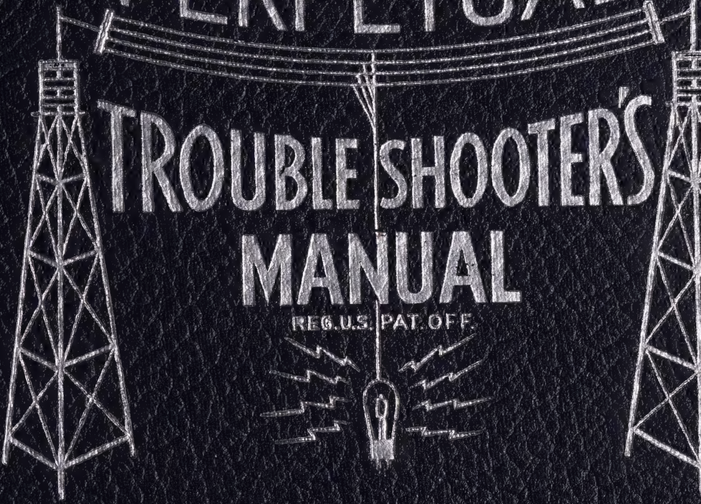
VOLUME XII

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG.U.S. PAT. OFF.



JOHN F. RIDER

ALLIED RADIO CORP.

MODELS B10525,B10526 B10765,B10766,B10767

STRUCTIONS FOR ADJUSTMENT AND RATION OF THE ELECTRIC TUNER

s very important to read the following instructions refully before attempting to adjust the electric ner. The electric tuner is made up of three integral its:

SH BUTTON SWITCH The push button switch consists of one (1) white tton (extreme left), and eight (8) brown buttons ose numerical sequence is reckoned from left to ht. The white button is provided for converting the from automatic electric push button tuning to nual knob tuning. The brown buttons are provided automatic electric tuning.

LECTOR MECHANISM The selector mechanism is made up of the selec- plate, eight (8) thumb screws, and the adjustment ht bulb.

CTRIC MOTOR The power for this tuner is provided by a small, cient electric motor, of the brushless variety. It is d with an automatic clutch and a silent gear train. e bearings and the oil retainer hold sufficient oil lubricate the motor for a lifetime.

e first step to take in adjusting the electric push tton device incorporated into this receiver is to oose eight (8) of the most powerful local stations, tions which are free from excess fading. Turn on receiver (broadcast band) and press in the white tton; tune in the station of the lowest frequency, ing the station selector knob. Now hold the white tton in and press in button number one (1), next to white button. (See Figure 1). Both buttons are now cked into place; a small pilot lamp located at the ar of the chassis will light up unless the thumb rew at the rear accidently happens to be correctly t. Loosen thumb screw number one (See Figure 2 order of thumb screws) enough to allow it to slide ely back and forth until the light goes out. Now hten the thumb screw; the adjustment for the first tion is now complete. Out of the station call letter eet supplied remove the proper station call block d insert into the window directly above button mber one (1). Now release button number one (1) pressing the white button in as far as it will go.

ith the white button still in, tune in the station of next highest frequency and holding the white tton, press in button number two (2). Both buttons now locked into place. Loosen thumb screw num- r two (see Figure 2) and slide back and forth until a int is reached at which the pilot lamp in the rear es out; tighten the thumb screw. Insert the proper ation call into the window of button number two (2).

llow this same procedure for the remaining sta- ns, always choosing the station with the next high- t frequency. After all eight (8) stations have been justed, check each adjustment by tuning in each ation. NOTE: In the window above the white but- n insert the word "OFF" found in the call letter eet.

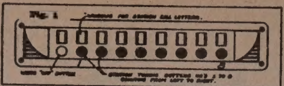


Fig. 1

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

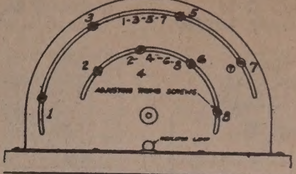
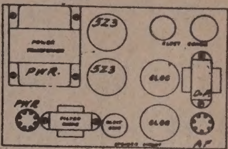


Fig. 2

POWER CHASSIS

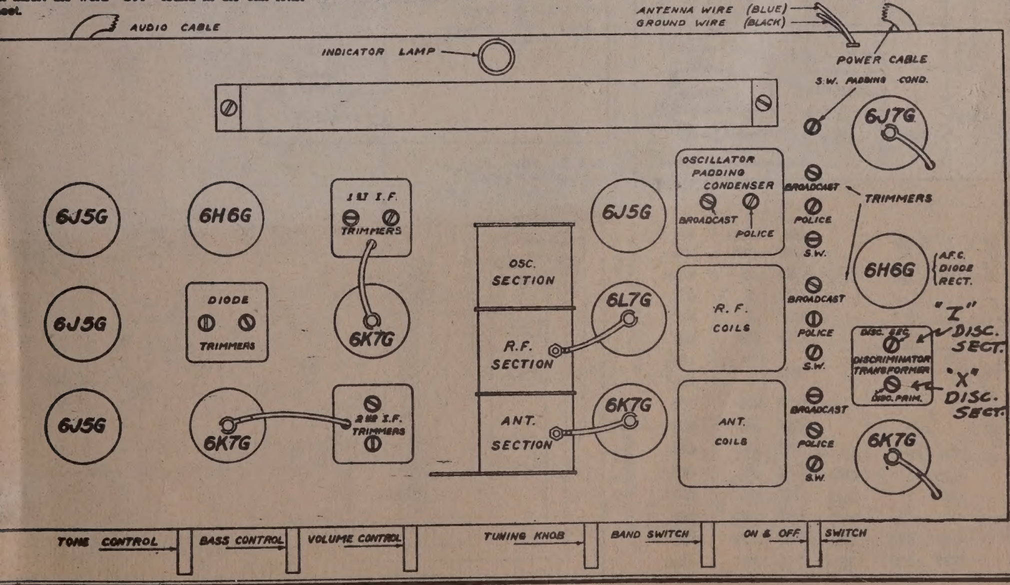


I.F. ALIGNMENT - Generator at 456 KC, connected to control grid of 6L7 thru .05 MFD condenser, align 1st, 2nd, and Diode transformer trimmers to peak. Connect a 0-200 microammeter between the ungrounded cathode of the 6H6 AFC diode rectifier, and ground. The Cathode indicated as point "A" in the schematic. Place a 100 MMFD condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the schematic. The condenser is used to detune the secondary circuit during the following primary adjustment : The primary is tuned by impressing an IF signal on the signal grid of the 6L7 and adjusting the trimmer marked "X" on the schematic and the chassis layout, to give a maximum meter indication. Signal strength should be approximately 100000 micro volts for the adjustment. With reduced signal strength repeat the adjustments of the entire I.F. system, for maximum sensitivity. The volume control should be on full for all adjustments. Without disturbing the generator or any of the other adjustments, the trimmer "Z" ("Disc. Sec.) should be adjusted as follows :Remove the 100 MMFD condenser from across the discriminator secondary, increase the generator signal to approximately 100,000 micro volts, with volume control turned down to limit audio output, slowly turn the trimmer "Z" until a sudden sharp drop in current occurs the meter will now probably read in reverse and off scale. Reverse trimmer adjustment bringing meter reading to zero. Used only a non-metallic screw driver. It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making the adjustments so that zero current setting is higher on the scale. After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed, and R.F. alignment may be accomplished.

BROADCAST BAND - Generator at 1730 KC, connected to the antenna thru a 200 MMFD condenser, variable condenser at minimum, peak oscillator trimmer. Generator at 1400 KC, tuning in signal, peak the RF and antenna trimmers. Generator at 600 KC, while rocking variable condenser, peak the oscillator padding condenser.

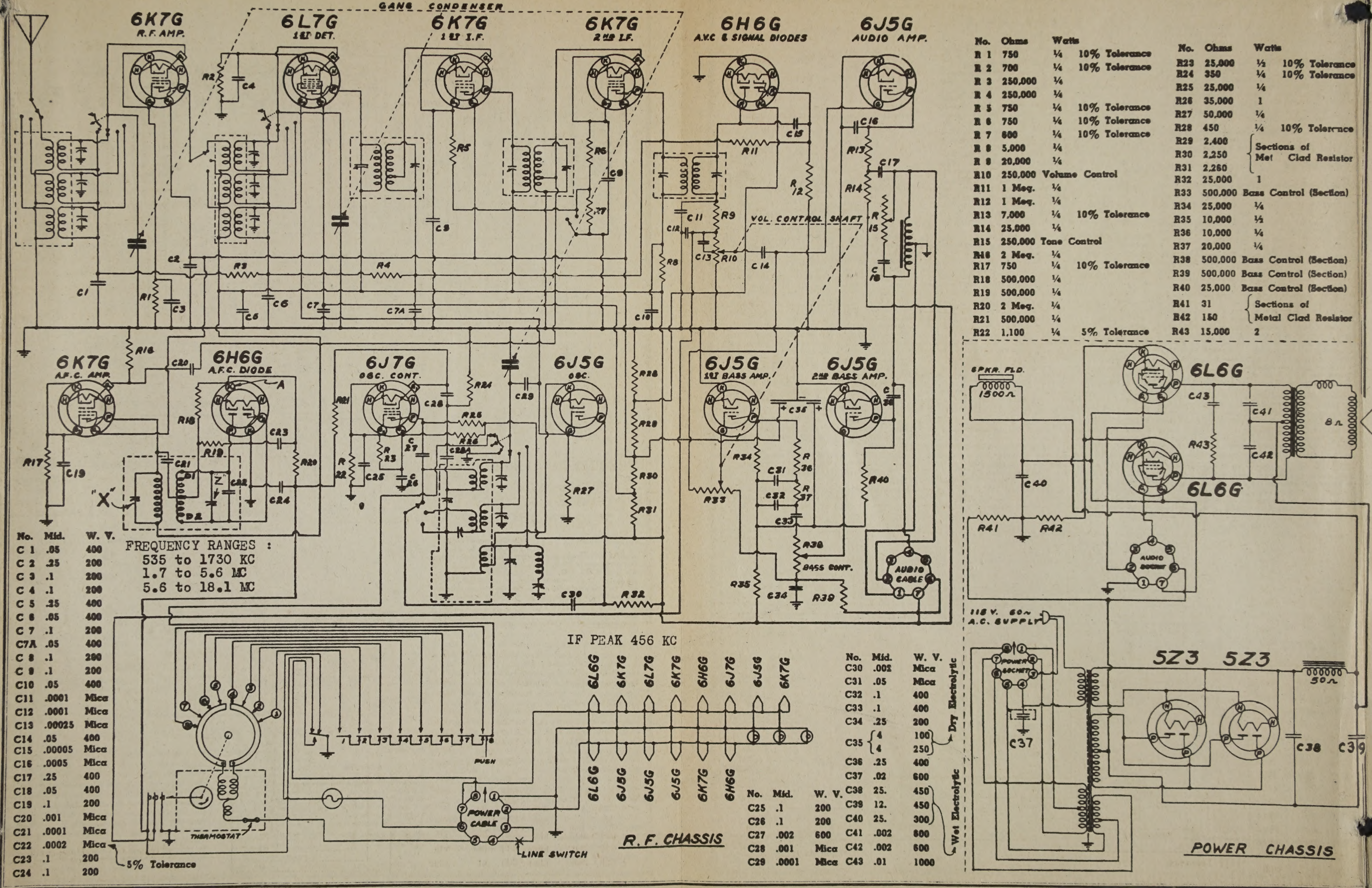
POLICE BAND - Generator at 5600 KC, connected to antenna thru 400 Ohm resistor, variable condenser at minimum, peak oscillator trimmer. Generator at 5000 KC, tune in signal, peak RF and antenna trimmers. Generator at 1800 KC, while rocking variable across signal, pad the oscillator circuit for maximum response.

SHORTWAVE BAND - Generator at 18100 KC, gang condenser at minimum, peak oscillator trimmer. Generator at 16000 KC, locate signal on receiver, peak RF and antenna trimmers. Generator at 6000 KC. while rocking variable across signal, peak SW padding condenser.



ALLIED RADIO CORP.

MODELS B10525,B10526,B10765,
B10766,B10767



FREQUENCY RANGES :
535 to 1730 KC
1.7 to 5.6 MC
5.6 to 18.1 MC

IF PEAK 456 KC

No.	Ohms	Watts	
R 1	750	¼	10% Tolerance
R 2	700	¼	10% Tolerance
R 3	250,000	¼	
R 4	250,000	¼	
R 5	750	¼	10% Tolerance
R 6	750	¼	10% Tolerance
R 7	600	¼	10% Tolerance
R 8	5,000	¼	
R 9	20,000	¼	
R10	250,000	Volume Control	
R11	1 Meg.	¼	
R12	1 Meg.	¼	
R13	7,000	¼	10% Tolerance
R14	25,000	¼	
R15	250,000	Tone Control	
R16	2 Meg.	¼	
R17	750	¼	10% Tolerance
R18	500,000	¼	
R19	500,000	¼	
R20	2 Meg.	¼	
R21	500,000	¼	
R22	1,100	¼	5% Tolerance

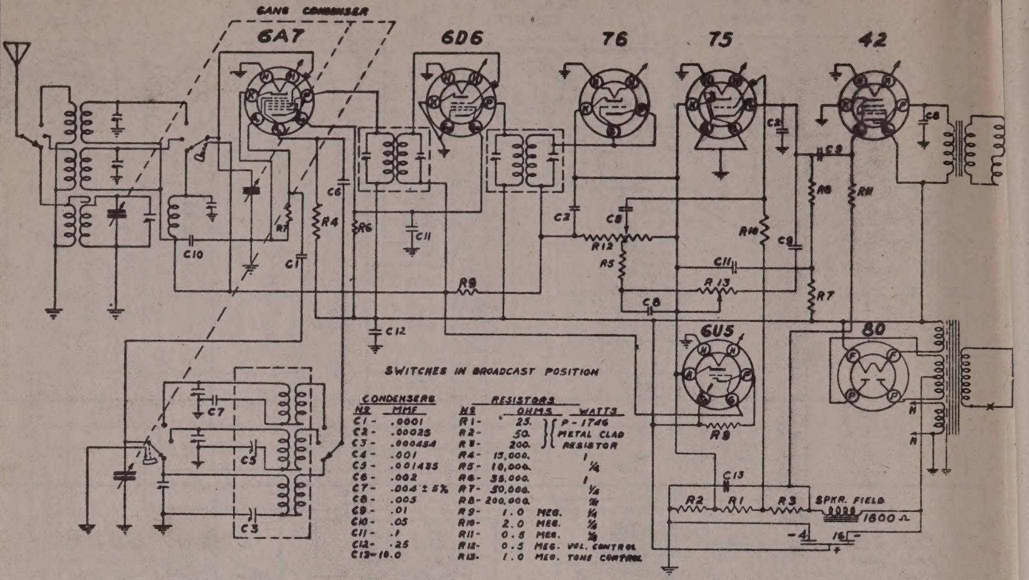
No.	Ohms	Watts	
R23	25,000	½	10% Tolerance
R24	350	¼	10% Tolerance
R25	25,000	¼	
R26	35,000	1	
R27	50,000	¼	
R28	450	¼	10% Tolerance
R29	2,400	Sections of Met Clad Resistor	
R30	2,250		
R31	2,260		
R32	25,000	1	
R33	500,000	Bass Control (Section)	
R34	25,000	¼	
R35	10,000	½	
R36	10,000	¼	
R37	20,000	¼	
R38	500,000	Bass Control (Section)	
R39	500,000	Bass Control (Section)	
R40	25,000	Bass Control (Section)	
R41	31	Sections of Metal Clad Resistor	
R42	150		
R43	15,000	2	

No.	Mfd.	W. V.	
C 1	.05	400	
C 2	.25	200	
C 3	.1	200	
C 4	.1	200	
C 5	.25	400	
C 6	.05	400	
C 7	.1	200	
C7A	.05	400	
C 8	.1	200	
C 9	.1	200	
C10	.05	400	
C11	.0001	Mica	
C12	.0001	Mica	
C13	.00025	Mica	
C14	.05	400	
C15	.00005	Mica	
C16	.0005	Mica	
C17	.25	400	
C18	.05	400	
C19	.1	200	
C20	.001	Mica	
C21	.0001	Mica	
C22	.0002	Mica	5% Tolerance
C23	.1	200	
C24	.1	200	

No.	Mfd.	W. V.
C25	.1	200
C26	.1	200
C27	.002	600
C28	.001	Mica
C29	.0001	Mica

No.	Mfd.	W. V.	
C30	.002	Mica	
C31	.05	Mica	
C32	.1	400	
C33	.1	400	
C34	.25	200	
C35	4 4	100 250	Dry Electrolytic
C36	.25	400	
C37	.02	600	
C38	25.	450	Wet Electrolytic
C39	12.	450	
C40	25.	300	
C41	.002	600	
C42	.002	600	
C43	.01	1000	

ALLIED RADIO CORP.



SWITCHES IN BROADCAST POSITION

CONDENSERS No.	MMF	RESISTORS No.	OHMS	WATTS
C1-	.0001	R1-	25.	P-1746 METAL CLAD RESISTOR
C2-	.00025	R2-	50.	
C3-	.000454	R3-	200.	
C4-	.001	R4-	15,000.	1
C5-	.001435	R5-	10,000.	¼
C6-	.002	R6-	35,000.	1
C7-	.004 ± 5%	R7-	50,000.	¼
C8-	.005	R8-	200,000.	½
C9-	.01	R9-	1.0 MEG.	¼
C10-	.05	R10-	2.0 MEG.	¼
C11-	.1	R11-	0.5 MEG.	½
C12-	.25	R12-	0.5 MEG. VOL. CONTROL	
C13-	10.0	R13-	1.0 MEG. TONE CONTROL	

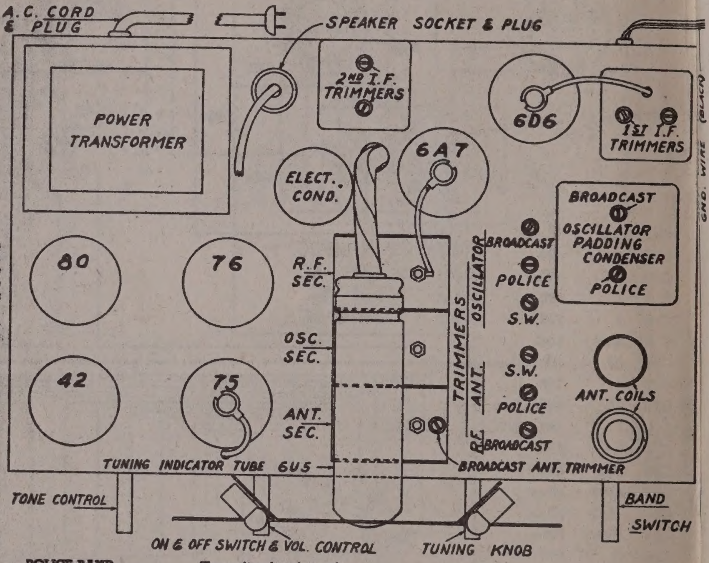
IF PEAKED AT 456 KC

FREQUENCY RANGE -

550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.



POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 K.C. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

FARNSWORTH TELEV. & RADIO CORP.

MODELS BK110, BK112 BK111

PUSH BUTTON SET UP

1. If the station you select for one of the buttons falls between 1500 to 1000 kilocycles be sure that the pin jack is in the upper strip.
2. Adjust the brass screw at the side of the lower trimmer until the wanted station is heard most clearly.
3. Adjust the lower trimmer screw for maximum volume.
4. Press Manual button making certain the station is still tuned in; check this reception against the reception on the button just set up. If it is the same proceed with the next station on the list.
5. If the station you desire to pick up falls between 1000 and 550 kilocycles, you must remove the pin jack and place in the hole provided at the bottom edge of the upper trimmer (see figure 1).
6. Turn the lower trimmer screw back until the screw is off the trimmer plates.
7. Adjust the brass screw until the wanted station is heard most clearly.
8. Then adjust the upper trimmer until maximum volume is secured; if maximum volume cannot be had and the upper trimmer screw is down tight you must finish tuning with the lower trimmer screw.

ALIGNMENT INSTRUCTIONS

An output meter and a signal generator are required for proper alignment of these sets. The oscillator should be calibrated at the following points, 455 Kc, 600 Kc, 900 Kc, 1400 Kc, 1600 Kc, 2.0 Mc. 5 Mc, 5.5 Mc, 6 Mc, 10 Mc, 16 Mc, and 18.0 Mc. Always keep the output of the signal generator as low as possible to prevent A.V.C. action and false settings. Connect the high side of the generator to the antenna terminal and the low side of it to the ground terminal making certain jumper on terminal strip is disconnected. Before aligning tighten wave trap trimmer screw.

TABULATION FOR ALIGNMENT

Steps	In Series With Antenna	Set Generator At	Set Gang At	Adjust	Located	To obtain
1.	SET VOLUME AND TONE CONTROLS AT MAXIMUM					
2.	250 mmfd.	455 Kc.	Note A	2nd I.F. Trimmers	Top of I.F. Trans.	Max. Output
3.				1st I.F. Trimmers		
4.				Wave Trap Trimmer	See Fig.	Min. Output
5.		1600 Kc.		Osc. B.C. Trimmer	See Fig.	MAXIMUM OUTPUT
6.		1400 Kc.	Note B	R.F. B.C. Trimmer Ant. B.C. Trimmer		
7.		600 Kc.		600 Kc. Pad.		
8.	Recheck 1400 Kc.					
9.	400 Ohms	5.5	Note A	Osc. Police Trimmer*		
10.		5 Mc.	Note B	R.F. Police Trimmer** Ant. Police Trimmer**		
11.		2 Mc.	Note B	2 Mc. Pad.		
12.	Recheck 5 Mc.					
13.	400 Ohms	18 Mc.	Note A	Osc. S.W. Trimmer*		
14.		16 Mc.	Note B	R. F. S.W. Trimmer** Ant. S.W. Trimmer**		
15.		6 Mc.	Note B	6 Mc. Pad.		
16.	Recheck 16 Mc.					

*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.
**Tighten R.F. Trimmer screw for maximum capacity, then unscrew until first peak is secured.

NOTE A. Set gang at minimum.
NOTE B. Strongest signal and rock gang.

WATTS	AT 117 VOLTS A.C.	106
VOLTAGE	A. C.	105-125

TUBE COMPLEMENT

6SK7 R. F. AMPLIFIER
6SA7 CONVERTER
6J5 OSCILLATOR
6SK7 I. F. AMPLIFIER
6Q7 DET A.V.C. 1ST AUDIO
6SC7 PHASE INVERTER
6SC7 DUO DRIVER
2 - 6V6 OUTPUT
2 - 5Y3G RECTIFIERS

MODELS	CHASSIS
BK-110	C-32
BK-111	C-73
BK-112	C-32

ALLIED RADIO CORP.

MODELS B10525,B10526 B10765,B10766,B10767

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner. The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH The push button switch consists of one (1) white button (extreme left), and eight (8) brown buttons whose numerical sequence is reckoned from left to right. The white button is provided for converting the set from automatic electric push button tuning to manual knob tuning. The brown buttons are provided for automatic electric tuning.

SELECTOR MECHANISM The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

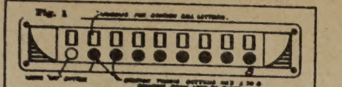
ELECTRIC MOTOR The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the white button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the white button in and press in button number one (1), next to the white button. (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call block and insert into the window directly above button number one (1). Now release button number one (1) by pressing the white button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two (2). Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call into the window of button number two (2).

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. NOTE: In the window above the white button insert the word "OFF" found in the call letter sheet.

Fig. 1



HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

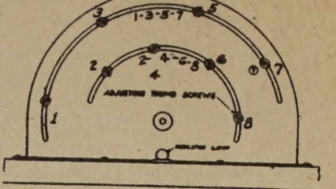
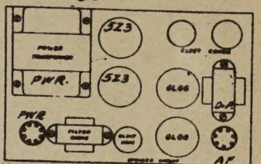


Fig. 2

POWER CHASSIS

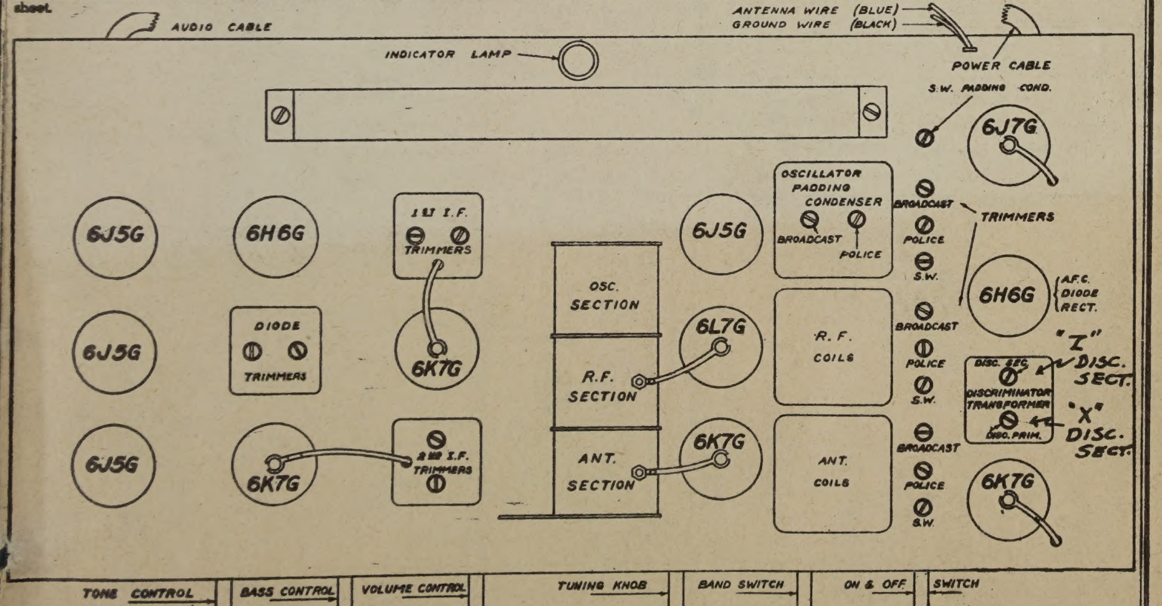


I.F. ALIGNMENT - Generator at 456 KC, connected to control grid of 6L7 thru .05 MFD condenser, align 1st, 2nd, and Diode transformer trimmers to peak. Connect a 0-200 microammeter between the ungrounded cathode of the 6H6 AFC diode rectifier, and ground. The Cathode indicated as point "A" in the schematic. Place a 100 MMFD condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the schematic. The condenser is used to detune the secondary circuit during the following primary adjustment : The primary is tuned by impressing an IF signal on the signal grid of the 6L7 and adjusting the trimmer marked "X" on the schematic and the chassis layout, to give a maximum meter indication. Signal strength should be approximately 100000 micro volts for the adjustment. With reduced signal strength repeat the adjustments of the entire I.F. system, for maximum sensitivity. The volume control should be on full for all adjustments. Without disturbing the generator or any of the other adjustments, the trimmer "Z" ("Disc. Sec.) should be adjusted as follows :Remove the 100 MMFD condenser from across the discriminator secondary, increase the generator signal to approximately 100,000 micro volts, with volume control turned down to limit audio output, slowly turn the trimmer "Z" until a sudden sharp drop in current occurs the meter will now probably read in reverse and off scale. Reverse trimmer adjustment bringing meter reading to zero. Used only a non-metallic screw driver. It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making the adjustments so that zero current setting is higher on the scale. After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed, and R.F. alignment may be accomplished.

BROADCAST BAND - Generator at 1730 KC, connected to the antenna thru a 200 MMFD condenser, variable condenser at minimum, peak oscillator trimmer. Generator at 1400 KC, tuning in signal, peak the RF and antenna trimmers. Generator at 600 KC, while rocking variable condenser, peak the oscillator padding condenser.

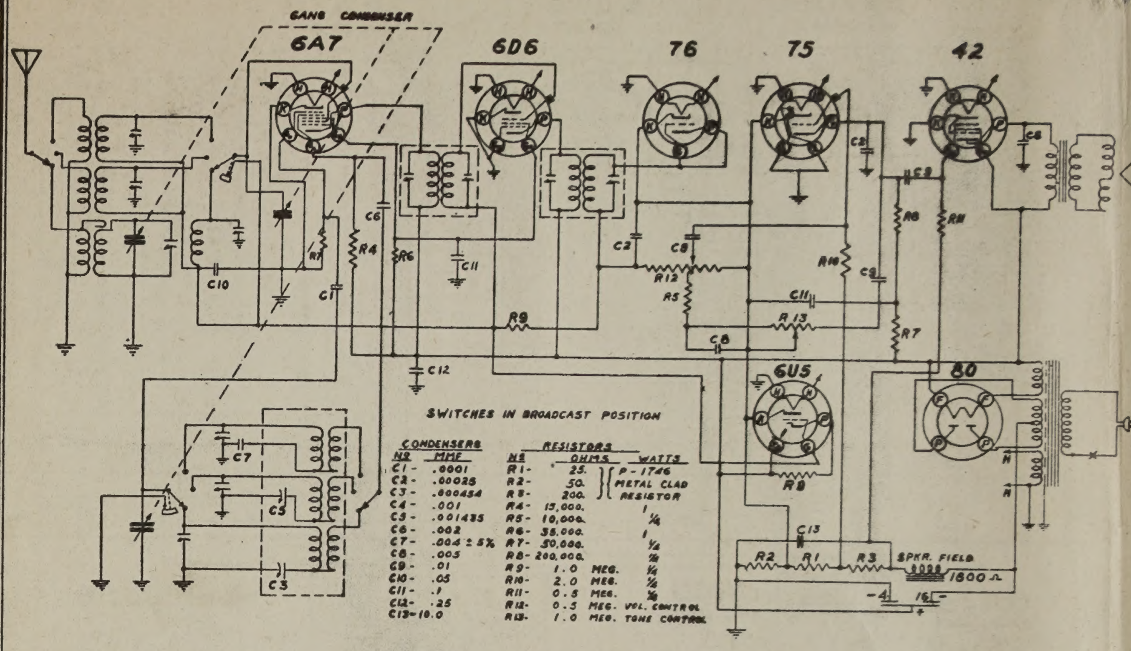
POLICE BAND - Generator at 5600 KC, connected to antenna thru 400 Ohm resistor, variable condenser at minimum, peak oscillator trimmer. Generator at 5000 KC, tune in signal, peak RF and antenna trimmers. Generator at 1800 KC, while rocking variable across signal, pad the oscillator circuit for maximum response.

SHORTWAVE BAND - Generator at 18100 KC, gang condenser at minimum, peak oscillator trimmer. Generator at 16000 KC, locate signal on receiver, peak RF and antenna trimmers. Generator at 6000 KC. while rocking variable across signal, peak SW padding condenser.



MODEL B10535

ALLIED RADIO CORP.



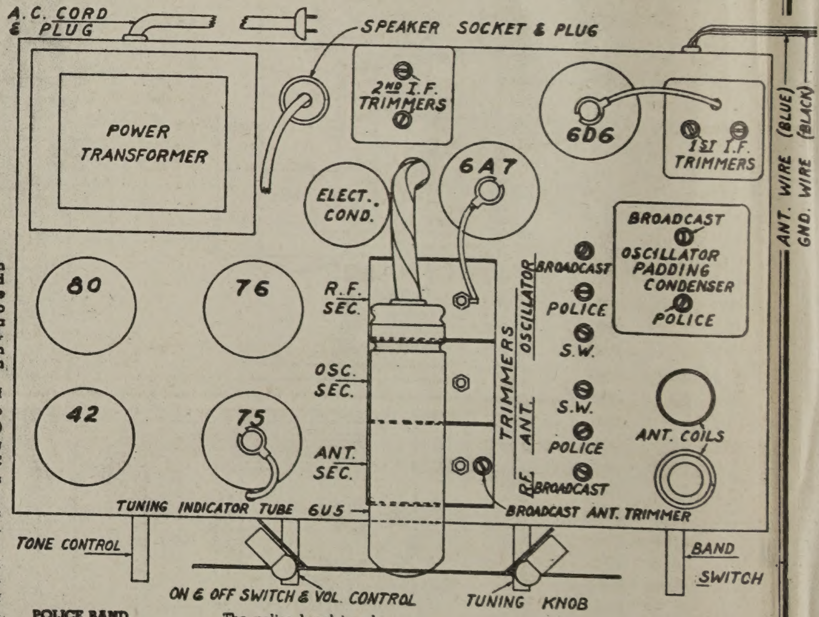
SWITCHES IN BROADCAST POSITION

CONDENSERS No	MMF	RESISTORS No	OHMS	WATTS
C1-	.0001	R1-	25.	P-1746 METAL CLAD RESISTOR
C2-	.00025	R2-	50.	
C3-	.000454	R3-	200.	
C4-	.001	R4-	13,000.	1
C5-	.001435	R5-	10,000.	¼
C6-	.002	R6-	35,000.	1
C7-	.004 ± 5%	R7-	50,000.	½
C8-	.005	R8-	200,000.	½
C9-	.01	R9-	1.0 MEG.	¼
C10-	.05	R10-	2.0 MEG.	½
C11-	.1	R11-	0.5 MEG.	½
C12-	.25	R12-	0.5 MEG. VOL. CONTROL	
C13-	10.0	R13-	1.0 MEG. TONE CONTROL	

IF PEAKED
AT 456 KC

FREQUENCY RANGE -

550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC



I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 K.C. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

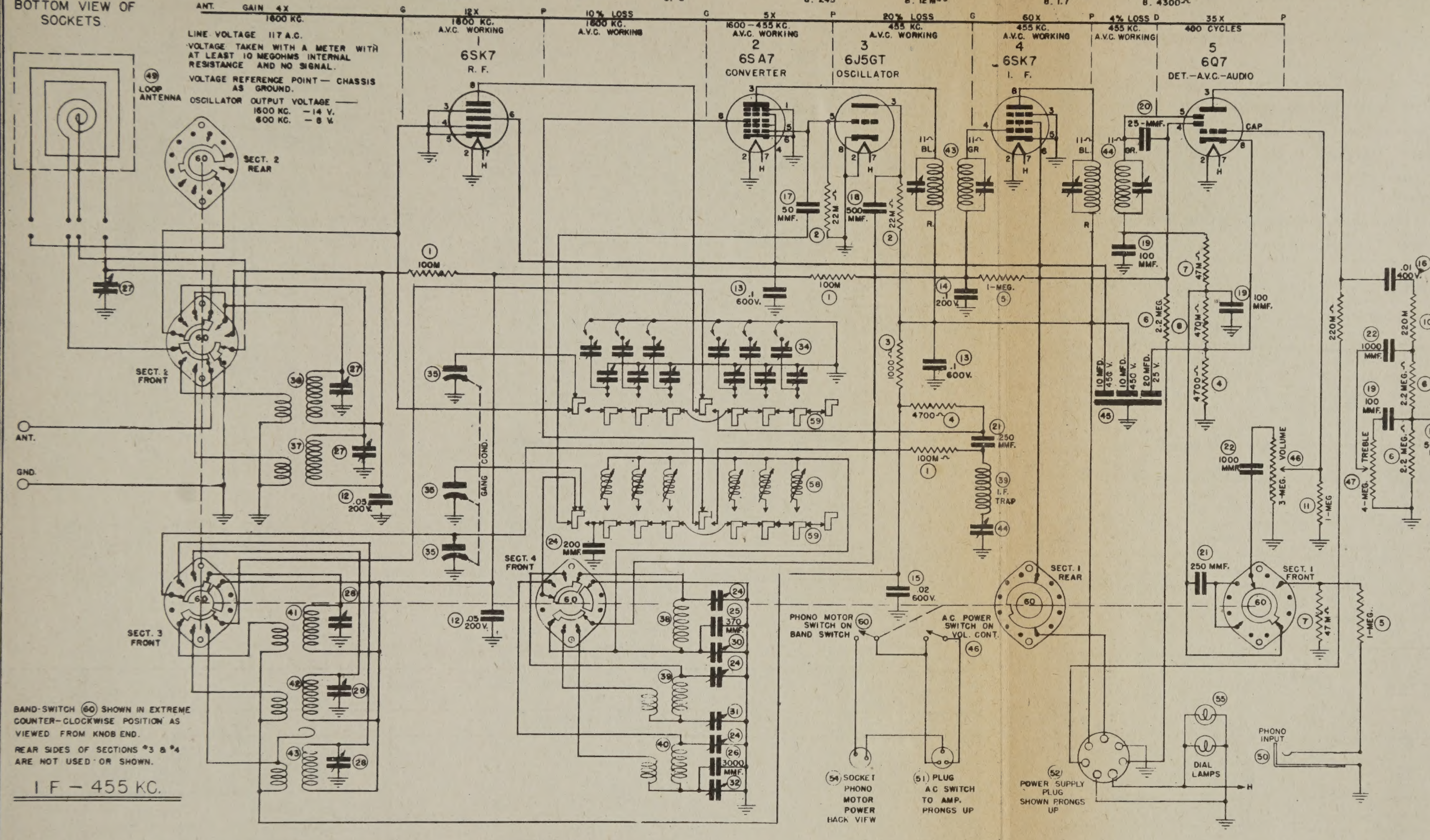
SHORT WAVE BAND ALIGNMENT The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

FARNSWORTH TELEV. & RADIO CORP.

BOTTOM VIEW OF SOCKETS

Pin	1 Voltage	1 Resistance	2 Voltage	2 Resistance	3 Voltage	3 Resistance	4 Voltage	4 Resistance	5 Voltage	5 Resistance
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	232	12M Ω	117	35 M Ω	0	0	140	270M Ω
4	-2.3	3.4 MEG.	85	6000 Ω	-14.2	20M Ω	-2.3	3.2 MEG.	-2.5	2.2 MEG.
5	0	0	-14.2	20M Ω	-14.2	22M Ω	0	0	1.5	520M Ω
6	85	6000 Ω	0	0	232	12 M Ω	85	6500 Ω	140	270M Ω
7	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω
8	232	13M Ω	-2.3	3.4 MEG. Ω	0	0	245	12 M Ω	1.7	4300 Ω

BROADCAST BAND	540 - 1600 K.C.
SPECIAL SERVICE BAND	1.6 - 5.4 Mc.
SHORT WAVE BAND	5.4 - 18


ANT. GAIN 4X 1600 KC.
G 12X 1600 KC. A.V.C. WORKING
P 10% LOSS 1600 KC. A.V.C. WORKING
G 5X 1600 - 455 KC. A.V.C. WORKING
P 20% LOSS 455 KC. A.V.C. WORKING
G 60X 455 KC. A.V.C. WORKING
P 4% LOSS 455 KC. A.V.C. WORKING
D 35X 400 CYCLES
1 6SK7 R. F.
2 6SA7 CONVERTER
3 6J5GT OSCILLATOR
4 6SK7 I. F.
5 6Q7 DET.-A.V.C.-AUDIO
(49) LOOP ANTENNA
SECT. 2 REAR
SECT. 1 FRONT
SECT. 3 FRONT
SECT. 4 FRONT
SECT. 1 REAR
ANT.
GND.
GANG COND.
PHONO MOTOR SWITCH ON BAND SWITCH (60)
A.C. POWER SWITCH ON VOL. CONT. (46)
(54) SOCKET PHONO MOTOR POWER BACK VIEW
(51) PLUG A.C. SWITCH TO AMP. PRONGS UP
(52) POWER SUPPLY PLUG SHOWN PRONGS UP
DIAL LAMPS (55)
PHONO INPUT (50)
(53) INPUT TO AMPLIFIER
I.F. TRAP (39)
VOLUME (46)
TREBLE (47)
BASS (48)
CAP

LINE VOLTAGE 117 A.C.

VOLTAGE TAKEN WITH A METER WITH AT LEAST 10 MEGOHMS INTERNAL RESISTANCE AND NO SIGNAL.

VOLTAGE REFERENCE POINT — CHASSIS AS GROUND.

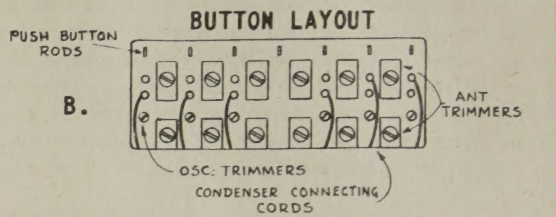
OSCILLATOR OUTPUT VOLTAGE —
1600 KC. -14 V.
600 KC. -8 V.

BAND-SWITCH (60) SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION AS VIEWED FROM KNOB END.

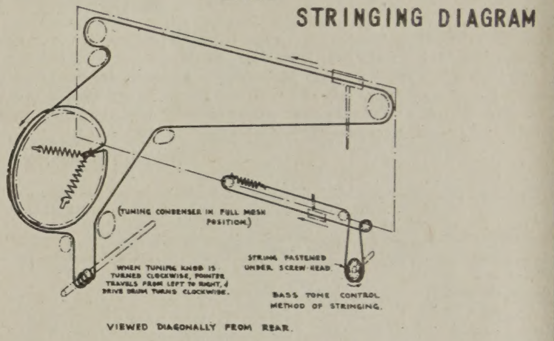
REAR SIDES OF SECTIONS #3 & #4 ARE NOT USED OR SHOWN.

I F — 455 KC.

BUTTON LAYOUT

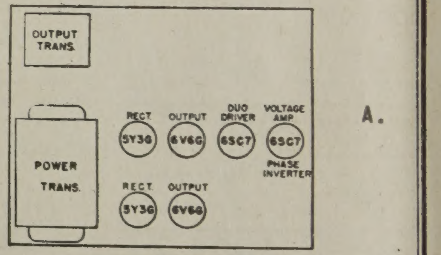


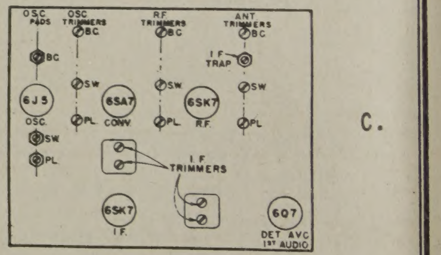
STRINGING DIAGRAM

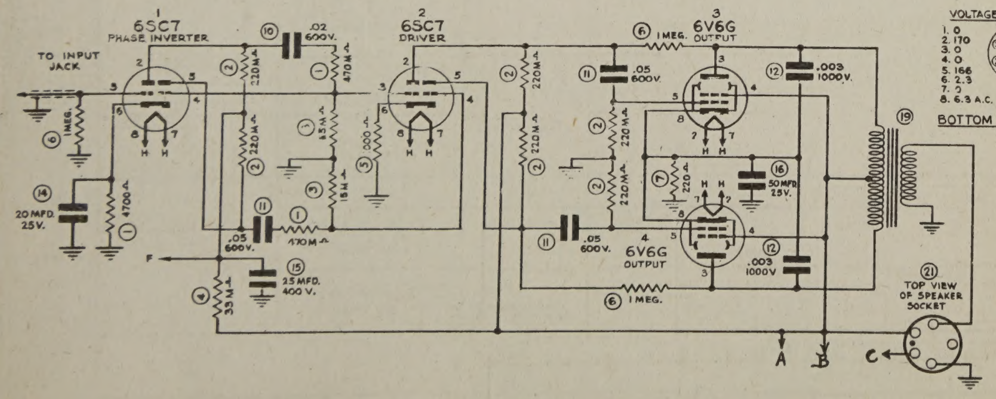

(TUNING CONDENSER IN FULL MESH POSITION)
WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER TRAVELS FROM LEFT TO RIGHT, & DRIVE DRUM TURNS CLOCKWISE.
STRING FASTENED UNDER SCREW-HEAD
BASS TONE CONTROL METHOD OF STRINGING.

VIEWED DIAGONALLY FROM REAR.

CHASSIS LAYOUT

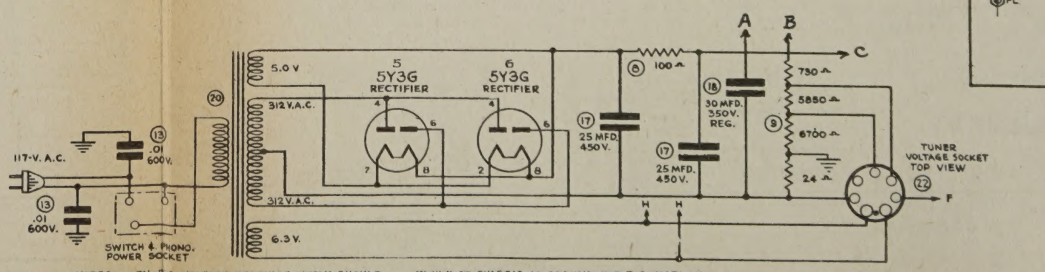






Pin	1 Voltage	1 Resistance	2 Voltage	2 Resistance	3 Voltage	3 Resistance	4 Voltage	4 Resistance	5 Voltage	5 Resistance	6 Voltage	6 Resistance
1	0	0	0	[illegible]	0	0	0	0	0	0	0	0
2	170	350M Ω	130	220M Ω	0	.2 Ω	[illegible]	2 Ω	333	14M Ω	333	14M Ω
3	0	15 M Ω	0	15M Ω	239	14M Ω	230	14 M Ω	OPEN	OPEN	OPEN	OPEN
4	0	500M Ω	0	15M Ω	250	14M Ω	250	14M Ω	312 A.C.	80 Ω	312 A.C.	80 Ω
5	166	350M Ω	130	220M Ω	0	0	0	0	0	0	0	0
6	2.3	4700 Ω	1.4	1000 Ω	OPEN	OPEN	OPEN	OPEN	312 A.C.	80 Ω	312 A.C.	80 Ω
7	0	.2 Ω	0	.2 Ω	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω	OPEN	OPEN	OPEN	OPEN
8	6.3 A.C.	.2 Ω	6.3 A.C.	.2 Ω	14	220 Ω	14	220 Ω	333	14M Ω	333	14M Ω

BOTTOM VIEW OF SOCKETS.

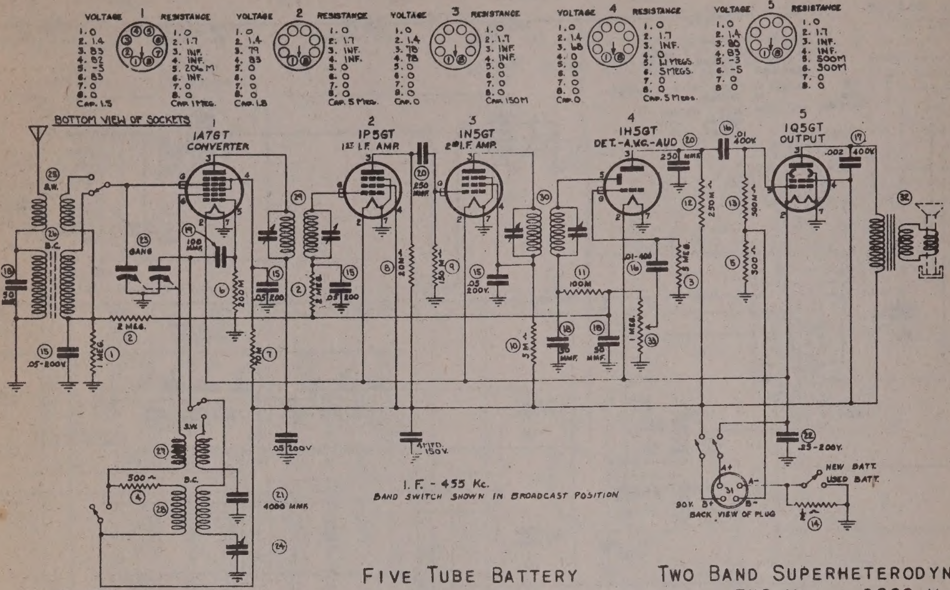


NOTES:- ON D.C. VOLTAGE READINGS METER SHOULD HAVE AT LEAST 10 MEGOHMS INTERNAL RESISTANCE.

REFER TO CHASSIS AS GROUND FOR D.C. VOLTAGE.
LINE VOLTAGE — 117 A.C.

MODEL BT57

FARNSWORTH TELEV. & RADIO CORP


VOLTAGE 1 RESISTANCE
1.0 2. 1.4 3. 83 4. 82 5. -5 6. 83 7. 0 8. 0 CAP. 1.5
1. 0 2. 1.7 3. INF. 4. INF. 5. 206 M 6. INF. 7. 0 8. 0 CAP. 1 MEG.
VOLTAGE 2 RESISTANCE
1. 0 2. 1.4 3. 79 4. 83 5. 0 6. 0 7. 0 8. 0 CAP. 1.8
1. 0 2. 1.7 3. INF. 4. INF. 5. 0 6. 0 7. 0 8. 0 CAP. 5 MEG.
VOLTAGE 3 RESISTANCE
1. 0 2. 1.4 3. 78 4. 78 5. 0 6. 0 7. 0 8. 0 CAP. 0
1. 0 2. 1.7 3. INF. 4. INF. 5. 0 6. 0 7. 0 8. 0 CAP. 150M
VOLTAGE 4 RESISTANCE
1. 0 2. 1.4 3. 68 4. 0 5. 0 6. 0 7. 0 8. 0 CAP. 0
1. 0 2. 1.7 3. INF. 4. 0 5. 11 MEGS. 6. 5 MEGS. 7. 0 8. 0 CAP. 5 MEGS.
VOLTAGE 5 RESISTANCE
1. 0 2. 1.4 3. 80 4. 83 5. -3 6. -5 7. 0 8 0
1. 0 2. 1.7 3. INF. 4. INF. 5. 500M 6. 300M 7. 0 8. 0
BOTTOM VIEW OF SOCKETS
1 1A7GT CONVERTER
2 1P5GT 1ST I.F. AMP.
3 1N5GT 2ND I.F. AMP.
4 1H5GT DET.-A.V.C.-AUD
5 1Q5GT OUTPUT
S.W.
B.C.
GANG
2 MEG.
.05-200V.
100 MMF.
250 MMF.
.05 200
.05 200V.
4 MEG.
100M
1 MEG.
.01 400K
250 MMF
.002 400K
3 MEG.
500 K
500 ~
4000 MMF.
.05 200V
4 MFD. 150V.
.25-200V.
NEW BATT.
USED BATT.
A+
A-
90V. B+
B-
31
BACK VIEW OF PLUG

I. F. - 455 Kc.
BAND SWITCH SHOWN IN BROADCAST POSITION

I.F. - 455 Kc.
Refer To Chassis As Ground For Voltage Reading. All Readings. Should Be Taken With Meter Having At Least 10 Megohms Internal Resistance. Readings To Be Taken With No Signal.

FIVE TUBE BATTERY
BROADCAST BAND
SHORTWAVE BAND

TWO BAND SUPERHETERODYNE
540 Kc. - 1600 Kc.
6 Mc. - 18.3 Mc.

TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	SET VOLUME CONTROL AT MAXIMUM					
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.	
4.		1600 Kc.		B.C.R.F. TRIMMER	RIGHT FRONT OF CHASSIS	
5.		1500 Kc.	NOTE B	B.C.R.F. TRIMMER		
6.		600 Kc.		B.C.	SIDE OF CHASSIS	
7.	RECHECK 1600 Kc.				LEFT FRONT OF CHASSIS	
8.	400 OHMS	18.1 Mc.	NOTE A	S.W. OSC. TRIMMER		
9.		16 Mc.	NOTE B	S.W.R.F. TRIMMER		
10.	CHECK SIGNAL AT 6 Mc. AND 10 Mc.					

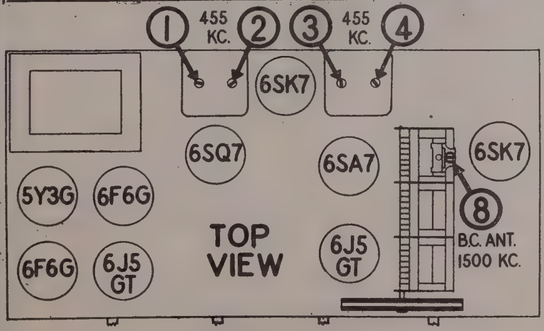
NOTE A. Set Gang at Minimum.
NOTE B. Strongest Signal and Rock Gang.

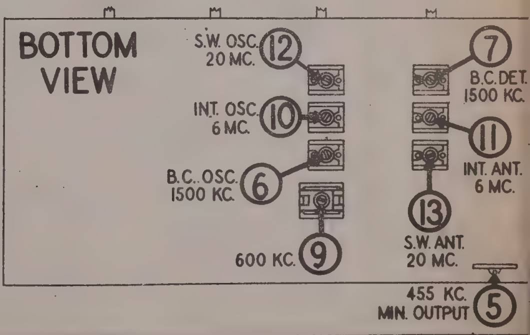
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or across the plates of the 6F6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. Push in the "Selectivity" button and keep it pushed in. Check the pointer to see that it is correctly set.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2 3-4	2nd I.F. 1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
400 OHM Carbon Resistor	"A" Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output, Using a Strong Generator Signal.
400 OHM Carbon Resistor	"A" Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	7 8	Broadcast Detector Broadcast Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	6 MC	10	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	Tune to 6 MC Generator Signal	11	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	20 MC	12	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 19.1 MC. If image does not appear, Realign at 20MC, with Trimmer Screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	Tune to 20 MC Generator Signal	13	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.





FARNSWORTH TELEV. & RADIO CORP.

MODELS BK110, BK112 BK111

PUSH BUTTON SET UP

1. If the station you select for one of the buttons falls between 1500 to 1000 kilocycles be sure that the pin jack is in the upper strip.
2. Adjust the brass screw at the side of the lower trimmer until the wanted station is heard most clearly.
3. Adjust the lower trimmer screw for maximum volume.
4. Press Manual button making certain the station is still tuned in; check this reception against the reception on the button just set up. If it is the same proceed with the next station on the list.
5. If the station you desire to pick up falls between 1000 and 550 kilocycles, you must remove the pin jack and place in the hole provided at the bottom edge of the upper trimmer (see figure 1).
6. Turn the lower trimmer screw back until the screw is off the trimmer plates.
7. Adjust the brass screw until the wanted station is heard most clearly.
8. Then adjust the upper trimmer until maximum volume is secured; if maximum volume cannot be had and the upper trimmer screw is down tight you must finish tuning with the lower trimmer screw.

ALIGNMENT INSTRUCTIONS

An output meter and a signal generator are required for proper alignment of these sets. The oscillator should be calibrated at the following points, 455 Kc, 600 Kc, 900 Kc, 1400 Kc, 1600 Kc, 2.0 Mc. 5 Mc, 5.5 Mc, 6 Mc, 10 Mc, 16 Mc, and 18.0 Mc. Always keep the output of the signal generator as low as possible to prevent A.V.C. action and false settings. Connect the high side of the generator to the antenna terminal and the low side of it to the ground terminal making certain jumper on terminal strip is disconnected. Before aligning tighten wave trap trimmer screw.

TABULATION FOR ALIGNMENT

Steps	In Series With Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1.	SET VOLUME AND TONE CONTROLS AT MAXIMUM					
2.	250 mmfd.	455 Kc.	Note A	2nd I.F. Trimmers	Top of I.F. Trans.	Max. Output
3.				1st I.F. Trimmers		
4.				Wave Trap Trimmer	See Fig.	Min. Output
5.		1600 Kc.		Osc. B.C. Trimmer	See Fig.	MAXIMUM OUTPUT
6.		1400 Kc.	Note B	R.F. B.C. Trimmer Ant. B.C. Trimmer		
7.		600 Kc.		600 Kc. Pad.		
8.	Recheck 1400 Kc.					
9.	400 Ohms	5.5	Note A	Osc. Police Trimmer*		
10.		5 Mc.	Note B	R.F. Police Trimmer** Ant. Police Trimmer**		
11.		2 Mc.	Note B	2 Mc. Pad.		
12.	Recheck 5 Mc.					
13.	400 Ohms	18 Mc.	Note A	Osc. S.W. Trimmer*		
14.		16 Mc.	Note B	R. F.S.W. Trimmer** Ant. S.W. Trimmer**		
15.		6 Mc.	Note B	6 Mc. Pad.		
16.	Recheck 16 Mc.					

*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.
**Tighten R.F. Trimmer screw for maximum capacity, then unscrew until first peak is secured.

NOTE A. Set gang at minimum.
NOTE B. Strongest Signal and rock gang.

WATTS	AT 117 VOLTS A.C.	106
VOLTAGE	A. C.	105-125

TUBE COMPLEMENT

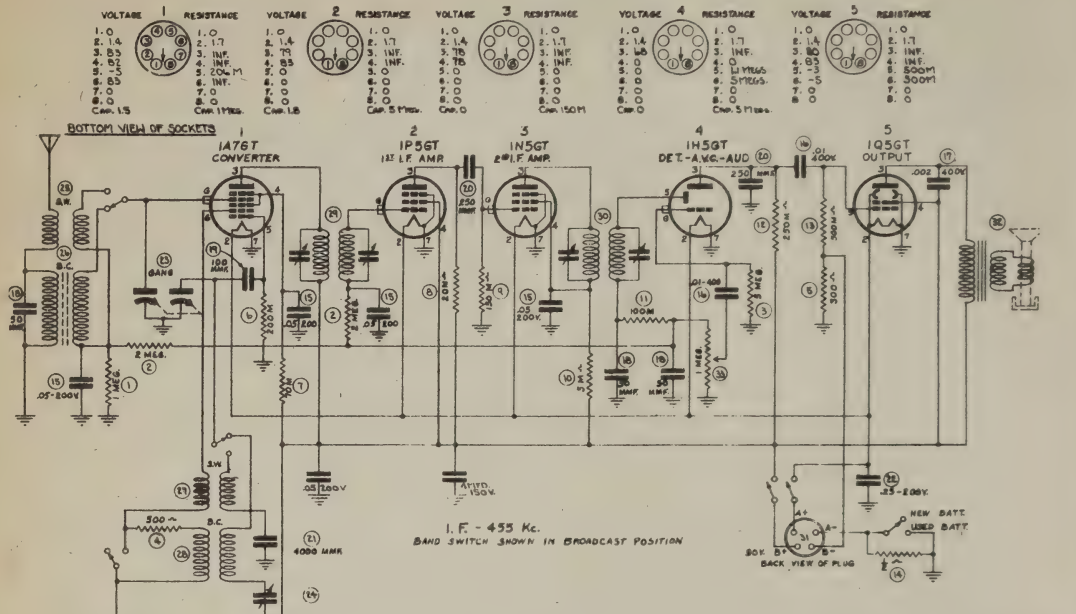
6SK7 R. F. AMPLIFIER
6SA7 CONVERTER
6J5 OSCILLATOR
6SK7 I. F. AMPLIFIER
6Q7 DET A.V.C. 1ST AUDIO

6SC7 PHASE INVERTER
6SC7 DUO DRIVER
2 - 6V6 OUTPUT
2 - 5Y3G RECTIFIERS

MODELS	CHASSIS
BK-110	C-32
BK-111	C-73
BK-112	C-32

MODEL BT57

FARNSWORTH TELEV. & RADIO CORP.



I.F. - 455 Kc.
Refer To Chassis As Ground For Voltage Readings. All Readings Should Be Taken With Meter Having At Least 10 Megohms Internal Resistance. Readings To Be Taken With No Signal

FIVE TUBE BATTERY
BROADCAST BAND
SHORTWAVE BAND

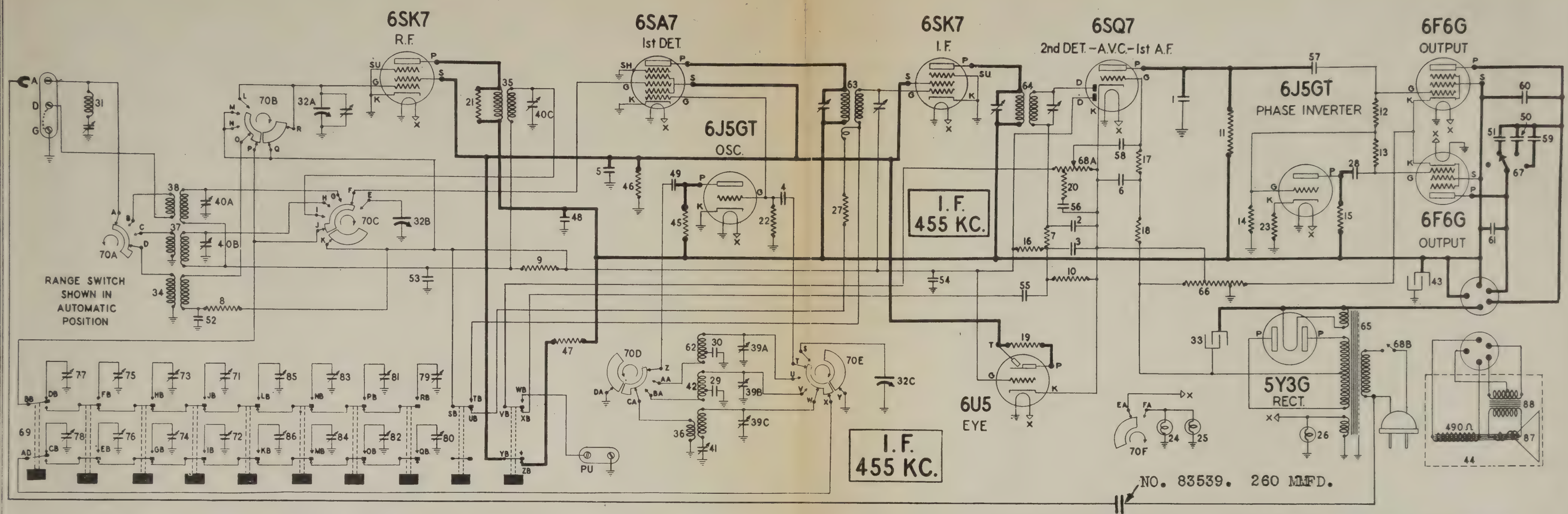
TWO BAND SUPERHETERODYNE
540 Kc. - 1600 Kc.
6 Mc. - 18.3 Mc.

TABULATION FOR ALIGNMENT

Steps	Use in Series with Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1.	SET VOLUME CONTROL AT MAXIMUM					
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.	
4.		1600 Kc.		B.C.R.F. TRIMMER	RIGHT FRONT OF CHASSIS	
5.		1500 Kc.	NOTE B	B.C.R.F. TRIMMER		
6.		600 Kc.		B.C.	SIDE OF CHASSIS	
7.	RECHECK 1600 Kc.				LEFT FRONT OF CHASSIS	
8.	400 OHMS	18.1 Mc.	NOTE A	S.W. OSC. TRIMMER		
9.		16 Mc.	NOTE B	S.W.R.F. TRIMMER		
10.	CHECK SIGNAL AT 6 Mc. AND 10 Mc.					

NOTE A. Set Gang at Minimum.
NOTE B. Strongest Signal and Rock Gang.

FIRESTONE TIRE & RUBBER CO.



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2-3	83783	Condenser—mica, 110 mmfd.	.20
4	85061	Condenser—mica, 51 mmfd.	.15
5	88682	Condenser—paper .1 mfd., 400 volt	.25
6	89421	Condenser—paper, .1 mfd., 200 volt	.25
7	110552	Resistor—carbon, 47,000 ohms, ¼ watt	.12
8-9-10-11-12-13-14-15	110553	Resistor—carbon, 220,000 ohms, ¼ watt	.12
16-17-18-19	110554	Resistor—carbon, 1 megohm, ¼ watt	.12
20	110565	Resistor—carbon, 22,000 ohms, ¼ watt	.12
21	110573	Resistor—carbon, 2,200 ohms, ¼ watt	.12
22	110578	Resistor—carbon, 68,000 ohms, ¼ watt	.12
23	110586	Resistor—carbon, 2,200 ohms, ¼ watt	.12
24-25-26	110629	Lamp—6.3 volt—.25 amps	.15
27	110975	Resistor—33 ohms, ½ watt (10%), W.W.	.12
28	111252	Condenser—paper, .05 mfd., 400 volt	.13
29	112426	Condenser—mica, 1650 mmfd. (3%)	.30
30	112427	Condenser—mica, 4050 mmfd. (3%)	.40
31	112796	Coil—wave trap (with trimmer)	.50
32A-32B-32C	113216	Condenser—Gang	6.50
33	113261	Condenser—electrolytic, 30 mfd., 450 volt	1.40
34	113295	Coil—antenna (B.C.)	1.20
35	113296	Coil—R.F. (B.C.)	1.30
36	113297	Coil—oscillator (B.C.)	.48
37	113298	Coil—antenna (police)	.50
38	113301	Coil—antenna (S.W.)	.52
39A-39B-39C	113319	Condenser—trimmer—3 section	.54
40A-40B-40C	113320	Condenser—trimmer—3 section	$0.54
41	113346	Condenser—padding	.38
42	113412	Coil—oscillator (police)	1.20
43	114972	Condenser—electrolytic, 16 mfd., 450 volt	.78
44	R-115070	Speaker—dynamic, 12"	10.50
45	116055	Resistor—carbon, 22,000 ohm, ½ watt	.12
46	116085	Resistor—10,000 ohms, 2 watt	.20
47	116093	Resistor—10,000 ohms, 5 watt	.38
48	116625	Condenser—.1 mfd., 600 volt	.25
49-50	116640	Condenser—.01 mfd., 600 volt	.15
51	116647	Condenser—.004 mfd., 600 volt	.15
52-53-54	116819	Condenser—.05 mfd., 600 volt	.15
55-56-57-58	116893	Condenser—.02 mfd., 600 volt	.15
59	116984	Condenser—.04 mfd., 600 volt	.20
60-61	117022	Condenser 0.002 mfd.—600 volt	.15
62	113607	Coil—short wave oscillator	.52
63	117616	Transformer—1st I.F.	1.50
64	117618	Transformer—2nd I.F.	1.50
65	117633	Transformer—power	9.00
66	117669	Resistor—bias strip	.52
67	117677	Switch—tone control	.80
68A-68B	117685	Volume control (400,000 ohms) with switch	1.00
69	117686	Push button switch	3.90
70A to 70F	117692	Range switch	5.00
71 to 78	117726	Condenser—trimmer gang (high frequency section)	3.90
79 to 86	117727	Condenser—trimmer gang (low frequency section)	3.90
87	R-117789	Cone & Voice Coil for R-115070 speaker	3.00
88	R-117790	Output transformer for R-115070	1.95

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES—ALL D.C. VOLTAGES MEASURED TO CHASSIS

ANTENNA GROUNDED **DIAL TUNED TO 540 K.C.**

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.0 A.C.	0	Note A		95	0	285		
6SA7	1st Det.	6.0 A.C.	0	Note A	—8	95		285		
6J5GT	Oscillator	6.0 A.C.	0	—8				104		
6SK7	I.F.	6.0 A.C.	0	Note A		95	0	285		
6SQ7	2nd Det., A.V.C., A.F.	6.0 A.C.	—3	Note B				175	Note A	Note A
6J5GT	Phase Inverter	6.0 A.C.	2	0				41		
6F6G	Output	6.0 A.C.	20	0		285		270		
6F6G	Output	6.0 A.C.	20	0		285		270		
6U5	Tuning Eye	6.0 A.C.	—3	Note* A		T=95 Volts*				
5Y3G	Rectifier	5.0 A.C.				Plates 375 V. A.C.				

NOTE A: Due to the high resistance of resistors No. 16, No. 7, No. 8, and No. 9, only very slight deflections of the voltmeter will be obtained.

NOTE B: Voltage is —5 volts measured at resistor No. 66.

*Voltages measured at end of tuning eye cable.

Use a high resistance voltmeter of at least 1000 ohms per volt.

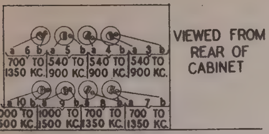
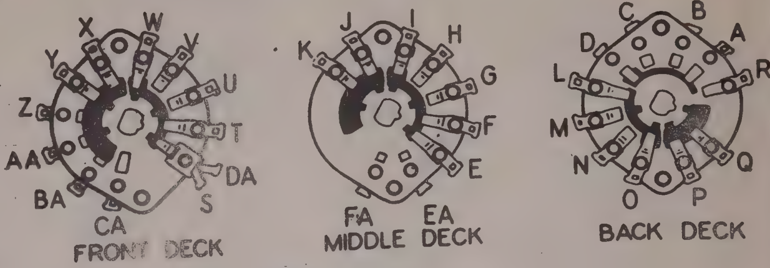


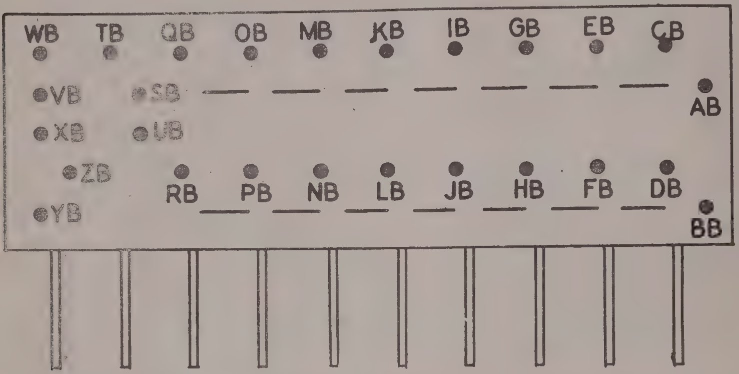
Fig. 1

FOR PUSH BUTTON DATA SEE INDEX.

FRONT VIEW OF RANGE SWITCH DECKS.



PUSH-BUTTON TUNER SWITCH



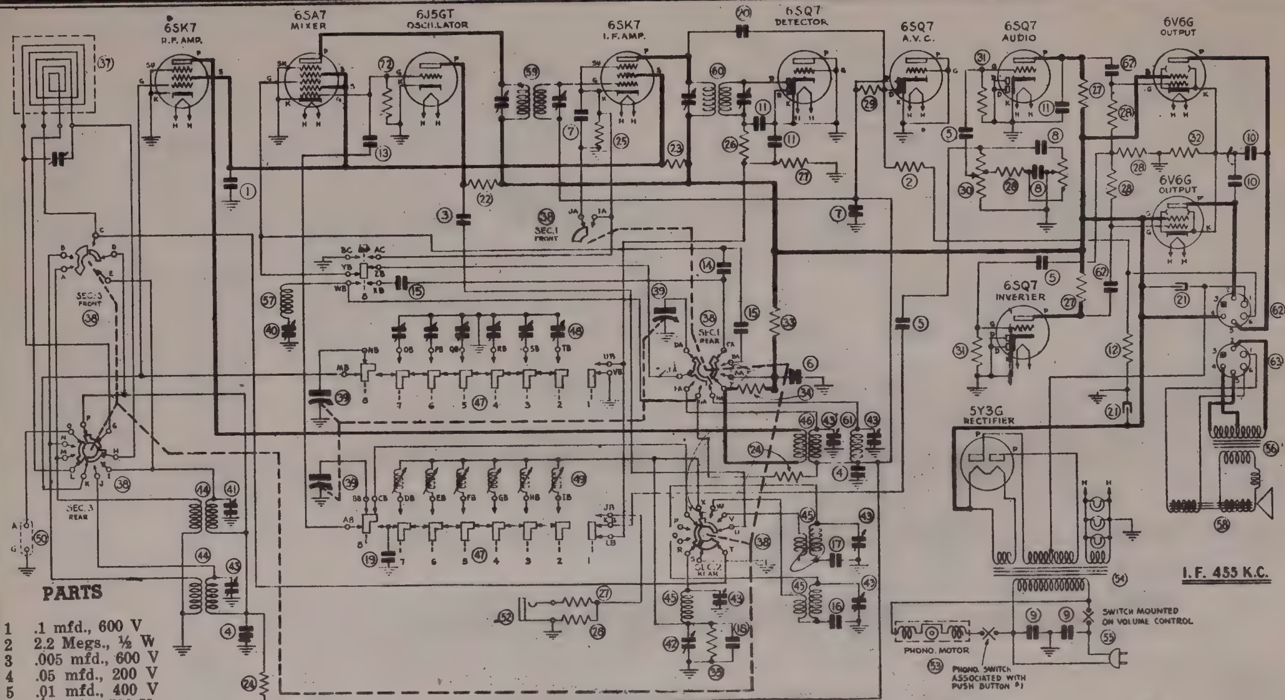
LETTERS ON TERMINALS OF SWITCHES SHOWN ABOVE CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.

MISCELLANEOUS PARTS

Part No.	*Description*	*List Price*
114043	Band Indicator slide & strip	$0.36
113442	Bracket—for tuning eye	.16
114032	Bracket and pulley assembly—right hand	.34
114034	Bracket and pulley assembly—left hand	.34
117703	Cable & socket for tuning eye	1.00
114955	Clamp for dial cord	.01
114042	Clamp for dial scale	.10
112798	Clip for mtg. wave trap coil	.01
110808	Clip—for tuning eye support	.14
114031	Collar—for band switch shaft	.10
85321	Connector—for antenna strip	.01
113178	Cord—dial	.30
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive (supplied in 2 foot lengths	.15
111973	Cushion—rubber rest for back of chassis	.06
117740	Dial scale	1.00
113338	Drum—dial drive	.54
114052	Escutcheon—dial	2.00
113890	Escutcheon—eye	.10
114053	Escutcheon—push button	.60
113347	Gear—on range switch shaft	.20
113207	Gear—pinion on auxiliary range switch shaft	.25
117087	Knob for tuning or volume	.12
117687	Light shield	.05
117662	Pointer assembly	$0.32
112762	Pulley—dial cord drive	.04
114047	Pulley—on band indicator shaft	.34
113887	Push button	.04
113463	Rubber bushing—chassis mtg.	.03
83624	Screw—self tapping 8x¼.	.01
85040	Screw—No. 6 Hex. Hd. Per C	.35
85827	Set screw—8-32 sq. head	.02
111116	Screw— No. 5x⅝; mechanism mtg.	.02
112874	Screw—No. 10x1⅛ chassis mtg.	.01
114914	Screw—special head for mtg. escutcheon	.15
117661	Shaft—auxiliary range switch shaft	.28
114084	Slide and strip assembly for tone indicator	.36
114117	Socket—dial lamp	.18
85427	Socket—octal base (standard)	.15
113025	Socket—octal base (with special ground)	.15
117704	Socket—for speaker 5 prong	.13
111090	Spacer—steel, mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
114046	Spring—for band indicator drive	.05
114041	Tabs—station call letters	.36
85066	Terminal strip—G.D.A.	.20
117664	Tuning shaft	.32
110829	Washer—flat steel, for mtg. chassis	.01
116530	Washer (paper) for back of knobs	.005

MODEL S-7406-7

FIRESTONE TIRE & RUBBER CO.

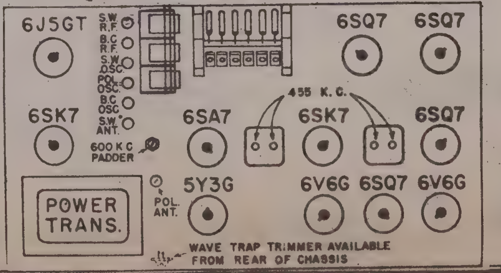


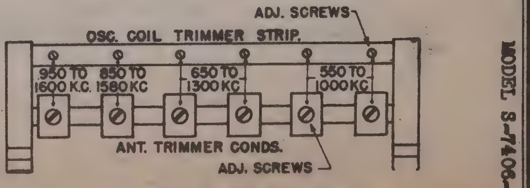
PARTS

No.	Part
1	.1 mfd., 600 V
2	2.2 Megs., ½ W
3	.005 mfd., 600 V
4	.05 mfd., 200 V
5	.01 mfd., 400 V
6	.05 mfd., 500 V
7	.1 mfd., 200 V
8	.002 mfd., 600
9	.01 mfd., 600 V
10	.01 mfd., 600 V
11	100 mmf., Mica
12	22 Ohm, ½ W.
13	50 mmf., Mica
14	10 mmf., Mica
15	250 mmf., Mica
16	1500 mmf., Mica
17	600 mmf., Mica
18	350 mmf., Silver 3%
19	270 mmf., Silver 3%
20	25 mmf., Mica
21	25 mfd., 450 V
22	22 M Ohm., ½ W
23	12 M Ohm., 2 W
24	100 M Ohm., ½ W
25	2200 Ohm., ½ W
26	47 M Ohm.,
27	470 M Ohm.,
28	220 M Ohm.,
29	1 Meg. Ohm.,
30	3.3 Meg. Ohm., Volume Control
31	10 Meg. Ohm., ½ Watt
32	220 Ohm, 2 Watt
33	1500 Ohm., ½ Watt
34	4700 Ohm., ½ Watt
35	10 M Ohm., ½ Watt
36	2.2 Meg. Ohm., Tone Control
37	Loop Assembly
38	Band Switch Assembly
39	Tuning Condenser Gang
40	Wave Trap Trimmer
41	Short Wave Trimmer
42	Broadcast Padder
43	Trimmer Strip Assembly
44	Antenna Coil Assembly
45	Oscillator Coil Assembly
46	Mixer Coil Assembly, Short W
47	Push Button Assembly Switch
48	Push Button Trimmer Strip
49	Button Oscillator Coil Strip
53	Phono Motor ……
54	Power Transformer
56	Output Transformer
57	Wave Trap Coil Assem
61	Mixer Coil Assembly, Broadcast
	Cone and Voice Coil Assembly
62	.02 mfd., 600 Volts

FOR SWITCH DATA, PUSH-BUTTON TUNER

ALIGNMENT, VOLTAGES—SEE INDEX.





VIEWED FROM REAR OF CABINET

MODEL S-7404-3

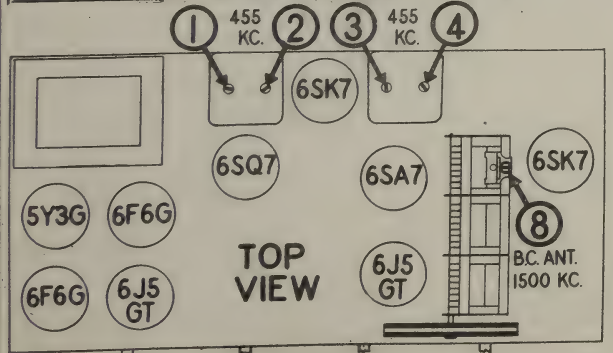
FIRESTONE TIRE & RUBBER CO.

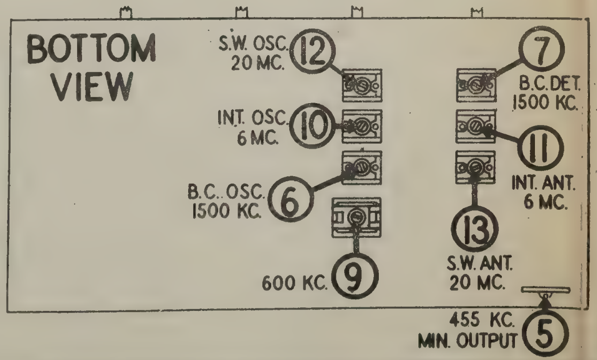
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or across the plates of the 6F6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. Push in the "Selectivity" button and keep it pushed in. Check the pointer to see that it is correctly set.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	"A" Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output, Using a Strong Generator Signal.
400 OHM Carbon Resistor	"A" Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	7	Broadcast Detector	Adjust for Maximum Output.
					8	Broadcast Antenna	
400 OHM Carbon Resistor	"A" Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	6 MC	10	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	Tune to 6 MC Generator Signal	11	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	20 MC	12	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 19.1 MC. If image does not appear, Realign at 20MC, with Trimmer Screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	Tune to 20 MC Generator Signal	13	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.





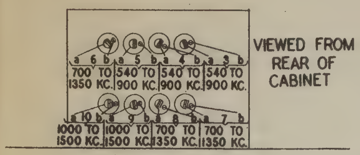
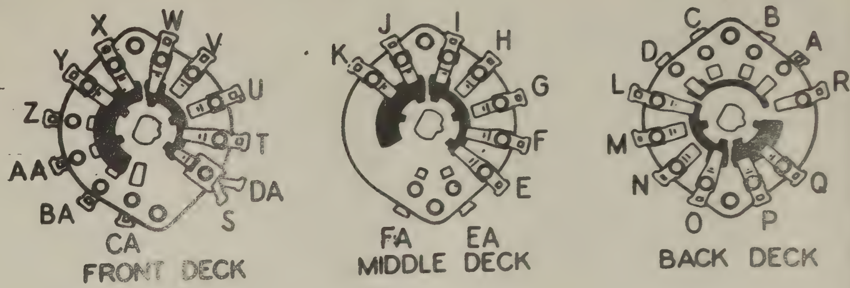


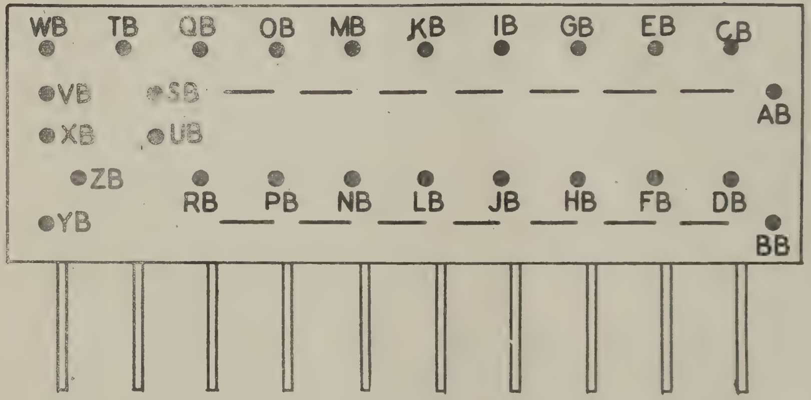
Fig. 1

FOR PUSH BUTTON DATA SEE INDEX.

FRONT VIEW OF RANGE SWITCH DECKS.



PUSH-BUTTON TUNER SWITCH



LETTERS ON TERMINALS OF SWITCHES SHOWN ABOVE CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.

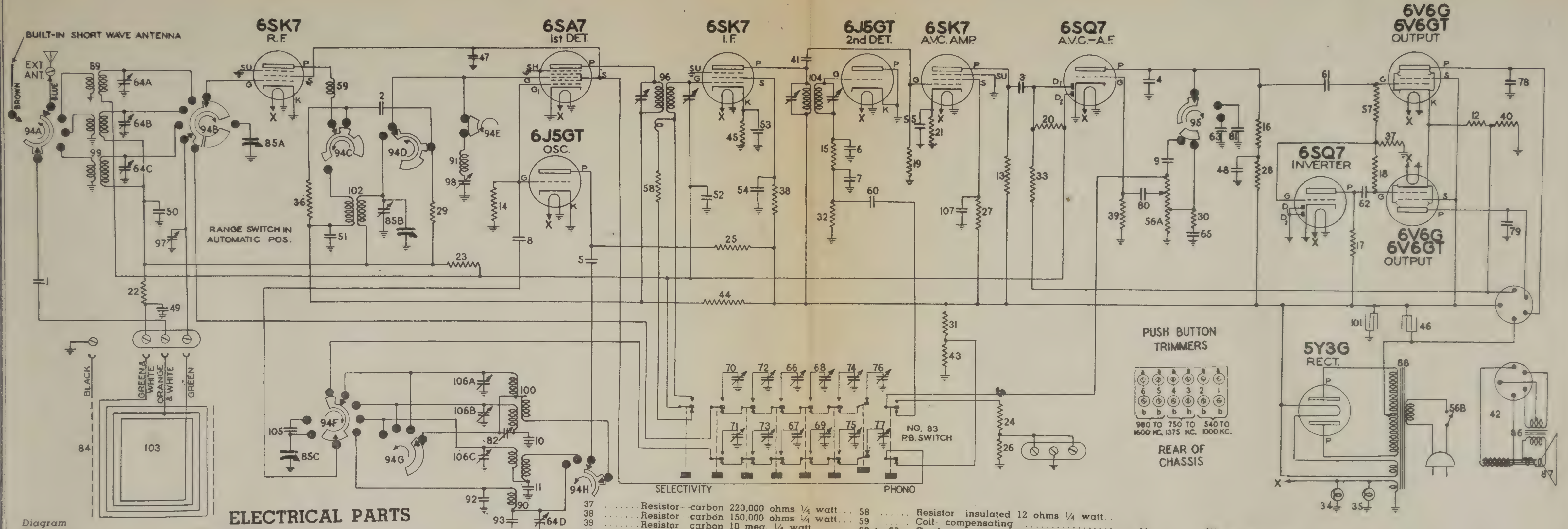
MISCELLANEOUS PARTS

Part No.	Description	List Price
114043	Band Indicator slide & strip	$0.36
113442	Bracket—for tuning eye	.16
114032	Bracket and pulley assembly—right hand	.34
114034	Bracket and pulley assembly—left hand	.34
117703	Cable & socket for tuning eye	1.00
114955	Clamp for dial cord	.01
114042	Clamp for dial scale	.10
112798	Clip for mtg. wave trap coil	.01
110808	Clip—for tuning eye support	.14
114031	Collar—for band switch shaft	.10
85321	Connector—for antenna strip	.01
113178	Cord—dial	.30
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive (supplied in 2 foot lengths	.15
111973	Cushion—rubber rest for back of chassis	.06
117740	Dial scale	1.00
113338	Drum—dial drive	.54
114052	Escutcheon—dial	2.00
113890	Escutcheon—eye	.10
114053	Escutcheon—push button	.60
113347	Gear—on range switch shaft	.20
113207	Gear—pinion on auxiliary range switch shaft	.25
117087	Knob for tuning or volume	.12
117687	Light shield	.05

Part No.	Description	List Price
117662	Pointer assembly	$0.32
112762	Pulley—dial cord drive	.04
114047	Pulley—on band indicator shaft	.34
113887	Push button	.04
113463	Rubber bushing—chassis mtg.	.03
83624	Screw—self tapping 8x¼	.01
85040	Screw—No. 6 Hex. Hd. Per C	.35
85827	Set screw—8-32 sq. head	.02
111116	Screw— No. 5x⅝; mechanism mtg.	.02
112874	Screw—No. 10x1⅛ chassis mtg.	.01
114914	Screw—special head for mtg. escutcheon	.15
117661	Shaft—auxiliary range switch shaft	.28
114084	Slide and strip assembly for tone indicator	.36
114117	Socket—dial lamp	.18
85427	Socket—octal base (standard)	.15
113025	Socket—octal base (with special ground)	.15
117704	Socket—for speaker 5 prong	.13
111090	Spacer—steel, mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
114046	Spring—for band indicator drive	.05
114041	Tabs—station call letters	.36
85066	Terminal strip—G.D.A.	.20
117664	Tuning shaft	.32
110829	Washer—flat steel, for mtg. chassis	.01
116530	Washer (paper) for back of knobs	.005

MODEL S-7404-7

FIRESTONE TIRE & RUBBER CO.



ELECTRICAL PARTS

Diagram Number	Description
1-2-3-4	Condenser mica 260 mmfd.
5-6-7	Condenser mica 110 mmfd.
8	Condenser mica 51 mmfd.
9	Condenser mica 510 mmfd.
10	Condenser .00144 mfd. mica
11	Condenser mica .00255 mfd.
12	Resistor wire wound 200 ohms 2 watts
13	Resistor carbon 15,000 ohms 1 watt
14-15	Resistor carbon 47,000 ohms 1/4 watt
16-17-18	Resistor carbon 220,000 ohms 1/4 watt
19-20	Resistor carbon 1 megohm 1/4 watt
21	Resistor carbon 4700 ohms 1/4 watt
22-23-24,	Resistor carbon 470,000 ohms 1/4 watt
25	Resistor carbon 22,000 ohms 1/2 watt
26-27-28	Resistor carbon 100,000 ohms 1/4 watt
29-30	Resistor carbon 68,000 ohms 1/4 watt
31	Resistor carbon 18,000 ohms 2 watts
32-33	Resistor carbon 330,000 ohms 1/4 watt
34-35	Dial light 6.3 volt
36	Resistor carbon 3,300 ohms 1/4 watt
37	Resistor carbon 220,000 ohms 1/4 watt
38	Resistor carbon 150,000 ohms 1/4 watt
39	Resistor carbon 10 meg. 1/4 watt
40	Resistor wire wound 110 ohms 1/2 watt
41	Condenser mica 15 mmfd.
42	Speaker cynamic 12 inch
43	Resistor carbon 27,000 ohms 1 watt
44	Resistor carbon 1500 ohms 1/2 watt
45	Not used in most sets, K goes to ground.
46	Condenser—electrolytic 16 mfd. 450 volt
47	Condenser—.1 mfd. 600 volt
48	Condenser—.2 mfd. 600 volt
49 to 55	Condenser—.05 mfd. 600 volt
56A to 56B	Volume control—1 meg. (with switch)
57	Resistor carbon 180,000 ohms 1/4 watt
58	Resistor insulated 12 ohms 1/4 watt
59	Coil compensating
60 to 63	Condenser—.01 mfd. 600 volt
64A to 64D	Condenser trimmer (4 section)
65	Condenser—.02 mfd. 600 volt
66 to 69	Condenser P. B. trimmer (med. freq.)
70 to 73	Condenser P. B. trimmer (high freq.)
74 to 77	Condenser P. B. trimmer (low freq.)
78 to 81	Condenser—.004 mfd. 600 volt
82	Condenser—padder
83	Switch—push button
84	Loop antenna shield
85A-B-C	Condenser variable tuning
86	Transformer—output for M-115116 speaker
87	Cone & voice coil for M-115116 speaker
88	Transformer—power—60 cycle Transformer—power 25 cycle
89	Coil—antenna (Band spread)
90	Coil—oscillator (Band spread)
91	Wave trap coil
92	Condenser—mica .0001 mfd. (low drift)
93	Condenser—compensating .0001 mfd.
94A to 94H	Switch range
95	Switch tone control
96	Transformer 1st I. F.
97-98	Condenser trimmer
99	Coil—Police & Short Wave antenna
100	Oscillator coil with trimmers
101	Condenser electrolytic 30 mfd. 450 volt
102	Coil—Broadcast R. F.
103	Loop antenna complete
104	Transformer—2nd I. F.
105	Condenser—low drift—75 mmfd.
106A to 106C	Condenser—trimmer (3 section)
107	Condenser—.05 mfd., 600 volt

Note
Mention Code
No. 347 when
ordering parts

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION

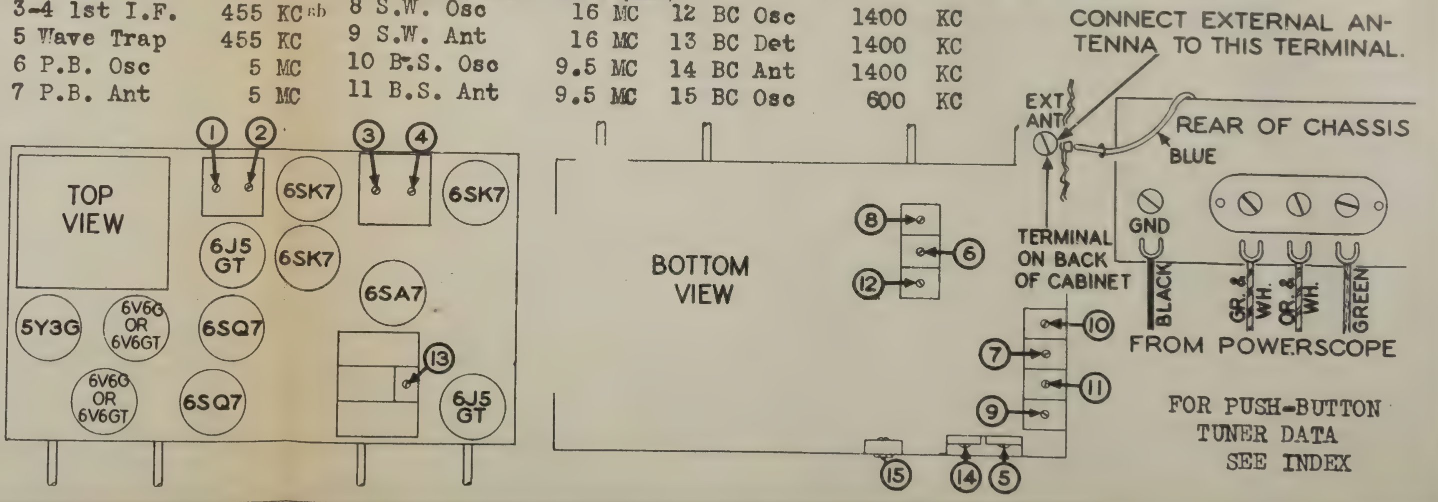
DIAL TUNED TO 540 KC

TUBE	FUNCTION	H	K	G	G1	S	SU	P	D1	D2
6SK7	R.F.	6.0 A.C.	0	Note A		85	0	235		
6SA7	1st. Det.	6.0 A.C.	0	Note A	—10	85	0	250		
6J5GT	Osc.	6.0 A.C.	0	—10			0	137		
6SK7	I.F.	6.0 A.C.	0	Note A		70	0	260		
6J5GT	2nd Det.	6.0 A.C.	0	0				0		
6SK7	A.V.C. Amp.	6.0 A.C.	15	0		140		230		
6SQ7	A.F.—A.V.C.	6.0 A.C.	0	0				80	Note A	Note A
6SQ7	Inverter	6.0 A.C.	0	0				70	0	0
6V6G or 6V6GT	Output	6.0 A.C.	12			260		252		
6V6G or 6V6GT	Output	6.0 A.C.	12			260		252		
5Y3G	Rectifier	5.0 A.C.				Plates 370 V.A.C. to C.T.				

USE A VOLTMETER OF AT LEAST 1000 OHMS PER VOLT.

NOTE A: Bias is —3.7 volts at these points, measured across resistor No. 40.

TRIMMERS	ALIGN AT				
1-2 2nd I.F.	455 KC	8 S.W. Osc	16 MC	12 BC Osc	1400 KC
3-4 1st I.F.	455 KC	9 S.W. Ant	16 MC	13 BC Det	1400 KC
5 Wave Trap	455 KC	10 B.S. Osc	9.5 MC	14 BC Ant	1400 KC
6 P.B. Osc	5 MC	11 B.S. Ant	9.5 MC	15 BC Osc	600 KC
7 P.B. Ant	5 MC				

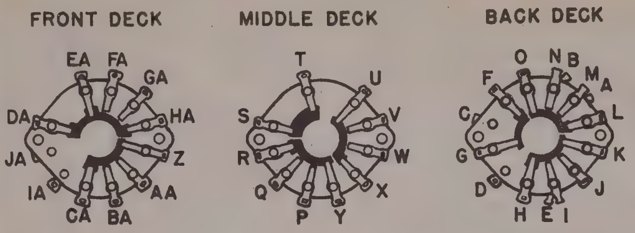


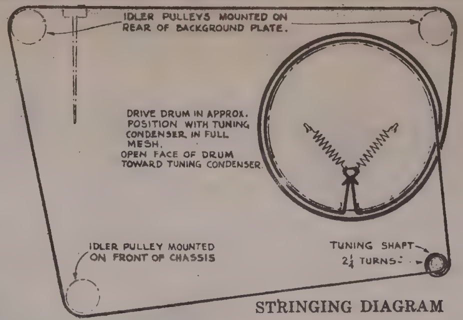
FOR PUSH-BUTTON
TUNER DATA
SEE INDEX

MODEL S-7406-7

FIRESTONE TIRE & RUBBER CO.

BACK VIEW OF RANGE SWITCH DECKS.

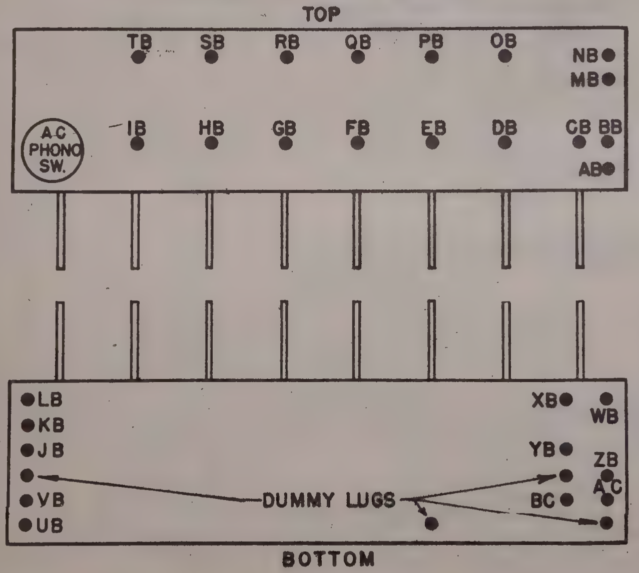



IDLER PULLEYS MOUNTED ON REAR OF BACKGROUND PLATE.
DRIVE DRUM IN APPROX. POSITION WITH TUNING CONDENSER IN FULL MESH. OPEN FACE OF DRUM TOWARD TUNING CONDENSER.
IDLER PULLEY MOUNTED ON FRONT OF CHASSIS
TUNING SHAFT 2¼ TURNS

STRINGING DIAGRAM

SEE INDEX FOR PUSH BUTTON TUNER DATA

PUSH-BUTTON TUNER SWITCH



LETTERS ON TERMINALS OF SWITCHES SHOWN ABOVE CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

ALIGN
BROADCAST BAND
OSC- 1600 KC
ANT- 1500 KC
PAD- 600 KC

POLICE BAND
OSC- 5.4 MC
ANT- 5 MC
SHORT WAVE
OSC- 18.1 MC
ANT- 16 MC

SOCKET VOLTAGES—ALL D.C. VOLTAGES MEASURED TO CHASSIS

ANTENNA GROUNDED

DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.3 A.C.	0	Note A		100		180		
6SA7	Mixer	6.3 A.C.	0	Note A		100		245		
6J5GT	Oscillator	6.3 A.C.	0					115		
6SK7	I. F.	6.3 A.C.	+3	Note A		100		245		
6SQ7	Det.	6.3 A.C.	0						Note A	Note A
6SQ7	A.V.C.	6.3 A.C.	0						Note A	Note A
6SQ7	1st Audio	6.3 A.C.	0					62		
6SQ7	Inverter	6.3 A.C.	0					62		
6V6G	Audio	6.3 A.C.	15			245		232		
6V6G	Audio	6.3 A.C.	15			245		232		
5Y3	Rect.	5 A.C.					230 A.C.		230A.C.	

NOTE A: Due to the high resistance in the circuit, only very slight deflections of the voltmeter will be obtained.

CIRCUIT FEATURES

This chassis is an 8 tube, three band, push button tuning superheterodyne receiver. The tuning ranges are 530 to 1730 KC, 2.2 to 7.0 MC and 6.8 to 22.5 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

A feature of this set is the special push-pull output stage. Instead of using a push-pull input transformer or a separate phase inverter tube the phase inversion is accomplished as follows. One of the 6K6G output tubes has a 3,300 ohm load resistor in its screen circuit across which is built up an audio voltage which is 180 electrical degrees out of phase with respect to the input grid voltage. This phase inverted voltage obtained across the screen resistor is now applied to the grid of the other output tube in this push-pull output combination. NOTE: It can be readily seen from the above explanation that if the 6K6G output tube, from which the phase inversion voltage is obtained, is removed from the set or becomes defective, it will be impossible for any signal to be heard in the speaker.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

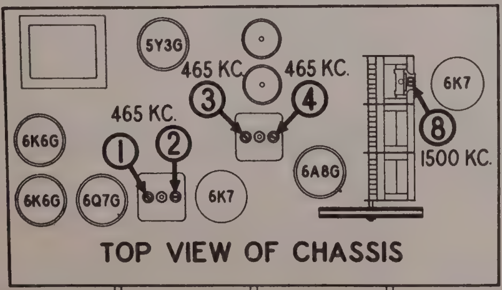
① Connect the output meter across the voice coil or between the plates of the 6K6G output tubes depending upon the type of meter. (The more sensitive type should be connected across the voice coil.)

② Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.

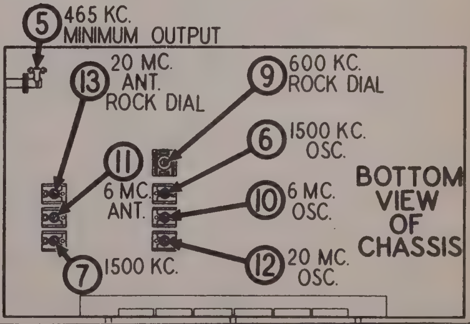
③ Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

④ With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

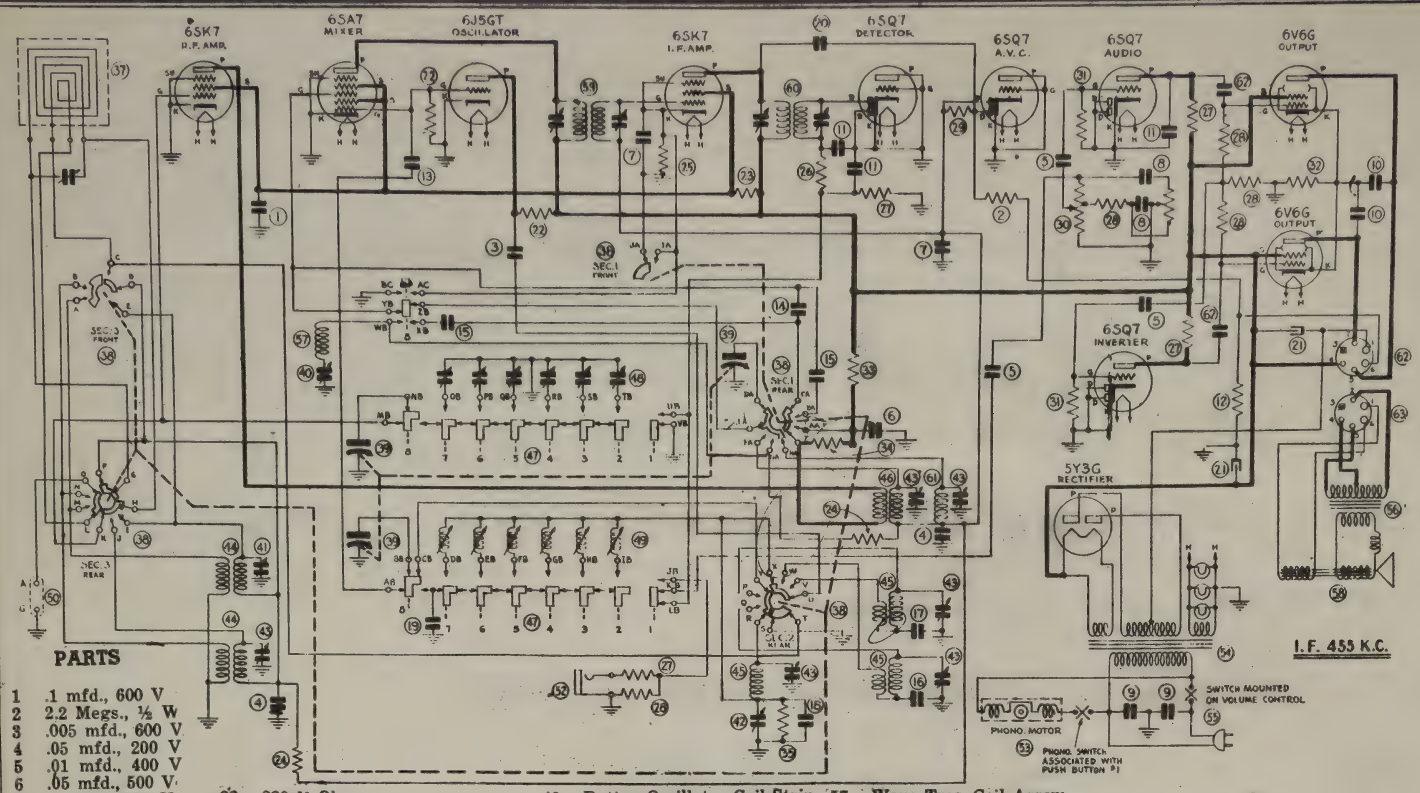
DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION (INDICATED BY DIAL)	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST	1500 KC	6	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST DETECTOR	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	6 MC	10	INTERMEDIATE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	TUNE TO 6 MC GENERATOR SIGNAL	11	INTERMEDIATE ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	20 MC	12	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	TUNE TO 20 MC GENERATOR SIGNAL	13	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED



TOP VIEW OF CHASSIS

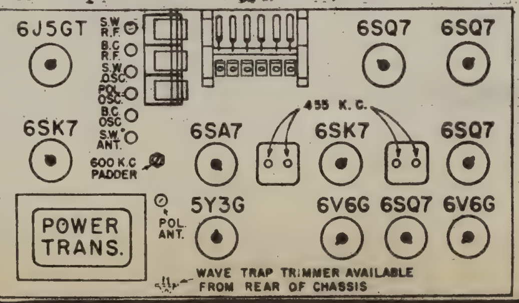


BOTTOM VIEW OF CHASSIS

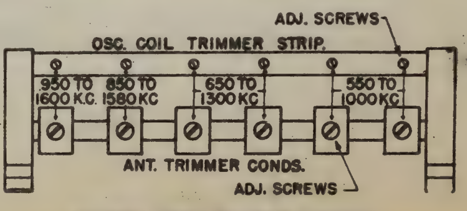


PARTS

1	.1 mfd., 600 V
2	2.2 Megs., ½ W
3	.005 mfd., 600 V
4	.05 mfd., 200 V
5	.01 mfd., 400 V
6	.05 mfd., 500 V
7	.1 mfd., 200 V
8	.002 mfd., 600
9	.01 mfd., 600 V
10	.01 mfd., 600 V
11	100 mmf., Mica
12	22 Ohm, ½ W.
13	50 mmf., Mica
14	10 mmf., Mica
15	250 mmf., Mica
16	1500 mmf., Mica
17	6000 mmf., Mica
18	350 mmf., Silver 3%
19	270 mmf., Silver 3%
20	25 mmf., Mica
21	25 mfd., 450 V
22	22 M Ohm., ½ W
23	12 M Ohm., 2 W
24	100 M Ohm., ½ W
25	2200 Ohm., ½ W
26	47 M Ohm.,
27	470 M Ohm.,
28	220 M Ohm.,
29	1 Meg. Ohm.,
30	3.3 Meg. Ohm., Volume Control
31	10 Meg. Ohm., ½ Watt
32	220 Ohm, 2 Watt
33	1500 Ohm., ½ Watt
34	4700 Ohm., ½ Watt
35	10 M Ohm., ½ Watt
36	2.2 Meg. Ohm., Tone Control
37	Loop Assembly
38	Band Switch Assembly
39	Tuning Condenser Gang
40	Wave Trap Trimmer
41	Short Wave Trimmer
42	Broadcast Padder
43	Trimmer Strip Assembly
44	Antenna Coil Assembly
45	Oscillator Coil Assembly
46	Mixer Coil Assembly, Short W
47	Push Button Assembly Switch
48	Push Button Trimmer Strip
49	Button Oscillator Coil Strip
53	Phono Motor ......
54	Power Transformer
56	Output Transformer
57	Wave Trap Coil Assem
61	Mixer Coil Assembly, Broadcast
	Cone and Voice Coil Assembly
63	.02 mfd., 600 Volts

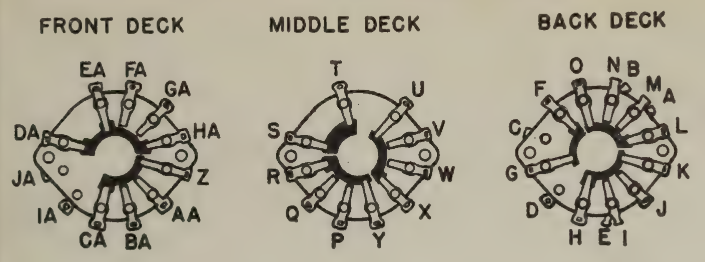


FOR SWITCH DATA, PUSH-BUTTON TUNER ALIGNMENT, VOLTAGES—SEE INDEX.

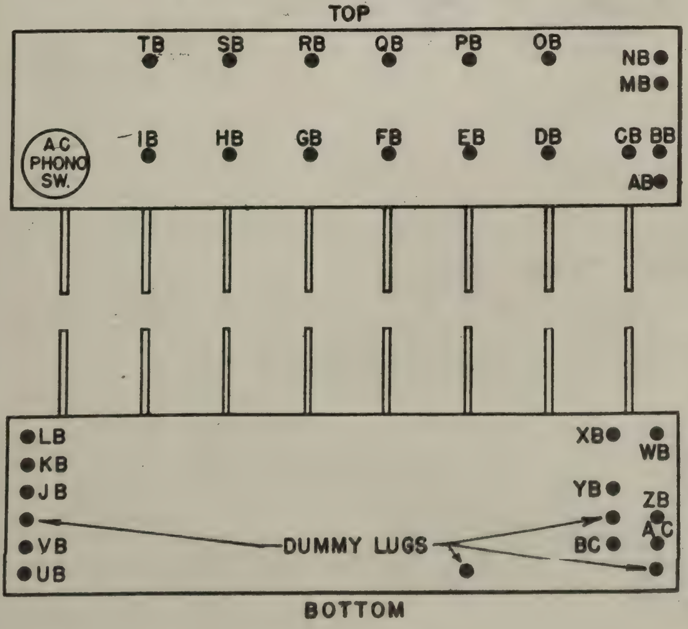


VIEWED FROM REAR OF CABINET

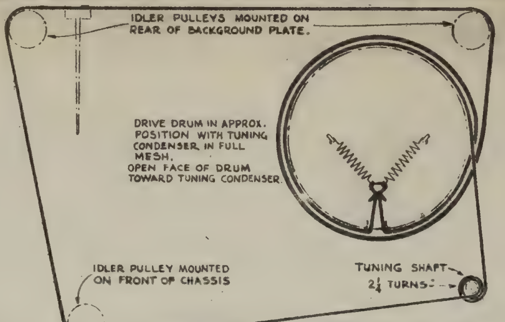
BACK VIEW OF RANGE SWITCH DECKS.



PUSH-BUTTON TUNER SWITCH



LETTERS ON TERMINALS OF SWITCHES SHOWN ABOVE CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE SWITCHES SHOWN IN THE CIRCUIT DIAGRAM.


IDLER PULLEYS MOUNTED ON REAR OF BACKGROUND PLATE.
DRIVE DRUM IN APPROX. POSITION WITH TUNING CONDENSER IN FULL MESH. OPEN FACE OF DRUM TOWARD TUNING CONDENSER
IDLER PULLEY MOUNTED ON FRONT OF CHASSIS
TUNING SHAFT 2¼ TURNS

STRINGING DIAGRAM

SEE INDEX FOR PUSH BUTTON TUNER DATA

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

ALIGN
BROADCAST BAND
OSC- 1600 KC
ANT- 1500 KC
PAD- 600 KC

POLICE BAND
OSC- 5.4 MC
ANT- 5 MC
SHORT WAVE
OSC- 18.1 MC
ANT- 16 MC

SOCKET VOLTAGES—ALL D.C. VOLTAGES MEASURED TO CHASSIS

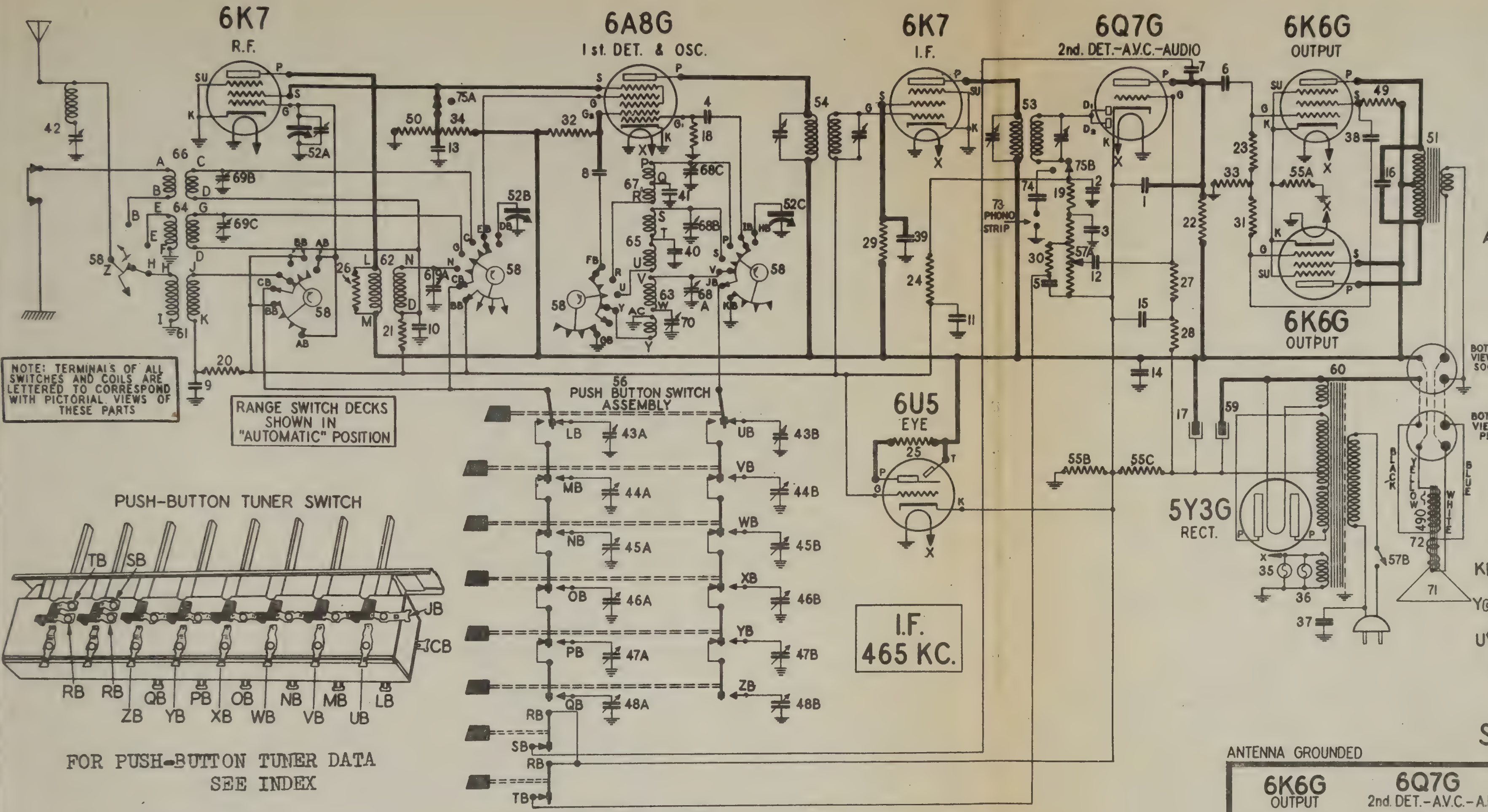
ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.3 A.C.	0	Note A		100		180		
6SA7	Mixer	6.3 A.C.	0	Note A		100		245		
6J5GT	Oscillator	6.3 A.C.	0					115		
6SK7	I. F.	6.3 A.C.	+3	Note A		100		245		
6SQ7	Det.	6.3 A.C.	0						Note A	Note A
6SQ7	A.V.C.	6.3 A.C.	0						Note A	Note A
6SQ7	1st Audio	6.3 A.C.	0					62		
6SQ7	Inverter	6.3 A.C.	0					62		
6V6G	Audio	6.3 A.C.	15			245		232		
6V6G	Audio	6.3 A.C.	15			245		232		
5Y3	Rect.	5 A.C.					230 A.C.		230A.C.	

NOTE A: Due to the high resistance in the circuit, only very slight deflections of the voltmeter will be obtained.

MODEL S-7427-2

FIRESTONE TIRE & RUBBER CO.

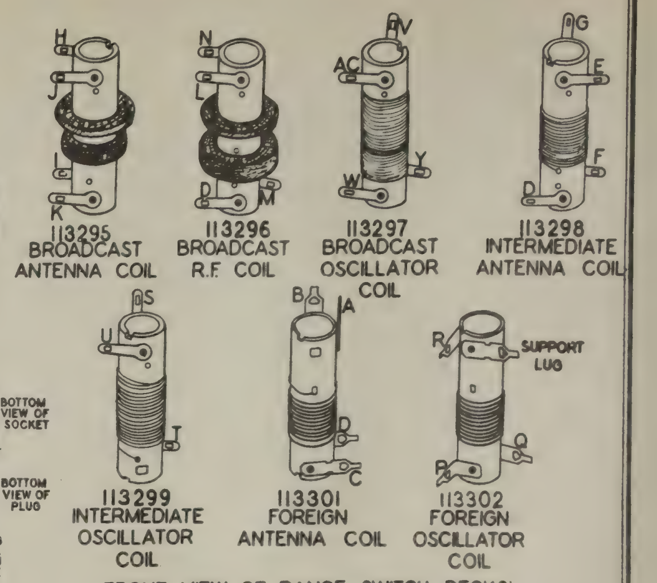


NOTE: TERMINALS OF ALL SWITCHES AND COILS ARE LETTERED TO CORRESPOND WITH PICTORIAL VIEWS OF THESE PARTS

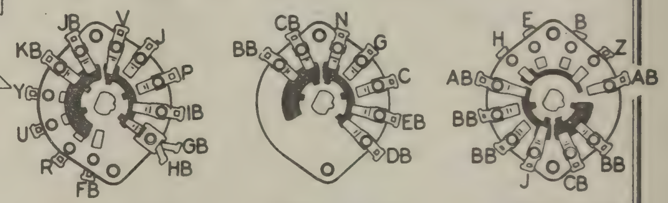
RANGE SWITCH DECKS SHOWN IN "AUTOMATIC" POSITION

I.F. 465 KC.

FOR PUSH-BUTTON TUNER DATA SEE INDEX



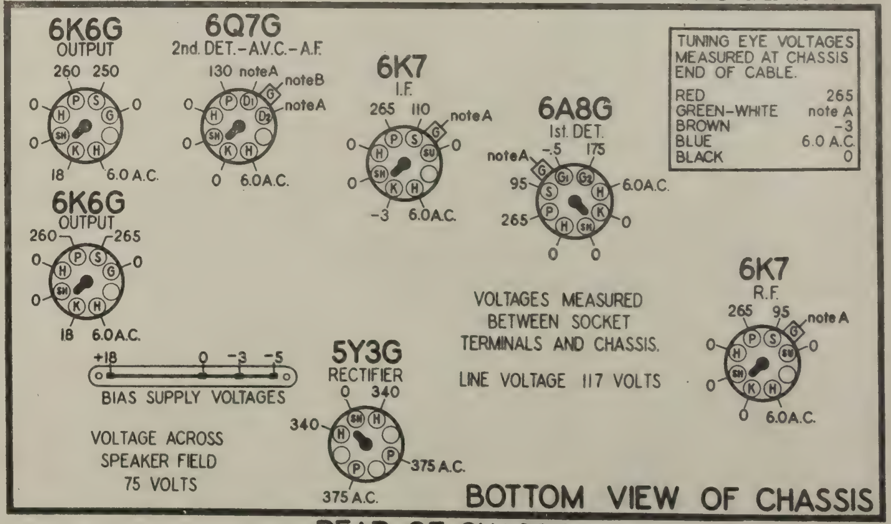
FRONT VIEW OF RANGE SWITCH DECKS:



FRONT DECK MIDDLE DECK BACK DECK

SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 530 KC.



TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE.

RED	265
GREEN-WHITE	note A
BROWN	-3
BLUE	6.0 A.C.
BLACK	0

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

LINE VOLTAGE 117 VOLTS

VOLTAGE ACROSS SPEAKER FIELD 75 VOLTS

BOTTOM VIEW OF CHASSIS

REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7 R.F., 6K7 I.F., 6U5 and the diode plates of the 6Q7-G tubes is -3 volts measured across resistor 55B.

NOTE B; The bias for the control grid of the triode section of the 6Q7-G tube is -5 volts measured across resistors 55B and 55C.

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	83539	Condenser - mica 260 mmfd.
2-3	83783	Condenser - mica 110 mmf.
4	85061	Condenser - mica 51 mmfd.
6	88026	Condenser - paper .02 mfd. 400 volt
7	88029	Condenser - paper .004 mfd. 400 volt
5-8	88030	Condenser - paper .01 mfd. 400 volt
9-10 11-12	88189	Condenser - paper .05 mfd. 200 volt
13-14	88682	Condenser - paper .1 mfd. 400 volt
15	89421	Condenser - paper .1 mfd. 200 volt
16	89826	Condenser - paper .004 mfd. 750 volt
17	89937	Condenser - electrolytic 30 mfd. 450 volt
18-19	110552	Resistor - carbon 47,000 ohms 1/4 watt
20-21-22 23	110553	Resistor - carbon 220,000 ohms 1/4 watt
24-25	110554	Resistor - carbon 1 megohm 1/4 watt
26	110557	Resistor - carbon 4700 ohms 1/4 watt
27-28	110559	Resistor - carbon 470,000 ohms 1/4 watt
29	110564	Resistor - carbon 100,000 ohms 1/4 watt
30-31	110565	Resistor - carbon 22,000 ohms 1/4 watt
32	110568	Resistor - carbon 15,000 ohms 1 watt
33	110578	Resistor - carbon 68,000 ohms 1/4 watt
34	110596	Resistor - carbon 15,000 ohms 3 watt
35-36	110629	Lamp - 6.3 volt - .25 amps
37	111214	Condenser - paper .01 mfd. 600 volt
38-39	111252	Condenser - paper .05 mfd. 400 volt
40	112426	Condenser - mica 1650 mmfd. (3%)
41	112427	Condenser - mica 4050 mmfd. (3%)
42	112796	Coil - wave trap (with trimmer)
43A - B 44A - B	112942	Condenser - dual push button trimmer (1100 KC to 1700 KC)
45A - B 46A - B	114505	Condenser - dual push button trimmer (770 KC to 1350 KC)
47A - B 48A - B	112944	Condenser - dual push button trimmer (550 KC to 1000 KC)
49	112952	Resistor - carbon 3,300 ohms 1/4 watt
50	112954	Resistor - carbon 10,000 ohms 1 watt
51	113192	Transformer - output
52A - C	113216	Condenser - gang
53	113229	Transformer - 2nd I.F.
54	113237	Transformer - 1st I.F.

PARTS LIST

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
55A - C	113251	Resistor - wire wound - Section A 240 ohms Section B 26 ohms Section C 18 ohms
56	114022	Switch - push button
57A - B	114020	Volume control - 250,000 ohms(with switch)
58	114030	Range switch
59	113261	Condenser - electrolytic 30 mfd. 450 volt
60	113271	Transformer - power 117 volt - 60 cycle
61	113295	Coil - antenna (B.C.)
62	113296	Coil - R.F. (B.C.)
63	113297	Coil - oscillator (B.C.)
64	113298	Coil - antenna (police)
65	113299	Coil - oscillator (police)
66	113301	Coil - antenna (S.W.)
67	113302	Coil - oscillator (S.W.)
68A - C	113319	Condenser - trimmer - 3 section
69A - C	113320	Condenser - trimmer - 3 section
70	113346	Condenser - padding
71---R	114163	Cone & Voice Coil assembly
72---R	115030	Speaker (Dynamic) 12 inch
73	84407	Phono Terminal Strip
74	89421	Condenser - 0.1 mfd. 200 volts
75A - B	114141	Switch - Radio Phono (D.P.D.T.)

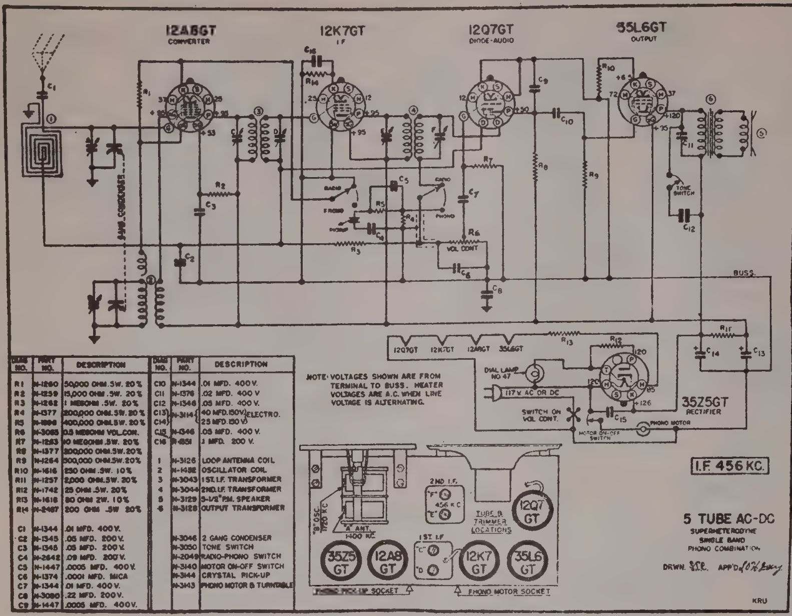
DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION
67568	Washer - embossed (for mtg. electrolytic)
83624	Screw - self tapping 8 X 1/4
84407	Terminal Strip - phono
85066	Terminal Strip - G.D.A.
85321	Connector - ground
85427	Socket - octal base (standard)
85827	Set Screw - 8/32 square head for tone or band ind.
88348	Eyelet - for dial cord
89746	Washer - (paper) for back of knobs
110496	Plug - speaker (4 prong)
110501	Socket - 4 prong (for spkr.)
110829	Washer - flat steel for chassis mtg.
111302	Cord - dial drive 6 or 50 ft. lengths
112745	Clip - coil mounting (osc. & ant.)
112798	Clip - for mtg. wave trap coil
112865	Base - for tube shield
112874	Screw - #10 X 1 1/8 chassis mtg.
112879	Screws - escutcheon mtg.
113025	Socket - octal base (with special ground)
113077	Shield - tube
113177	Spring - dial cord tension
113178	Cord - for band indicator (28" req.) supplied in 4 ft. lengths
113205	Thrust Plate - for tuning shaft
113207	Gear - pinion on auxiliary range switch shaft
113288	Shaft - auxiliary - for range switch
113338	Drum - dial drive
113347	Gear - on range switch shaft
113463	Rubber bushing - for chassis mtg.
113710	Washer - ceramic for trimmer condensers
113723	Knobs
113762	Push button
114023	Socket - dial lamp with bracket
114025	Shaft - tuning
114027	Socket - dial lamp - with clip
114031	Collar - for band switch shaft
114032	Bracket and pulley assembly - right hand
114034	Bracket and pulley assembly - left hand
114036	Dial mtg. plate
114040	Dial scale
114041	Tabs - call letter
114042	Clamp - for dial scale
114043	Band indicator slides & strip
114046	Spring for band indicator
114047	Pulley - on band indicator shaft
114048	Dial pointer & slide
114052	Escutcheon - dial
114088	Cable & Plug - for tuning eye
114089	Escutcheon - push button

FORM NO. 8829 PRINTED IN UNITED STATES OF AMERICA

MODEL S-7406-5

FIRESTONE TIRE & RUBBER CO.



DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%
R2	N-1259	15,000 OHM .5W. 20%
R3	N-1262	1 MEGOHM .5W. 20%
R4	N-1377	200,000 OHM .5W. 20%
R5	N-1896	400,000 OHM .5W. 20%
R6	N-3065	0.5 MEGOHM VOL.CON.
R7	N-1263	10 MEGOHM .5W. 20%
R8	N-1377	200,000 OHM .5W. 20%
R9	N-1264	500,000 OHM .5W. 20%
R10	N-1616	250 OHM .5W. 10%
R11	N-1257	2,000 OHM .5W. 20%
R12	N-1742	25 OHM .5W. 20%
R13	N-1618	80 OHM 2W. 10%
R14	N-2467	200 OHM .5W 20%
C1	N-1344	.01 MFD. 400V.
C2	N-1345	.05 MFD. 200V.
C3	N-1345	.05 MFD. 200V.
C4	N-2642	.09 MFD. 200V.
C5	N-1447	.0005 MFD. 400V.
C6	N-1374	.0001 MFD. MICA
C7	N-1344	.01 MFD. 400V.
C8	N-3080	.22 MFD. 200V.
C9	N-1447	.0005 MFD. 400V.
C10	N-1344	.01 MFD. 400V.
C11	N-1376	.02 MFD. 400 V
C12	N-1346	.05 MFD. 400V.
C13	N-3114	40 MFD. 150V. ELECTRO.
C14		25 MFD. 150 V. ELECTRO.
C15	N-1346	.05 MFD. 400 V.
C16	N-1851	.1 MFD. 200 V.
1	N-3126	LOOP ANTENNA COIL
2	N-1482	OSCILLATOR COIL
3	N-3043	1ST. I.F. TRANSFORMER
4	N-3044	2ND. I.F. TRANSFORMER
5	N-3129	5-1/2" P.M. SPEAKER
6	N-3128	OUTPUT TRANSFORMER
	N-3046	2 GANG CONDENSER
	N-3050	TONE SWITCH
	N-2049	RADIO-PHONO SWITCH
	N-3140	MOTOR ON-OFF SWITCH
	N-3144	CRYSTAL PICK-UP
	N-3143	PHONO MOTOR & TURNTABLE

TUNING RANGE AND DIAL CALIBRATION

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters). The upper scale is calibrated from 55 to 170 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries; also the popular 1712 kilocycle (KC) Police Band. Add a zero to figures on the scale to obtain kilocycles. The lower scale is calibrated directly in meters. If stations are listed by kilocycles (KC), use the upper scale and if they are listed by meters use the lower scale.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set up on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

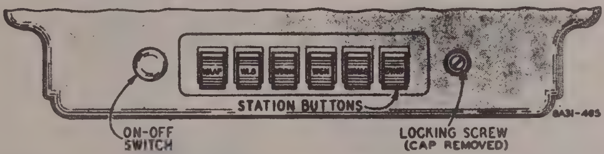
CAUTION: NEVER LEAVE RECORDS ON TURNTABLE, EXCEPT WHILE PLAYING THEM. THE RECORDS WILL BECOME DAMAGED BY WARPING

MODULATION HUM Dec.8,1939.

In case modulation hum (hum with signal) is encountered on the above model , the trouble may be due to the 6SK7 1st A.F. tube. Interchange this tube with the 6SK7 R.F and 6SK7 I.F. tubes. Note the results. The 6SK7 1st A.F. tube may be left in either the R.F. or I.F. tube sockets if the arrangement reduces the hum.

If the hum is still appreciable after the above procedure try out several new 6SK7 1st A.F. tubes. Use the one which reduces the hum to a minimum.

Setting the Station Buttons



There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Setting a Station Button

Turn the manual tuning knob so that the pointer moves toward 1700 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon —See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handle screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob using the tuning eye as a guide.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way down.* It will go down easily at first and then a firm gentle pressure must be applied to push it down the rest of the way. It is better to start with the left hand button.

Hold *this* button all the way down. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way down.*

Release the button after the station is tuned in.

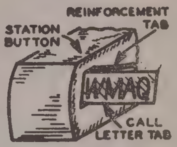
Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way down. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob so that the pointer moves toward 1700 KC until the stop is reached. Then, with the SMALL HANDLE screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Television Sound Connections

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the back panel of the chassis base is a socket to which is connected the phono cable shielded pin tip. Upon removal of this pin tip, the connector on the cable from a television receiver can be inserted in the socket. (The cable connector must be a single shielded pin tip type, part No. M93.)

When Television sound reproduction is desired, the knob located above the dial of the radio should be turned to the Phonograph (P) position. For radio reception, the knob should be in the Radio (R) position.

FIRESTONE TIRE & RUBBER CO.

MODEL S-7427-2

CIRCUIT FEATURES

This chassis is an 8 tube, three band, push button tuning superheterodyne receiver. The tuning ranges are 530 to 1730 KC, 2.2 to 7.0 MC and 6.8 to 22.5 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

A feature of this set is the special push-pull output stage. Instead of using a push-pull input transformer or a separate phase inverter tube the phase inversion is accomplished as follows. One of the 6K6G output tubes has a 3,300 ohm load resistor in its screen circuit across which is built up an audio voltage which is 180 electrical degrees out of phase with respect to the input grid voltage. This phase inverted voltage obtained across the screen resistor is now applied to the grid of the other output tube in this push-pull output combination. NOTE: It can be readily seen from the above explanation that if the 6K6G output tube, from which the phase inversion voltage is obtained, is removed from the set or becomes defective, it will be impossible for any signal to be heard in the speaker.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

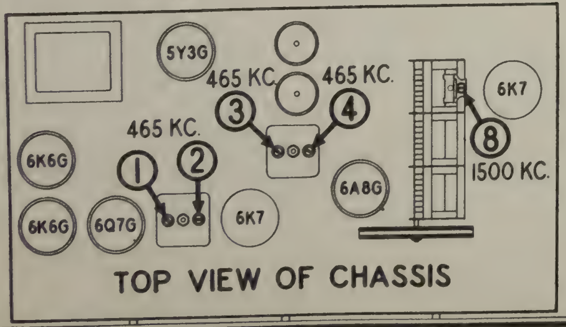
① Connect the output meter across the voice coil or between the plates of the 6K6G output tubes depending upon the type of meter. (The more sensitive type should be connected across the voice coil.)

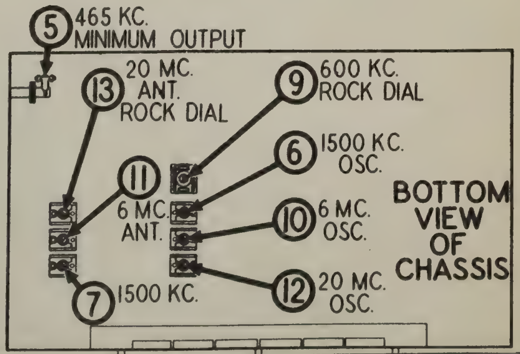
② Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.

③ Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

④ With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

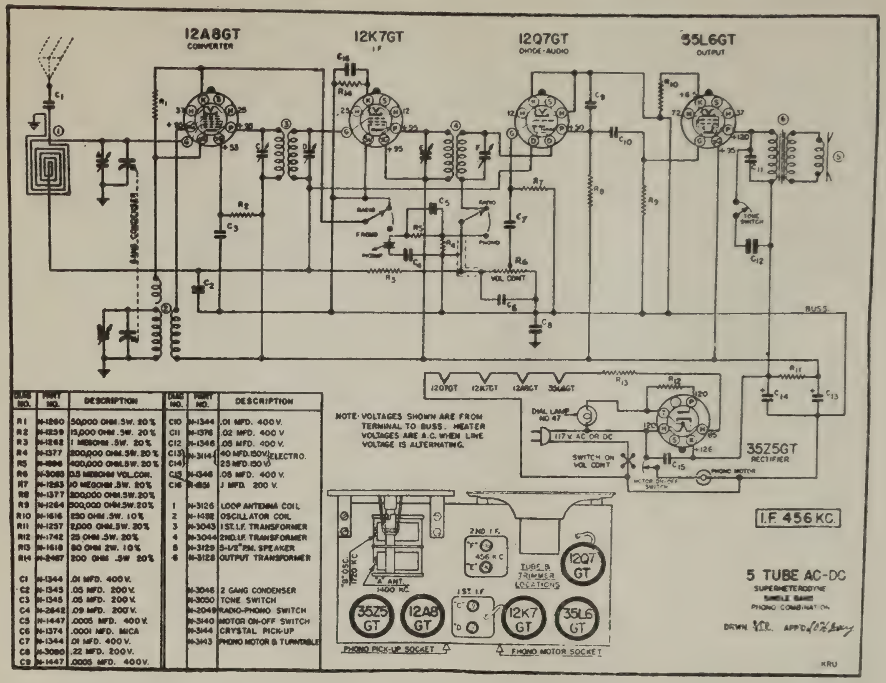
DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION (INDICATED BY DIAL)	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST	1500 KC	6	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST DETECTOR	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	6 MC	10	INTERMEDIATE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	TUNE TO 6 MC GENERATOR SIGNAL	11	INTERMEDIATE ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	20 MC	12	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	TUNE TO 20 MC GENERATOR SIGNAL	13	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED





MODEL S-7406-5

FIRESTONE TIRE & RUBBER CO.



NOTE· VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%	C10	N-1344	.01 MFD. 400V.
R2	N-1259	15,000 OHM .5W. 20%	C11	N-1376	.02 MFD. 400 V
R3	N-1262	1 MEGOHM .5W. 20%	C12	N-1346	.05 MFD. 400 V.
R4	N-1377	200,000 OHM .5W. 20%	C13	N-3114	40 MFD. 150V. ELECTRO.
R5	N-1896	400,000 OHM .5W. 20%	C14		25 MFD. 150 V.
R6	N-3063	0.5 MEGOHM VOL. CON.	C15	N-1346	.05 MFD. 400 V.
R7	N-1263	10 MEGOHM .5W. 20%	C16	N-1651	.1 MFD. 200 V.
R8	N-1377	200,000 OHM .5W. 20%			
R9	N-1264	500,000 OHM .5W. 20%	1	N-3126	LOOP ANTENNA COIL
R10	N-1616	230 OHM .5W. 10%	2	N-1452	OSCILLATOR COIL
R11	N-1257	2,000 OHM .5W. 20%	3	N-3043	1ST. I.F. TRANSFORMER
R12	N-1742	25 OHM .5W. 20%	4	N-3044	2ND. I.F. TRANSFORMER
R13	N-1618	80 OHM 2W. 10%	5	N-3129	5-1/2" P.M. SPEAKER
R14	N-2487	200 OHM .5W 20%	6	N-3128	OUTPUT TRANSFORMER
C1	N-1344	.01 MFD. 400 V.			
C2	N-1345	.05 MFD. 200 V.		N-3046	2 GANG CONDENSER
C3	N-1345	.05 MFD. 200 V.		N-3050	TONE SWITCH
C4	N-2642	.09 MFD. 200 V.		N-2049	RADIO-PHONO SWITCH
C5	N-1447	.0005 MFD. 400 V.		N-3140	MOTOR ON-OFF SWITCH
C6	N-1374	.0001 MFD. MICA		N-3144	CRYSTAL PICK-UP
C7	N-1344	.01 MFD. 400 V.		N-3143	PHONO MOTOR & TURNTABLE
C8	N-3080	.22 MFD. 200 V.			
C9	N-1447	.0005 MFD. 400 V.			

TUNING RANGE AND DIAL CALIBRATION

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters). The upper scale is calibrated from 55 to 170 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries; also the popular 1712 kilocycle (KC) Police Band. Add a zero to figures on the scale to obtain kilocycles. The lower scale is calibrated directly in meters. If stations are listed by kilocycles (KC), use the upper scale and if they are listed by meters use the lower scale.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

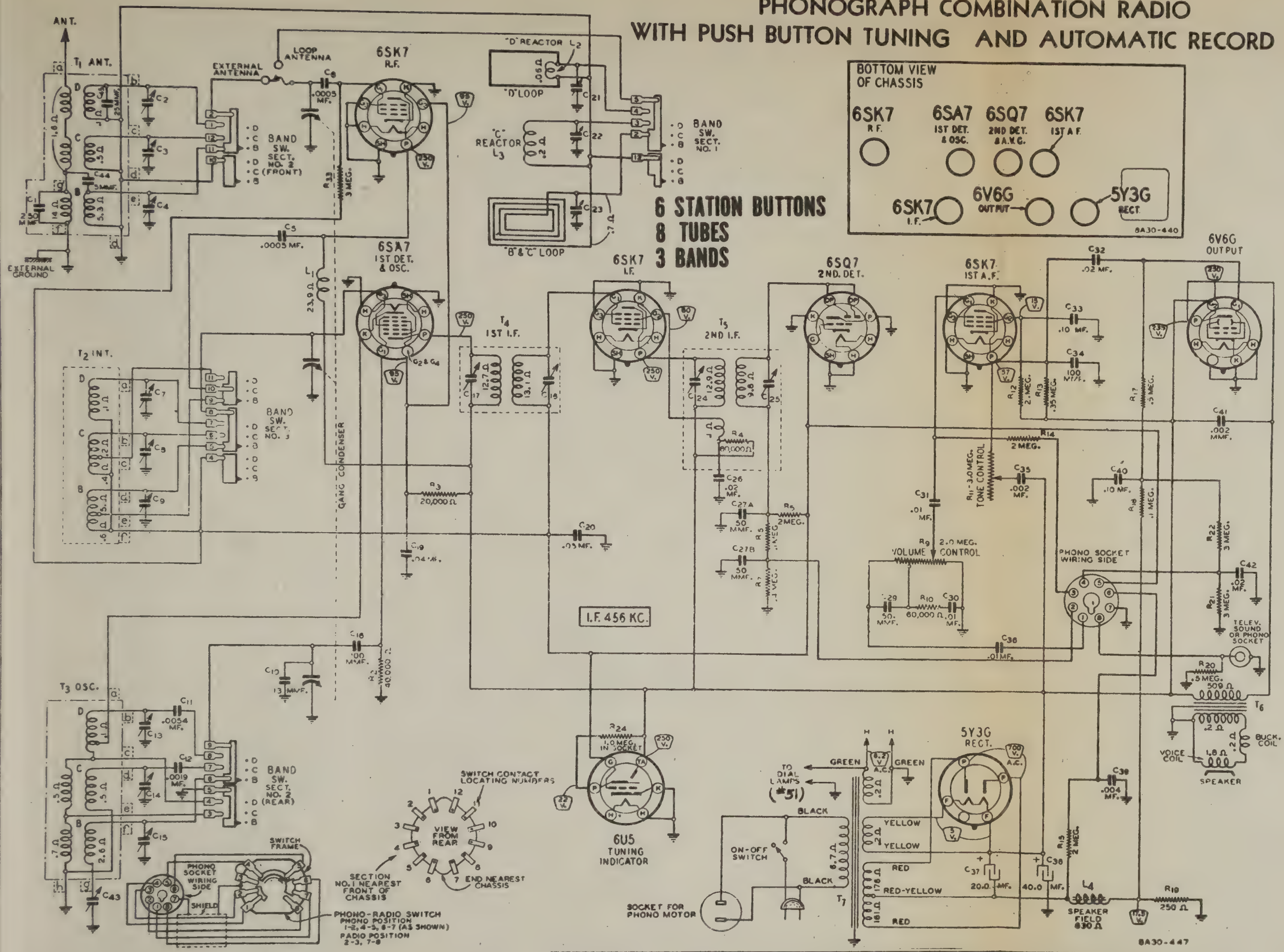
BROADCAST BAND ALIGNMENT. Remove chassis, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set up on a metal bench.

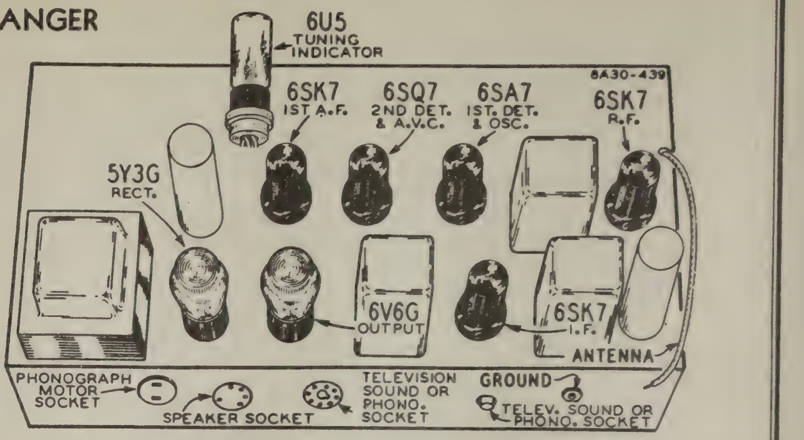
Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

CAUTION: NEVER LEAVE RECORDS ON TURNTABLE, EXCEPT WHILE PLAYING THEM. THE RECORDS WILL BECOME DAMAGED BY WARPING

GAMBLE-SKOGMO, INC.

PHONOGRAPH COMBINATION RADIO WITH PUSH BUTTON TUNING AND AUTOMATIC RECORD CHANGER





Antenna and Ground

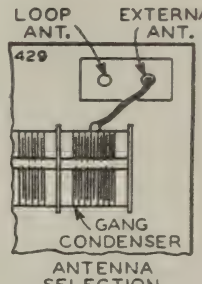
Two loop antennas are incorporated in the speaker chamber and may be used for broadcast band and short wave reception. For the reception of local or nearby stations, an outside antenna is usually not required. The use of the loop antenna may, in some locations, provide best broadcast band operation.

In general, however, more stations will be heard and noise will sometimes be reduced by using an outside antenna.

For best reception of short wave stations, an outside antenna is recommended.

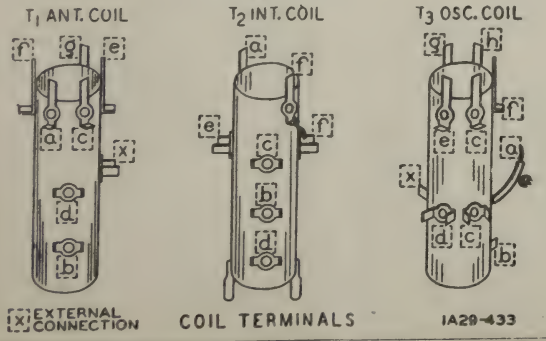
A white wire will be found coming out of the chassis. Connect this wire to the outside antenna lead.

On the back panel of the chassis base is a screw (marked GND) under which the ground wire should be fastened.



ANTENNA SELECTION SOCKET

ANTENNA SELECTION SOCKET—At the right front corner of the chassis base (from back of cabinet) is a 2 hole pin tip socket—See illustration. If it is desired to operate the radio using the loop antennas, the pin tip should be inserted in the hole farthest from the side of the chassis. If it is desired to operate the radio using an external antenna, insert the pin tip in the hole nearest the side of the chassis. The socket may be reached after removing the four wing nuts holding the cover over the opening in the cabinet back.



SPECIFICATIONS

Power Consumption	71 Watts (At 117 volts 60 cycles) 88 Watts (Phonograph Operating)
Power Output	4.0 Watts Undistorted 5.0 Watts Maximum
Selectivity	30 KC Broad at 1000 times Signal
Intermediate Frequency	456 KC
Speaker	10" Electro-Dynamic

Receivers of this model which are to be used on 25 cycle, 230 volt, or other service are so marked on label.

Tuning Frequency Range

B Range	528 to 1730 KC
C Range	2200 to 7000 KC
D Range	7000 to 22000 KC

Sensitivity (For 0.5 Watt output)

B Range	1.0 Microvolt Average
C Range	1.0 Microvolt Average
D Range	3.0 Microvolts Average

FOR OTHER DATA SEE INDEX

Important—A good antenna and ground are essential for best operation of this radio. Connections should be clean and tight. Do not use an old outside antenna as in most cases it will be unsatisfactory.

Voltages at Sockets

Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C24) & (C25)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) (C16 on 1A29) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

NOTE B—If the pointer is not at 1500 KC on the dial remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on schematic page.

Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Drive Cord Replacement

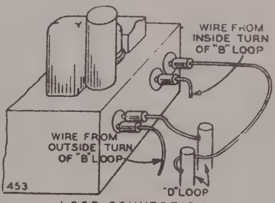
Use a drive cord approximately 70 inches in length. Tie a large knot with a small loop at one end of the new drive cord. Thread other end of cord up through hole in rim of condenser drive pulley. Pull cord through hole until large knot is flush against pulley rim.

Turn gang condenser to completely closed position. Remove guide arm from front of chassis—See illustration.

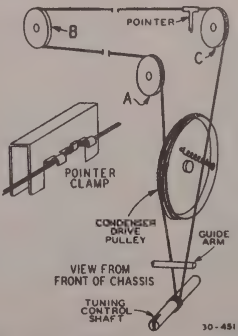
Wind ¼ turn in a clockwise direction (from right side of chassis) around condenser drive pulley. Wind cord over pulleys A, B, and C as shown. Wind 4½ turns in a clockwise direction (from front of chassis) around tuning control shaft. Turns should progress toward the chassis.

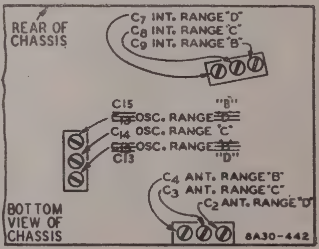
Wind 1¾ turns in a clockwise direction (from right side of chassis) around condenser drive pulley. This turn should be at left side (from front of chassis) of pulley groove. Pass cord through hole in pulley rim. Secure tension spring to cord loop. Knot other end of cord to spring. Stretch spring and secure free end to hook on drive pulley. Replace guide arm.

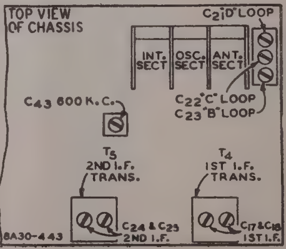
Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.


WIRE FROM INSIDE TURN OF "B" LOOP
WIRE FROM OUTSIDE TURN OF "B" LOOP
453
"D" LOOP

LOOP CONNECTIONS

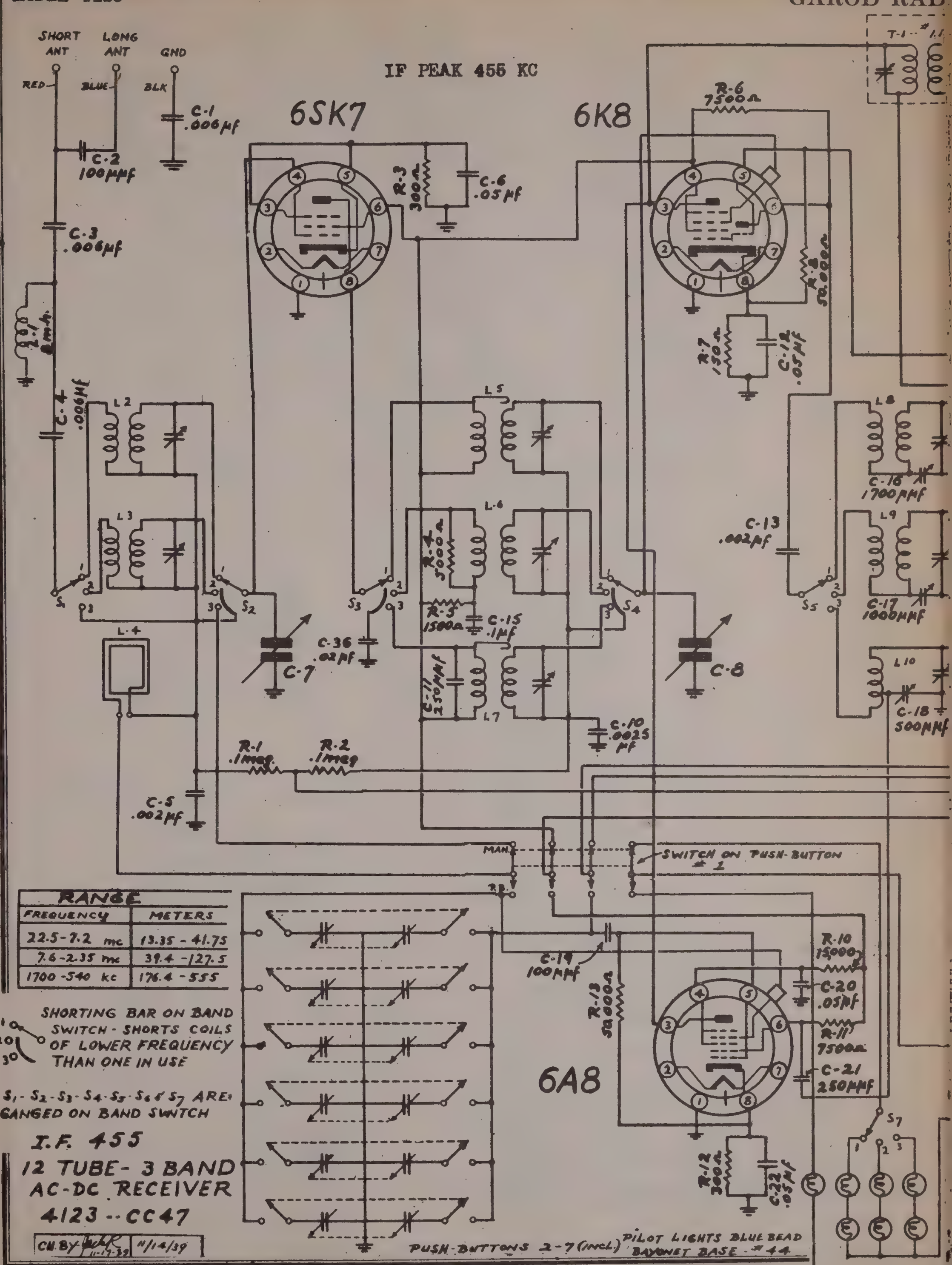






MODEL 4123

GAROD RAD



RANGE	
FREQUENCY	METERS
22.5-7.2 mc	13.35 - 41.75
7.6-2.35 mc	39.4 -127.5
1700 -540 kc	176.4 -555

1 2 3 SHORTING BAR ON BAND SWITCH - SHORTS COILS OF LOWER FREQUENCY THAN ONE IN USE

S_1-S_2-S_3-S_4-S_5-S_6 & S_7 ARE GANGED ON BAND SWITCH

I.F. 455

12 TUBE- 3 BAND AC-DC RECEIVER

4123 -- CC47

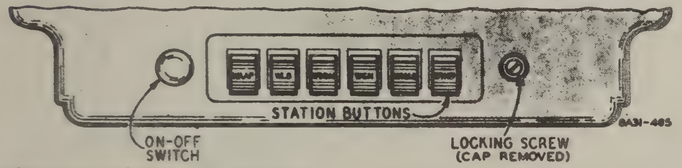
CH. BY 11-17-39	11/14/39

MODULATION HUM Dec.8,1939.

In case modulation hum (hum with signal) is encountered on the above model , the trouble may be due to the 6SK7 1st A.F. tube. Interchange this tube with the 6SK7 R.F and 6SK7 I.F. tubes. Note the results. The 6SK7 1st A.F. tube may be left in either the R.F. or I.F. tube sockets if the arrangement reduces the hum.

If the hum is still appreciable after the above procedure try out several new 6SK7 1st A.F. tubes. Use the one which reduces the hum to a minimum.

Setting the Station Buttons



There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Setting a Station Button

Turn the manual tuning knob so that the pointer moves toward 1700 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon —See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handle screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob using the tuning eye as a guide.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way down*. It will go down easily at first and then a firm gentle pressure must be applied to push it down the rest of the way. It is better to start with the left hand button.

Hold *this* button all the way down. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way down.*

Release the button after the station is tuned in.

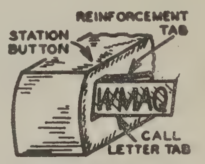
Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way down. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob so that the pointer moves toward 1700 KC until the stop is reached. Then, with the SMALL HANDLE screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Television Sound Connections

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the back panel of the chassis base is a socket to which is connected the phono cable shielded pin tip. Upon removal of this pin tip, the connector on the cable from a television receiver can be inserted in the socket. (The cable connector must be a single shielded pin tip type, part No. M93.)

When Television sound reproduction is desired, the knob located above the dial of the radio should be turned to the Phonograph (P) position. For radio reception, the knob should be in the Radio (R) position.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO				
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C24) & (C25)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) (C16 ON 1A29) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

NOTE B—If the pointer is not at 1500 KC on the dial remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on schematic page.

Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Drive Cord Replacement

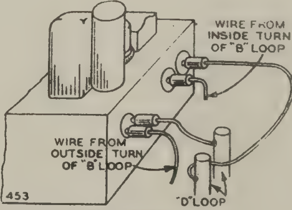
Use a drive cord approximately 70 inches in length. Tie a large knot with a small loop at one end of the new drive cord. Thread other end of cord up through hole in rim of condenser drive pulley. Pull cord through hole until large knot is flush against pulley rim.

Turn gang condenser to completely closed position. Remove guide arm from front of chassis—See illustration.

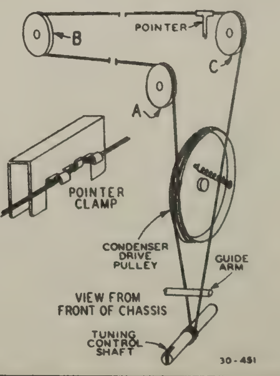
Wind ¼ turn in a clockwise direction (from right side of chassis) around condenser drive pulley. Wind cord over pulleys A, B, and C as shown. Wind 4½ turns in a clockwise direction (from front of chassis) around tuning control shaft. Turns should progress toward the chassis.

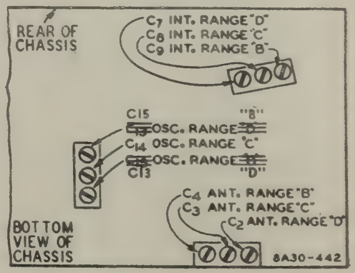
Wind 1¾ turns in a clockwise direction (from right side of chassis) around condenser drive pulley. This turn should be at left side (from front of chassis) of pulley groove. Pass cord through hole in pulley rim. Secure tension spring to cord loop. Knot other end of cord to spring. Stretch spring and secure free end to hook on drive pulley. Replace guide arm.

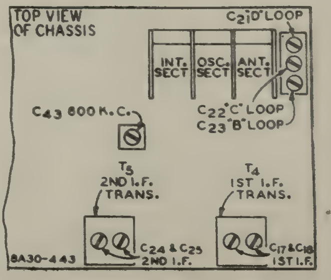
Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.


WIRE FROM INSIDE TURN OF "B" LOOP
WIRE FROM OUTSIDE TURN OF "B" LOOP
"D" LOOP
453

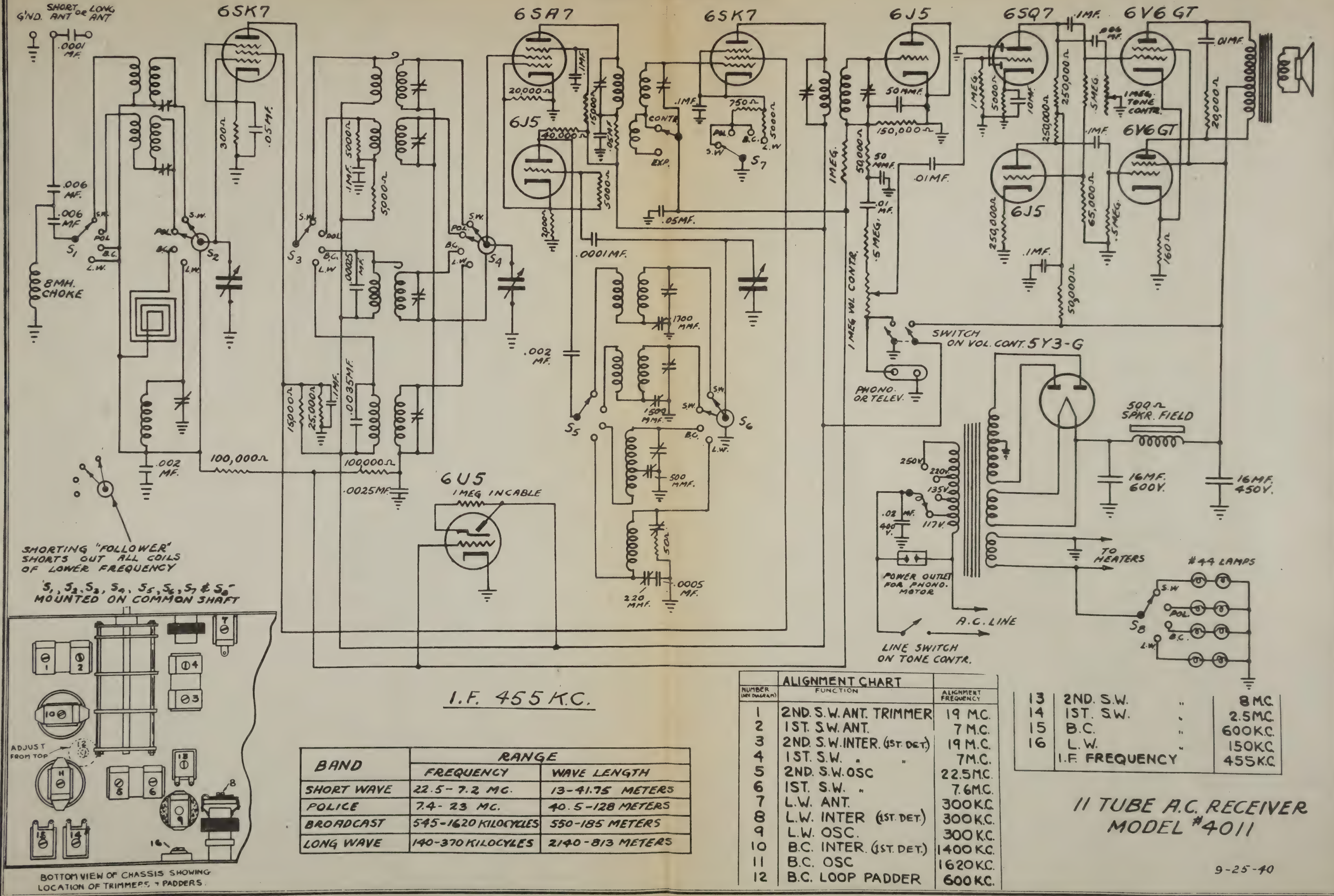
LOOP CONNECTIONS







GAROD RADIO CORP.



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS + PADDERS.

I.F. 455 K.C.

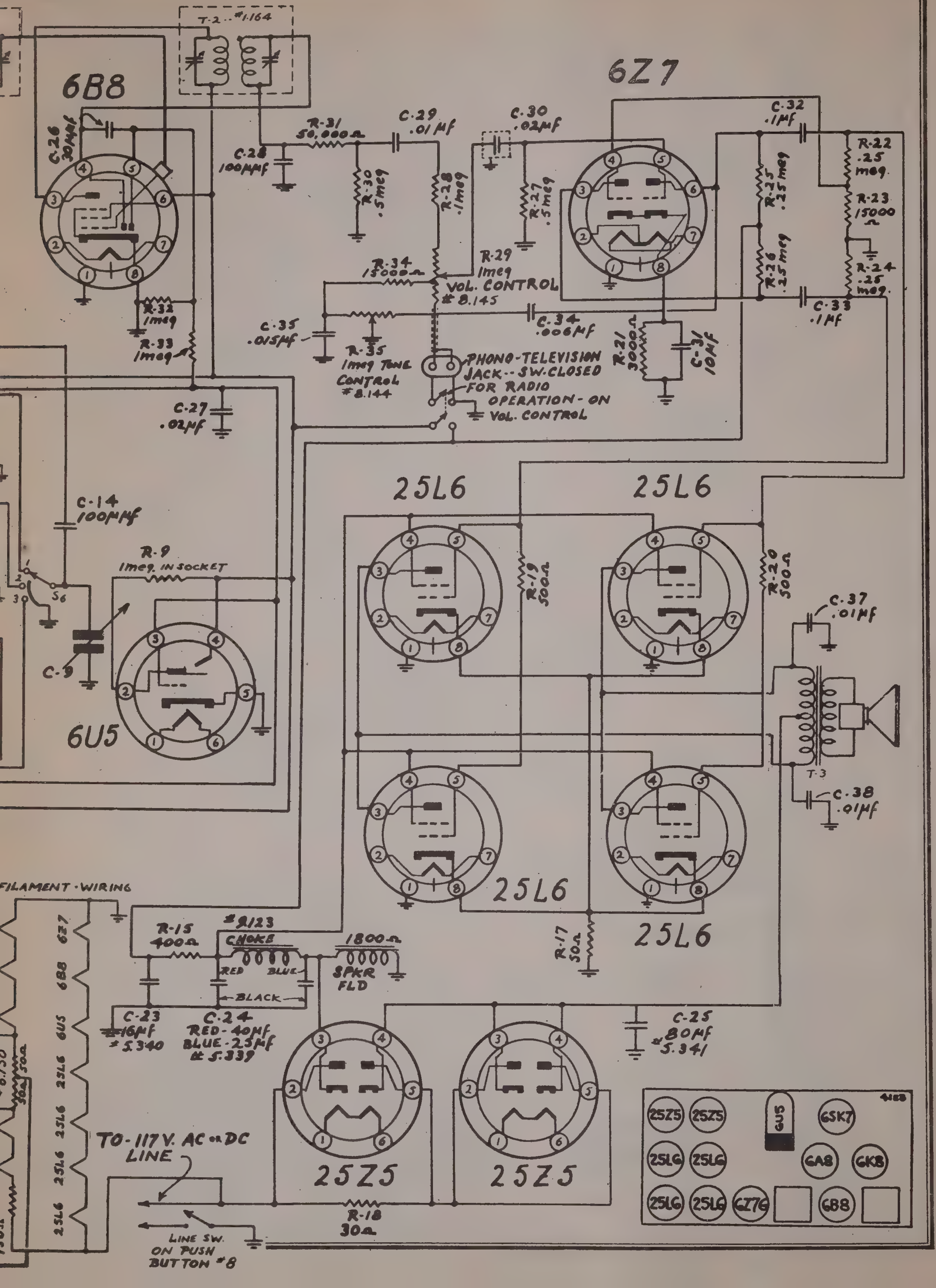
BAND	RANGE	
	FREQUENCY	WAVE LENGTH
SHORT WAVE	22.5-7.2 MC.	13-41.75 METERS
POLICE	7.4-23 MC.	40.5-128 METERS
BROADCAST	545-1620 KILOCYCLES	550-185 METERS
LONG WAVE	140-370 KILOCYLES	2140-813 METERS

ALIGNMENT CHART

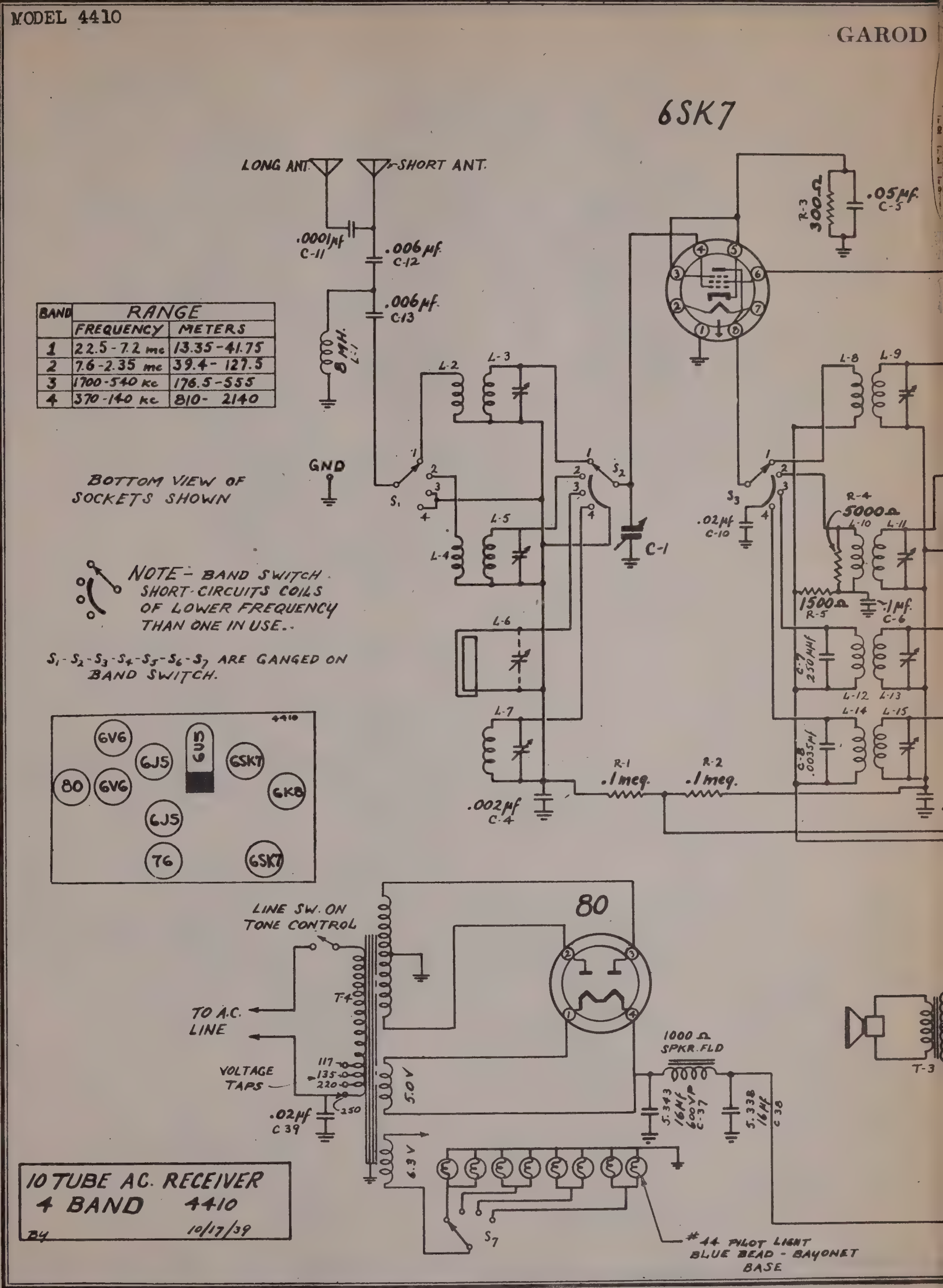
NUMBER (SEE DIAGRAM)	FUNCTION	ALIGNMENT FREQUENCY
1	2ND. S.W. ANT. TRIMMER	19 M.C.
2	1ST. S.W. ANT.	7 M.C.
3	2ND. S.W. INTER. (1ST. DET.)	19 M.C.
4	1ST. S.W. " "	7M.C.
5	2ND. S.W. OSC	22.5M.C.
6	1ST. S.W. "	7.6M.C.
7	L.W. ANT.	300K.C.
8	L.W. INTER (1ST. DET.)	300K.C.
9	L.W. OSC.	300K.C.
10	B.C. INTER. (1ST. DET.)	1400K.C.
11	B.C. OSC	1620K.C.
12	B.C. LOOP PADDER	600K.C.
13	2ND. S.W. "	8M.C.
14	1ST. S.W. "	2.5M.C.
15	B.C. "	600K.C.
16	L.W. "	150K.C.
	I.F. FREQUENCY	455K.C.

11 TUBE A.C. RECEIVER
MODEL #4011

9-25-40


T-2 - #1.164
6B8
C-26 30μμf
C-28 100μμf
R-31 50,000Ω
C-29 .01μf
R-30 .5meg
R-28 .1meg
C-30 .02μf
R-27 .5meg
6Z7
C-32 .1μf
R-22 .25 meg.
R-25 .25meg
R-23 15000Ω
R-26 .25meg
R-24 .25 meg.
C-33 .1μf
R-21 3000Ω
C-31 10μf
R-34 15000Ω
R-29 1meg VOL. CONTROL #8.145
C-34 .006μf
C-35 .015μf
R-35 1meg TONE CONTROL #8.144
PHONO-TELEVISION JACK-- SW. CLOSED FOR RADIO OPERATION - ON VOL. CONTROL
R-32 1meg
R-33 1meg
C-27 .02μf
C-14 100μμf
R-9 1meg. IN SOCKET
S6
C-9
6U5
25L6
25L6
R-19 500Ω
R-20 500Ω
C-37 .01μf
T-3
C-38 .01μf
25L6
25L6
R-17 30Ω
FILAMENT-WIRING
6Z7
6B8
6U5
25L6
25L6
25L6
25L6
R-15 400Ω
#9.123 CHOKE
RED
BLUE
BLACK
1800Ω SPKR FLD
C-23 16μf #5.340
C-24 RED-40μf BLUE-25μf #5.339
C-25 80μf #5.341
25Z5
25Z5
TO-117V. AC or DC LINE
R-18 30Ω
LINE SW. ON PUSH BUTTON #8
25Z5
25Z5
6U5
6SK7
25L6
25L6
6A8
6K8
25L6
25L6
6Z7G
6B8

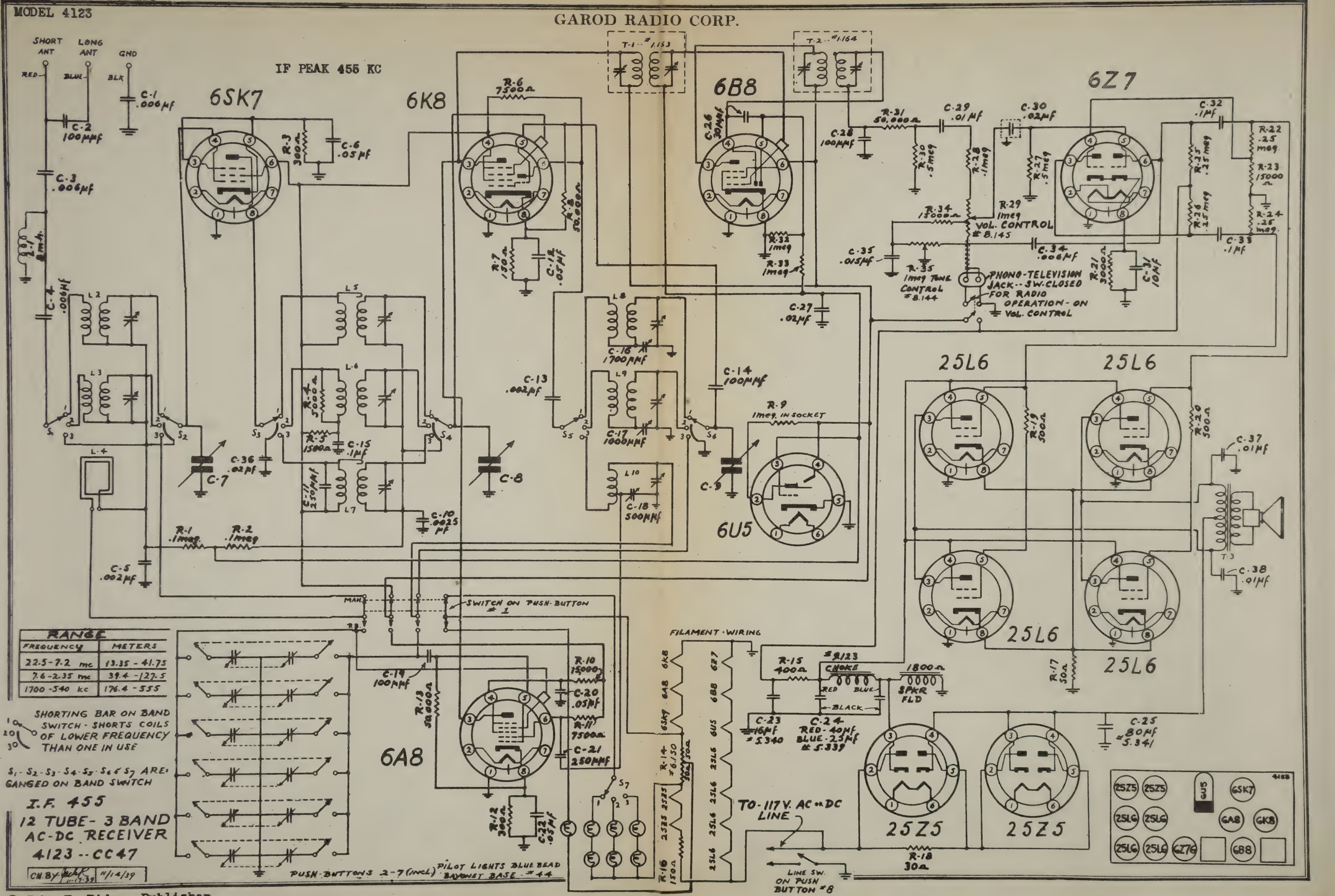
MODEL 4410



BAND	RANGE	
	FREQUENCY	METERS
1	22.5-7.2 mc	13.35-41.75
2	7.6-2.35 mc	39.4-127.5
3	1700-540 kc	176.5-555
4	370-140 kc	810-2140

MODEL 4123

GAROD RADIO CORP.



RANGE	
FREQUENCY	METERS
22.5-7.2 mc	13.35 - 41.75
7.6-2.35 mc	39.4 -127.5
1700 -540 kc	176.4 - 555

SHORTING BAR ON BAND SWITCH - SHORTS COILS OF LOWER FREQUENCY THAN ONE IN USE

S1 - S2 - S3 - S4 - S5 - S6 & S7 ARE GANGED ON BAND SWITCH

I.F. 455

12 TUBE - 3 BAND AC-DC RECEIVER

4123 -- CC47

CH. BY 11-17-39 11/14/39

GAROD RADIO CORP.

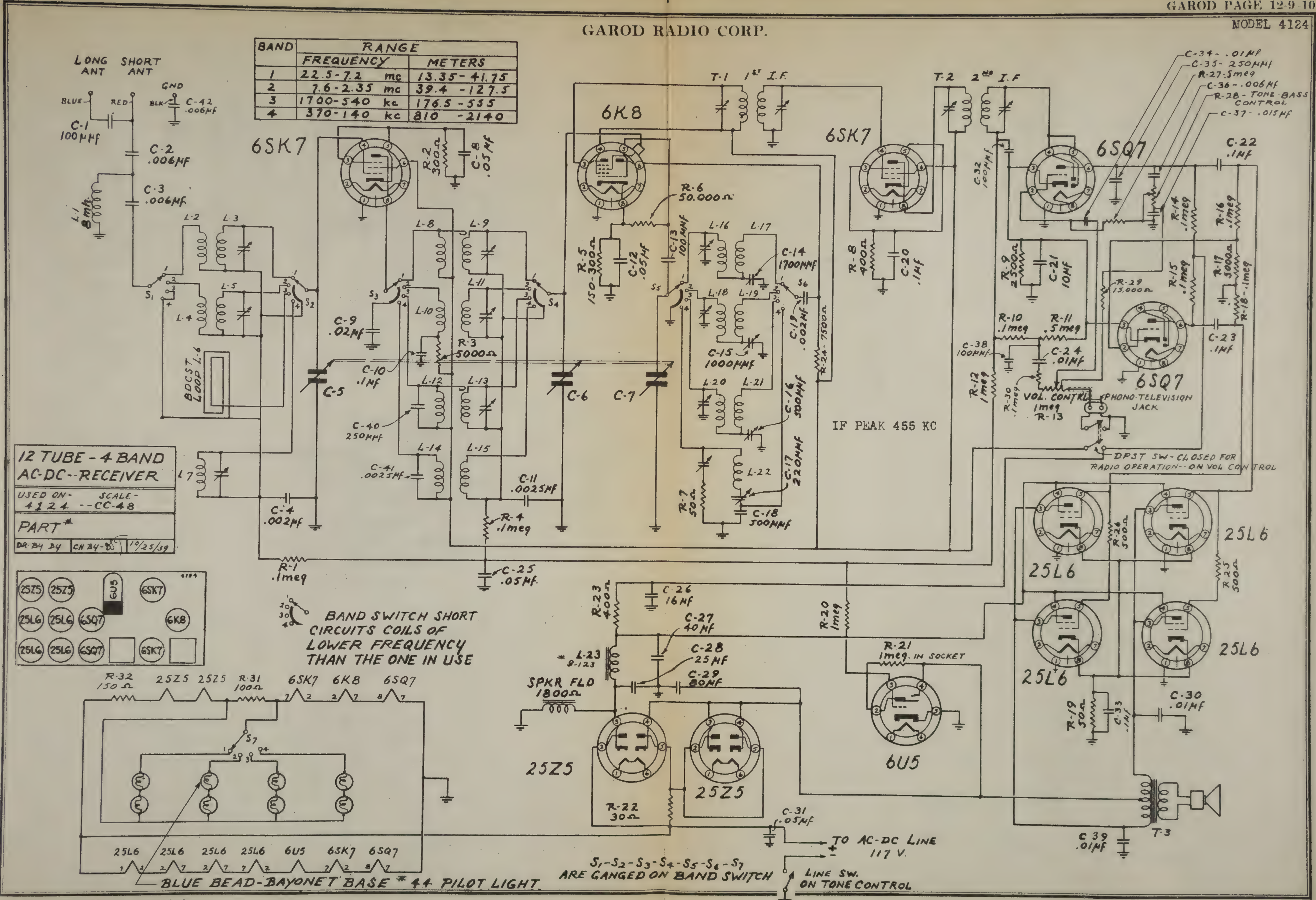
BAND	RANGE			
	FREQUENCY		METERS	
1	22.5-7.2	mc	13.35-41.75	
2	7.6-2.35	mc	39.4 -127.5	
3	1700-540	kc	176.5 -555	
4	370-140	kc	810 -2140	

12 TUBE - 4 BAND
AC-DC--RECEIVER

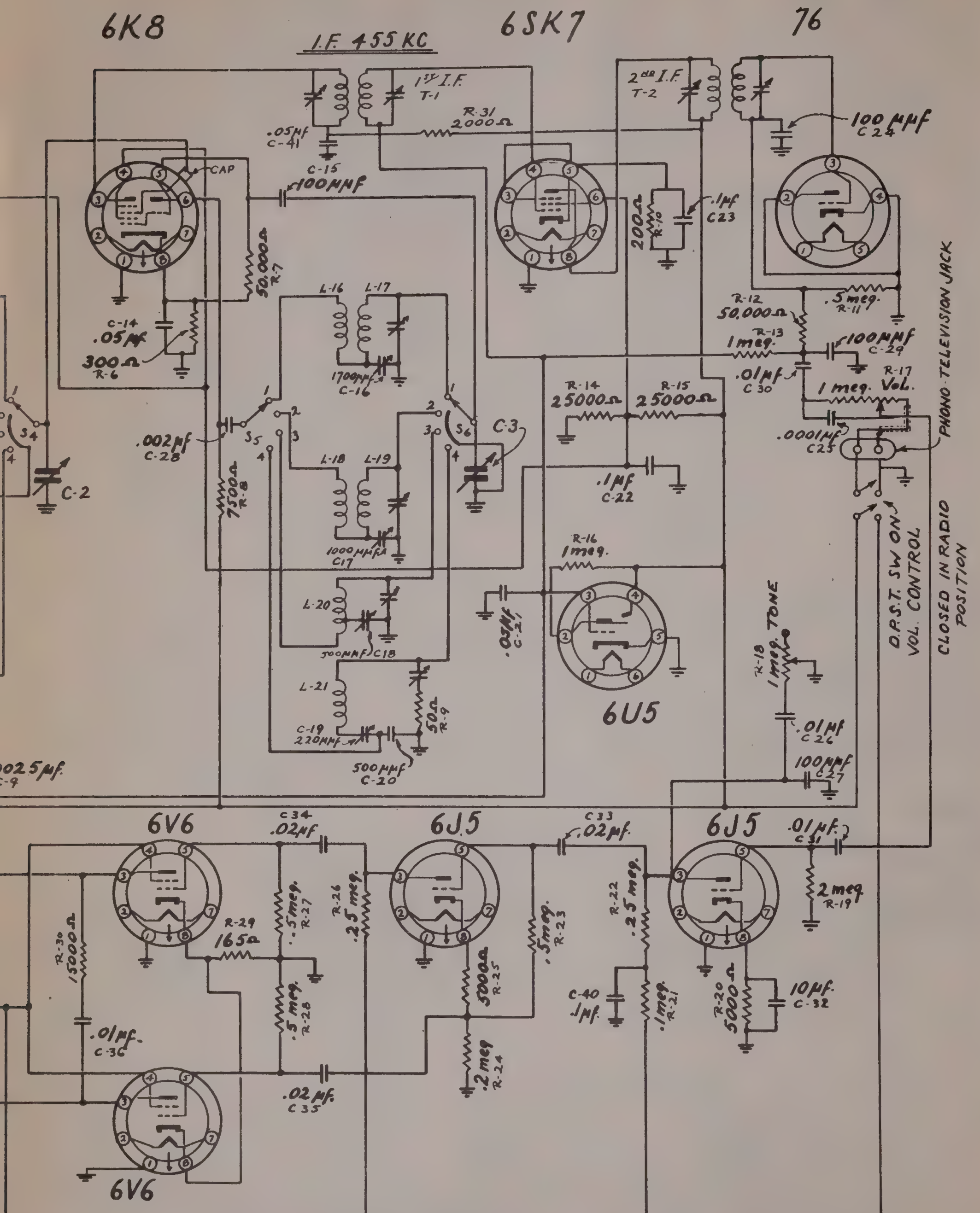
USED ON- 4124 SCALE- --CC-48

PART *

DR BY By CH BY 10/25/39

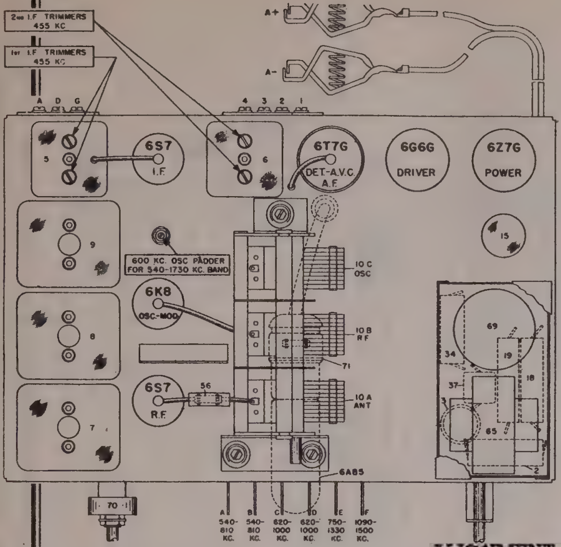


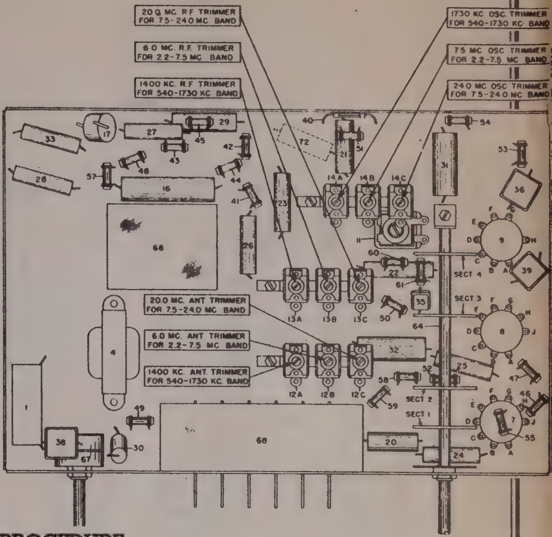
RADIO CORP.


6K8
I.F. 455 KC
6SK7
76
1ST I.F. T-1
2ND I.F. T-2
R-31 2000Ω
.05μf C-41
C-15 100MMF
CAP
100 μμf C24
.1μf C23
200Ω R-10
50,000Ω R-7
C-14 .05μf
300Ω R-6
L-16
L-17
1700μμf C-16
S4
S5
S6
C-3
C-2
.002μf C-28
7500Ω R-8
L-18
L-19
1000μμf C17
L-20
500μμf C18
L-21
C-19 220μμf
50Ω R-9
500μμf C-20
.0025μf C-9
R-12 50,000Ω
.5meg. R-11
R-13 1meg.
100μμf C-29
.01μf C30
R-17 1meg. Vol.
R-14 25000Ω
R-15 25000Ω
.0001μf C25
.1μf C-22
PHONO·TELEVISION JACK
D.P.S.T. SW ON VOL. CONTROL
CLOSED IN RADIO POSITION
R-16 1meg.
.05μf C-21
6U5
R-18 1meg. TONE
.01μf C26
100μμf C27
6V6
C34 .02μf
6J5
C33 .02μf
6J5
.01μf C31
R-30 15000Ω
R-29 165Ω
.5meg. R-27
R-26 .25meg.
.5meg. R-23
R-22 .25meg.
2meg. R-19
.5meg. R-28
5000Ω R-25
C-40 .1μf
.1meg. R-21
R-20 5000Ω
10μf C-32
.01μf C-36
.2meg R-24
.02μf C35
6V6

MODEL JB-72

GENERAL ELECTRIC CO.




20.0 MC. R.F. TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC BAND
1400 KC. R.F TRIMMER FOR 540-1730 KC BAND
1730 KC OSC. TRIMMER FOR 540-1730 KC. BAND
7.5 MC OSC TRIMMER FOR 2.2-7.5 MC BAND
24.0 MC OSC TRIMMER FOR 7.5-24.0 MC BAND
20.0 MC. ANT TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC. ANT TRIMMER FOR 2.2-7.5 MC BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
14A 14B 14C
13A 13B 13C
12A 12B 12C
SECT 4
SECT 3
SECT 2
SECT 1

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator: consisting of:	Attach output of test oscillator to:	
I.F. ALIGNMENT use any band position	Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap	Adjust each of the second I.F. transforme trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output
	3 Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.2 TO 7.5 M.C. BAND	1 Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	2 Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output
7.5 TO 24 M.C. BAND	1 Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer fo maximum output—be sure to use prope peak. The image of the 24 M. C. Signal should be heard at 24.91 M. C. when the correct peak is used.
	2 Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna and R.F. trimmers for maximum output

THE FOLLOWING DATA WILL BE USEFUL TO SERVICE MEN EQUIPPED WITH VACUUM-TUBE VOLTMETERS OR SIMILAR VOLTAGE MEASURING INSTRUMENTS: †

(1) Stage Gains

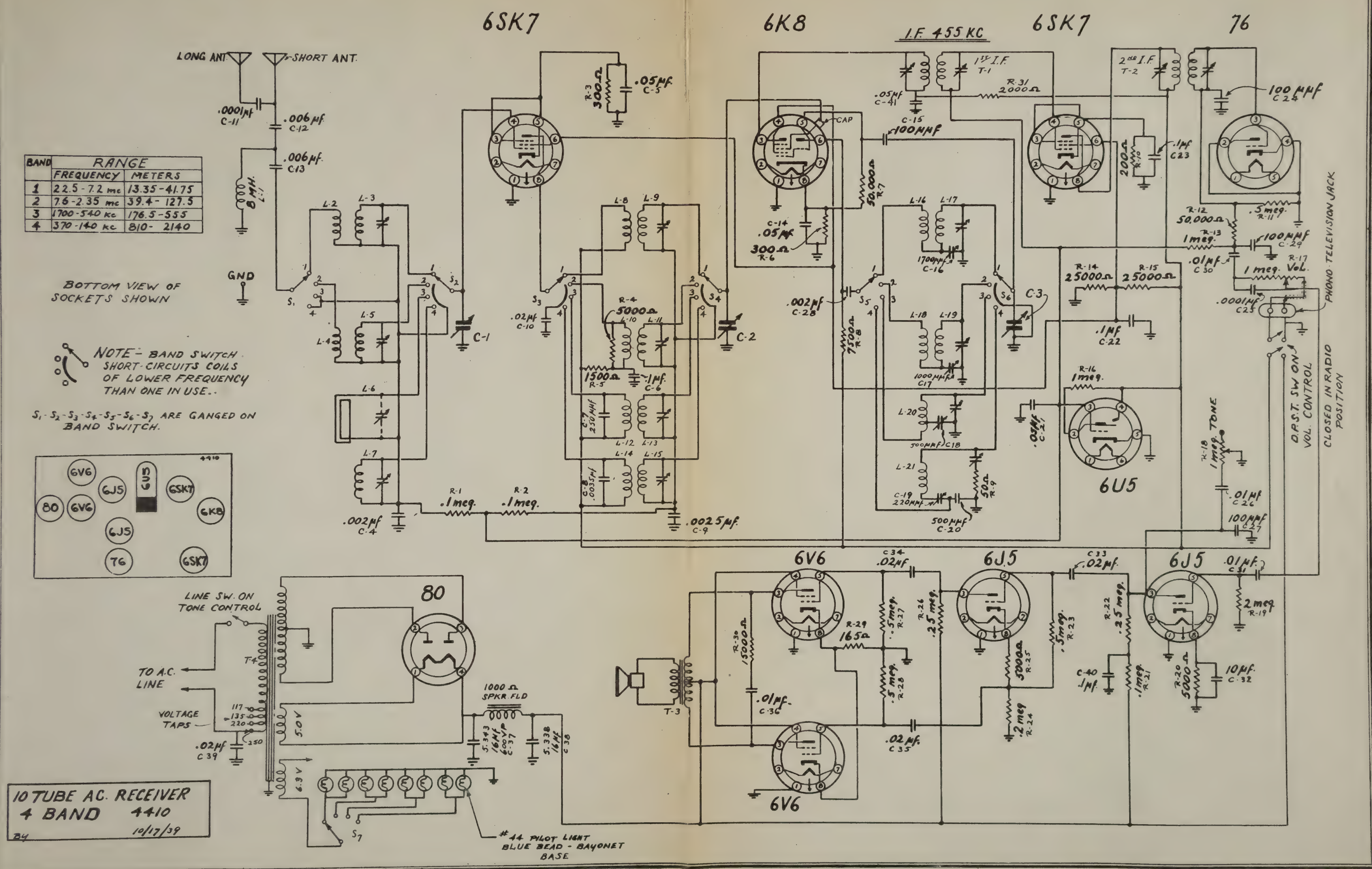
	Gain †
Antenna Post to 6S7 R. F. Grid	8 at 1000 KC
6S7 R. F. Grid to 6K8 Converter Grid	12 at 1000 KC
6K8 Converter Grid to 6S7 I. F. Grid	28 at 455 KC
6S7 I. F. Grid to 6T7G Diode Plate	50 at 455 KC

(2) Audio Gain
A 400 cycle signal of .05 volts across volume control will give approximately ½ watt speaker output. Volume control turned to maximum.)

(3) DC voltage developed across oscillator grid resistor (50) averages 15 volts at 1000 KC.

† Variations of +10% —20% permissible.

GAROD RADIO CORP.



BAND	RANGE	
	FREQUENCY	METERS
1	22.5 - 7.2 mc	13.35 - 41.75
2	7.6 - 2.35 mc	39.4 - 127.5
3	1700 - 540 kc	176.5 - 555
4	370 - 140 kc	810 - 2140

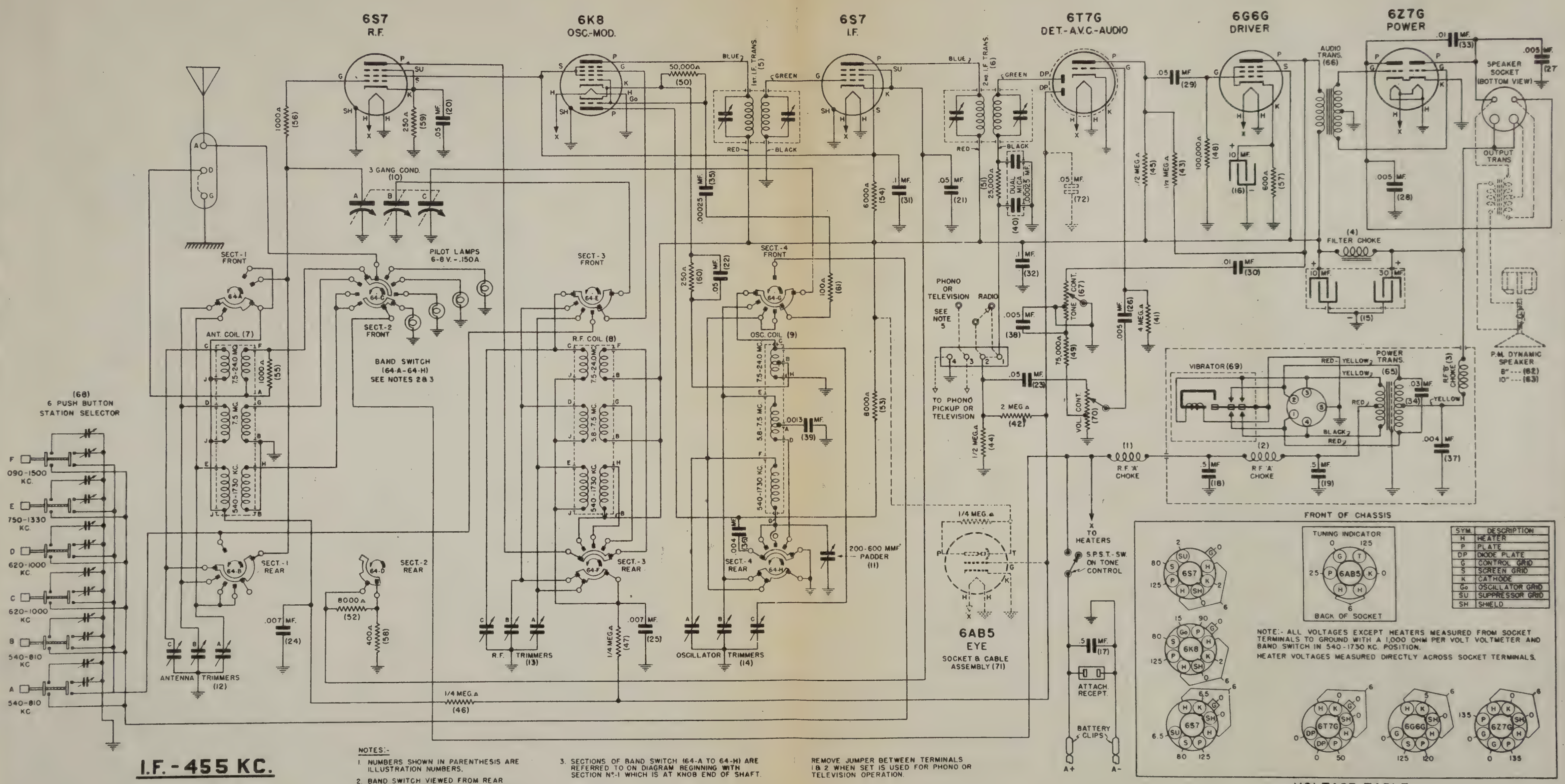
BOTTOM VIEW OF SOCKETS SHOWN

NOTE - BAND SWITCH SHORT-CIRCUITS COILS OF LOWER FREQUENCY THAN ONE IN USE..

S_1-S_2-S_3-S_4-S_5-S_6-S_7 ARE GANGED ON BAND SWITCH.

10 TUBE AC. RECEIVER
4 BAND 4410
By 10/17/39

GENERAL ELECTRIC CO.



SYM.	DESCRIPTION
H	HEATER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
S	SCREEN GRID
K	CATHODE
Go	OSCILLATOR GRID
SU	SUPPRESSOR GRID
SH	SHIELD

NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER AND BAND SWITCH IN 540-1730 KC. POSITION.

HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

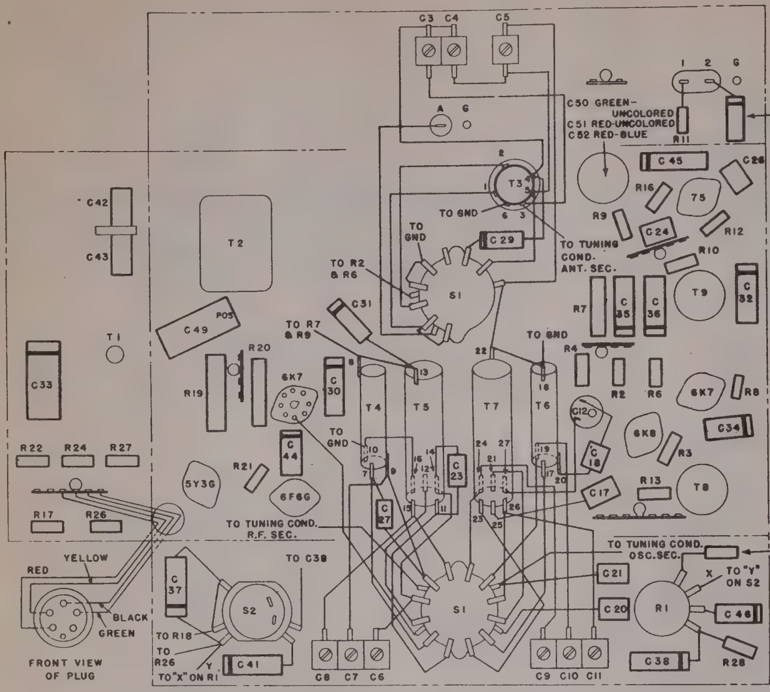
I.F. - 455 KC.

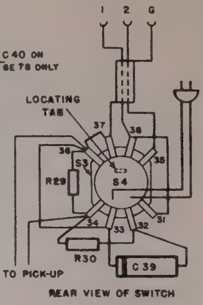
NOTES:-

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH VIEWED FROM REAR SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION.
3. SECTIONS OF BAND SWITCH (64-A TO 64-H) ARE REFERRED TO ON DIAGRAM BEGINNING WITH SECTION No.-1 WHICH IS AT KNOB END OF SHAFT.

REMOVE JUMPER BETWEEN TERMINALS 1 & 2 WHEN SET IS USED FOR PHONO OR TELEVISION OPERATION.

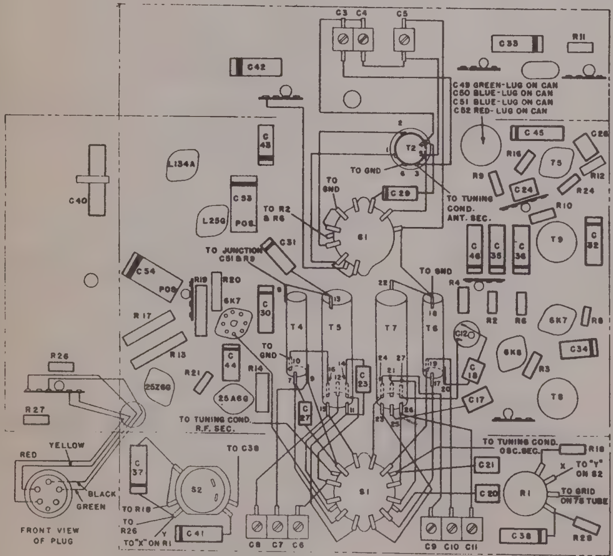
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)



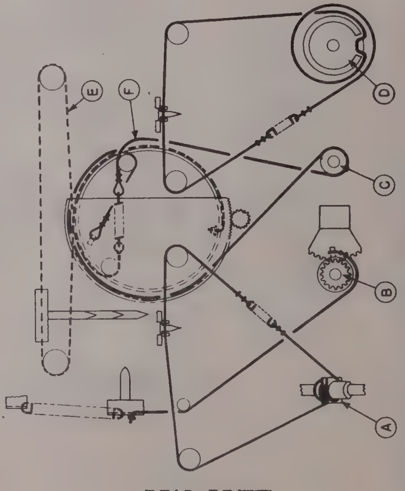


FOR GE 78 ONLY

Chassis Parts Layout (GE-73 and GE-78)

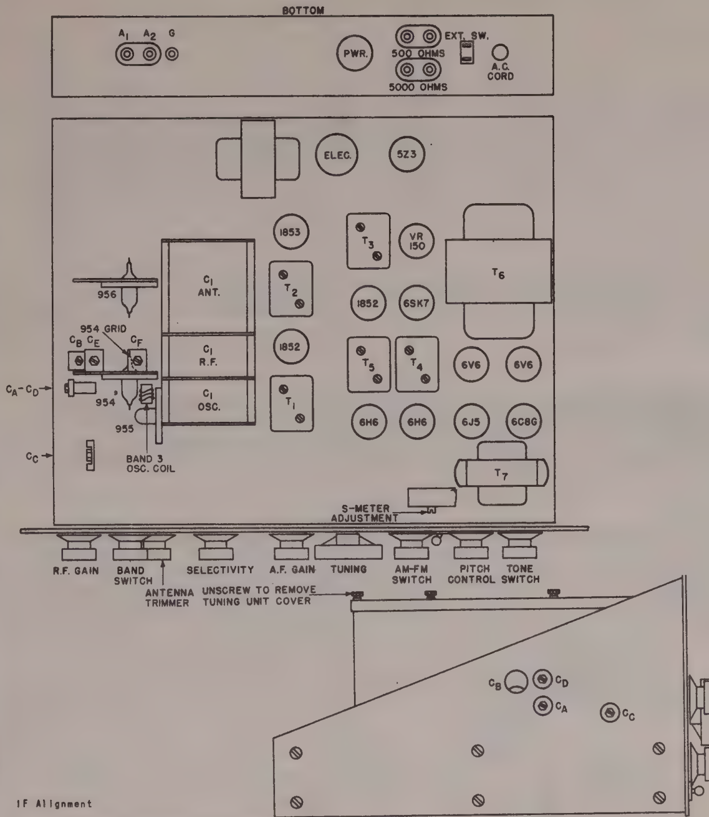


Chassis Parts Layout (GDE-73)



DIAL DRIVE

Models GE-73, GE-78, and GDE-73



IF Alignment

Connect a signal generator to the grid of the 954 converter tube. Use either a small clip or a piece of flexible wire wound around the grid terminal. Do not attempt to solder to the tube as the heat is certain to crack the glass. Connect a suitable output meter across the speaker terminals.

Controls should be set as follows:

RF gain control at maximum sensitivity.
Band switch in band 2.
Selectivity switch in sharp position.
AM-FM switch in AM position.

Audio gain control in maximum position.
AVC switch in off position.
ANL switch in off position.
BFO switch in off position.

Tune the signal generator to 5.25 megacycles and align transformers T_1, T_2, T_3 and T_4 for maximum response.

A bakelite screw-driver with a metal or insulated tip is necessary for accurate alignment.

This alignment process should be repeated at least once to assure greatest possible selectivity.

To align the "discriminator" transformer (T_5) turn the selectivity switch to the broad position and the AM-FM switch to the AM position.

Leave the signal generator set at the frequency originally used for IF alignment with the modulation left on. Rotate the trimmer control across the discriminator (T_5) secondary (nearest the front of the chassis) until the signal drops to zero. As this point is approached very suddenly, turn the control very slowly. Now slightly detune the signal generator until the output meter gives a readable indication. Adjust the primary trimmer control of the discriminator transformer for maximum response.

Next detune the signal generator to either side of resonance and note the maximum output in each case as indicated on the output meter. These values should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary until the output rises an amount equal to about half the difference of the two outputs previously noted.

Retest for balance as above and readjust the primary till both maximum readings are alike when the signal generator is detuned to either side of resonance.

If a balance cannot be obtained, it is an indication that the discriminator secondary trimmer control has been adjusted off its proper center and will require a very slight readjustment in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a slight misadjustment will result in the distorted reception of frequency-modulated signals.

RF Alignment

Connect a high frequency signal generator to the antenna terminal (A_1) through a 75 ohm resistor and the ground of the generator to the ground terminal of the receiver. Leave terminal A_2 connected to the ground terminal.

The Ferris Signal Generator Model 18B is recommended for alignment purposes. If this is not available, harmonics of a standard signal generator may be used.

The controls should be set in the same position as for IF alignment.

Set the AM-FM switch in the AM position.
Set the bandswitch on band 1.
Tune the generator and receiver to 42 mc.

Adjust oscillator trimmer C_A until the signal is heard. The frequency of the oscillator is higher than that of the signal. Next adjust trimmer C_B and the antenna trimmer for maximum response.

Tune both receiver and signal generator to 28 megacycles and adjust padder C_C for maximum response while rocking the tuning control. Then repeat the alignment at the high frequency end as described.

BAND 2

Tune the receiver and signal generator to 75 megacycles. Adjust trimmer C_D until the signal is heard. In this band, the frequency of the oscillator is lower than that of the signal. Adjust the antenna trimmer and trimmer C_E for maximum response while rocking the gang condenser. No padder condenser adjustment is provided for the low-frequency end of this band.

BAND 3

Tune the receiver and signal generator to 120 megacycles. Adjust trimmer C_F and the antenna trimmer for maximum response while rocking the gang. It is not recommended that the frequency of the oscillator in this band be adjusted except at the factory. Should it be impractical to return the receiver to the factory for adjustment, then the following instructions are included.

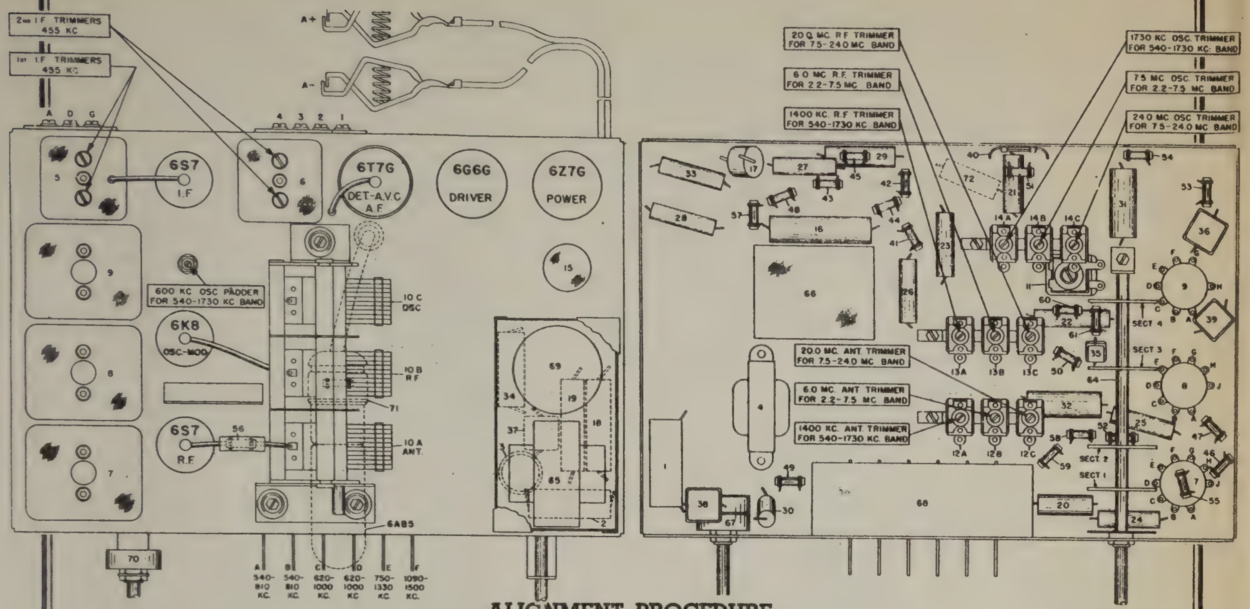
Remove the top cover and locate the high frequency oscillator coil. The white wire winding, one end of which is connected to a terminal on the form is the primary. By carefully shifting the free end of this winding the frequency can be changed over a sufficient range. This lead should be cemented in place with Q-Max or any other low loss cement when adjustment is completed.

Repeat the adjustment of C_F as described above after shifting the frequency of the oscillator.

As in band 2, the frequency of the oscillator is higher than that of the signal. No padder condenser adjustment is provided for the low frequency end of this band.

GENERAL ELECTRIC CO.

MODEL JB-72


2nd I.F. TRIMMERS 455 KC
1st I.F. TRIMMERS 455 KC
A+
A-
6S7 I.F.
6T7G DET-A.V.C. A.F.
6G6G DRIVER
6Z7G POWER
600 KC OSC PADDER FOR 540-1730 KC BAND
6K8 OSC-MOD
6S7 R.F
10C OSC
10B RF
10A ANT.
6AB5
20.0 MC R.F TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC R.F TRIMMER FOR 2.2-7.5 MC BAND
1400 KC R.F TRIMMER FOR 540-1730 KC BAND
1730 KC OSC TRIMMER FOR 540-1730 KC BAND
7.5 MC OSC TRIMMER FOR 2.2-7.5 MC BAND
24.0 MC OSC TRIMMER FOR 7.5-24.0 MC BAND
20.0 MC ANT TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC ANT TRIMMER FOR 2.2-7.5 MC BAND
1400 KC ANT TRIMMER FOR 540-1730 KC BAND
SECT 4
SECT 3
SECT 2
SECT 1
A 540-810 KC.
B 540-810 KC.
C 620-1000 KC.
D 620-1000 KC
E 750-1330 KC.
F 1090-1500 KC.

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:		TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator: consisting of:	Attach output of test oscillator to:	
I.F. ALIGNMENT use any band position	Any point where no interfering signal is received.		Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap	Adjust each of the second I.F. transforme trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output
	3	Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 60 K.C. oscillator padder for maximum output.
2.2 TO 7.5 M.C. BAND	1	Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	2	Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output
7.5 TO 24 M.C. BAND	1	Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer fo maximum output—be sure to use prope peak. The image of the 24 M. C. Signal should be heard at 24.91 M. C. when the correct peak is used.
	2	Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 2 M.C. antenna and R.F. trimmers for maximum output

THE FOLLOWING DATA WILL BE USEFUL TO SERVICE MEN EQUIPPED WITH VACUUM-TUBE VOLTMETERS OR SIMILAR VOLTAGE MEASURING INSTRUMENTS:

(1) Stage Gains

Stage Gains	Gain †
Antenna Post to 6S7 R. F. Grid	8 at 1000 KC
6S7 R. F. Grid to 6K8 Converter Grid	12 at 1000 KC
6K8 Converter Grid to 6S7 I. F. Grid	28 at 455 KC
6S7 I. F. Grid to 6T7G Diode Plate	50 at 455 KC

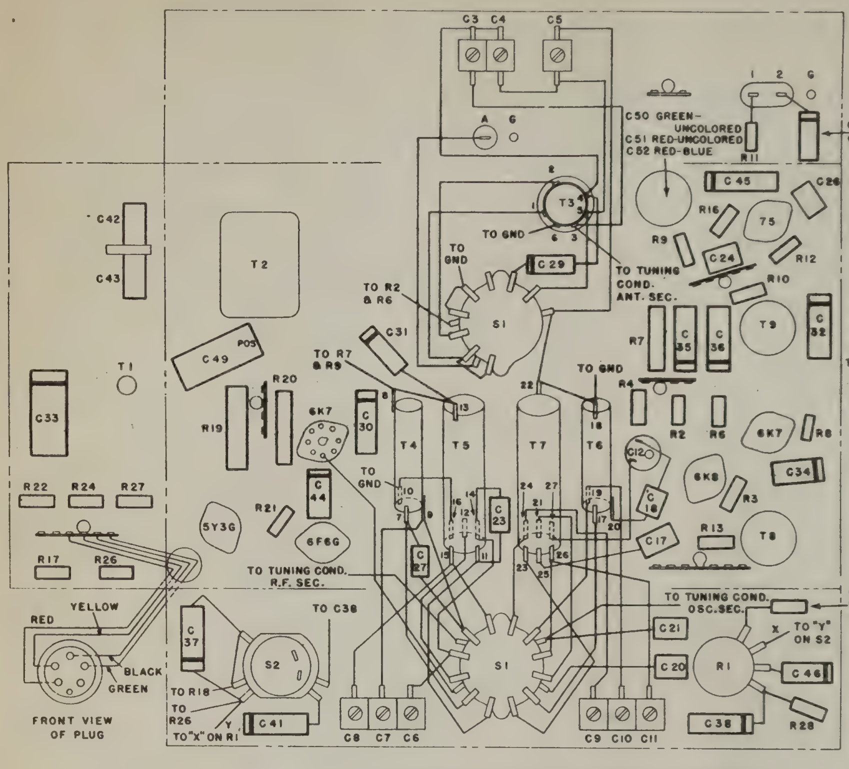
(2) Audio Gain
A 400 cycle signal of .05 volts across volume control will give approximately ½ watt speaker output. Volume control turned to maximum.)

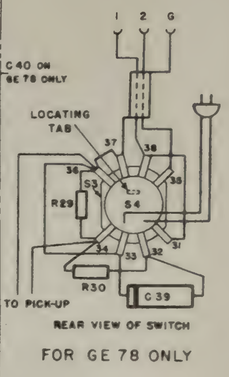
(3) DC voltage developed across oscillator grid resistor (50) averages 15 volts at 1000 KC.

† Variations of +10% —20% permissible.

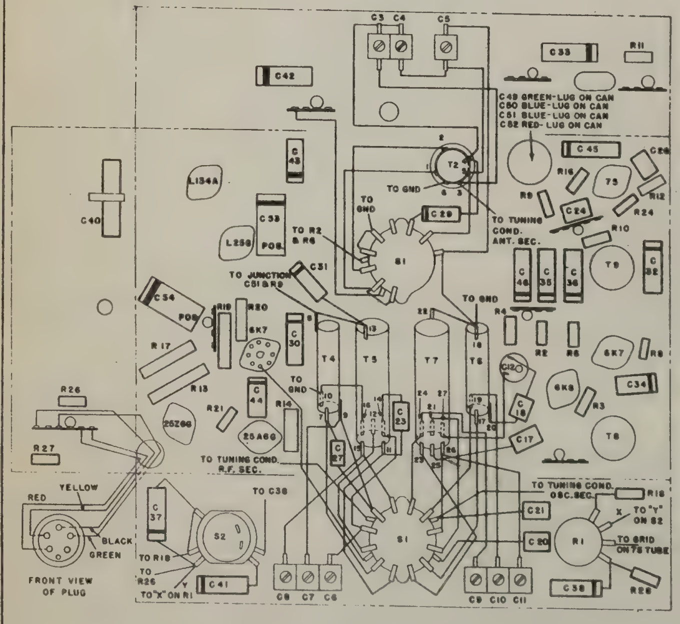
MODELS GE-73, GE-78
MODEL GDE-73

GENERAL ELECTRIC CO.

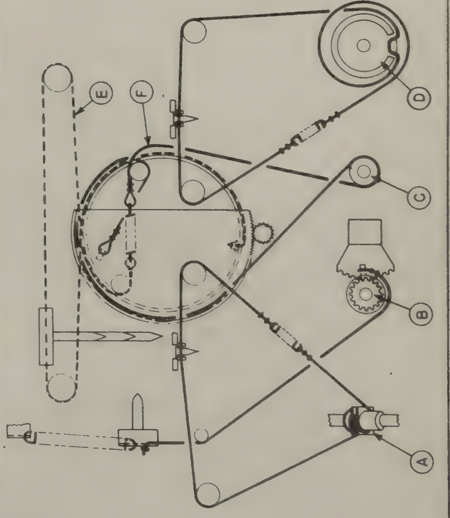




Chassis Parts Layout (GE-73 and GE-78)



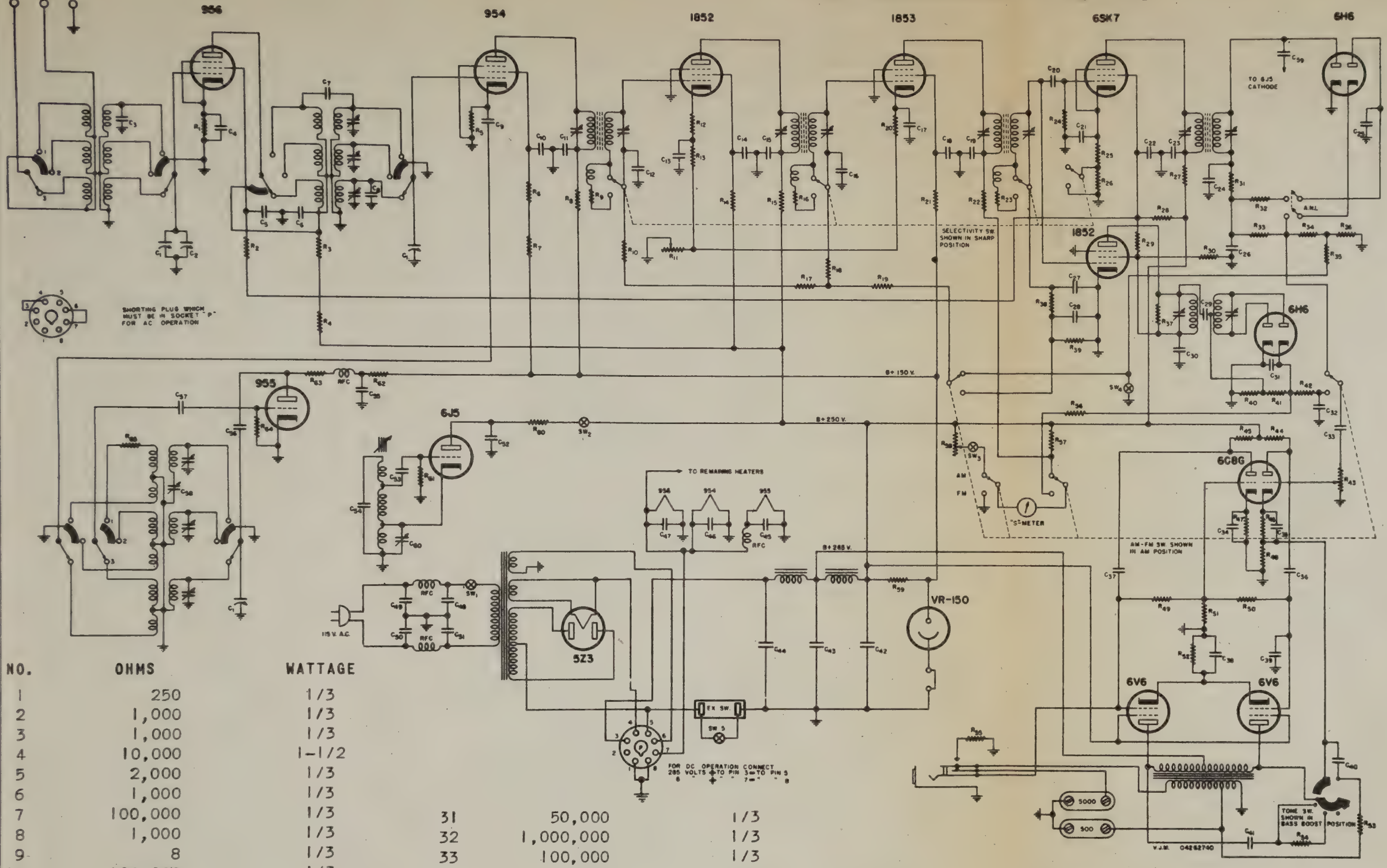
Chassis Parts Layout (GDE-73)



DIAL DRIVE

Models GE-73, GE-78, and GDE-73

THE HALLICRAFTERS INC.


A1
A2
G
956
954
1852
1853
6SK7
6H6
1852
6H6
955
6J5
6C8G
VR-150
5Z3
6V6
6V6
SHORTING PLUG WHICH MUST BE IN SOCKET "P" FOR AC OPERATION
SELECTIVITY SW. SHOWN IN SHARP POSITION
TO REMAINING HEATERS
TO 6J5 CATHODE
B+ 150 V.
B+ 250 V.
B+ 265 V.
AM
FM
"S" METER
AM-FM SW. SHOWN IN AM POSITION
115 V. AC
FOR DC OPERATION CONNECT 285 VOLTS TO PIN 3 — TO PIN 5
TONE SW. SHOWN IN BASS BOOST POSITION
5000
500
ANL

NO.	OHMS	WATTAGE
1	250	1/3
2	1,000	1/3
3	1,000	1/3
4	10,000	1-1/2
5	2,000	1/3
6	1,000	1/3
7	100,000	1/3
8	1,000	1/3
9	8	1/3
10	100,000	1/3
11	10,000	R.F. Gain Control
12	35	1/3
13	120	1/3
14	40,000	1/3
15	300	1/3
16	8	1/3
17	100,000	1/3
18	100,000	1/3
19	100,000	1/3
20	200	1/3
21	1,000	1/3
22	300	1/3
23	8	1/3
24	500,000	1/3
25	300	1/3
26	5,000	1/3
27	1,000	1/3
28	7,500	10 Wire Wound
29	2,000	1/3
30	20,000	1-1/2
31	50,000	1/3
32	1,000,000	1/3
33	100,000	1/3
34	250,000	1/3
35	500,000	1/3
36	250,000	1/3
37	15,000	1/3
38	50,000	1/3
39	250,000	1/3
40	100,000	1/3
41	100,000	1/3
42	200,000	1/3
43	500,000	Audio Gain Control
44	250,000	1/3
45	250,000	1/3
46	5,000	1/3
47	5,000	1/3
48	120	1/3
49	250,000	1/3
50	250,000	1/3
51	100,000	1/3
52	250	1-1/2
53	10,000	1/3
54	4,000	1-1/2
55	5,000	1-1/2
56	600,000	1/3
57	17	1/3 Wire Wound
58	1,500	S. Meter Zero Adj. Wire Wound
59	3,200	10
60	25,000	1-1/2
61	50,000	1/3
62	300	1/3
63	5,000	1/3
54	20,000	1/3
65	35	1/3

Band 1	27.5	to	47 mc
Band 2	46	to	82 mc
Band 3	82	to	145 mc

I.F. PEAK 5.25 MC

NO.	CAPACITY	VOLTAGE	TYPE
1	60 mmf	Per Section	Air
2	15 mmf	Ant.Trimmer	Air
3	5 mmf		3 Ceramicon
4	.002 mfd		Mica
5	300 mmf		Mica
6	.002 mfd		Mica
7	10. mmf		Ceramicon
8	10. mmf		Ceramicon
9	300 mmf		Mica
10	300 mmf		Mica
11	.01 mfd	600	Paper
12	.001 mfd		Mica
13	.02 mfd	400	Paper
14	.02 mfd	400	Paper
15	01 mfd	600	Paper
16	.001 mfd		Mica
17	.02 mfd	400	Paper
18	.02 mfd	400	Paper
19	.01 mfd	600	Paper
20	50 mmf		Mica
21	.02 mfd	400	Paper
22	.02 mfd	400	Paper
23	.01 mfd	600	Paper
24	50 mmf		Mica
25	.05 mfd	400	Paper
26	50 mmf		Mica
27	100 mmf		Mica
28	500 mmf		Mica
29	25 mmf		Mica
30	.002 mfd		Mica
31	50 mmf		Mica
32	500 mmf		Mica
33	.05 mfd	400	Paper
34	30 mfd	25	Electrolytic
35	30 mfd	25	Electrolytic
36	.05 mfd	400	Paper
37	.05 mfd	400	Paper
38	20 mfd		Electrolytic
39	.002 mfd		Mica
40	.05 mfd	400	Paper
41	.05 mfd	400	Paper
42	10. mfd	350	Electrolytic
43	30 mfd	350	Electrolytic
44	10 mfd	400	Electrolytic
45	300 mmf		Mica
46	300 mmf		Mica
47	300 mmf		Mica
48	.01 mfd	600	Paper
49	.01 mfd	600	Paper
50	.01 mfd	600	Paper
51	.01 mfd	600	Paper
52	.002 mfd		Mica
53	100 mmf		Mica
54	200 mmf		Ceramicon
55	300 mmf		Mica
56	50 mmf		Ceramicon
57	.001 mfd		Mica
58	450 mmf		Pad
59	2 mmf		Twisted Pair
60	25 mmf	B.O. Pitch Control Air	

MODELS S-17,
SX-17 (1939)

THE HALLICRAFTERS INC.

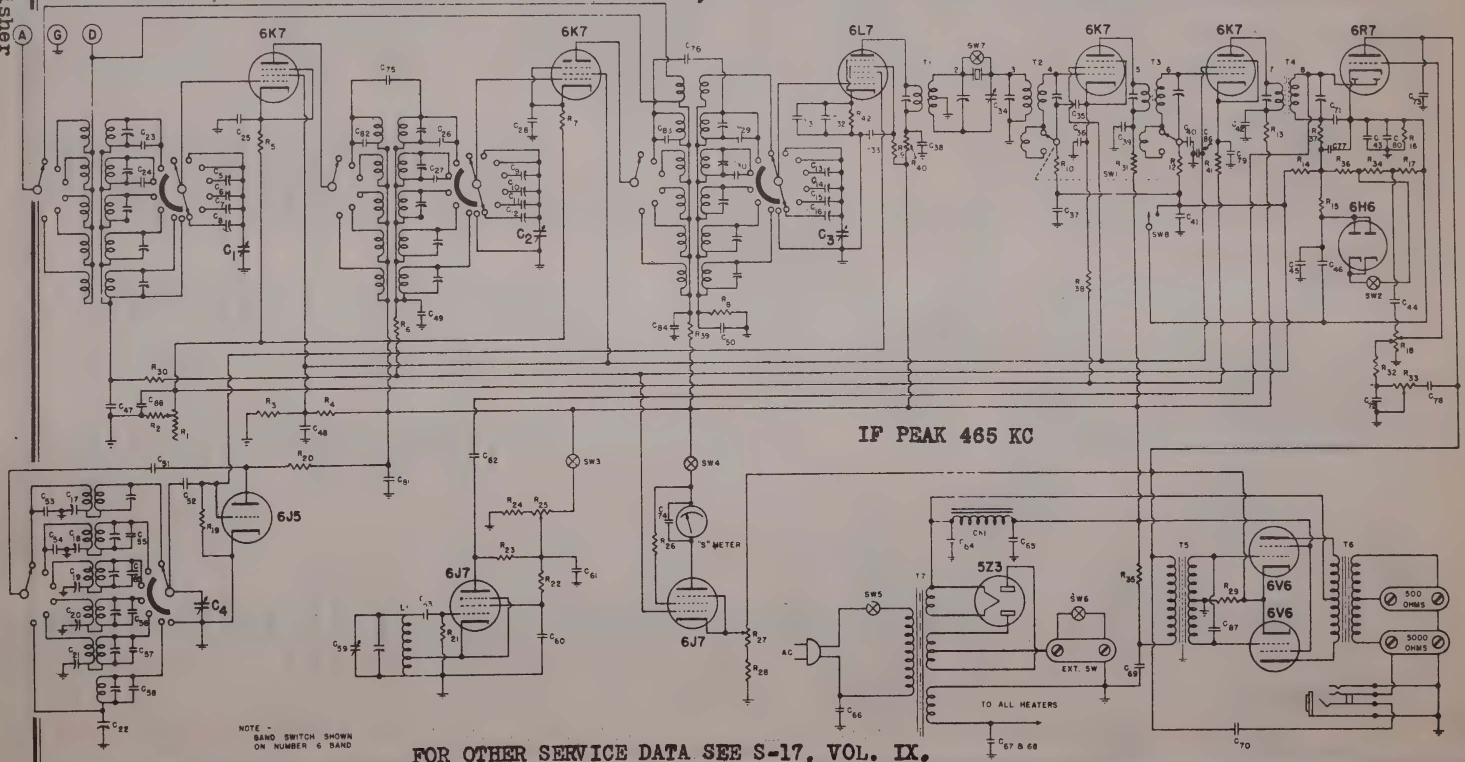
NOTE: 6H6 Silencer voltages; pins 3,4,5, and 8 are -2 volts; pin 7, 6.3 volts. See chart VOL. IX.

For other parts see S-17, VOL. IX

No.	Capacity	Type	Voltage
36	.1 mfd	Air	200
38	.05 "		400
39	.05 "		400
42	.05 "		400
45	.1 mfd		200
46	.002 "	Mica	
48	25 "		400
69	8 "		450
78	.1 mfd		400
79	.1 "		200
86	.1 mfd		200
87	.0005 "		450
88	.25 "		400

No.	Ohms	Wattage
1	10,000	R.F. Gain
2	95	1/3
10	100,000	1/3
13	10,000	"
29	400	2
31	10,000	"
32	60,000	"
38	2,000	"
40	10,000	"
41	1,500	"
42	280	1

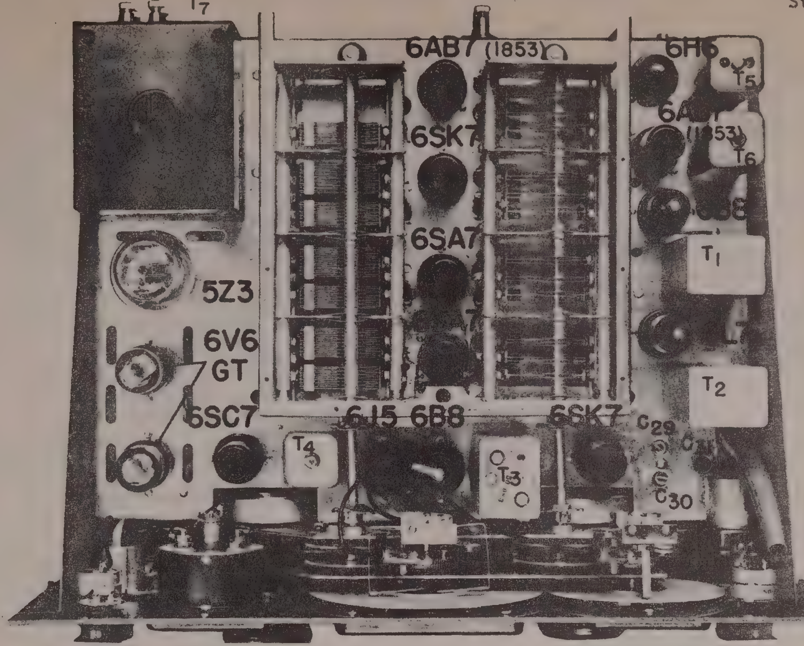
SKYRIDER MODELS S-17, SX-17



FOR OTHER SERVICE DATA SEE S-17, VOL. IX.

THE HALLICRAFTERS INC.

MODEL SX 28
Super Skyrider

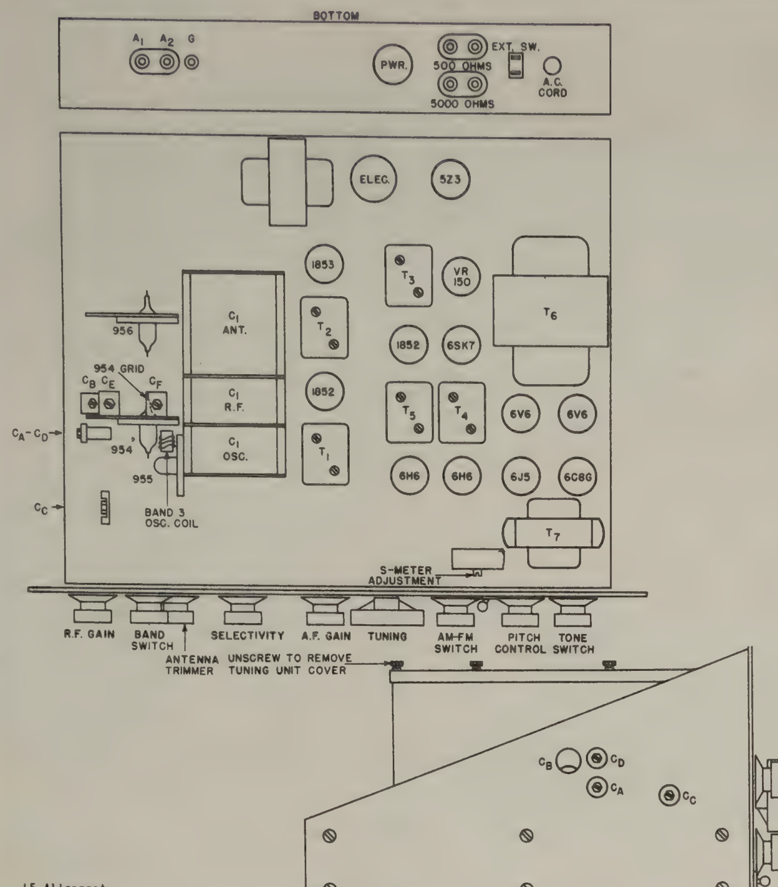


The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of ±10% from the indicated values.

TUBE	FUNCTION	SOCKET TERMINALS								
		1	2	3	4	5	6	7	8	Cap.
6AB7	RF Amp. (1)	...	...	...	0.1	4.15	170	6.3	227	....
6SK7	RF Amp. (2)	...	...	4.35	0.1	4.35	105	6.3	279	....
6SA7	Mixer	...	...	250	100	0.12	4.1	6.3	...	....
6SA7	HF Osc.	...	...	116	116	0.3	...	6.3	116	....
6L7	IF Amp. (1) Noise Limiter	...	...	245	102	...	...	6.3	4	−.075
6SK7	IF Amp. 2	...	...	4	...	4	107.5	6.3	235	....
6B8	2nd Det. S Meter Tube	...	...	17.2	−.255	−.255	108	6.3	...	−.17
6B8	AVC Amp.	...	...	225.5	0.2	0.2	107	6.3	2	....
6AB7	Noise Amp.	...	...	...	.07	1.1	150	6.3	225	....
6H6	Noise Rectifier	...	...	...	.1	...	17.6 DL	6.3	—.1	....
6J5	Beat Osc.	...	...	140	...	−7.4	...	6.3	...	BFO ON ONLY FOR TEST
6SC7	1st Audio Amp.	...	140	...	...	137	1.4	6.3	...	....
6V6GT	P.P. Audio Amp.	...	...	310	290	...	198 DL	6.3	17	....
6V6GT	P.P. Audio Amp.	...	...	310	290	...	...	6.3	17	....
5Z3	Rectifier	320	340 AC	340 AC	320	...	...	...	...	....

THE HALLICRAFTERS INC.

MODEL S-27



IF Alignment

Connect a signal generator to the grid of the 954 converter tube. Use either a small clip or a piece of flexible wire wound around the grid terminal. Do not attempt to solder to the tube as the heat is certain to crack the glass. Connect a suitable output meter across the speaker terminals.

Controls should be set as follows:

RF gain control at maximum sensitivity.
Band switch in band 2.
Selectivity switch in sharp position.
AM-FM switch in AM position.

Audio gain control in maximum position.
AVC switch in off position.
ANL switch in off position.
BFO switch in off position.

Tune the signal generator to 5.25 megacycles and align transformers T_1, T_2, T_3 and T_4 for maximum response.

A bakelite screw-driver with a metal or insulated tip is necessary for accurate alignment.

This alignment process should be repeated at least once to assure greatest possible selectivity.

To align the "discriminator" transformer (T_5) turn the selectivity switch to the broad position and the AM-FM switch to the AM position.

Leave the signal generator set at the frequency originally used for IF alignment with the modulation left on. Rotate the trimmer control across the discriminator (T_5) secondary (nearest the front of the chassis) until the signal drops to zero. As this point is approached very suddenly, turn the control very slowly. Now slightly detune the signal generator until the output meter gives a readable indication. Adjust the primary trimmer control of the discriminator transformer for maximum response.

Next detune the signal generator to either side of resonance and note the maximum output in each case as indicated on the output meter. These values should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary until the output rises an amount equal to about half the difference of the two outputs previously noted.

Retest for balance as above and readjust the primary till both maximum readings are alike when the signal generator is detuned to either side of resonance.

If a balance cannot be obtained, it is an indication that the discriminator secondary trimmer control has been adjusted off its proper center and will require a very slight readjustment in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a slight misadjustment will result in the distorted reception of frequency-modulated signals.

RF Alignment

Connect a high frequency signal generator to the antenna terminal (A_1) through a 75 ohm resistor and the ground of the generator to the ground terminal of the receiver. Leave terminal A_2 connected to the ground terminal.

The Ferris Signal Generator Model 18B is recommended for alignment purposes. If this is not available, harmonics of a standard signal generator may be used.

The controls should be set in the same position as for IF alignment.

Set the AM-FM switch in the AM position.
Set the bandswitch on band 1.
Tune the generator and receiver to 42 mc.

Adjust oscillator trimmer C_A until the signal is heard. The frequency of the oscillator is higher than that of the signal. Next adjust trimmer C_B and the antenna trimmer for maximum response.

Tune both receiver and signal generator to 28 megacycles and adjust padder C_C for maximum response while rocking the tuning control. Then repeat the alignment at the high frequency end as described.

BAND 2

Tune the receiver and signal generator to 75 megacycles. Adjust trimmer C_D until the signal is heard. In this band, the frequency of the oscillator is lower than that of the signal. Adjust the antenna trimmer and trimmer C_E for maximum response while rocking the gang condenser. No padder condenser adjustment is provided for the low-frequency end of this band.

BAND 3

Tune the receiver and signal generator to 120 megacycles. Adjust trimmer C_F and the antenna trimmer for maximum response while rocking the gang. It is not recommended that the frequency of the oscillator in this band be adjusted except at the factory. Should it be impractical to return the receiver to the factory for adjustment, then the following instructions are included.

Remove the top cover and locate the high frequency oscillator coil. The white wire winding, one end of which is connected to a terminal on the form is the primary. By carefully shifting the free end of this winding the frequency can be changed over a sufficient range. This lead should be cemented in place with Q-Max or any other low loss cement when adjustment is completed.

Repeat the adjustment of C_F as described above after shifting the frequency of the oscillator.

As in band 2, the frequency of the oscillator is higher than that of the signal. No padder condenser adjustment is provided for the low frequency end of this band.

MODELS S-17,
SX-17 (1939)

THE HALLICRAFTERS INC.

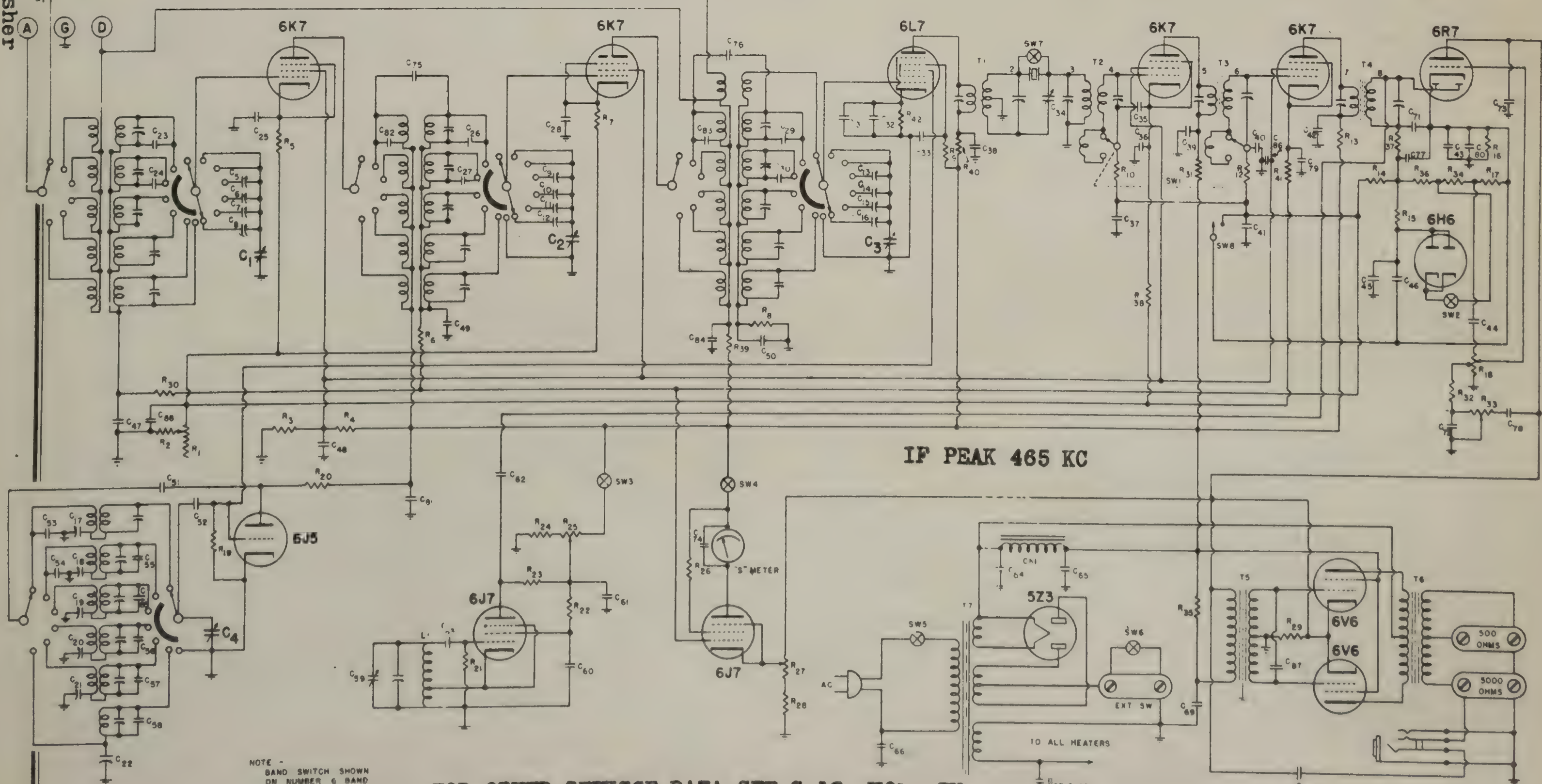
NOTE: 6H6 Silencer voltages; pins 3,4,5, and 8 are -2 volts; pin 7, 6.3 volts. See chart VOL. IX.

For other parts see S-17, VOL. IX

No.	CAPACITY	TYPE	VOLTAGE
36	.1 mfd	Air	200
38	.05 "		400
39	.05 "		400
42	.05 "		400
45	.1 mfd		200
46	.002 "	Mica	
48	25 "		400
69	8 "		450
78	.1 mfd		400
79	.1 "		200
86	.1 mfd		200
87	.0005 "		450
88	.25 "		400

No.	OHMS	WATTAGE
1	10,000	R.F. Gain
2	95	1/3
10	100,000	1/3
13	10,000	"
29	400	2
31	10,000	"
32	60,000	"
38	2,000	"
40	10,000	"
41	1,500	"
42	280	1

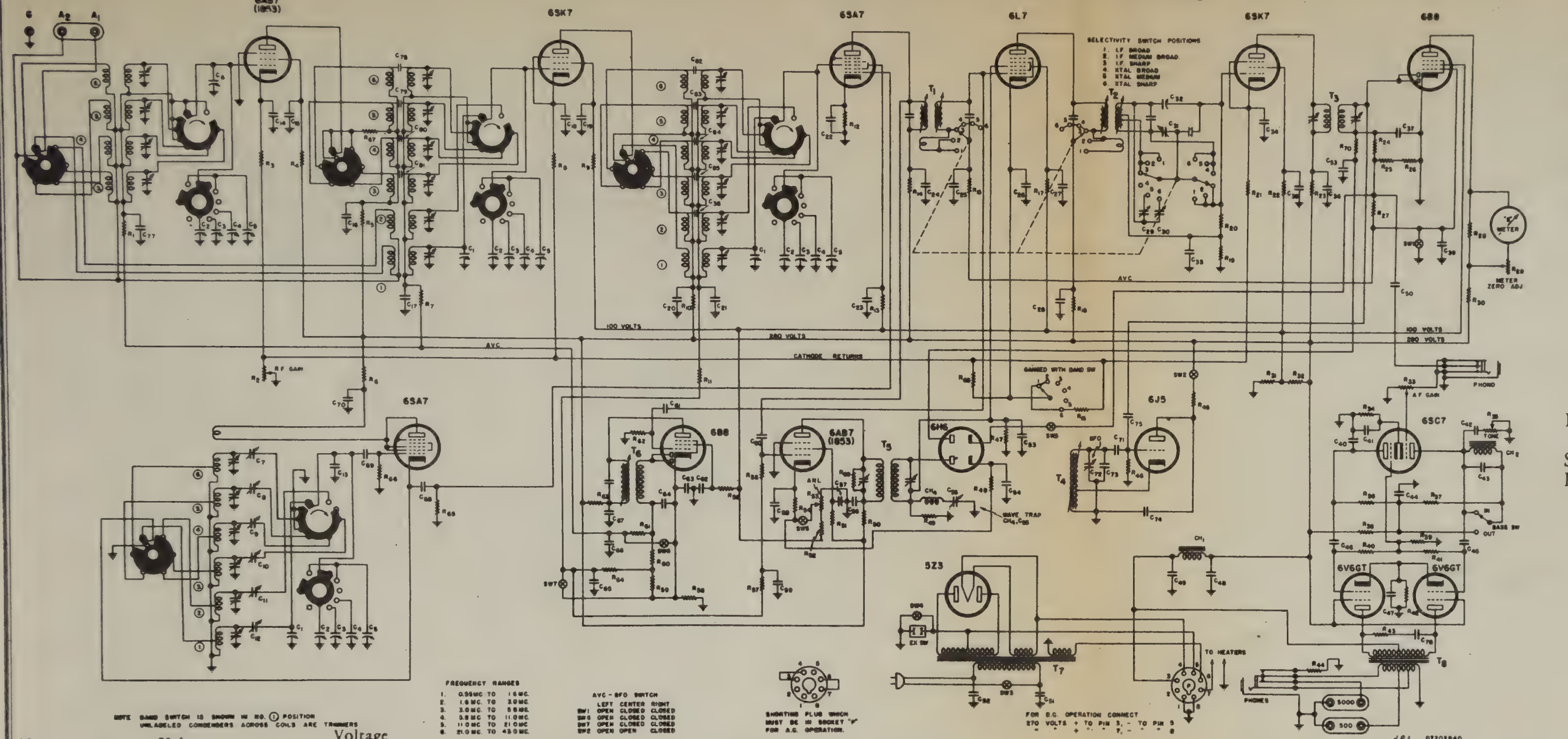
SKYRIDER MODELS S-17, SX-17



FOR OTHER SERVICE DATA SEE S-17, VOL. IX.

THE HALLICRAFTERS INC.

MODEL SX28
Super Skyrider



Power Consumption—at 117 volts—60 cycles—138 watts
Power Consumption—DC operation—18 amp. at 6 volts or 108 watts
Power Output —8 watts undistorted
Sensitivity—(for .05 watts output) Bands 1 to 5—2 MV and under; 6th band 4 MV

		2 x	1000 x
Selectivity—IF broad (high fidelity)		12 kc	36 kc
	IF Sharp	4.1 kc	22 kc

Frequency Range RF—Note: These are the actual frequencies covered corresponding to nominal figures indicated on the front panel.

550 to 1,620 kilocycles
1.5 to 3.1 megacycles
2.9 to 5.9 megacycles
5.75 to 11.5 megacycles
10.3 to 21.5 megacycles
20.4 to 42 megacycles

Frequency response AF (audio filter out broad IF—tone control high-70 to 3000 cycles ± 2½ DB
Speaker Output Impedances—5000 and 500 ohms
Intermediate Frequency—455 kc

No.	Value	Voltage or Purpose	Type
C 1	Band No. 1 Tuning Condenser	......	......
C 2	Main Tuning Condenser	......	......
C 3	3 Plate Bandspread Condenser	......	......
C 4	4 Plate Bandspread Condenser	......	......
C 5	5 Plate Bandspread Condenser	......	......
C 6	50 mmf	......	Variable Air
C 7	2,160 mmf	Band No. 6 Pad	Mica
C 8	2,962 mmf	5 Pad	Mica
C 9	2,276 mmf	4 Pad	Mica
C10	1,600 mmf	3 Pad	Mica
C11	876 mmf	2 Pad	Mica
C12	515 mmf	1 Pad	Mica
C13	Temperature Compensated	Condenser	
C14	.02 mfd	400	Tubular
C15	.02 mfd	400	Tubular
C16	.02 mfd	400	Tubular
C17	.05 mfd	200	Tubular
C18	.02 mfd	400	Tubular
C19	.02 mfd	400	Tubular
C20	.02 mfd	400	Tubular
C21	.05 mfd	200	Tubular
C22	.02 mfd	400	Tubular
C23	.02 mfd	400	Tubular
C24	.02 mfd	400	Tubular
C25	.02 mfd	400	Tubular
C26	.05 mfd	200	Tubular
C27	.02 mfd	400	Tubular
C28	.02 mfd	400	Tubular
C29	20 mmf	Trimming Condenser	
C30	20 mmf	Trimming Condenser	
C31	20 mmf	Trimming Condenser	
C32	20 mmf	Crystal Phasing	Air
C33	.02 mfd	400	Tubular
C34	.05 mfd	200	Tubular
C35	.02 mfd	400	Tubular
C36	.02 mfd	400	Tubular
C37	50 mmf		Mica
C38	5 mmf		Ceramic
C39	.02 mfd	400	Tubular
C40	500 mmf	......	Mica
C41	10. mfd	25	Electrolytic
C42	.02 mfd	400	Tubular
C43	5000 mmf	....	Mica
C44	10. mfd	300	Electrolytic
C45	.05 mfd	400	Tubular
C46	.05 mfd	400	Tubular
C47	40 mfd	25	Electrolytic
C48	30 mfd	400	Electrolytic
C49	30 mfd	450	Electrolytic
C50	.02 mfd	400	Tubular
C51	.01 mfd	600	Tubular
C52	.01 mfd	600	Tubular
C53	.05 mmf	200	Mica
C54	.05 mfd	400	Tubular
C55		Trimming Cond.	
C56	.02 mfd	400	Tubular
C57	.02 mfd	400	Tubular
C58	.05 mfd	200	Tubular
C59	.05 mfd	200	Tubular
C60	50 mmf	......	Mica
C61	250 mmf	......	Mica in T_1
C62	.02 mfd	400	Tubular
C63	.05 mfd	200	Tubular
C64	100 mmf	......	Mica
C65	.02 mfd	400	Tubular
C66	.05 mfd	200	Tubular
C67	.02 mfd	400	Tubular
C68	50 mmf	......	Mica
C69	50 mmf	......	Mica
C70	2000 mmf	......	Mica
C71	100 mmf	......	Mica
C72	25 mmf	BFO Control	Air
C73	500 mmf	......	Mica in T_4
C74	.01 mfd	600	(Braided Leads)
C75	2 mmfd	......	Twisted Leads
C76	2000 mmfd	......	Mica
C77	.05 mfd	200	Tubular
C78	10 mmfd	......	Ceramic
C79	5 mmfd	......	Ceramic
C80	5 mmfd	......	Ceramic
C81	2 mmfd	......	Twisted Leads
C82	10 mmfd	......	Ceramic
C83	5 mmfd	......	Ceramic
C84	5 mmfd	......	Ceramic
C85	2 mmfd	......	Twisted Leads

No.	Value in Ohms	Wattage or Purpose
R 1	100,000	⅓
R 2	10,000	RF Gain Control
R 3	300	⅓
R 4	25,000	½
R 5	3,000	⅓
R 6	7,000	2
R 7	100,000	⅓
R 8	300	⅓
R 9	1,000	⅓
R10	3,000	⅓
R11	100,000	⅓
R12	400	⅓
R13	1,000	⅓
R14	3,000	⅓
R15	100,000	⅓
R16	250	⅓
R17	1,000	⅓
R18	3,000	⅓
R19	100,000	⅓
R20	500,000	⅓
R21	400	⅓
R22	1,000	⅓
R23	3,000	⅓
R24	100,000	⅓
R25	250,000	⅓
R26	250,000	⅓
R27	500,000	
R28	100	⅓
R29	500	"S" Meter Control
R30	30,000	2
R31	11,000	1½ Candohm
R32	4,000	7
R33	500,000	AF Gain Control
R34	1,000	⅓
R35	500,000	Tone Control
R36	100,000	⅓
R37	100,000	⅓
R38	50,000	⅓
R39	200,000	⅓
R40	250,000	⅓
R41	250,000	⅓
R42	200	2
R43	20,000	1
R44	5,000	10
R45	20,000	1
R46	50,000	⅓
R47	5,000	1
R48	100,000	⅓
R49	1,000,000	⅓
R50	5,000	⅓
R51	20,000	½
R52	50,000	⅓
R53	50,000	ANL Control
R54	54	⅓
R55	500,000	⅓
R56	1,000	⅓
R57	100,000	⅓
R58	200	⅓
R59	250,000	⅓
R60	250,000	⅓
R61	500,000	⅓
R62	500,000	⅓ Inside T_1
R63	3,000	⅓
R64	500,000	⅓
R65	50,000	⅓
R66	50,000	⅓
R67	500	⅓
R68	600	½
R69	100,000	⅓
R70	1,000,000	⅓

MODEL SX28
Super Skyrider

THE HALLICRAFTERS INC.

ALIGNMENT PROCEDURE MODEL SX-28—SUPER SKYRIDER

Equipment Needed for Aligning:

1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.

2—Output indicating meter connected to 5000 ohm output terminals.

3—Non-metallic screw driver.

4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF.

Tone control at maximum high frequency position (#9)—BFO at 0—Bass switch at Bass IN—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .55 to 1.6 band—RF alignment depending on band aligned.

Selectivity control at sharp IF—Send-Receive switch in Receive—Crystal phasing at #3 on left side—ANL—OFF at 0—AVC OFF.

Important: Have bandspread control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on Bands 3-4-5-6.

Note: Antenna trimmer not in circuit on bands 1 and 2.
455 KC—IF Alignment: Tune main dial to 1400 kc on .55 to 1.6 mc band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the air trimmer condenser at the top of T3 for maximum gain.

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent when the correct adjustment has been reached.

Switch to "Xtal Sharp" and adjust C_{30} for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of C_{30}. Either one of these points may be used at which to leave C_{30}. a sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust C_{29} till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

BFO Adjustment: Set front panel control to zero—BFO switch ON—Signal Generator tuned to crystal frequency—selectivity switch in IF Sharp position—now, adjust screw on top of T4, after loosening lock nut, to zero best.
Noise Limiter and AVC Amplifier Adjustment: Have the controls set as before except that the AVC switch is now in the ON position. Connect a high resistance type voltmeter across R47 which is connected between terminal #5 of the 6L7 tube and chassis.

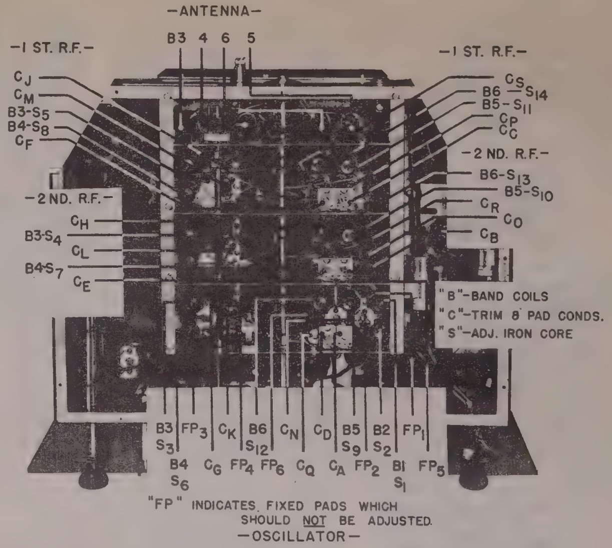
ANL & AVC Amplifier Adjustment. Connect a 50,000 ohm resistor across primary of T5 (Red and Blue leads). Set generator at 455 kc as for IF alignment. Connect generator to grip of 6AB7 tube (pin #4). Rotate ANL contro all the way to the right, or position #9. Adjust screws on top of T5 for maximum indication on DC meter connected across R47. Reconnect generator, as for IF alignment, to mixer grid of 6SA7 tube. Remove 50,000 ohm resistor which was inserted across primary of T5 during alignment. Remove grid clip off top of 6L7 tube. With generator set at 455 kc and ANL control at extreme right adjust wave trap trimmer C55 for minimum signal as indicated on output meter.

With generator connected to 6SA7 mixer grid as above, replace 6L7 grid and turn ANL control to extreme left until switch clicks. Connect high resistance DC meter across 6B8 diode filter condenser C64. Adjust screw on top of T6 for maximum indication on DC meter across C64.

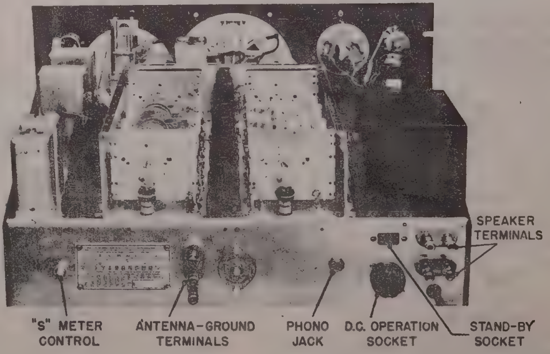
RF ALIGNMENT

Connect hot lead of signal generator to A_1—through dummy antenna shown in table. Leave jumper connected between A_2 and G. Ground of Generator to Chassis.

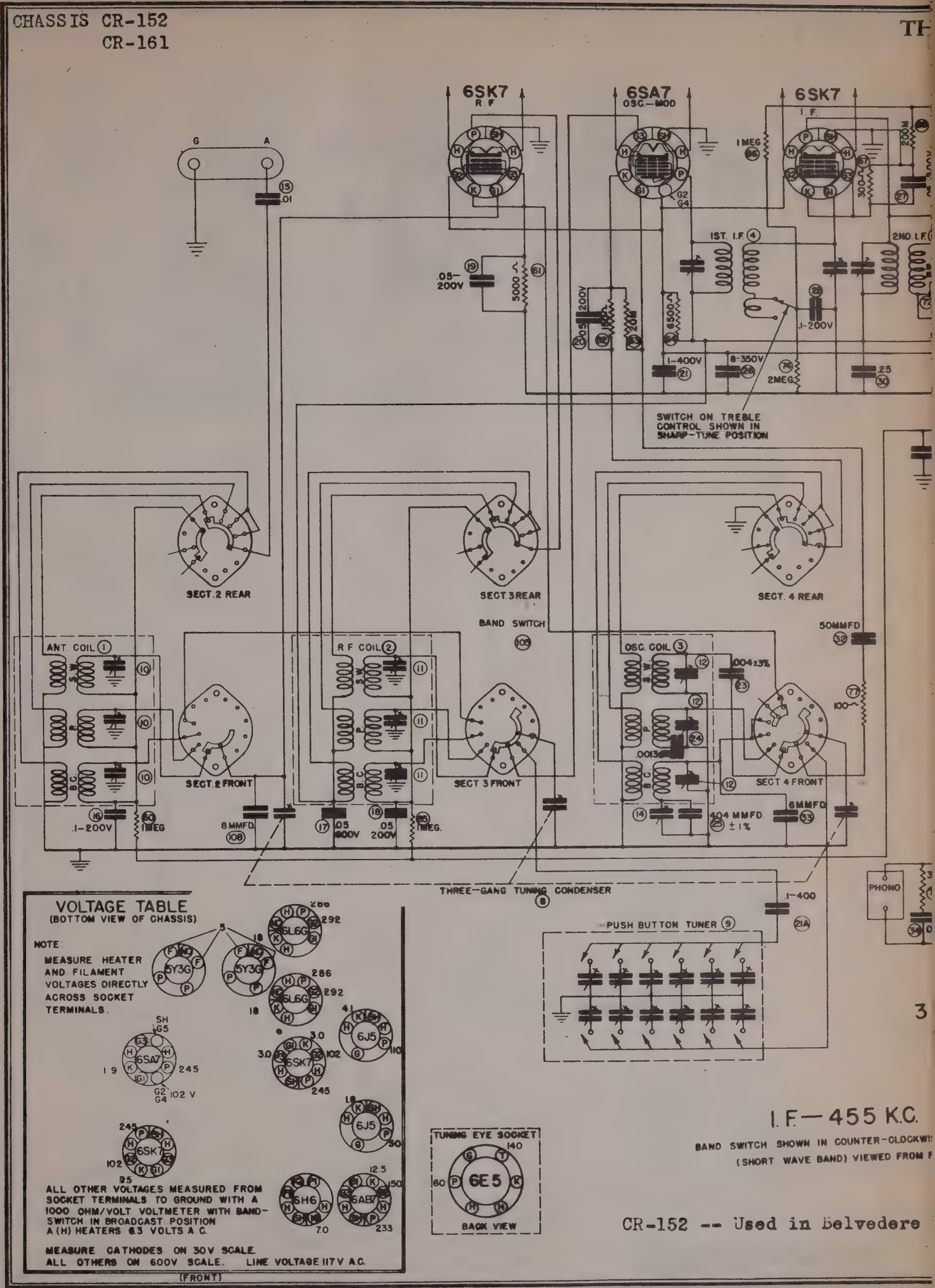
Band	Rec. Dial Setting	Sig. Gen. Freq.	Dummy Antenna	HIGH FREQUENCY END		LOW FREQUENCY END	
				Adjust Osc. With	Adjust Trimmers for Max. Gain	Adjust Osc. With	Permeability Tuned By
1	1.4 mc	1.4 mc	200 mmf	C_A	C_B C_C	....	....
1	.6	.6	200 mmf	....	....	S_1	....
2	2.8	2.8	400 ohms	C_D	C_E C_F	....	....
2	1.6	1.6	400 ohms	....	....	S_2	....
3	5.6	5.6	400 ohms	C_G	C_H C_J	....	....
3	3.2	3.2	400 ohms	....	....	S_3	S_4 S_5
4	11	11	400 ohms	C_K	C_L C_M	....	....
4	6	6	400 ohms	....	....	S_6	S_7 S_8
5	20	20	400 ohms	C_N	C_O C_P	....	....
5	11	11	400 ohms	....	....	S_9	S_{10} S_{11}
6	36	36	400 ohms	C_Q	C_R C_S	....	....
6	22	22	400 ohms	....	....	S_{12}	S_{13} S_{14}



"FP" INDICATES FIXED PADS WHICH SHOULD NOT BE ADJUSTED.
—OSCILLATOR—



CHASSIS CR-152
CR-161



NOTE:
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

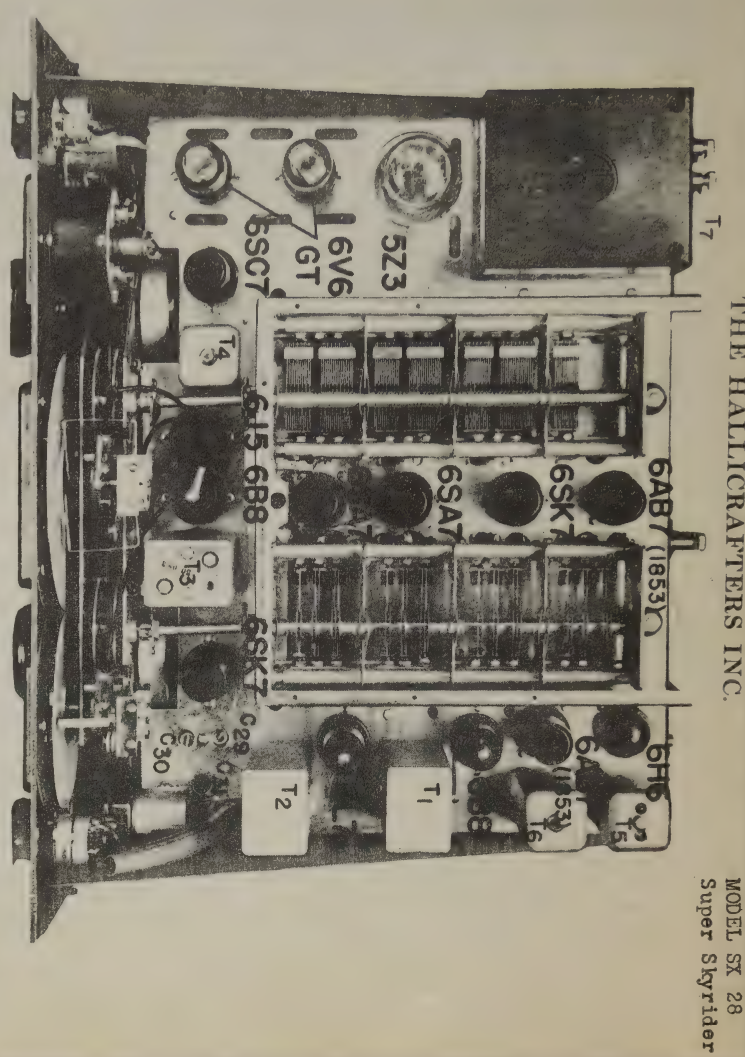
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN BROADCAST POSITION
A (H) HEATERS 6.3 VOLTS A.C.

MEASURE CATHODES ON 30V SCALE.
ALL OTHERS ON 600V SCALE. LINE VOLTAGE 117 V A.C.

I.F. — 455 K.C.

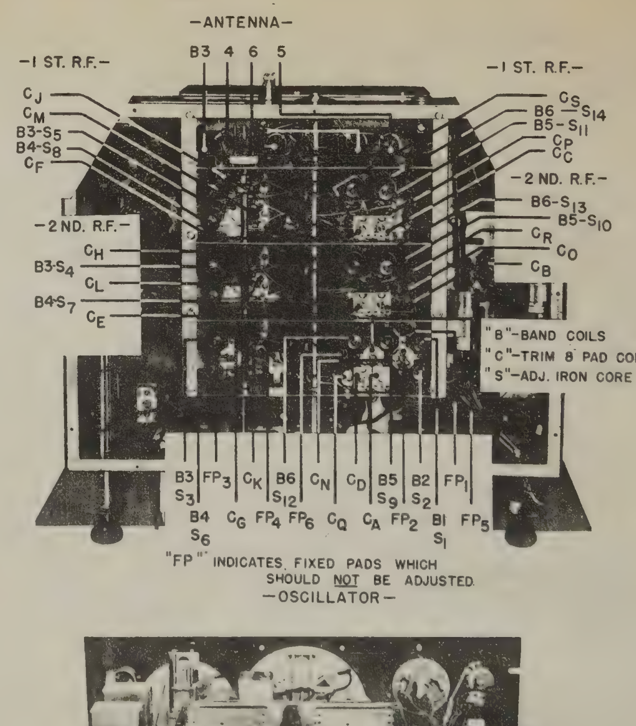
BAND SWITCH SHOWN IN COUNTER-CLOCKWI
(SHORT WAVE BAND) VIEWED FROM F

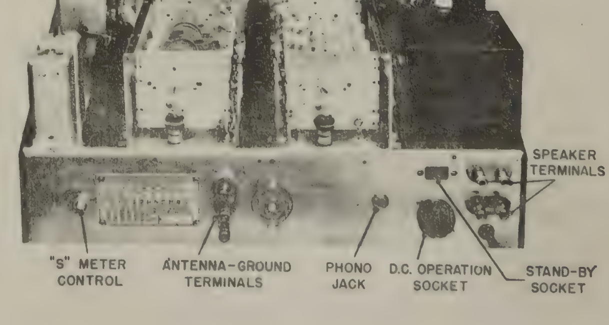
CR-152 -- Used in Belvedere



The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of ±10% from the indicated values.

TUBE	FUNCTION	SOCKET TERMINALS								
		1	2	3	4	5	6	7	8	Cap.
6AB7	RF Amp. (1)	...	...	...	0.1	4.15	170	6.3	227	....
6SK7	RF Amp. (2)	...	...	4.35	0.1	4.35	105	6.3	279	....
6SA7	Mixer	...	...	250	100	0.12	4.1	6.3	...	....
6SA7	HF Osc.	...	...	116	116	0.3	...	6.3	116	....
6L7	IF Amp. (1) Noise Limiter	...	...	245	102	...	...	6.3	4	−.075
6SK7	IF Amp. 2	...	...	4	...	4	107.5	6.3	235	....
6B8	2nd Det. S Meter Tube	...	...	17.2	−.255	−.255	108	6.3	...	−.17
6B8	AVC Amp.	...	...	225.5	0.2	0.2	107	6.3	2	....
6AB7	Noise Amp.	...	...	...	.07	1.1	150	6.3	225	....
6H6	Noise Rectifier	...	...	...	.1	...	17.6 DL	6.3	—.1	....
6J5	Beat Osc.	...	...	140	...	−7.4	...	6.3	...	BFO ON ONLY FOR TEST
6SC7	1st Audio Amp.	...	140	...	...	137	1.4	6.3	...	....
6V6GT	P.P. Audio Amp.	...	...	310	290	...	198 DL	6.3	17	....
6V6GT	P.P. Audio Amp.	...	...	310	290	...	...	6.3	17	....
5Z3	Rectifier	320	340 AC	340 AC	320	...	...	...	...	....





ALIGNMENT PROCEDURE MODEL SX-28—SUPER SKYRIDER

Equipment Needed for Aligning:

1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.

2—Output indicating meter connected to 5000 ohm output terminals.

3—Non-metallic screw driver.

4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF.

Tone control at maximum high frequency position (#9)—BFO at 0—Bass switch at Bass IN—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .55 to 1.6 band—RF alignment depending on band aligned.

Selectivity control at sharp IF—Send-Receive switch in Receive—Crystal phasing at #3 on left side—ANL—OFF at 0—AVC OFF.

Important: Have bandspread control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on Bands 3-4-5-6.

Note: Antenna trimmer not in circuit on bands 1 and 2.

455 KC—IF Alignment: Tune main dial to 1400 kc on .55 to 1.6 mc band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the air trimmer condenser at the top of T3 for maximum gain.

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent when the correct adjustment has been reached.

Switch to "Xtal Sharp" and adjust C_{30} for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of C_{30}. Either one of these points may be used at which to leave C_{30}. a sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust C_{29} till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

BFO Adjustment: Set front panel control to zero—BFO switch ON—Signal Generator tuned to crystal frequency—selectivity switch in IF Sharp position—now, adjust screw on top of T4, after loosening lock nut, to zero best.

Noise Limiter and AVC Amplifier Adjustment: Have the controls set as before except that the AVC switch is now in the ON position. Connect a high resistance type voltmeter across R47 which is connected between terminal #5 of the 6L7 tube and chassis.

ANL & AVC Amplifier Adjustment. Connect a 50,000 ohm resistor across primary of T5 (Red and Blue leads). Set generator at 455 kc as for IF alignment. Connect generator to grip of 6AB7 tube (pin #4). Rotate ANL contro all the way to the right, or position #9. Adjust screws on top of T5 for maximum indication on DC meter connected across R47. Reconnect generator, as for IF alignment, to mixer grid of 6SA7 tube. Remove 50,000 ohm resistor which was inserted across primary of T5 during alignment. Remove grid clip off top of 6L7 tube. With generator set at 455 kc and ANL control at extreme right adjust wave trap trimmer C55 for minimum signal as indicated on output meter.

With generator connected to 6SA7 mixer grid as above, replace 6L7 grid and turn ANL control to extreme left until switch clicks. Connect high resistance DC meter across 6B8 diode filter condenser C64. Adjust screw on top of T6 for maximum indication on DC meter across C64.

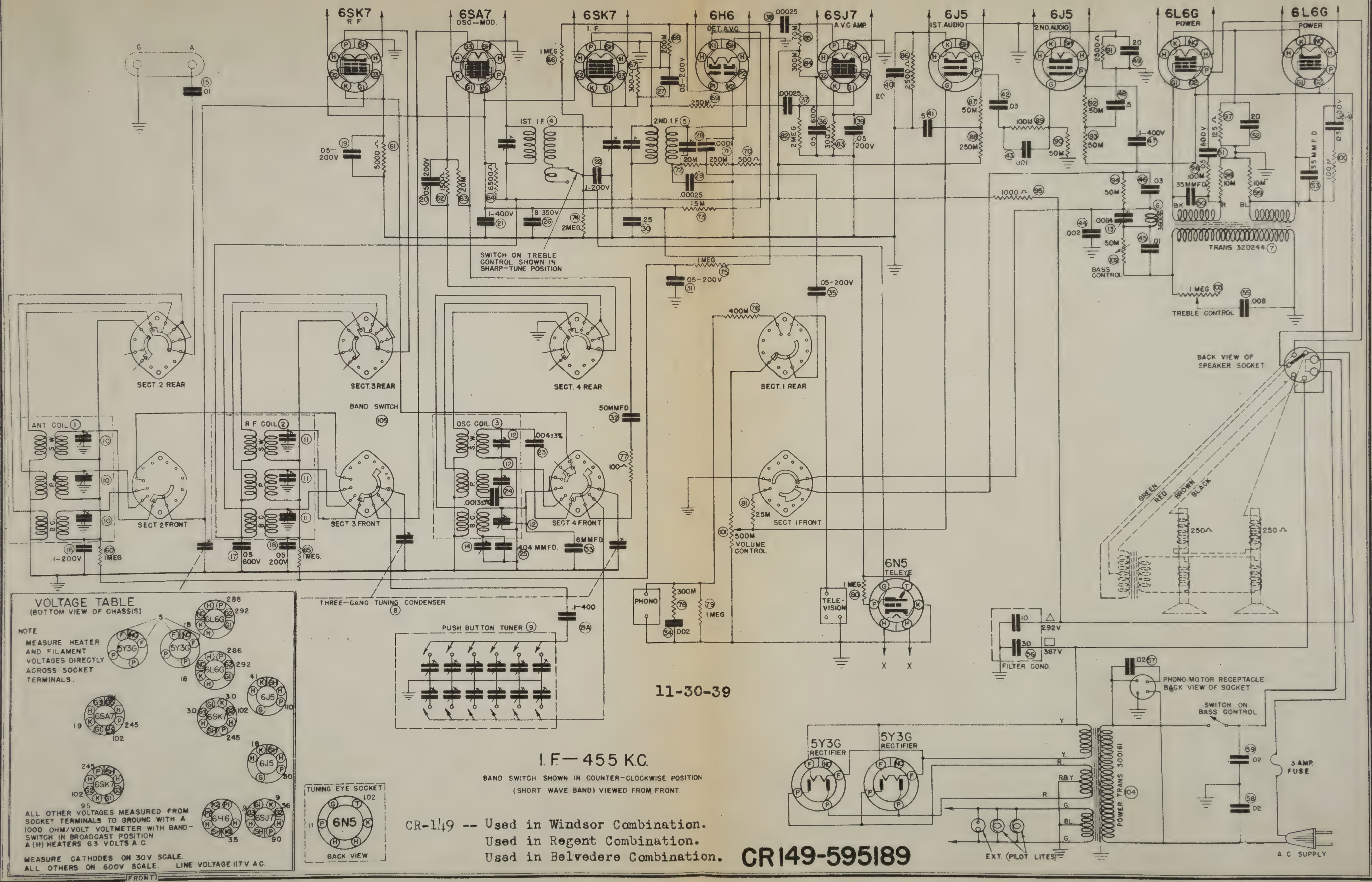
RF ALIGNMENT

Connect hot lead of signal generator to A_1—through dummy antenna shown in table. Leave jumper connected between A_2 and G. Ground of Generator to Chassis.

Band	Rec. Dial Setting	Sig. Gen. Freq.	Dummy Antenna	HIGH FREQUENCY END		LOW FREQUENCY END	
				Adjust Osc. With	Adjust Trimmers for Max. Gain	Adjust Osc. With	Permeability Tuned By
1	1.4 mc	1.4 mc	200 mmf	C_A	C_B C_C	...	....
1	.6	.6	200 mmf	...	....	S_1	....
2	2.8	2.8	400 ohms	C_D	C_E C_F	...	....
2	1.6	1.6	400 ohms	...	....	S_2	....
3	5.6	5.6	400 ohms	C_G	C_H C_J	....	.. ..
3	3.2	3.2	400 ohms	...	....	S_3	S_4 S_5
4	11	11	400 ohms	C_K	C_L C_M	...	....
4	6	6	400 ohms	....	....	S_6	S_7 S_8
5	20	20	400 ohms	C_N	C_O C_P	...	....
5	11	11	400 ohms	....	....	S_9	S_{10} S_{11}
6	36	36	400 ohms	C_Q	C_R C_S	....	....
6	22	22	400 ohms	....	....	S_{12}	S_{13} S_{14}

CHASSIS CR-149

THE MAGNAVOX CO. INC.



NOTE

MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN BROADCAST POSITION A (H) HEATERS 6.3 VOLTS A.C.

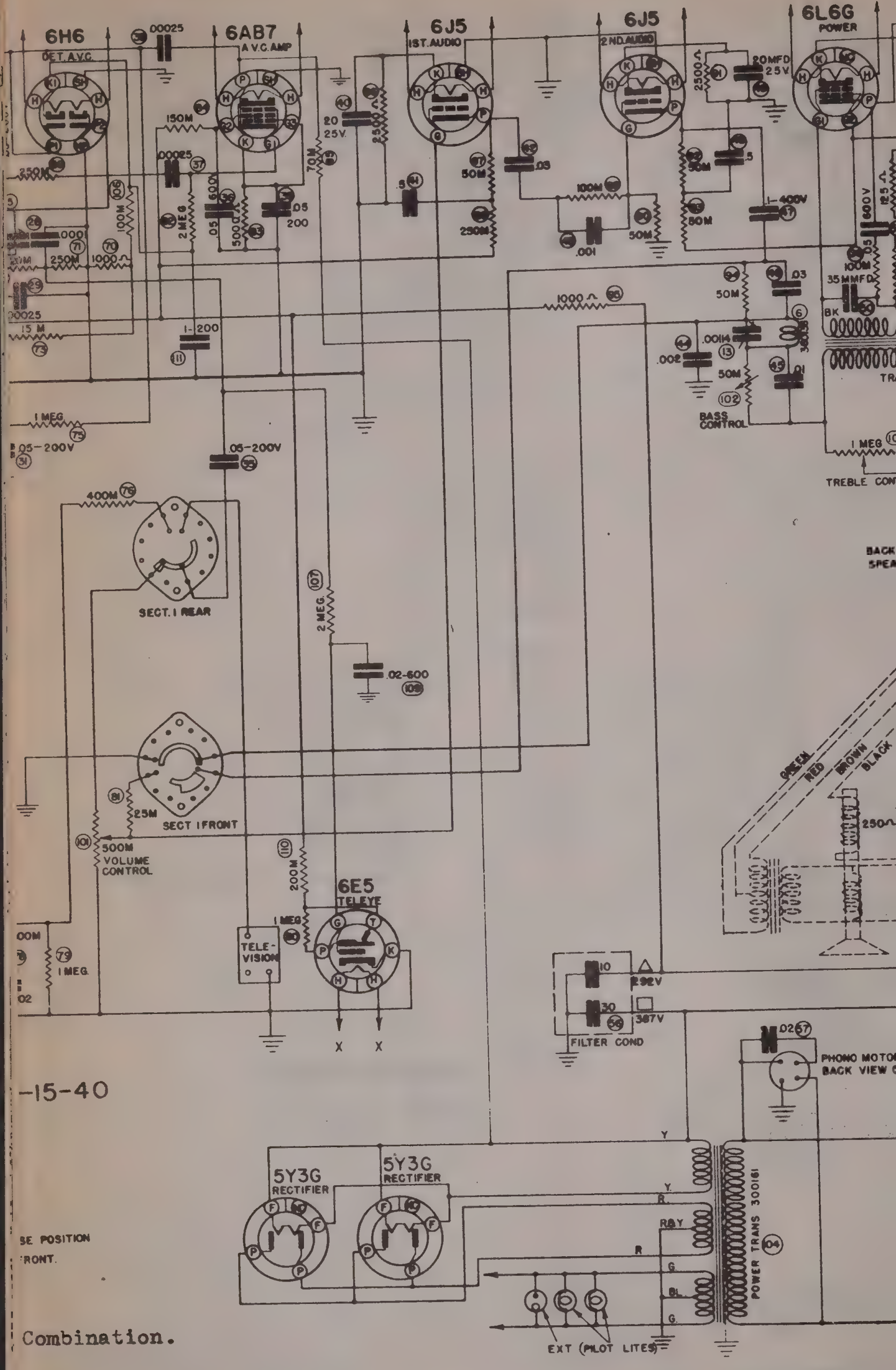
MEASURE CATHODES ON 30V SCALE. ALL OTHERS ON 600V SCALE. LINE VOLTAGE 117 V. A.C.

I.F.—455 K.C.

BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR-149 -- Used in Windsor Combination.
Used in Regent Combination.
Used in Belvedere Combination.

CR149-595189



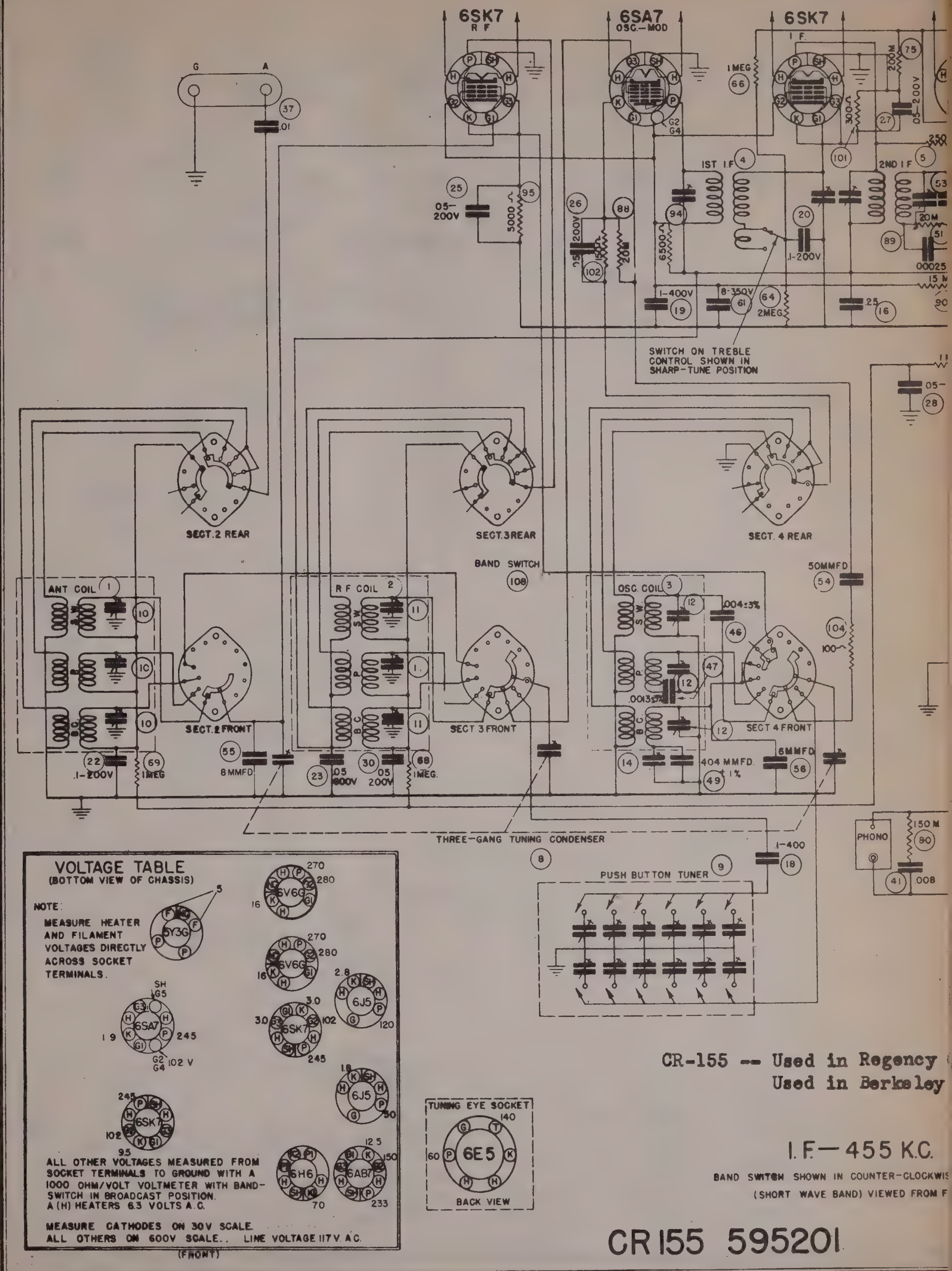
-15-40

SE POSITION
RONT.

Combination.

CHASSIS CR-155

THE MAGNA



CR-155 -- Used in Regency

Used in Berkeley

I. F — 455 K.C.

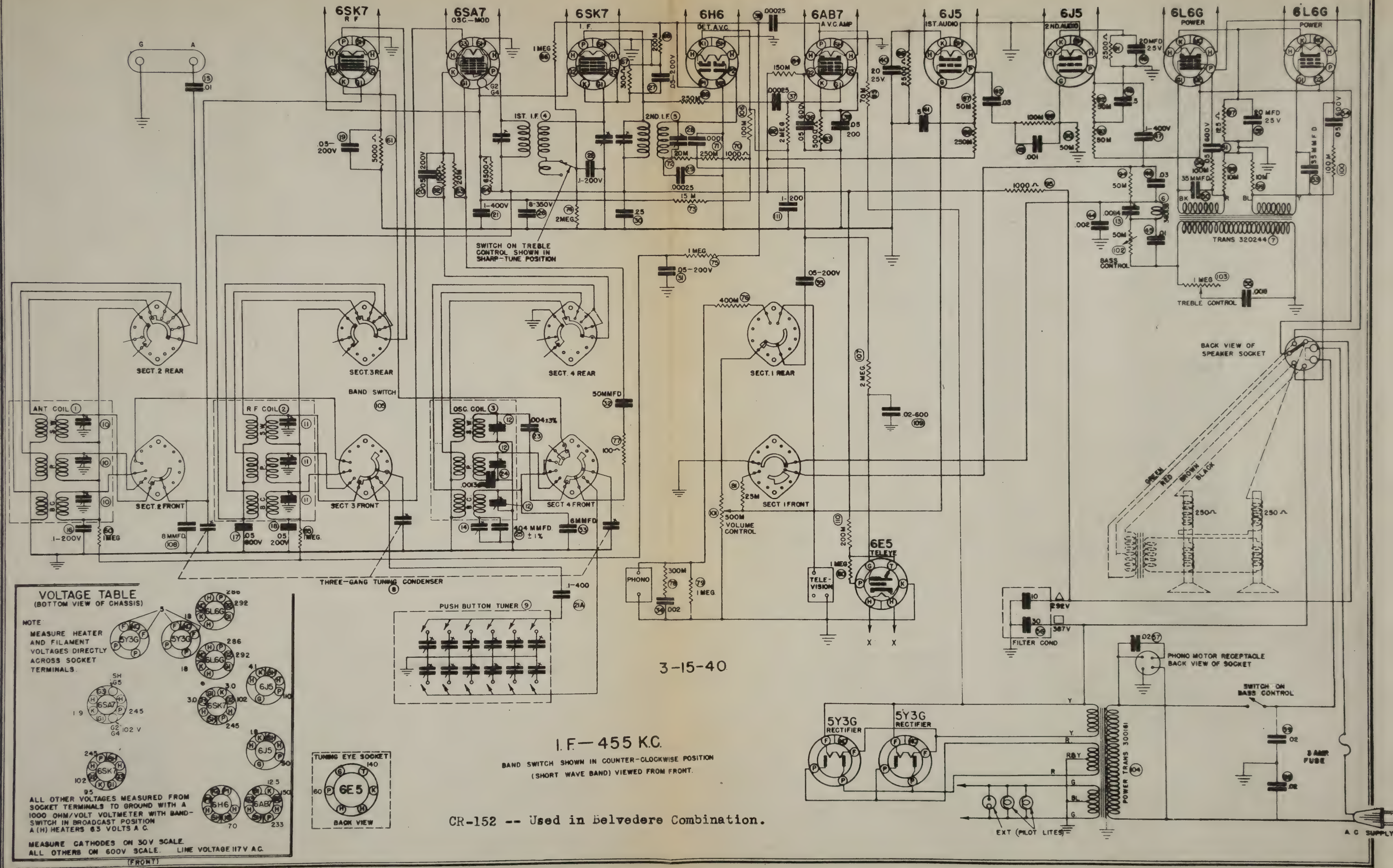
BAND SWITCH SHOWN IN COUNTER-CLOCKWIS

(SHORT WAVE BAND) VIEWED FROM F

CR155 595201

CHASSIS CR-152
CR-161

THE MAGNAVOX CO. INC.



NOTE
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN BROADCAST POSITION
A (H) HEATERS 6.3 VOLTS A.C.

MEASURE CATHODES ON 30V SCALE.
ALL OTHERS ON 600V SCALE. LINE VOLTAGE 117V A.C.

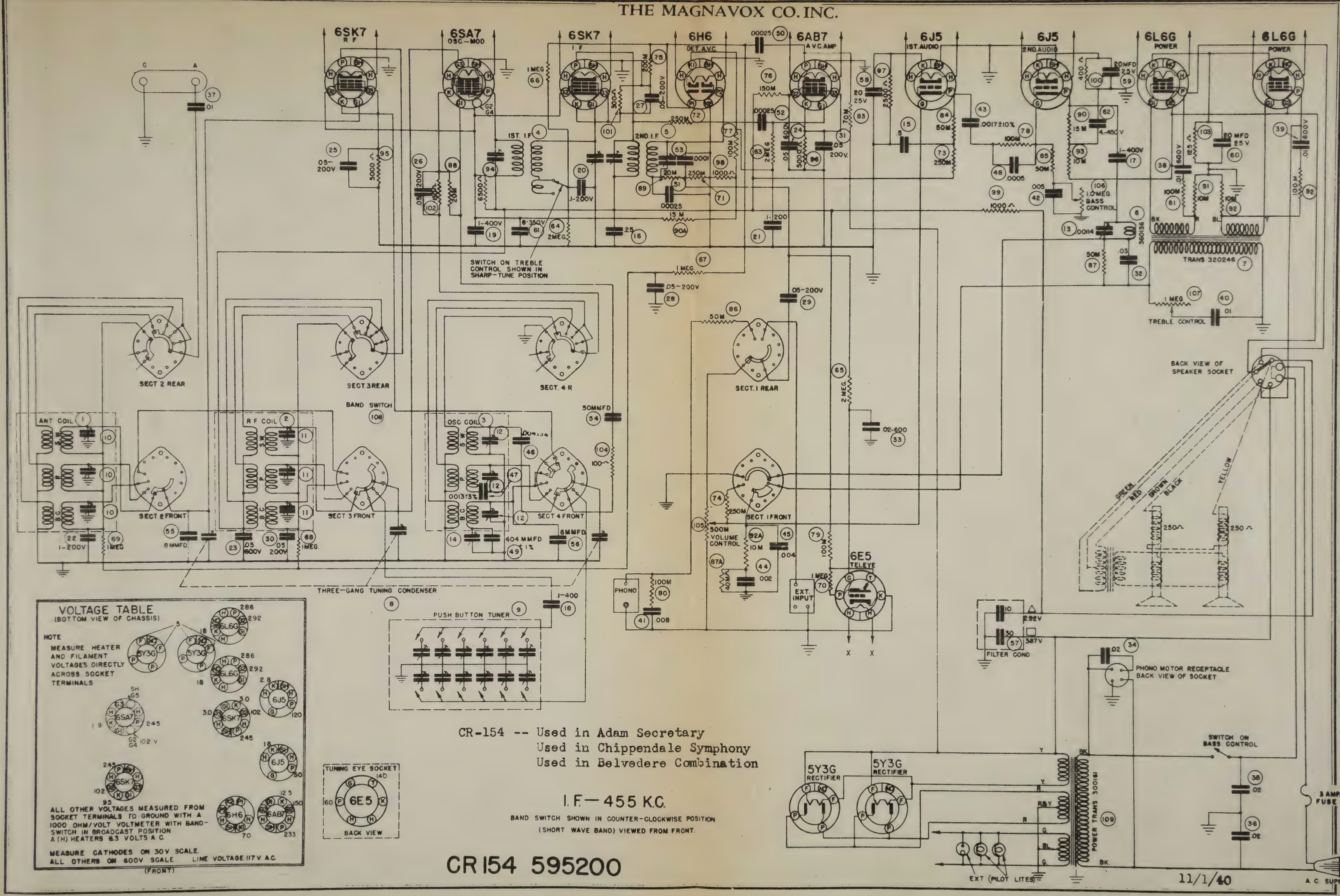
3-15-40

I.F.—455 K.C.

BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR-152 -- Used in Belvedere Combination.

THE MAGNAVOX CO. INC.



NOTE

MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN BROADCAST POSITION
A (H) HEATERS 6.3 VOLTS A C.

MEASURE CATHODES ON 30V SCALE.
ALL OTHERS ON 600V SCALE LINE VOLTAGE 117 V. A.C.

CR-154 -- Used in Adam Secretary
Used in Chippendale Symphony
Used in Belvedere Combination

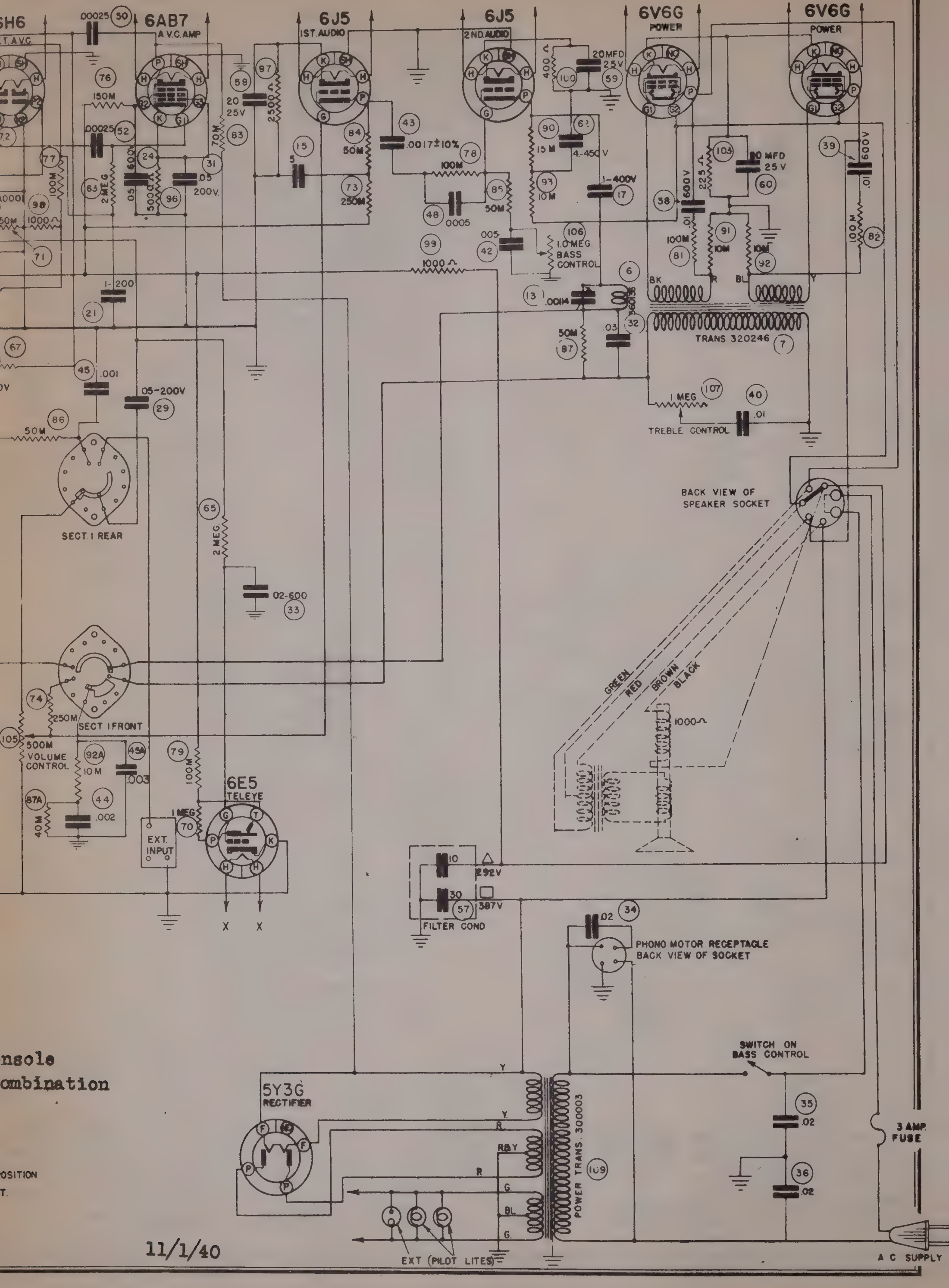
I.F.—455 K.C.

BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR154 595200

11/1/40

OX CO. INC.



nsole

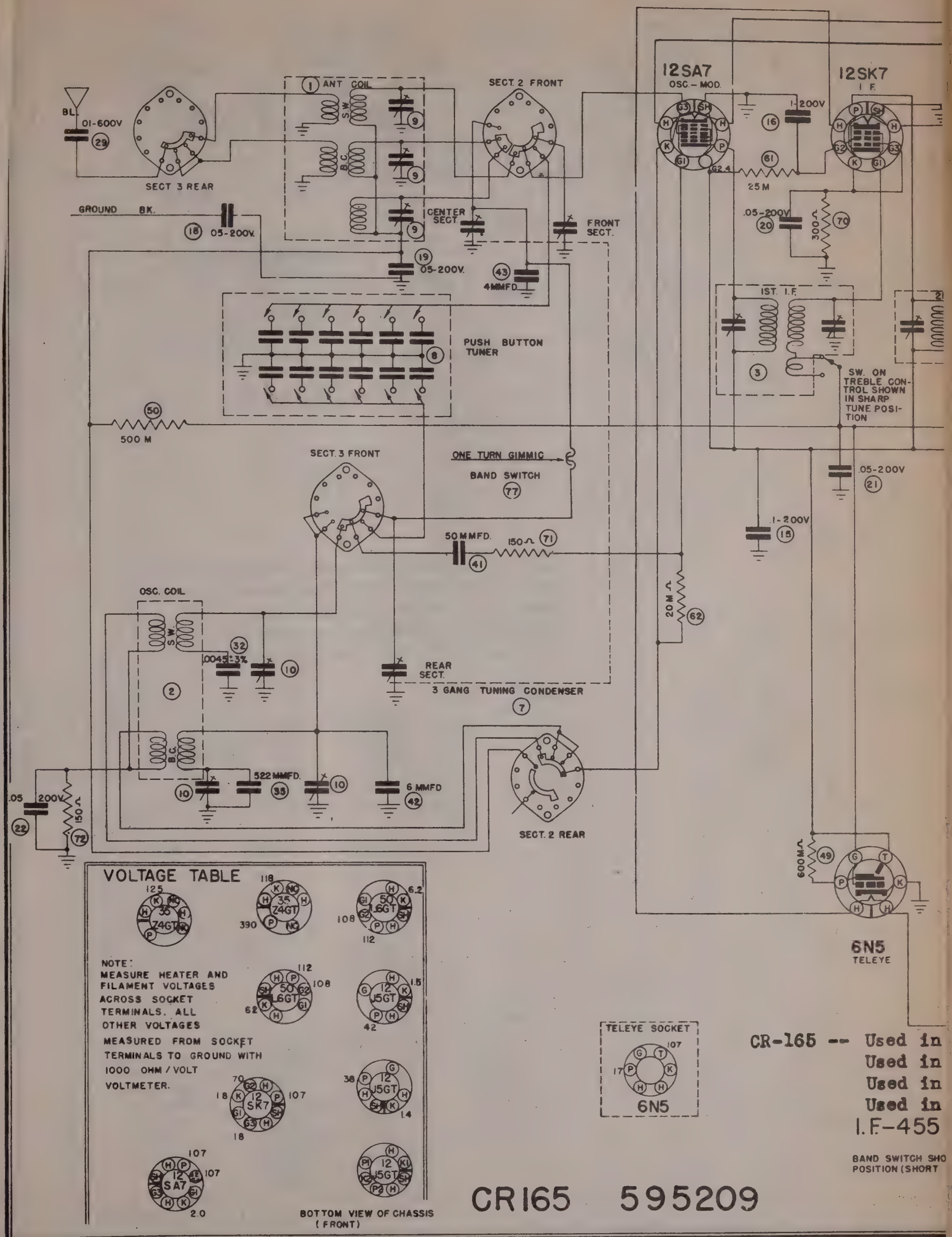
ombination

POSITION

T.

11/1/40

THE MAG



NOTE:
MEASURE HEATER AND FILAMENT VOLTAGES ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH 1000 OHM / VOLT VOLTMETER.

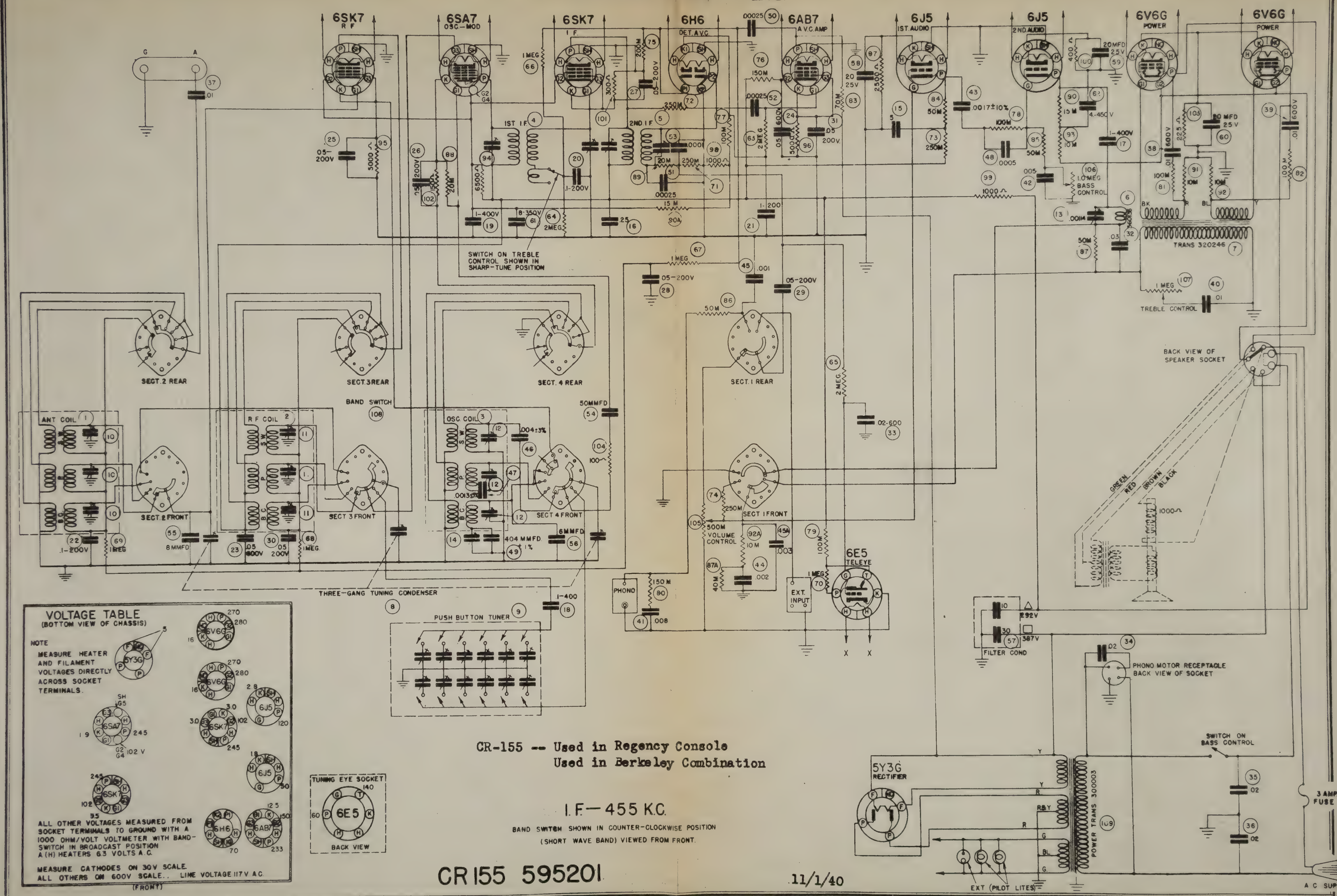
CR-165 -- Used in
Used in
Used in
Used in
I.F-455

BAND SWITCH SHO
POSITION (SHORT

CR165 595209

CHASSIS CR-155

THE MAGNAVOX CO. INC.



NOTE
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN BROADCAST POSITION
A (H) HEATERS 6.3 VOLTS A.C.

MEASURE CATHODES ON 30V SCALE.
ALL OTHERS ON 600V SCALE.. LINE VOLTAGE 117 V. A.C.

CR-155 -- Used in Regency Console
Used in Berkeley Combination

I.F.—455 K.C.

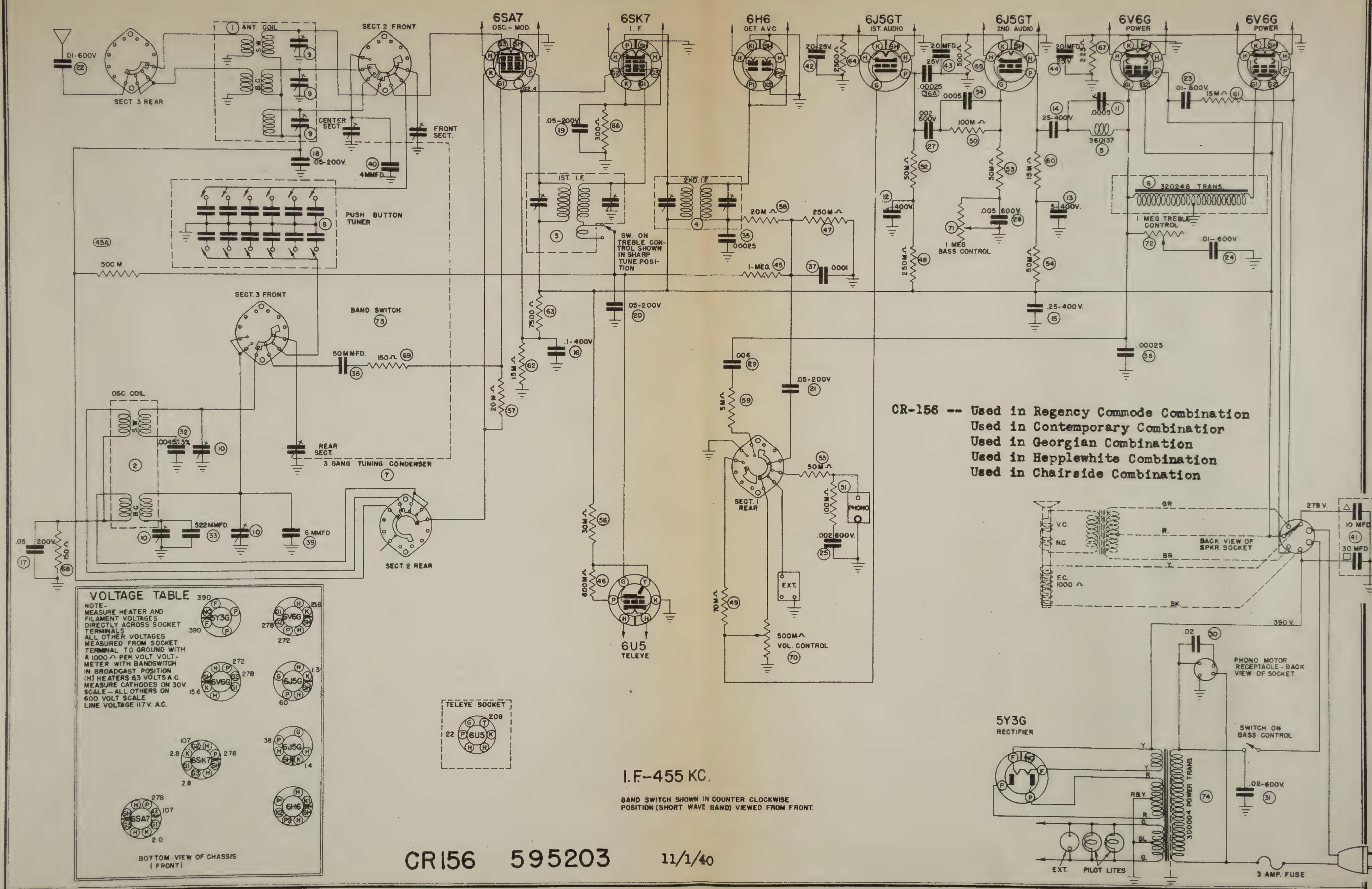
BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR155 595201

11/1/40

© John F. Rider, Publisher

THE MAGNAVOX CO. INC.



CR-156 -- Used in Regency Commode Combination
Used in Contemporary Combination
Used in Georgian Combination
Used in Hepplewhite Combination
Used in Chairside Combination

VOLTAGE TABLE

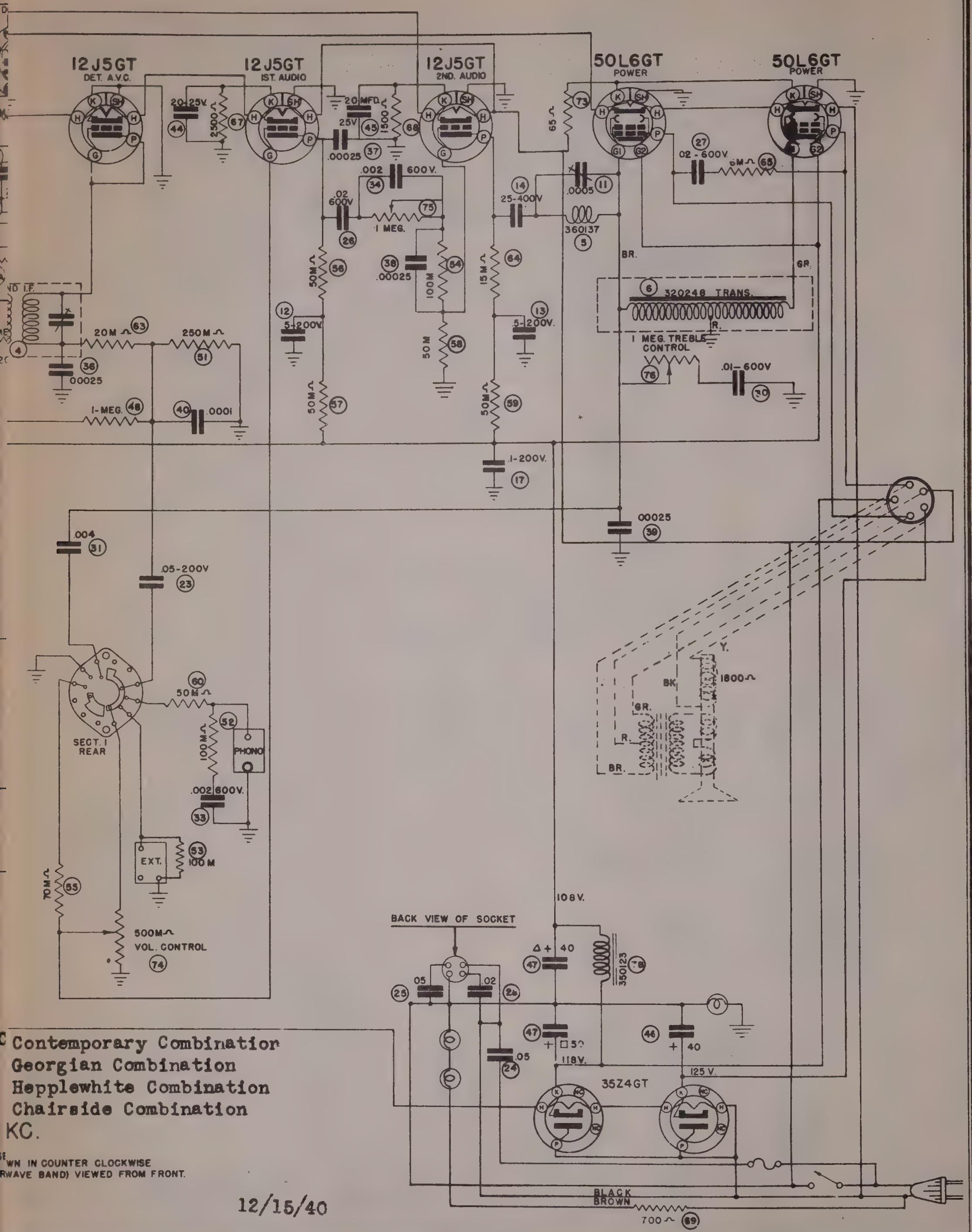
NOTE-
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 Ω PER VOLT VOLTMETER WITH BANDSWITCH IN BROADCAST POSITION
(H) HEATERS 6.3 VOLTS A.C.
MEASURE CATHODES ON 30V. SCALE—ALL OTHERS ON 600 VOLT SCALE
LINE VOLTAGE 117V. A.C.

I.F.-455 KC.

BAND SWITCH SHOWN IN COUNTER CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR156 595203 11/1/40

NAVOX CO.INC.



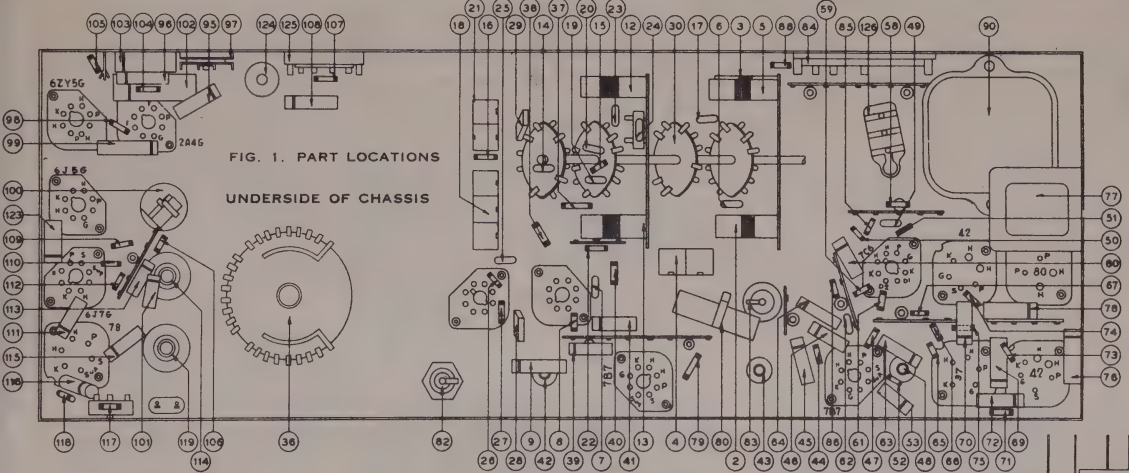
Contemporary Combination
Georgian Combination
Hepplewhite Combination
Chairside Combination
KC.

WN IN COUNTER CLOCKWISE
RWAVE BAND) VIEWED FROM FRONT.

12/15/40

PHILCO RADIO & TELEVISION CORP.

MODEL 41-316 (121)



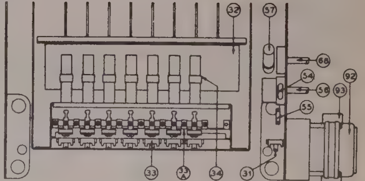
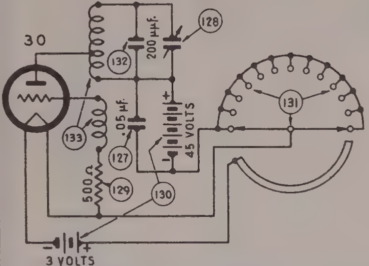


FIG. 8. LOCATION OF PARTS, TUNING UNIT



SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

FIG. 2. WIRELESS REMOTE CONTROL UNIT WIRING

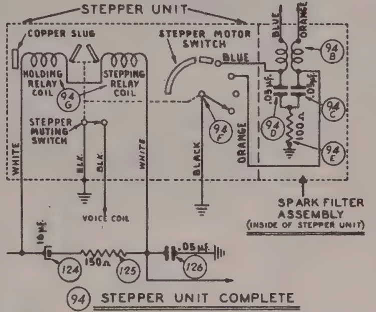


FIG. 3. INTERNAL WIRING OF STEPPER UNIT NUMBERS CORRESPOND TO SCHEMATIC

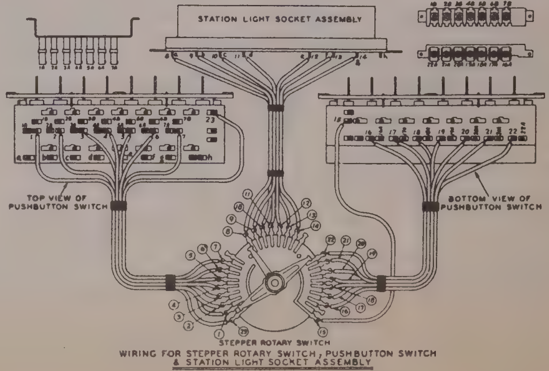

STATION LIGHT SOCKET ASSEMBLY
TOP VIEW OF PUSHBUTTON SWITCH
BOTTOM VIEW OF PUSHBUTTON SWITCH
STEPPER ROTARY SWITCH
WIRING FOR STEPPER ROTARY SWITCH, PUSHBUTTON SWITCH & STATION LIGHT SOCKET ASSEMBLY

FIG. 4. CABLE WIRING FROM STEPPER ROTARY SWITCH TO PUSH-BUTTON SWITCH AND STATION LIGHTS

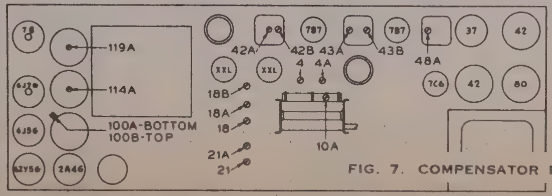
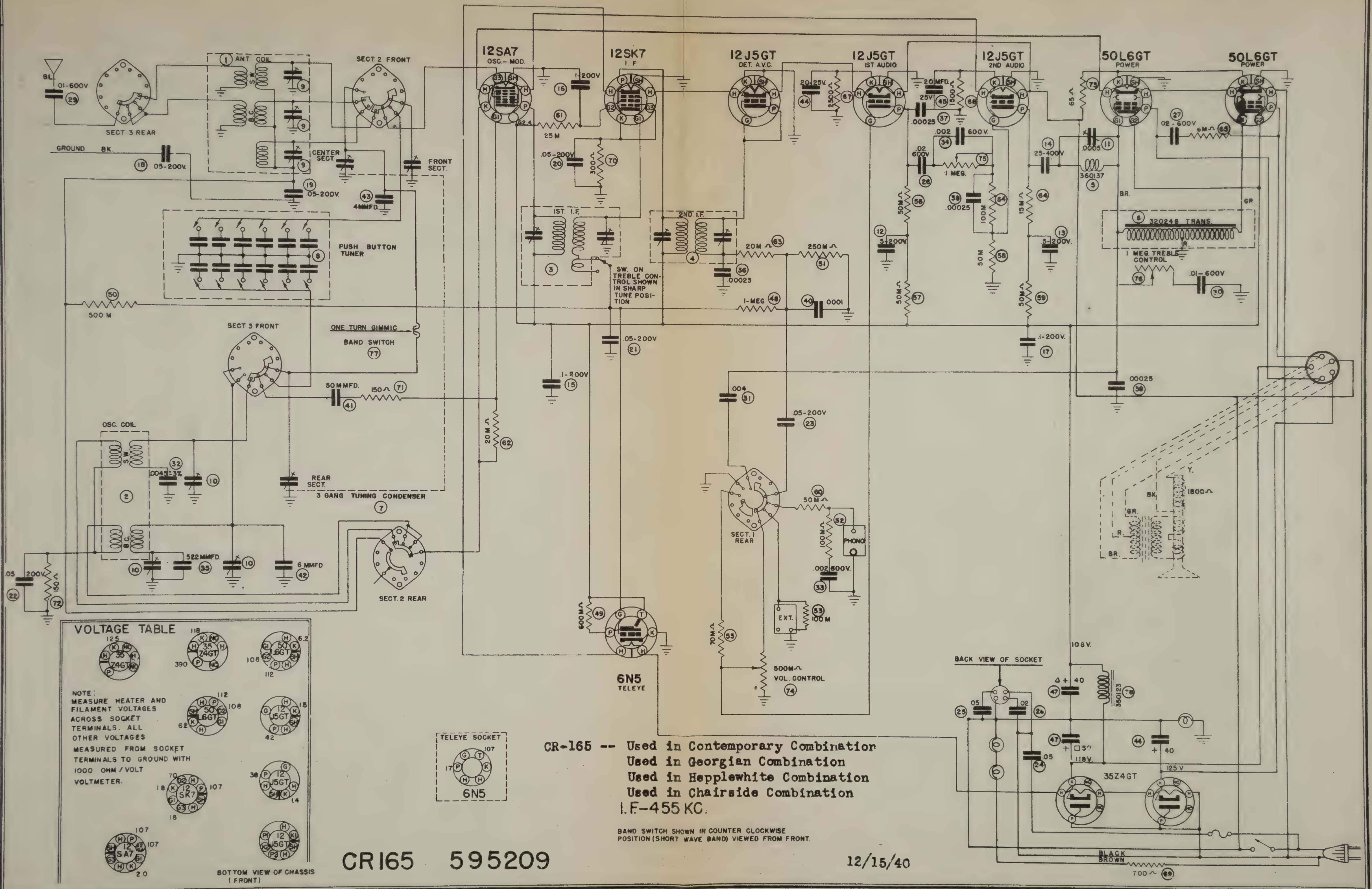


FIG. 7. COMPENSATOR LOCATIONS — TOP

CHASSIS CR-165

THE MAGNAVOX CO.INC.



NOTE: MEASURE HEATER AND FILAMENT VOLTAGES ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH 1000 OHM / VOLT VOLTMETER.

CR-165 -- Used in Contemporary Combination
Used in Georgian Combination
Used in Hepplewhite Combination
Used in Chairside Combination

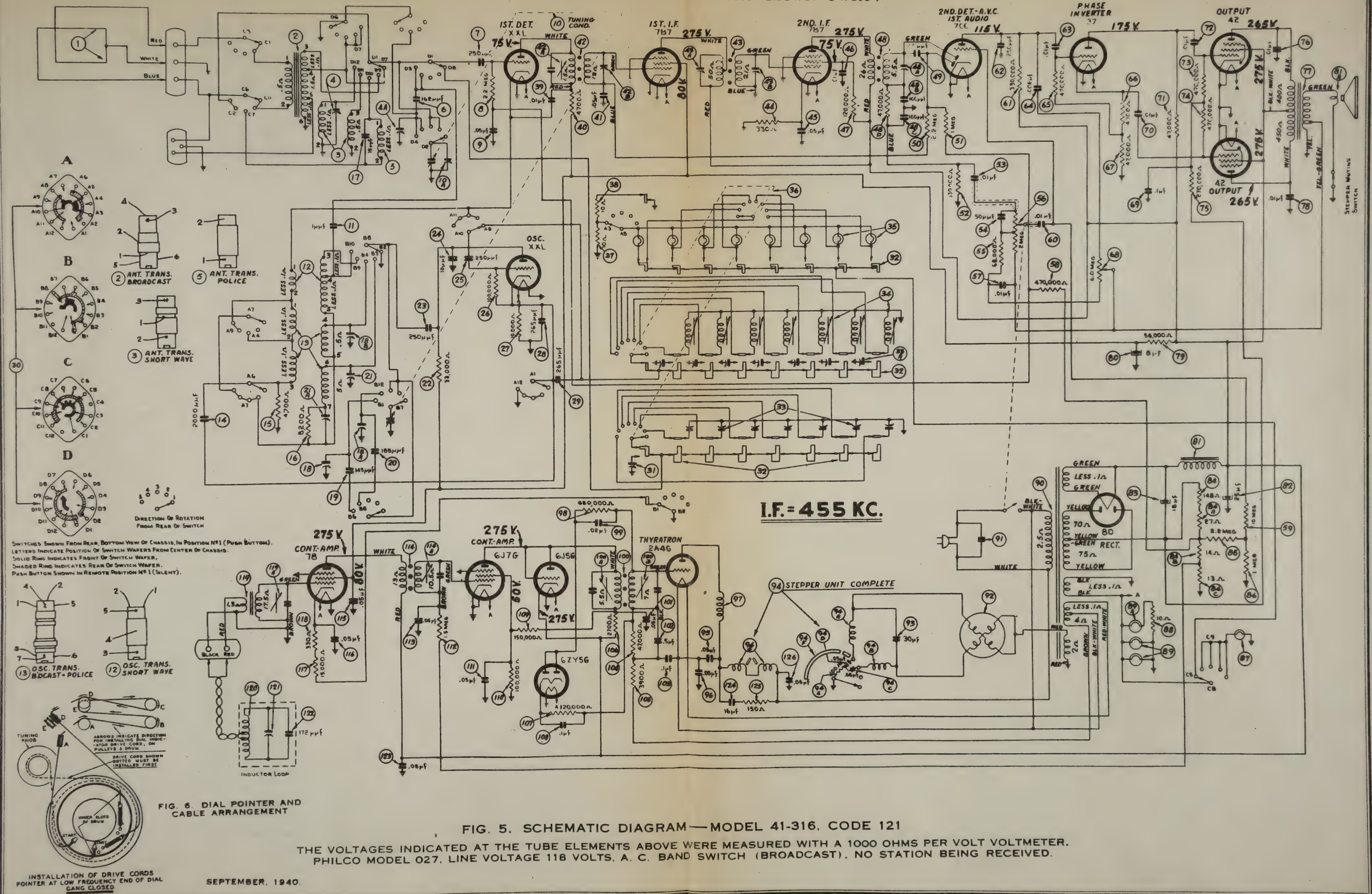
I.F.-455 KC.

BAND SWITCH SHOWN IN COUNTER CLOCKWISE POSITION (SHORT WAVE BAND) VIEWED FROM FRONT.

CR165 595209

12/15/40

PHILCO RADIO & TELEVISION CORP.



SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No1 (PUSH BUTTON).
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM CENTER OF CHASSIS.
SOLID RING INDICATES FRONT OF SWITCH WAFER.
SHADED RING INDICATES REAR OF SWITCH WAFER.
PUSH BUTTON SHOWN IN REMOTE POSITION No 1 (SILENT).

FIG. 6. DIAL POINTER AND CABLE ARRANGEMENT

FIG. 5. SCHEMATIC DIAGRAM—MODEL 41-316, CODE 121

THE VOLTAGES INDICATED AT THE TUBE ELEMENTS ABOVE WERE MEASURED WITH A 1000 OHMS PER VOLT VOLTMETER. PHILCO MODEL 027. LINE VOLTAGE 118 VOLTS, A. C. BAND SWITCH (BROADCAST). NO STATION BEING RECEIVED.

SEPTEMBER, 1940.

Model 41-316

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by code numbers appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5......355 K. C.
Code 6......367 K. C.
Code 7......375 K. C.
Code 8......383 K. C.
Code 9......395 K. C.

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 K. C. apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 K. C., the second set to 375 K. C., and the third set to 395 K. C.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 077 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inch in diameter).

2. Philco wireless remote control aligning adapter. Part No. 45-2769.

3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.

2. Remove the 78 control amplifier tube, its shield and the shield of the 6J7G tube. Apply power to the set and turn the range selector disc to "remote".

3. Attach the "high" side of the signal generator output to the grid of the 6J7G tube. Set the generator modulation control to "mod on" and turn the attenuator control about one-fourth on.

4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 K. C. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 K. C.

5. After the control frequency has been found or changed, compensators (100A), (100B) are adjusted for maximum indication on the vacuum tube voltmeter.

6. After adjusting this circuit, replace the 78 tube and shields in their sockets and remove the signal generator lead from the grid of the 6J7G tube.

7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (114A) and (119A) are now adjusted for maximum reading on the vacuum tube voltmeter.

8. Next adjust the secondary inductor loop compensator (121) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of a loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position. After these compensators are adjusted to maximum, the control amplifier is tuned to the frequency selected.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (128) Fig. 2, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (128) is then readjusted for maximum voltage reading.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

ADJUSTING REMOTE CONTROL UNIT OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (117) 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

ADJUSTING FOR PUSH-BUTTON AND WIRELESS REMOTE CONTROL OPERATION

Broadcast stations can be tuned in automatically from the wireless remote control unit and in addition, can also be tuned in automatically by push-button operation. Eight push-buttons are provided on the radio chassis. One of these (extreme left) is used to select Remote Control Tuning. The remaining push-buttons are used to select stations automatically by push-button operation.

By using the remote tuning unit, seven broadcast stations can be tuned in; the volume can be raised and lowered; a silent position can be selected and the radio can be turned "OFF"

The selected broadcast stations can be set up for push-button and remote tuning control operation by adjusting the padders and coils located in back of the push-button assembly. Three adjustments must be made for each broadcast station selected.

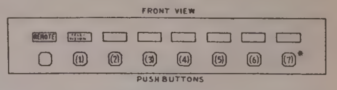
The bottom row marked "ANT" is for the antenna padder for remote control operation; the middle row of adjusting screws is for the oscillator coils used in remote control; the top row of adjusting screws is for the oscillator adjustment for push-button tuning. Each set of three padders is numbered from "1 to 7" corresponding to the numbers shown on the push-buttons in Figure above.

To set up stations on these models for best reception, a Signal Generator PHILCO Model 077; Vacuum Tube Voltmeter PHILCO Model 027 or 028 and Aligning Adaptor, Part No. 45-2767 should be used. With this equipment proceed as follows:

1. Select and remove the desired seven (7) station call letters from the receiver station tab card. Insert the station tabs in the windows of the bezel on the receiver. Place the lowest frequency station in the second window (No. 1 in diagram) on the left of the bezel, and the remaining station tabs in the windows in the order of increasing broadcast frequency.

2. Remove the tabs of the corresponding seven stations from the wireless control call letter card. Insert the LOUD, SOFT and SILENT tabs in the first, second and third spaces, respectively, on the right hand side of the bezel. Insert the tab of the lowest frequency station in the fourth space on the right side of the bezel on the remote control unit dial. Transparent tabs are also supplied. These should be placed over each call letter. Place the remaining call letter tabs around the bezel from right to left (counter-clockwise) in the order of increasing frequency.

3. Remove the 7C6 second detector tube from its socket and insert the aligning adaptor, Part No. 45-2767. Replace the tube in the adaptor. Connect the negative (—) terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive (+) terminal of the voltmeter to the black wire of the adaptor.



4. Turn volume control and power switch to the "ON" position, and allow the receiver to heat up. Attach a loop consisting of a few turns of wire to the output terminals of the Model 077 Signal Generator. Turn the signal generator power switch to "MOD ON". Turn the receiver "Band" selector to "Broadcast" and manually tune in the lowest frequency station desired. This station should be between 540 to 1030 K. C. Then tune the signal generator to the frequency of the same station and a beat note will be heard. Leave the signal generator pointer set at this frequency.

5. Press in the "Remote" push-button. Dial the first low frequency station on the remote control unit.

6. Using a padding screw driver adjust No. 1 "OSC Remote" (middle row) until the station identified by the modulated signal of the Signal Generator is tuned to maximum reading on the voltmeter. Next adjust the "No. 1 ANT" padder (bottom row) for maximum indication on the voltmeter.

Press in the No. 1 push-button on the radio and adjust No. 1 "P.BUTTON OSC" padder (top row) for maximum output on the same station.

7. Turn the Signal Generator off the station frequency and readjust the No. 1 "OSC P.BUTTON" padder for maximum; then press REMOTE push-button and readjust No. 1 "Remote OSC" and No. 1 "ANT" padders for maximum reading with the station signal. This should be done with the volume control of the receiver at low volume.

Repeat this procedure for each of the remaining stations to be set up. They should be set up in the order of their increasing frequency.

8. After all stations have been set up for push-button and remote control operation, press in the fifth (5) push-button and adjust the padder "ANT COMPENSATOR" located to the right of the padder strip unit below the dial, for maximum signal strength. See Fig. 8 for compensator (31).

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the 42 tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 3 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. If the chassis is to be aligned outside the cabinet the loop should be in the same relative position near the chassis as when assembled in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown on Fig. 7. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	High side to No. 3 terminal loop Panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Position	48D, 43A, 43B, 42A, 42B	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	21, 10A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	21A	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat operation No. 2 again				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	18B	Note C
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W." 1	18A, 4A	Note D
7	Use Loop on Generator	18 M. C.	18 M. C.	Range Switch "S. W." 2	18, 4	Note E

Note A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Fig. 6.

NOTE B — When adjusting the compensator, the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — Adjust compensator (18B) to the SECOND signal peak from the tight (closed) position.

NOTE D — Adjust compensator (18A) to the FIRST signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver dial at 12 M. C. and turn the signal generator to 11.090 M. C.

NOTE E — Adjust compensator (18) to the SECOND signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver at 18 M. C. and turning the signal generator to 18.910 M. C. When adjusting compensator (4) roll the tuning condenser, See Note "B" on how to roll the condenser.

PHILCO RADIO & TELEVISION CORP.

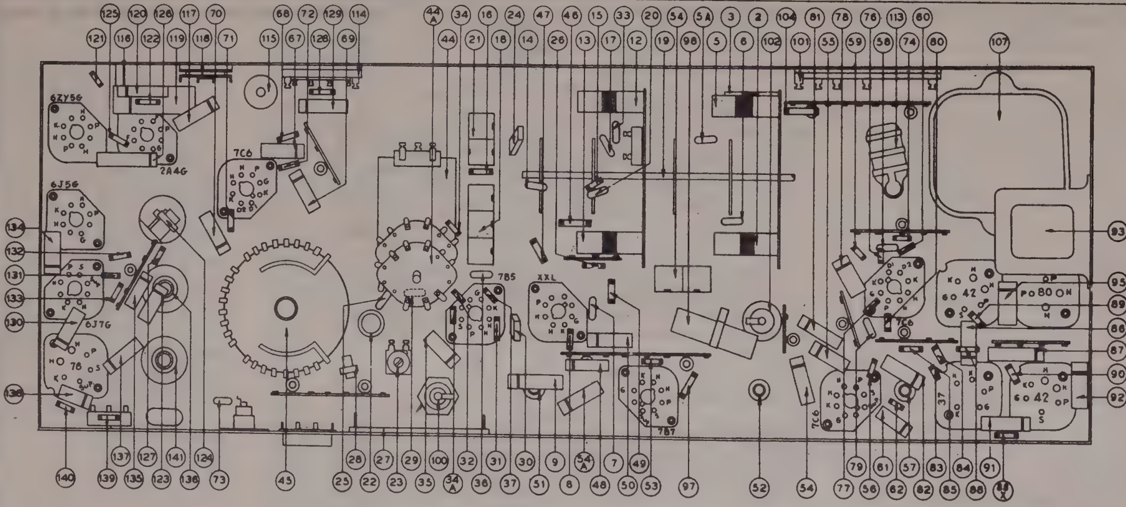

125 120 126 117 70 68 72 129 114 44A 34 16 24 47 46 15 33 20 54 5A 3 2 104 81 78 76 113 60
121 116 122 119 118 71 115 67 128 69 44 21 18 14 26 13 17 12 19 98 5 6 102 101 55 59 58 74 80 107
134 132 131 133 130 138
93 95 89 86 87 90 92
137 127 141 124 28 27 29 100 32 31 30 9 54A 7 49 79 61 57 83 84 91
140 139 135 123 136 73 45 25 22 23 35 34A 36 37 51 8 48 50 53 97 52 54 77 56 62 82 85 88 44X
6ZY5G
2A4G
6J5G
6J7G
7C6
78
7B5
XXL
7B7
7C6
42
80
37
42

FIG. 1. PART LOCATIONS—UNDERSIDE OF CHASSIS

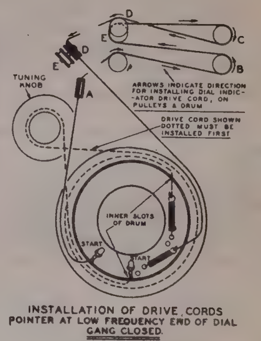
TUNING BAND FREQUENCIES: 540 to 1720 K. C., 2.3 to 7.0 M. C., 9 to 12 M. C., 13.5 to 18 M. C.

INTERMEDIATE FREQUENCY: 155 K. C.

AUDIO OUTPUT: 10 watts.

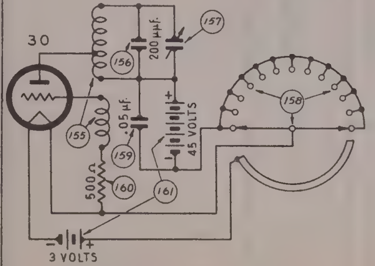
POWER SUPPLY: 118 volts, 60 cycle A. C. The radio can also be operated on 118 volts, 50 cycle A. C. To do this it is necessary to replace the record changer motor as indicated in the parts list.

POWER CONSUMPTION: 200 Watts


TUNING KNOB
A
B
C
D
E
ARROWS INDICATE DIRECTION FOR INSTALLING DIAL INDICATOR DRIVE CORD, ON PULLEYS & DRUM
DRIVE CORD SHOWN DOTTED MUST BE INSTALLED FIRST
INNER SLOTS OF DRUM
START
START

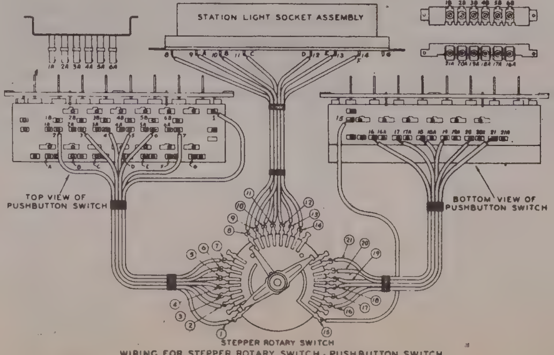
INSTALLATION OF DRIVE CORDS
POINTER AT LOW FREQUENCY END OF DIAL
GANG CLOSED.

FIG. 4. DIAL POINTER AND CABLE ARRANGEMENT



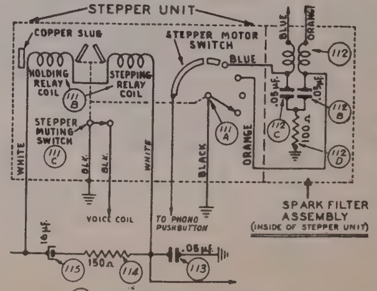
SCHEMATIC DIAGRAM OF
WIRELESS REMOTE CONTROL UNIT

FIG. 3. WIRELESS REMOTE CONTROL UNIT WIRING


STATION LIGHT SOCKET ASSEMBLY
TOP VIEW OF PUSHBUTTON SWITCH
BOTTOM VIEW OF PUSHBUTTON SWITCH
STEPPER ROTARY SWITCH

WIRING FOR STEPPER ROTARY SWITCH, PUSHBUTTON SWITCH & STATION LIGHT SOCKET ASSEMBLY

FIG. 5. CABLE WIRING FROM STEPPER ROTARY SWITCH TO PUSH-BUTTON SWITCH AND STATION LIGHTS



(111) STEPPER UNIT COMPLETE

FIG. 6. INTERNAL WIRING OF STEPPER UNIT. NUMBERS CORRESPOND TO SCHEMATIC

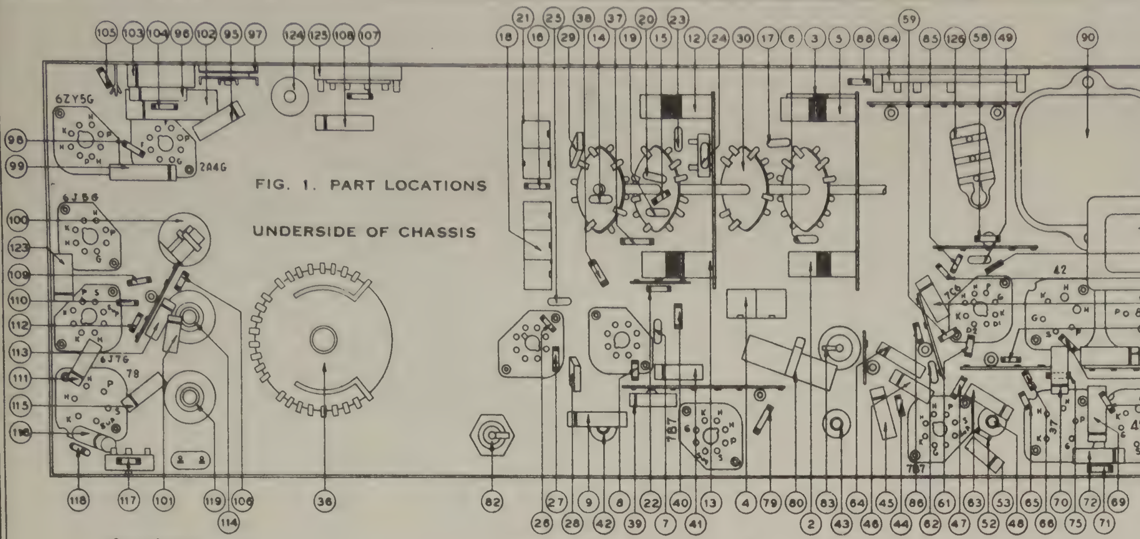
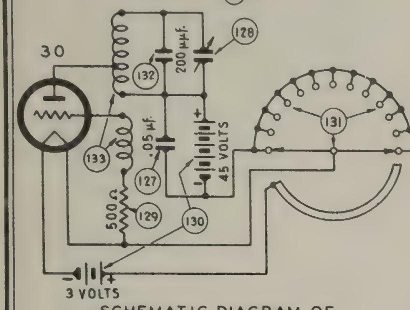


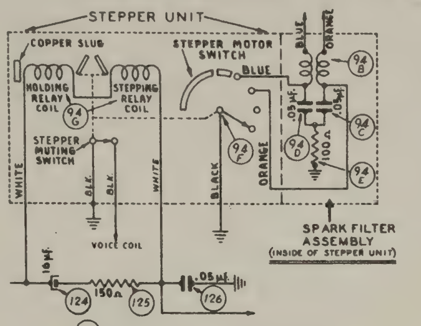
FIG. 1. PART LOCATIONS

UNDERSIDE OF CHASSIS



SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

FIG. 2. WIRELESS REMOTE CONTROL UNIT WIRING



(94) STEPPER UNIT COMPLETE

FIG. 3. INTERNAL WIRING OF STEPPER UNIT NUMBERS CORRESPOND TO SCHEMATIC

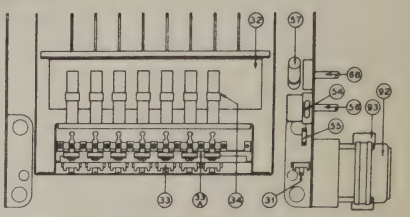


FIG. 8. LOCATION OF PARTS. TUNING UNIT

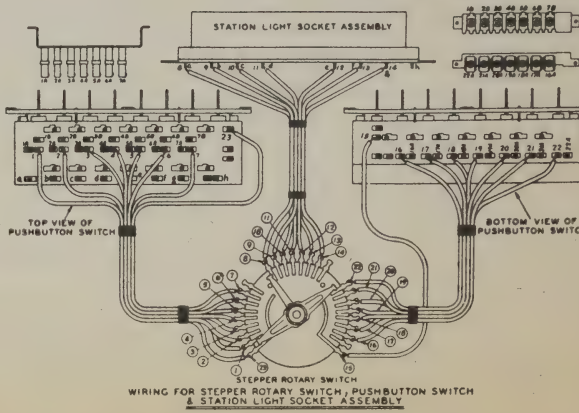

STATION LIGHT SOCKET ASSEMBLY
TOP VIEW OF PUSHBUTTON SWITCH
BOTTOM VIEW OF PUSHBUTTON SWITCH
STEPPER ROTARY SWITCH
WIRING FOR STEPPER ROTARY SWITCH, PUSHBUTTON SWITCH & STATION LIGHT SOCKET ASSEMBLY

FIG. 4. CABLE WIRING FROM STEPPER ROTARY SWITCH TO PUSH-BUTTON SWITCH AND STATION LIGHTS

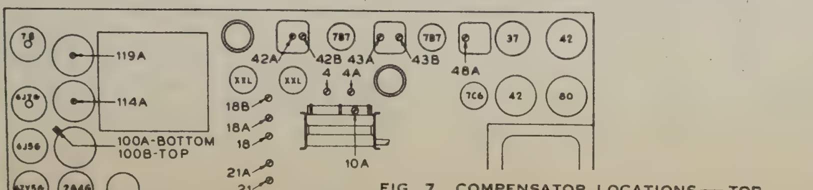


FIG. 7. COMPENSATOR LOCATIONS — TOP

Model 41-316

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by code numbers appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5......355 K. C.	Code 7......375 K. C.
Code 6......367 K. C.	Code 8......383 K. C.
Code 9......395 K. C.	

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 K. C. apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 K. C., the second set to 375 K. C., and the third set to 395 K. C.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 077 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inch in diameter).
2. Philco wireless remote control aligning adapter. Part No. 45-2769.
3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.
2. Remove the 78 control amplifier tube, its shield and the shield of the 6J7G tube. Apply power to the set and turn the range selector disc to "remote".
3. Attach the "high" side of the signal generator output to the grid of the 6J7G tube. Set the generator modulation control to "mod on" and turn the attenuator control about one-fourth on.
4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 K. C. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 K. C.
5. After the control frequency has been found or changed, compensators (100A), (100B) are adjusted for maximum indication on the vacuum tube voltmeter.
6. After adjusting this circuit, replace the 78 tube and shields in their sockets and remove the signal generator lead from the grid of the 6J7G tube.
7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (114A) and (119A) are now adjusted for maximum reading on the vacuum tube voltmeter.
8. Next adjust the secondary inductor loop compensator (121) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of a loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.
9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position. After these compensators are adjusted to maximum, the control amplifier is tuned to the frequency selected.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.
2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (128) Fig. 2, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.
3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (128) is then re-adjusted for maximum voltage reading.
4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

ADJUSTING REMOTE CONTROL UNIT OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (117) 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

ADJUSTING FOR PUSH-BUTTON AND WIRELESS REMOTE CONTROL OPERATION

Broadcast stations can be tuned in automatically from the wireless remote control unit and in addition, can also be tuned in automatically by push-button operation. Eight push-buttons are provided on the radio chassis. One of these (extreme left) is used to select Remote Control Tuning. The remaining push-buttons are used to select stations automatically by push-button operation.

By using the remote tuning unit, seven broadcast stations can be tuned in; the volume can be raised and lowered; a silent position can be selected and the radio can be turned "OFF"

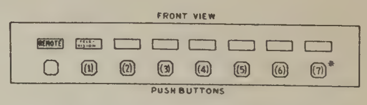
The selected broadcast stations can be set up for push-button and remote tuning control operation by adjusting the padders and coils located in back of the push-button assembly. Three adjustments must be made for each broadcast station selected.

The bottom row marked "ANT" is for the antenna padder for remote control operation; the middle row of adjusting screws is for the oscillator coils used in remote control; the top row of adjusting screws is for the oscillator adjustment for push-button tuning. Each set of three padders is numbered from "1 to 7" corresponding to the numbers shown on the push-buttons in Figure above.

To set up stations on these models for best reception, a Signal Generator PHILCO Model 077; Vacuum Tube Voltmeter PHILCO Model 027 or 028 and Aligning Adaptor, Part No. 45-2767 should be used. With this equipment proceed as follows:

1. Select and remove the desired seven (7) station call letters from the receiver station tab card. Insert the station tabs in the windows of the bezel on the receiver. Place the lowest frequency station in the second window (No. 1 in diagram) on the left of the bezel, and the remaining station tabs in the windows in the order of increasing broadcast frequency.
2. Remove the tabs of the corresponding seven stations from the wireless control call letter card. Insert the LOUD, SOFT and SILENT tabs in the first, second and third spaces, respectively, on the right hand side of the bezel. Insert the tab of the lowest frequency station in the fourth space on the right side of the bezel on the remote control unit dial. Transparent tabs are also supplied. These should be placed over each call letter. Place the remaining call letter tabs around the bezel from right to left (counter-clockwise) in the order of increasing frequency.
3. Remove the 7C6 second detector tube from its socket and insert the aligning adaptor, Part No. 45-2767. Replace the tube in the adaptor. Connect the negative (—) terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive (+) terminal of the voltmeter to the black wire of the adaptor.

FRONT VIEW



PUSH BUTTONS

4. Turn volume control and power switch to the "ON" position, and allow the receiver to heat up. Attach a loop consisting of a few turns of wire to the output terminals of the Model 077 Signal Generator. Turn the signal generator power switch to "MOD ON". Turn the receiver "Band" selector to "Broadcast" and manually tune in the lowest frequency station desired. This station should be between 540 to 1030 K. C. Then tune the signal generator to the frequency of the same station and a beat note will be heard. Leave the signal generator pointer set at this frequency.
5. Press in the "Remote" push-button. Dial the first low frequency station on the remote control unit.
6. Using a padding screw driver adjust No. 1 "OSC Remote" (middle row) until the station identified by the modulated signal of the Signal Generator is tuned to maximum reading on the voltmeter. Next adjust the "No. 1 ANT" padder (bottom row) for maximum indication on the voltmeter.

Press in the No. 1 push-button on the radio and adjust No. 1 "P.BUTTON OSC" padder (top row) for maximum output on the same station.

7. Turn the Signal Generator off the station frequency and readjust the No. 1 "OSC P.BUTTON" padder for maximum; then press REMOTE push-button and readjust No. 1 "Remote OSC" and No. 1 "ANT" padders for maximum reading with the station signal. This should be done with the volume control of the receiver at low volume.

Repeat this procedure for each of the remaining stations to be set up. They should be set up in the order of their increasing frequency.

8. After all stations have been set up for push-button and remote control operation, press in the fifth (5) push-button and adjust the padder "ANT COMPENSATOR" located to the right of the padder strip unit below the dial, for maximum signal strength. See Fig. 8 for compensator (31).

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the 42 tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 3 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. If the chassis is to be aligned outside the cabinet the loop should be in the same relative position near the chassis as when assembled in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown on Fig. 7. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	High side to No. 3 terminal loop Panel.	455 K. C.	560 K. C.	Vol. Max. Range Switch "S. W." Position	48D, 43A, 43B, 42A, 42B	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	21, 10A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	21A	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat operation No. 2 again				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	18B	Note C
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W." 1	18A, 4A	Note D
7	Use Loop on Generator	18 M. C.	18 M. C.	Range Switch "S. W." 2	18, 4	Note E

Note A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Fig. 6.

NOTE B — When adjusting the compensator, the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

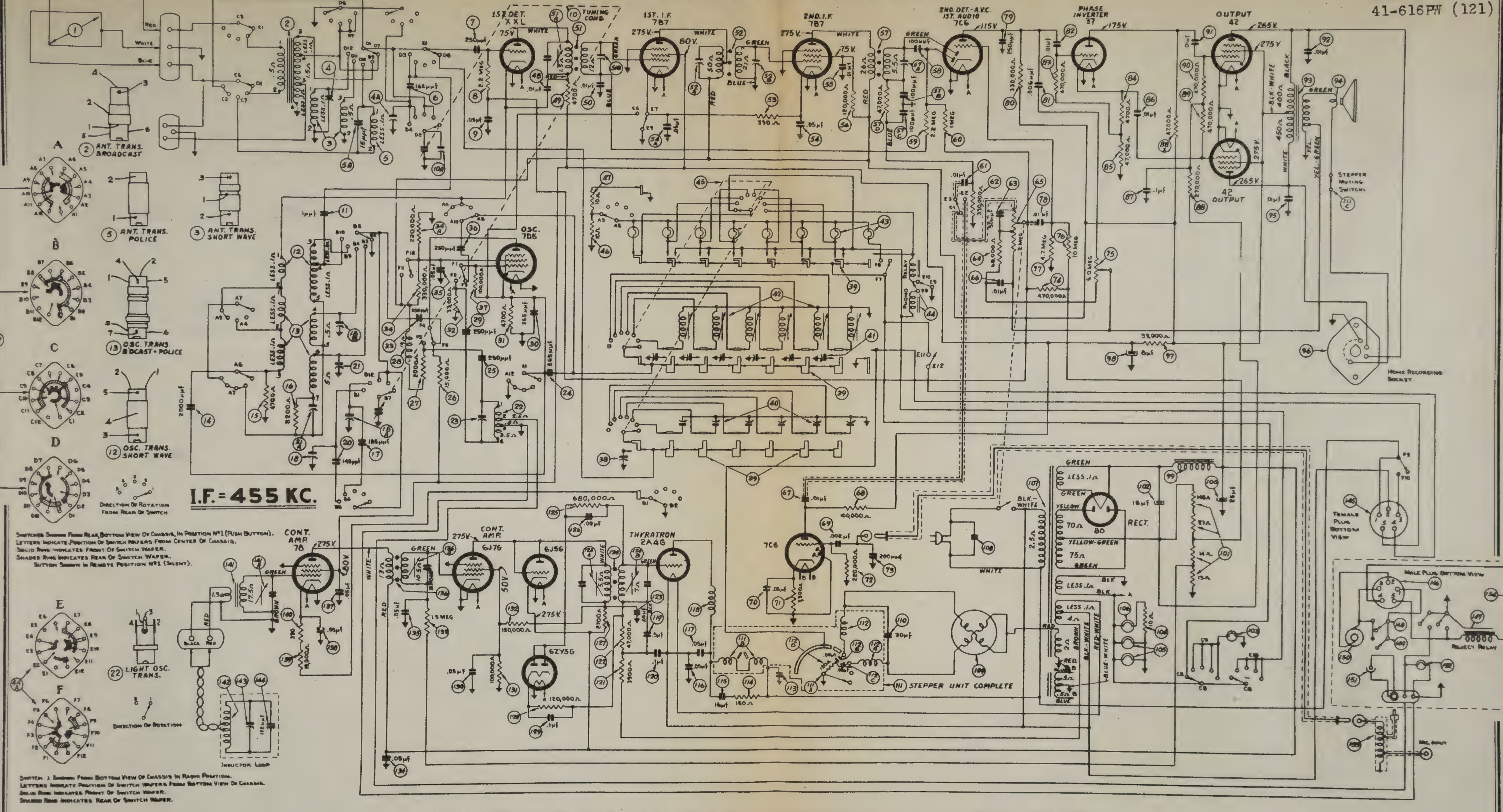
NOTE C — Adjust compensator (18B) to the SECOND signal peak from the tight (closed) position.

NOTE D — Adjust compensator (18A) to the FIRST signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver dial at 12 M. C. and turn the signal generator to 11.090 M. C.

NOTE E — Adjust compensator (18) to the SECOND signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver at 18 M. C. and turning the signal generator to 18.910 M. C. When adjusting compensator (4) roll the tuning condenser, See Note "B" on how to roll the condenser.

PHILCO RADIO & TELEVISION CORP.

MODELS 41-616P
41-616PW (121)



Switches Shown From Rear, Bottom View Of Chassis, In Position Nº1 (Push Button).
Letters Indicate Position Of Switch Wafers From Center Of Chassis.
Solid Ring Indicates Front Of Switch Wafer.
Shaded Ring Indicates Rear Of Switch Wafer.
Button Shown In Remote Position Nº1 (Silent).

Switch J Shown From Bottom View Of Chassis In Radio Position.
Letters Indicate Position Of Switch Wafers From Bottom View Of Chassis.
Solid Ring Indicates Front Of Switch Wafer.
Shaded Ring Indicates Rear Of Switch Wafer.

LINE VOLTAGE 118 VOLTS, A. C. BAND SWITCH (BROADCAST), NO STATION BEING RECEIVED.

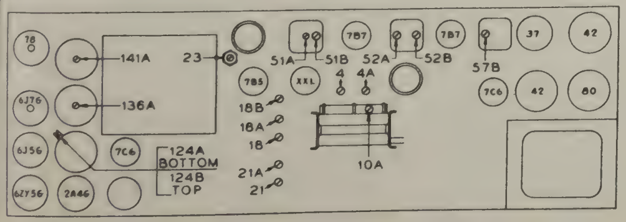


FIG 7. COMPENSATOR LOCATIONS — TOP OF CHASSIS

OCTOBER, 1940.

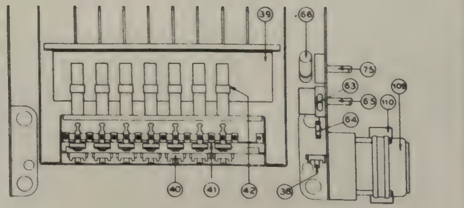


FIG. 8. LOCATION OF PARTS, TUNING UNIT

ADJUSTMENT OF WIRELESS REMOTE CONTROL CIRCUITS

Model 41-616, Code 121

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by code numbers appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5......355 K. C.	Code 7......375 K. C.
Code 6......367 K. C.	Code 8......383 K. C.
Code 9......395 K. C.	

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 K. C. apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 K. C., the second set to 375 K. C., and the third set to 395 K. C.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 077 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inch in diameter).

2. Philco wireless remote control aligning adapter. Part No. 45-2769.

3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.

2. Remove the 78 control amplifier tube, its shield and the shield of the 6J7G tube. Apply power to the set and turn the range selector disc to "remote".

3. Attach the "high" side of the signal generator output to the grid of the 6J7G tube. Set the generator modulation control to "mod on" and turn the attenuator control about one-fourth on.

4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 K. C. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 K. C.

5. After the control frequency has been found or changed, compensators (124A), (124B) are adjusted for maximum indication on the vacuum tube voltmeter.

6. After adjusting this circuit, replace the 78 tube and shields in their sockets and remove the signal generator lead from the grid of the 6J7G tube.

7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (136A) and (141A) are now adjusted for maximum reading on the vacuum tube voltmeter.

8. Next adjust the secondary inductor loop compensator (143) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of a loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position. After these compensators are adjusted to maximum, the control amplifier is tuned to the frequency selected.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (157) Fig. 3, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (157) is then re-adjusted for maximum voltage reading.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

ADJUSTING REMOTE CONTROL UNIT OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (139) 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

LIGHT-BEAM REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE — These adjustments should be made with the power line voltage at 118 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 1/32" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 23 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.

2. While the record is playing, turn compensator 23 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

SCHE. No.	DESCRIPTION	PART No.
1	Loop Aerial	76-1191
	Sleeve Mounting (2 required)	28-2257
	Sleeve Mounting (1 required)	56-1907
	Washer	28-4186
	Washer	W-151
	Washer	W-425
	Screw	W-288
2	Aerial Transformer (Broadcast)	32-3579
3	Aerial Transformer (Short Wave)	32-3581
4	Compensator (18 M. C.)	31-6391
4A	Compensator (12 M. C.) Part of 4	
5	Aerial Transformer (6 M. C.)	32-3580
5A	Mica Condenser (15 mmfd.)	60-015157
6	Mica Condenser (162 mmfd.)	30-1178
7	Mica Condenser (250 mmfd.)	60-125157
8	Resistor (2.2 megohms)	33-522339
9	Condenser (.05 mfd., 200 volts)	30-4519
10	Tuning Condenser	31-2507
	Coupling	31-2291
	Drive Cord (Tuning Drum)	31-2315
	Drive Cord (Pointer)	31-2316
	Drum and Shaft (Cable)	38-9716
10A	Comp. (1500 K. C., Aerial) Part of 10	
11	Condenser (Consists of Wire and Lug from 810 to D3)	
12	Oscillator Transformer (Short Wave)	32-3578
13	Oscillator Trans. (Police and Broadcast)	32-3582
14	Mica Condenser (2000 mfd.)	60-220324
15	Resistor (4700 ohms)	33-247339
16	Resistor (8200 ohms)	33-282339
17	Mica Condenser (185 mmfd.)	30-1197
18	Compensator (18 M. C.)	31-6362
18A	Compensator (13 M. C.) Part of 18	
18B	Compensator (6 M. C.) Part of 18	
19	Band Switch (R. F. Section)	42-1618
20	Mica Condenser (145 mmfd.)	30-1177
21	Compensator (Oscillator, 1500 K. C.)	31-6365
21A	Compensator (Oscillator, 580 K. C.)	
22	Oscillator Transformer (Supplies power to Phonograph Pick-up)	32-3527
23	Compensator (Adjusting Phonograph Pick-up Light)	31-6384
24	Mica Condenser (265 mmfd.)	31-1186
25	Mica Condenser (280 mmfd.)	60-125157
26	Resistor (15,000 ohms)	33-315339
27	Resistor (2000 ohms, Wirewound)	33-3405
28	R. F. Choke (Phonograph Circuit)	32-3401
29	Mica Condenser (250 mmfd.)	60-125157
30	Mica Condenser (265 mmfd.)	30-1196
31	Resistor (4700 ohms)	33-247339
32	Resistor (33,000 ohms)	33-333339
33	Mica Condenser (250 mmfd.)	60-125157

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. **Signal Generator:** Covering the frequency range of the receiver, such as Philco Models 077 or 177.

2. **Aligning Indicator:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028. Circuit testers contain both these meters.

3. **Tools:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the 42 tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 3 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. If the chassis is to be aligned outside the cabinet the loop should be in the same relative position near the chassis as when assembled in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown in Figure 7. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust. Compensators in Order	
1	High side to No. 4 terminal loop Panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Position	57A, 52A, 52B, 51B, 51A	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	21, 10A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	21A	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat operation No. 2 again				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	18B	Note C
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W." 1	18A, 4A	Note D
7	Use Loop on Generator	18 M. C.	18 M. C.	Range Switch "S. W." 2	18, 4	Note E

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Figure 4.

NOTE B — When adjusting the compensator, the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — Adjust compensator (18B) to the SECOND signal peak from the tight (closed) position.

NOTE D — Adjust compensator (18A) to the FIRST signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver dial at 12 M. C. and turn the signal generator to 11.090 M. C.

NOTE E — Adjust compensator (18) to the SECOND signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver at 18 M. C. and turning the signal generator to 18.910 M. C. When adjusting compensator (4) roll the tuning condenser, See Note "B" on how to roll the condenser.

34	Resistor (330,000 ohms)	33-433339
34A	Resistor (220,000 ohms)	33-422339
35	Condenser (.05 mfd., 200 volts)	30-4519
36	Mica Condenser (250 mmfd.)	60-125157
37	Resistor (100,000 ohms)	33-410339
38	Compensator (Aerial—Push-buttons)	31-6367
39	Push-button Switch	42-1619
40	Compensator Strip (Remote Cont. Aerial)	31-6390
41	Push-button Comp. Strip (Oscillator)	31-6389
42	Oscillator Coil Assem. (Remote Control)	32-3563
	Coils (1-2-3-4)	32-3597
	Coils (5-6)	32-3041
	Iron Core	28-6916
	Coil Clip	28-6910
43	Remote Cont. & Push-button Tuning Lgts.	34-2064
	Socket Assembly	76-1145
	Light Cover	76-1146
44	Phonograph Relay (Remote Control) Complete with Switch	42-1621
44A	Changeover Switch	42-1647
45	Stepper Rotary Switch	42-1620
	Insulating Washer	27-7397
	Insulating Washer	27-8040
	Rubber Sleeve	4169
	Contact Arm	38-9764
	Drive Arm	38-9763
	Nut	28-6967
	Washer	W-467
46	Resistor (10 ohms)	33-010434
47	Resistor (10 ohms)	33-010434
48	Condenser (.01 mfd., 400 volts)	30-4572
49	Resistor (4700 ohms)	33-247339
50	Condenser (.01 mfd., 400 volts)	30-4572
51	1st I. F. Transformer	32-3493
52	2nd I. F. Transformer	32-3494
53	Resistor (330 ohms)	33-133336
54	Condenser (.05 mfd., 400 volts)	30-4518
54A	Condenser (.05 mfd., 400 volts)	30-4518
55	Condenser (.01 mfd., 400 volts)	30-4572
56	Resistor (120,000 ohms)	33-412339
57	3rd I. F. Transformer	32-3566
58	Condenser (100 mmfd.)	60-110157
59	Resistor (2.2 megohms)	33-522339
60	Resistor (1 megohm)	33-510339
61	Condenser (.01 mfd., 400 volts)	30-4572
62	Resistor (330,000 ohms)	33-433339
63	Mica Condenser (50 mmfd.)	60-050137
64	Resistor (68,000 ohms)	33-368339
65	Volume Control	33-5417
	Drive Pulley	56-6111
	Set Screw	W-2106
66	Condenser (.01 mfd., 400 volts)	30-4572
67	Condenser (.01 mfd., 400 volts)	30-4572
68	Resistor (100,000 ohms)	33-410339
69	Condenser (.002 mfd., 400 volts)	30-4579
70	Condenser (.05 mfd., 400 volts)	30-4519
71	Resistor (3300 ohms)	33-233339
72	Resistor (220,000 ohms)	33-422339
73	Condenser (200 mmfd.)	60-120137
74	Resistor (470,000 ohms)	33-447339
75	Tone Control	33-5326
76	Resistor (10 megohms)	33-610339
77	Resistor (4.7 megohms)	33-547339
78	Condenser (.01 mfd., 400 volts)	30-4572
79	Condenser (250 mmfd.)	60-125157
80	Resistor (330,000 ohms)	33-433339
81	Condenser (.006 mfd., 400 volts)	30-4591
82	Condenser (.01 mfd., 400 volts)	30-4572
83	Resistor (470,000 ohms)	33-447339
84	Resistor (4700 ohms)	33-247339
85	Resistor (47,000 ohms)	33-347339
86	Condenser (.01 mfd., 400 volts)	30-4572
87	Condenser (.1 mfd.)	30-4586
88	Resistor (270,000 ohms)	33-427339
88X	Resistor (47,000 ohms)	33-347339
89	Resistor (470,000 ohms)	33-447339
90	Resistor (470,000 ohms)	33-447339
91	Condenser (.01 mfd., 400 volts)	30-4572
92	Condenser (.01 mfd., 1000 volts)	30-4381
93	Output Transformer	32-8138
94	Cone Assembly (For Spkr. 36-1530-4)	36-4181
95	Condenser (.01 mfd., 1000 volts)	30-4381
96	Socket (Home Recording Unit)	27-6190
	Shunt Plug Assembly	76-1103
97	Resistor (33,000 ohms)	33-333439
98	Electrolytic Condenser (8 mfd.)	30-2473
99	Field Coil (Replace Speaker 36-1530)	
100	Electrolytic Cond. (125 mfd., 300 volts)	30-2360
101	Resist (Wirewound, 148-27-14-13 ohms)	33-3304
102	Electrolytic Cond. (18 mfd., 475 volts)	30-2200
	Insulator	27-8800
103	Pilot Lamp	34-2064
104	Resistor (10 ohms, Cabinet Jewel)	33-010339
105	Pilot Lamp (Push-buttons)	34-2064
106	Pilot Lamp (Cabinet Jewel)	34-2210
107	Power Transformer (115 volts, 60 cycle)	32-8137
108	Power Line Condenser (Inside Plug of Power Cord)	
109	Vol. Cont. Mtr. & Gear Train Complete	35-1237
	Drive Belt	27-9770
	Drive Pulley	56-6111
	Adjusting Bracket	56-2014
110	Electrolytic Condenser (30 mfd.)	30-2361
111	Remote Control Stepper Unit Complete	76-1144
111A	Stepper Contact Wafer	38-9761
111B	Stepper Relay Coils (Holding Coil)	38-9821
	Stepper Relay Coil (Stepping Coil)	38-9823
111C	Stepper Mounting Switch	38-9760
	Rubber Cushion (Bottom of Stepper)	27-4789
	Rubber Liner (Ends)	27-4800
	Rubber Liner (Top)	27-4801
	Rubber Liner (Side)	54-4041
	Cover	76-1160
112	Filter Choke (Spark Filter, Stepper Unit)	32-3276
112A	Filter Choke (Part of 112)	
112B	Condenser (.05 mfd., 200 volts)	30-4444
112C	Condenser (.05 mfd., 200 volts)	30-4444
112D	Resistor (100 ohms)	33-110339
*	Spark Filter Complete, consisting of 112, 112A, 112B, 112C, 112D	38-9698
113	Condenser	3615090
114	Resistor (Wirewound, 150 ohms)	33-3362
115	Condenser (16 mfd., 150 volts)	30-2307
116	Condenser (.05 mfd., 400 volts)	30-4518
117	Condenser (.05 mfd., 400 volts)	30-4518
118	Spark Filter Choke Coil	32-1281
119	Condenser (.5 mfd., 200 volts)	30-4590
120	Condenser (.1 mfd., 200 volts)	30-4586
121	Resistor (3900 ohms)	33-239334
122	Resistor (47,000 ohms)	33-347339
123	Condenser (.05 mfd., 400 volts)	30-4518
124	3rd Control Amplifier Transformer	32-3275
125	Resistor (680,000 ohms)	33-468339
126	Condenser (.02 mfd., 400 volts)	30-4516
127	Resistor (2700 ohms)	33-227339
128	Resistor (120,000 ohms)	33-412339
129	Condenser (.1 mfd., 200 volts)	30-4586
130	Condenser (.05 mfd., 400 volts)	30-4518
131	Resistor (100,000 ohms)	33-410339
132	Resistor (150,000 ohms)	33-415339
133	Resistor (1.5 megohms)	33-515339
134	Condenser (.05 mfd., 400 volts)	30-4518
135	Condenser (.05 mfd., 200 volts)	30-4519
136	2nd Control Amplifier Transformer	32-3087
137	Condenser (.05 mfd., 400 volts)	30-4518
138	Condenser (.05 mfd., 200 volts)	30-4519
139	Resistor (15,000 ohms)	33-315339
140	Resistor (330 ohms)	33-133336
141	1st Control Amplifier Transformer	32-3086
142	Secondary Indicator	76-1159
143	Compensator (Secondary Inductor)	31-6268
144	Mica Condenser (Secondary Inductor)	30-1198
145	Record Changer Cable and Plug Assembly (Chassis)	41-3606
146	Power Cable and Plug Assembly (Record Changer)	41-3860
147	Reject Relay (Part of Changer)	42-1631
148	Power Cycling Switch (Record Changer)	42-1633
149	Radio Recording Power Sw. (Rec. Chngr.)	42-1632
150	Record Changer Motor (115 volts, 60 c.)	35-1272
	Record Changer Motor (115 volts, 50 c.)	35-1273
151	Recording Lamps	34-2432
152	Light Beam Pick-up Complete	35-2309
153	Phono. & Home Recording Input Trans.	32-8148
154	Reject Cycling Switch	42-1630

WIRELESS REMOTE CONTROL UNIT

155	Primary Inductor	32-3097
156	Mica Condenser (200 mmfd.)	30-1115
157	Compensator	31-6268
158	Pulser Unit (Complete)	38-9704
159	Condenser (.05 mfd.)	30-4519
160	Resistor (500 ohms)	33-150339
161	Remote Control Battery Pack	41-8023
	Bezel (Remote Unit)	56-1240
	Dial Tuning Disc	27-4792
	Dial Cap	27-4793
	Finger Stop	27-4794
	Screw	W-2130
	Spacer	27-4795
	Socket (Tube)	27-6119
	Cable (Battery)	41-3447

MISCELLANEOUS PARTS

Automatic Record Changer (115 v., 50 c.)	35-1264
Automatic Record Changer (115 v., 60 c.)	35-1260
Rubber Cushion (Mounting Changer)	54-4034
Washer	28-3541
Spring	28-8970
Bolt	W-2226
Nut	W-96
Band Indicator Scale	27-5608
Bezel	40-6628
Screw	W-2073
Cabinet (Walnut)	10516A
Cabinet (Mahogany)	10516B
Cable (Phono Input)	41-3554
Cable (Phono Pick-up Light)	41-3607
Cable (Record Changer)	41-3606
Cable (Speaker)	41-3595
Cable (Station Lights to Rotary Switch)	41-3598
Cable (Oscillator Circuit—P. B. Switch to Rotary Switch)	41-3599
Cable (Aerial Circuit—P. B. Switch to Rotary Switch)	41-3600
Cable (Phono Input to 7C7)	L-3268
Cable (7C7 to Phono Switch)	L-3269
Cable (Volume Control to 7C6)	L-3270
Cable (Volume Control to Phono Switch)	L-3271
Cable (I. F. to Phono Switch)	L-3272
Cord (Power)	L-3176
Dial Scale	27-5658
Pointer	56-1033
Clamp (Dial)	56-1034
Control Drum (Volume)	54-4024
Control Drum (Tone Control)	27-4764
Control Drum (Tuning)	27-4766
Control Drum (Wave Switch)	27-4984
Shaft (Control Drums, Left Hand)	28-6924
Shaft (Control Drums, Right Hand, Includes Band Light Shield)	76-1073
Shaft Bearing	56-1036
Bracket (Left Hand Controls)	56-1983
Bracket (Right Hand Controls)	56-1984
Jewel (Pilot Lamp)	27-4777
Knobs (Push-buttons)	54-4009
Socket (Octal Tubes)	27-6098
Socket (Loktal, Oscillator Tube)	27-6129
Socket (Loktal, Bakelite)	27-6131
Socket (Three Prong Aerial)	27-6149
Socket Assembly Dial Lamp)	38-9711
Socket Assembly (Cabinet)	38-9712
Socket Assembly (Band Indicator)	38-9628
Sleeve (Tuning Unit Mounting)	28-2257
Sleeve (Push-button Switch Mounting)	28-3806
Spring (Tilt Front)	28-8982
Spring (Tilt Front)	28-8983
Speaker (Walnut Cabinet)	36-1515
Speaker Mahogany Cabinet)	36-1530
Terminal Panel (Indicator Loop)	38-9533
Tab (Television)	27-5648
Tab (Remote)	27-5665
Tab (Phono)	27-5666
Tab (Kit)	40-6595

PHILCO RADIO & TELEVISION CORP.

MODEL 41-788
(121, 122)

ADJUSTING NORMAL TUNING RANGES

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Tuning Condenser Stator Lug Middle Section	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Band Selector "Brdcst"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Brdcst"	34A, 25X, 4	Note B
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	34A, 25X, 4	
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Band Selector "S.W.1"	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.2"	38A, 22A, 8A	Note C

ADJUSTING BAND SPREAD TUNING RANGES

MECHANICAL ADJUSTMENTS: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and Oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme clockwise position (highest frequency).
2. Adjust location of "antenna" and "R. F." iron cores so that the end of the iron core is 1/32" inside the end of the transformer. This is done by loosening the screw which holds the iron core bracket and then sliding the bracket until the correct dimension is obtained.
3. The Oscillator transformers and Iron cores are adjusted in the same manner as given for antenna and R. F. Transformer in operation "2" above, except that the end of the iron core is .24" beyond the end of the transformer. (The diameter of a size "C" steel drill corresponds to this dimension).
4. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjustment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E — Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (38A) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 19.090 M. C.

NOTE D — Before adjustng padders 45A, 45C, 50A, 50B, 51A, turn padder 45B to full clockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

NOTE E — Before adjusting padders, turn the band spread tuning knob to its extreme counter-clockwise position. Set the band spread dial pointer on the first MARK on the left edge (low frequency end) of the 31 meter scale.

NOTE F — To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread hand tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and "R. F." compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD — Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible because it is much easier to align a receiver to a strong signal.

MECHANICAL ADJUSTMENTS OF BAND SPREAD TUNING MECHANISM

1. ADJUSTMENT OF TUNING SHAFT
   End play can be removed by adjusting the rear bearing No. (A) Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.
2. INSTALLING NEW BAND SPREAD TUNING SHAFT
   a. Turn shaft (B) until carriage (C) is approximately six (6) threads from knob end of shaft. See Fig. 1.
   b. Turn shaft counter-clockwise at the same time holding the rear stop washer (D) until all other washers are in contact.
   c. Insert the front end of shaft through the rear of the front bearing. Install front ball bearing and then while holding the R. F. unit in a vertical position with the rear end of the radio up, drop the rear ball bearing into position and assemble the retaining screw.

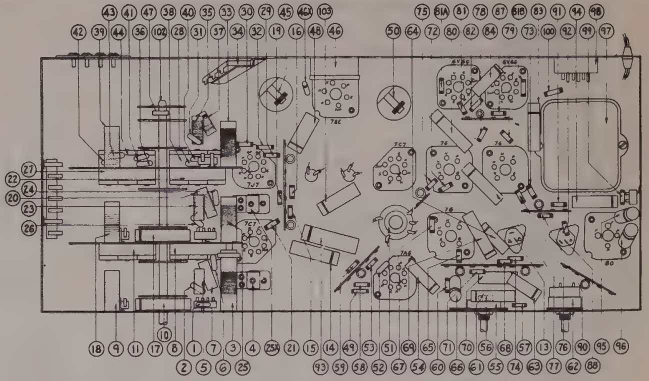


FIG. 4 — PART LOCATIONS, UNDERSIDE OF CHASSIS

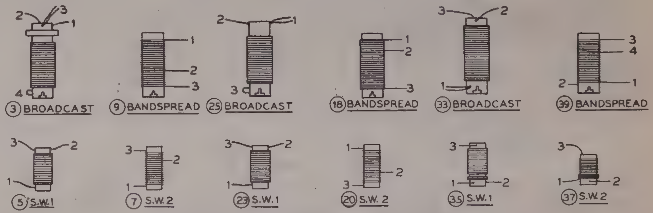


FIG. 5 — R. F. TRANSFORMER WIRING LOCATIONS

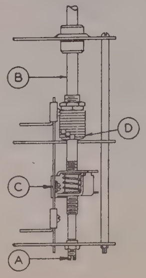


FIG. 1 — BAND SPREAD TUNING MECHANISM

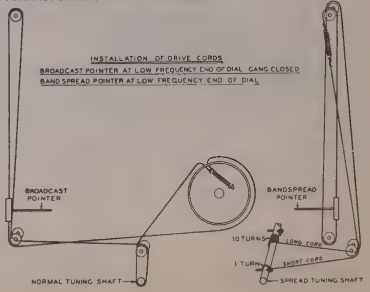

INSTALLATION OF DRIVE CORDS
BROADCAST POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED
BAND SPREAD POINTER AT LOW FREQUENCY END OF DIAL
BROADCAST POINTER
BANDSPREAD POINTER
10 TURNS
LONG CORD
1 TURN
SHORT CORD
NORMAL TUNING SHAFT
SPREAD TUNING SHAFT

FIG. 2 — INSTALLING TUNING DRIVE CORDS

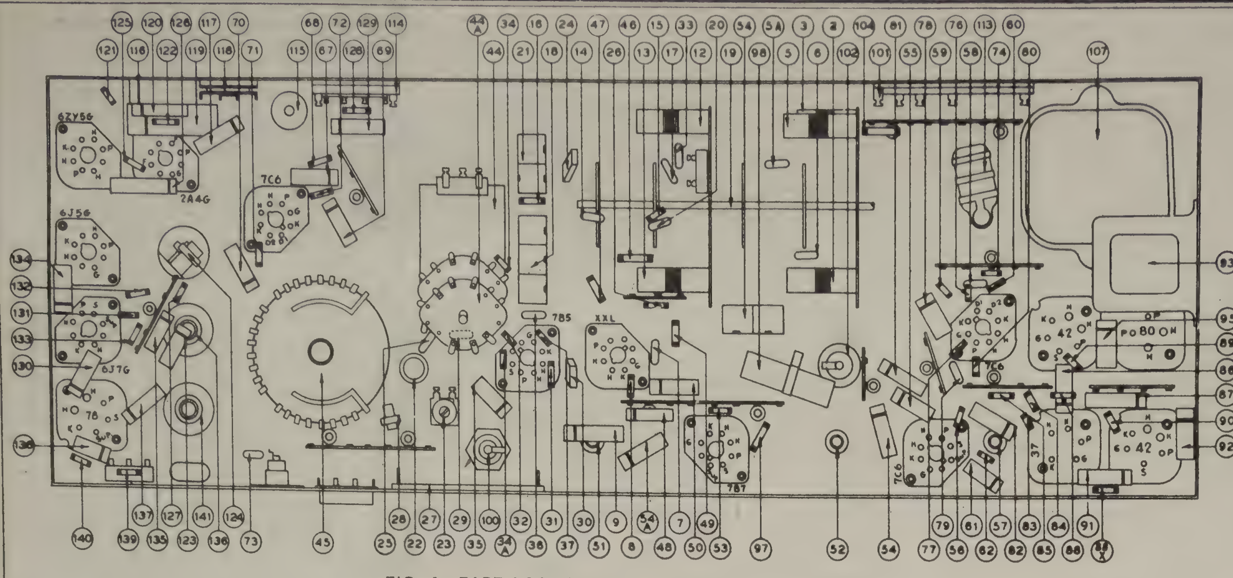
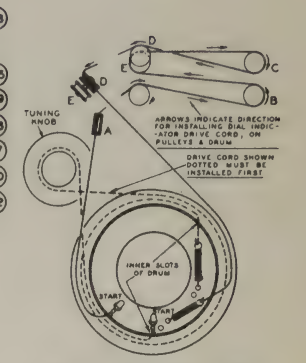


FIG. 1. PART LOCATIONS — UNDERSIDE OF CHASSIS

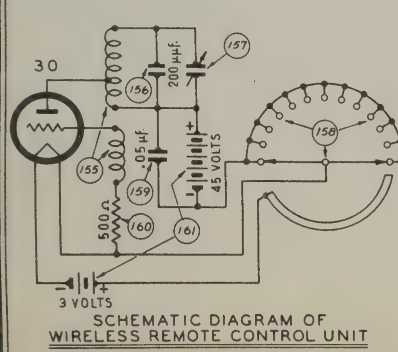
TUNING BAND FREQUENCIES: 540 to 1720 K. C., 2.3 to 7.0 M. C., 9 to 12 M. C., 13.5 to 18 M. C.
INTERMEDIATE FREQUENCY: 455 K. C.
AUDIO OUTPUT: 10 watts.

POWER SUPPLY: 118 volts, 60 cycle A. C. The radio can also be operated on 118 volts, 50 cycle A. C. To do this it is necessary to replace the record changer motor as indicated in the parts list.
POWER CONSUMPTION: 200 Watts


ARROWS INDICATE DIRECTION FOR INSTALLING DIAL INDICATOR DRIVE CORD, ON PULLEYS & DRUM
DRIVE CORD SHOWN DOTTED MUST BE INSTALLED FIRST
TUNING KNOB
INNER SLOTS OF DRUM
START
A
B
C
D
E

INSTALLATION OF DRIVE CORDS
POINTER AT LOW FREQUENCY END OF DIAL
GANG CLOSED

FIG. 4. DIAL POINTER AND CABLE ARRANGEMENT



SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

FIG. 3. WIRELESS REMOTE CONTROL UNIT WIRING

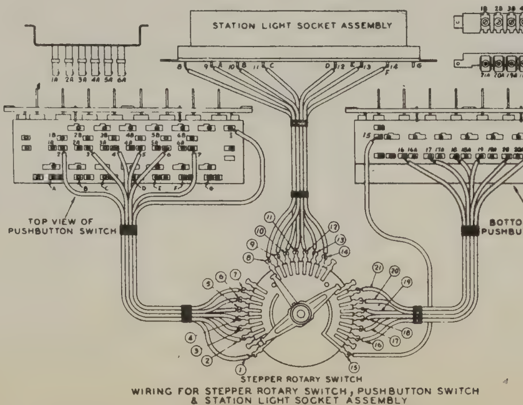

STATION LIGHT SOCKET ASSEMBLY
TOP VIEW OF PUSHBUTTON SWITCH
BOTTOM VIEW OF PUSHBUTTON SWITCH
STEPPER ROTARY SWITCH
WIRING FOR STEPPER ROTARY SWITCH, PUSHBUTTON SWITCH & STATION LIGHT SOCKET ASSEMBLY

FIG. 5. CABLE WIRING FROM STEPPER ROTARY SWITCH TO PUSH-BUTTON SWITCH AND STATION LIGHTS

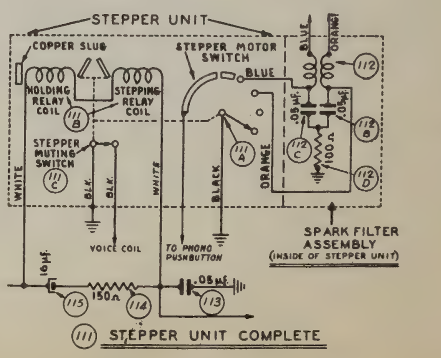


FIG. 6. INTERNAL WIRING OF STEPPER UNIT. NUMBERS CORRESPOND TO SCHEMATIC

ADJUSTMENT OF WIRELESS REMOTE CONTROL CIRCUITS

Model 41-616, Code 121

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by code numbers appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5......355 K. C. Code 7......375 K. C.
Code 6......367 K. C. Code 8......383 K. C.
Code 9......395 K. C.

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 K. C. apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 K. C., the second set to 375 K. C., and the third set to 395 K. C.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 077 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inch in diameter.)

2. Philco wireless remote control aligning adapter. Part No. 45-2769.

3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.

2. Remove the 78 control amplifier tube, its shield and the shield of the 6J7G tube. Apply power to the set and turn the range selector disc to "remote".

3. Attach the "high" side of the signal generator output to the grid of the 6J7G tube. Set the generator modulation control to "mod on" and turn the attenuator control about one-fourth on.

4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 K. C. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 K. C.

5. After the control frequency has been found or changed, compensators (124A), (124B) are adjusted for maximum indication on the vacuum tube voltmeter.

6. After adjusting this circuit, replace the 78 tube and shields in their sockets and remove the signal generator lead from the grid of the 6J7G tube.

7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (136A) and (141A) are now adjusted for maximum reading on the vacuum tube voltmeter.

8. Next adjust the secondary inductor loop compensator (143) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of a loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position. After these compensators are adjusted to maximum, the control amplifier is tuned to the frequency selected.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (157) Fig. 3, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (157) is then readjusted for maximum voltage reading.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

ADJUSTING REMOTE CONTROL UNIT OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (139) 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

LIGHT-BEAM REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE — These adjustments should be made with the power line voltage at 118 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 1/32" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 23 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.

2. While the record is playing, turn compensator 23 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. **Signal Generator:** Covering the frequency range of the receiver, such as Philco Models 077 or 177.

2. **Aligning Indicator:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028. Circuit testers contain both these meters.

3. **Tools:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the 42 tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 3 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. If the chassis is to be aligned outside the cabinet the loop should be in the same relative position near the chassis as when assembled in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown in Figure 7. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust. Compensators in Order	
1	High side to No. 4 terminal loop Panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Position	57A, 52A, 52B, 51B, 51A	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	21, 10A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	21A	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat operation No. 2 again				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	18B	Note C
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W." 1	18A, 4A	Note D
7	Use Loop on Generator	18 M. C.	18 M. C.	Range Switch "S. W." 2	18, 4	Note E

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Figure 4.

NOTE B — When adjusting the compensator, the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — Adjust compensator (18B) to the SECOND signal peak from the tight (closed) position.

NOTE D — Adjust compensator (18A) to the FIRST signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver dial at 12 M. C. and turn the signal generator to 11.090 M. C.

NOTE E — Adjust compensator (18) to the SECOND signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver at 18 M. C. and turning the signal generator to 18.910 M. C. When adjusting compensator (4) roll the tuning condenser, See Note "B" on how to roll the condenser.

SCHE. No.	DESCRIPTION	PART No.
1	Loop Aerial	76-1101
	Sleeve Mounting (2 required)	28-2257
	Sleeve Mounting (1 required)	56-1907
	Washer	28-4186
	Washer	W-161
	Washer	W-425
	Screw	W-266
2	Aerial Transformer (Broadcast)	32-3579
3	Aerial Transformer (Short Wave)	32-3581
4	Compensator (18 M. C.)	31-6301
4A	Compensator (12 M. C.) Part of 4	
5	Aerial Transformer (6 M. C.)	32-3580
5A	Mica Condenser (15 mmfd.)	60-015157
6	Mica Condenser (162 mmfd.)	30-1178
7	Mica Condenser (250 mmfd.)	60-125157
8	Resistor (2.2 megohms)	33-522339
9	Condenser (.05 mfd., 200 volts)	30-4519
10	Tuning Condenser	31-2507
	Coupling	31-2291
	Drive Cord (Tuning Drum)	31-2315
	Drive Cord (Pointer)	31-2316
	Drum and Shaft (Cable)	38-9716
10A	Comp. (1500 K. C., Aerial) Part of 10	
11	Condenser (Consists of Wire and Lug from B10 to D3)	
12	Oscillator Transformer (Short Wave)	32-2578
13	Oscillator Trans. (Police and Broadcast)	32-3582
14	Mica Condenser (2000 mfd.)	60-220324
15	Resistor (4700 ohms)	33-247339
16	Resistor (8200 ohms)	33-282339
17	Mica Condenser (185 mmfd.)	30-1197
18	Compensator (18 M. C.)	31-6262
18A	Compensator (12 M. C.) Part of 18	
18B	Compensator (6 M. C.) Part of 18	
19	Band Switch (R. F. Section)	42-1818
20	Mica Condenser (145 mmfd.)	30-1177
21	Compensator (Oscillator 1500 K. C.)	31-6365
21A	Compensator (Oscillator 580 K. C.)	
22	Oscillator Transformer (Supplies power to Phonograph Pick-up)	32-3527
23	Compensator (Adjusting Phonograph Pick-up Light)	31-6304
24	Mica Condenser (265 mmfd.)	31-1106
25	Mica Condenser (250 mmfd.)	60-125157
26	Resistor (15,000 ohms)	33-315339
27	Resistor (2000 ohms, Wirewound)	33-3405
28	R. F. Choke (Phonograph Circuit)	32-3401
29	Mica Condenser (250 mmfd.)	60-125157
30	Mica Condenser (265 mmfd.)	30-1106
31	Resistor (4700 ohms)	33-247339
32	Resistor (33,000 ohms)	33-333339
33	Mica Condenser (250 mmfd.)	60-125157
34	Resistor (330,000 ohms)	33-433339
34A	Resistor (220,000 ohms)	33-422339
35	Condenser (.05 mfd., 200 volts)	30-4519
36	Mica Condenser (250 mmfd.)	60-125157
37	Resistor (100,000 ohms)	33-410339
38	Compensator (Aerial—Push-buttons)	31-6367
39	Push-button Switch	42-1819
40	Compensator Strip (Remote Cont. Aerial)	31-6390
41	Push-button Comp. Strip (Oscillator)	31-6389
42	Oscillator Coil Assem. (Remote Control)	32-3563
	Coils (1-2-3-4)	32-3597
	Coils (5-6)	32-3041
	Iron Core	28-6916
	Coil Clip	28-6910
43	Remote Cont. & Push-button Tuning Lgts.	34-2064
	Socket Assembly	76-1145
	Light Cover	76-1146
44	Phonograph Relay (Remote Control) Complete with Switch	42-1621
44A	Changeover Switch	42-1647
45	Stepper Rotary Switch	42-1620
	Insulating Washer	27-7397
	Insulating Washer	27-8040
	Rubber Sleeve	4169
	Contact Arm	38-9764
	Drive Arm	38-9763
	Nut	28-6967
	Washer	W-467
46	Resistor (10 ohms)	33-010434
47	Resistor (10 ohms)	33-010434
48	Condenser (.01 mfd., 400 volts)	30-4572
49	Resistor (4700 ohms)	33-247339
50	Condenser (.01 mfd., 400 volts)	30-4572
51	1st I. F. Transformer	32-3493
52	2nd I. F. Transformer	32-3494
53	Resistor (330 ohms)	33-133336
54	Condenser (.05 mfd., 400 volts)	30-4518
54A	Condenser (.05 mfd., 400 volts)	30-4518
55	Condenser (.01 mfd., 400 volts)	30-4572
56	Resistor (120,000 ohms)	33-412339
57	3rd I. F. Transformer	32-3566
58	Condenser (100 mmfd.)	60-110157
59	Resistor (2.2 megohms)	33-522339
60	Resistor (1 megohm)	33-510339
61	Condenser (.01 mfd., 400 volts)	30-4572
62	Resistor (330,000 ohms)	33-433339
63	Mica Condenser (50 mmfd.)	60-050137
64	Resistor (68,000 ohms)	33-368339
65	Volume Control	33-5417
	Drive Pulley	56-6111
	Set Screw	W-2108
66	Condenser (.01 mfd., 400 volts)	30-4572
67	Condenser (.01 mfd., 400 volts)	30-4572
68	Resistor (100,000 ohms)	33-410339
69	Condenser (.002 mfd., 400 volts)	30-4579
70	Condenser (.05 mfd., 400 volts)	30-4519
71	Resistor (3300 ohms)	33-233339
72	Resistor (220,000 ohms)	33-422339
73	Condenser (200 mmfd.)	60-120137
74	Resistor (470,000 ohms)	33-447339
75	Tone Control	33-5326
76	Resistor (10 megohms)	33-6103[illegible]
77	Resistor (4.7 megohms)	33-5473[illegible]
78	Condenser (.01 mfd., 400 volts)	30-4572
79	Condenser (250 mmfd.)	60-125157
80	Resistor (130,000 ohms)	33-433339
81	Condenser (.006 mfd., 400 volts)	30-4591
82	Condenser (.01 mfd., 400 volts)	30-4572
83	Resistor (470,000 ohms)	33-447339
84	Resistor (4700 ohms)	33-247339
85	Resistor (47,000 ohms)	33-347339
86	Condenser (.01 mfd., 400 volts)	30-4572
87	Condenser (.1 mfd.)	30-4586
88	Resistor (270,000 ohms)	33-42733[illegible]
88X	Resistor (47,000 ohms)	33-347339
89	Resistor (470,000 ohms)	33-447339
90	Resistor (470,000 ohms)	33-447339
91	Condenser (.01 mfd., 400 volts)	30-457[illegible]
92	Condenser (.01 mfd., 1000 volts)	30-4381
93	Output Transformer	32-8130
94	Cone Assembly (For Spkr. 36-1530-4)	36-4101
95	Condenser (.01 mfd., 1000 volts)	30-4381
96	Socket (Home Recording Unit)	27-6150
	Shunt Plug Assembly	76-1103
97	Resistor (33,000 ohms)	33-333439
98	Electrolytic Condenser (8 mfd.)	30-2473
99	Field Coil (Replace Speaker 36-1530)	
100	Electrolytic Cond. (125 mfd., 300 volts)	30-2380
101	Resist. (Wirewound, 148-27-14-13 ohms)	33-3364
102	Electrolytic Cond. (18 mfd., 475 volts)	30-2200
	Insulator	27-8800
103	Pilot Lamp	34-2064
104	Resistor (10 ohms, Cabinet Jewel)	33-010339
105	Pilot Lamp (Push-buttons)	34-2064
106	Pilot Lamp (Cabinet Jewel)	34-2210
107	Power Transformer (115 volts, 60 cycle)	32-8137
108	Power Line Condenser (Inside Plug of Power Cord)	
109	Vol. Cont. Mtr. & Gear Train Complete	35-1237
	Drive Belt	27-9770
	Drive Pulley	56-6111
	Adjusting Bracket	56-2014
110	Electrolytic Condenser (30 mfd.)	30-2381
111	Remote Control Stepper Unit Complete	76-1144
111A	Stepper Contact Wafer	38-9761
111B	Stepper Relay Coils (Holding Coil)	38-9621
	Stepper Relay Coil (Stepping Coil)	38-9623
111C	Stepper Muting Switch	38-9780
	Rubber Cushion (Bottom of Stepper)	27-4799
	Rubber Liner (Ends)	27-4800
	Rubber Liner (Top)	27-4801
	Rubber Liner (Side)	54-4041
	Cover	76-1160
112*	Filter Choke (Spark Filter, Stepper Unit)	32-3276
112A	Filter Choke (Part of 112)	
112B	Condenser (.05 mfd., 200 volts)	30-4444
112C	Condenser (.05 mfd., 200 volts)	30-4444
112D	Resistor (100 ohms)	33-110339
*	Spark Filter Complete consisting of 112, 112A, 112B, 112C, 112D	38-9898
113	Condenser	3615090
114	Resistor (Wirewound, 150 ohms)	33-3362
115	Condenser (16 mfd., 150 volts)	30-2387
116	Condenser (.05 mfd., 400 volts)	30-4518
117	Condenser (.05 mfd., 400 volts)	30-4518
118	Spark Filter Choke Coil	32-1281
119	Condenser (.5 mfd., 200 volts)	30-4590
120	Condenser (.1 mfd., 200 volts)	30-4586
121	Resistor (3900 ohms)	33-239334
122	Resistor (47,000 ohms)	33-347339
123	Condenser (.05 mfd., 400 volts)	30-4518
124	3rd Control Amplifier Transformer	32-3275
125	Resistor (680,000 ohms)	33-468339
126	Condenser (.02 mfd., 400 volts)	30-4516
127	Resistor (2700 ohms)	33-227339
128	Resistor (120,000 ohms)	33-412339
129	Condenser (.1 mfd., 200 volts)	30-4586
130	Condenser (.05 mfd., 400 volts)	30-4518
131	Resistor (100,000 ohms)	33-410339
132	Resistor (150,000 ohms)	33-415339
133	Resistor (1.5 megohms)	33-515339
134	Condenser (.05 mfd., 400 volts)	30-4518
135	Condenser (.05 mfd., 200 volts)	30-4519
136	2nd Control Amplifier Transformer	32-3007
137	Condenser (.05 mfd., 400 volts)	30-4518
138	Condenser (.05 mfd., 200 volts)	30-4519
139	Resistor (15,000 ohms)	33-315339
140	Resistor (330 ohms)	33-133336
141	1st Control Amplifier Transformer	32-3066
142	Secondary Indicator	76-1150
143	Compensator (Secondary Inductor)	31-6268
144	Mica Condenser (Secondary Inductor)	30-1198
145	Record Changer Cable and Plug Assembly (Chassis)	41-3606
146	Power Cable and Plug Assembly (Record Changer)	41-3560
147	Reject Relay (Part of Changer)	42-1631
148	Power Cycling Switch (Record Changer)	42-1633
149	Radio Recording Power Sw. (Rec. Chngr.)	42-1632
150	Record Changer Motor (115 volts, 60 c.)	35-1272
	Record Changer Motor (115 volts, 50 c.)	35-1273
151	Recording Lamps	34-2432
152	Light Beam Pick-up Complete	35-2209
153	Phono. & Home Recording Input Trans.	32-8148
154	Reject Cycling Switch	42-1630

WIRELESS REMOTE CONTROL UNIT

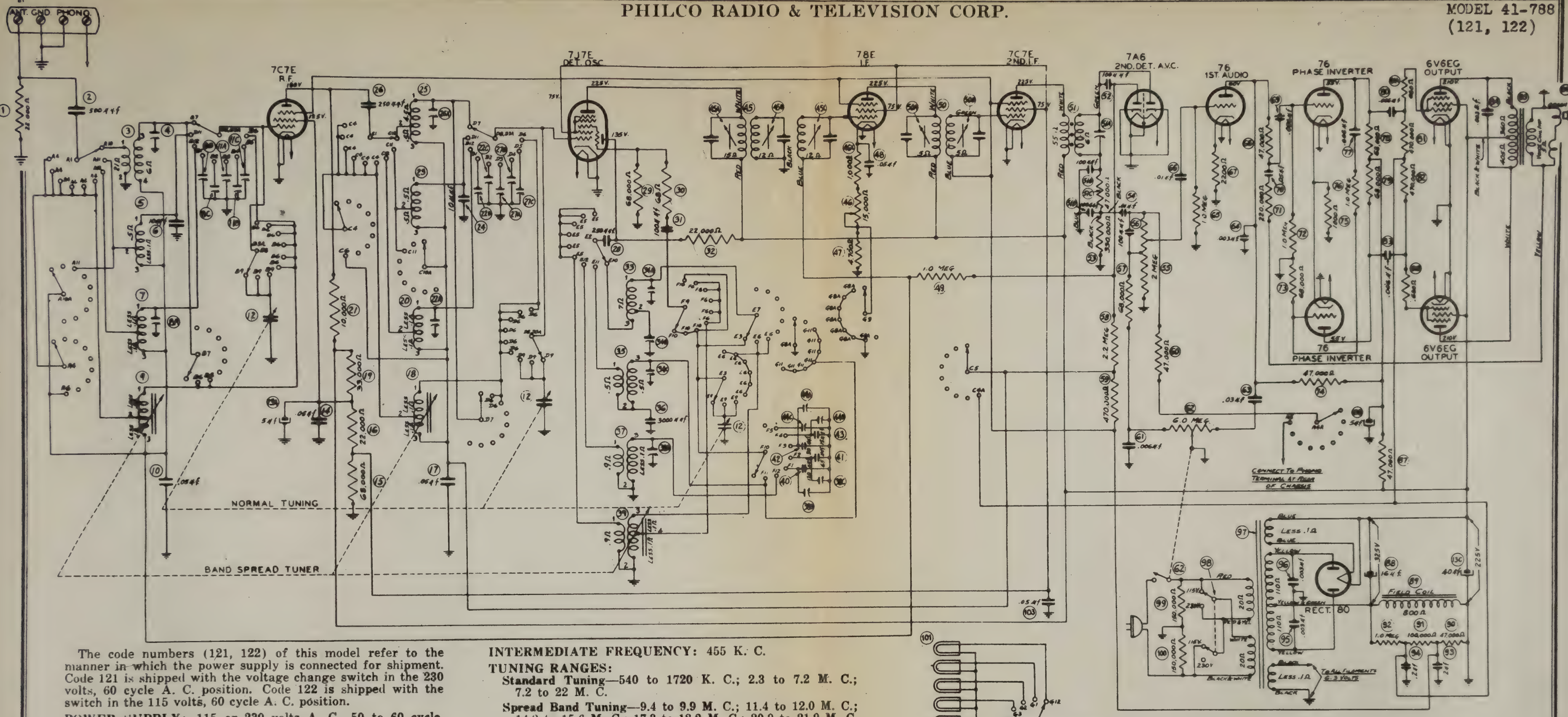
SCHE. No.	DESCRIPTION	PART No.
155	Primary Inductor	32-3067
156	Mica Condenser (200 mmfd.)	30-1115
157	Compensator	31-6266
158	Pulser Unit (Complete)	38-9704
159	Condenser (.05 mfd.)	30-4519
160	Resistor (500 ohms)	33-150339
161	Remote Control Battery Pack	41-8023
	Bezel (Remote Unit)	56-1240
	Dial Tuning Disc	27-4792
	Dial Cap	27-4793
	Finger Stop	27-4794
	Screw	W-2139
	Spacer	27-4795
	Socket (Tube)	27-6119
	Cable (Battery)	41-3447

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Automatic Record Changer (115 v., 50 c.)	35-1264
Automatic Record Changer (115 v., 60 c.)	35-1260
Rubber Cushion (Mounting Changer)	54-4034
Washer	28-3541
Spring	28-8970
Bolt	W-2226
Nut	W-98
Band Indicator Scale	27-5608
Bezel	40-6628
Screw	W-2073
Cabinet (Walnut)	10516A
Cabinet (Mahogany)	10516B
Cable (Phono Input)	41-3554
Cable (Phono Pick-up Light)	41-3607
Cable (Record Changer)	41-3606
Cable (Speaker)	41-3595
Cable (Station Lights to Rotary Switch)	41-3598
Cable (Oscillator Circuit—P. B. Switch to Rotary Switch)	41-3599
Cable (Aerial Circuit—P. B. Switch to Rotary Switch)	41-3600
Cable (Phono Input to 7C7)	L-3268
Cable (7C7 to Phono Switch)	L-3269
Cable (Volume Control to 7C6)	L-3270
Cable (Volume Control to Phono Switch)	L-3271
Cable (I. F. to Phono Switch)	L-3272
Cord (Power)	L-3176
Dial Scale	27-5650
Pointer	56-1033
Clamp (Dial)	56-1034
Control Drum (Volume)	54-4024
Control Drum (Tone Control)	27-4764
Control Drum (Tuning)	27-4766
Control Drum (Wave Switch)	27-4984
Shaft (Control Drums, Left Hand)	28-6924
Shaft (Control Drums, Right Hand, Includes Band Light Shield)	76-1073
Shaft Bearing	56-1036
Bracket (Left Hand Controls)	56-1083
Bracket (Right Hand Controls)	56-1084
Jewel (Pilot Lamp)	27-4777
Knobs (Push buttons)	54-4000
Socket (Octal Tubes)	27-6098
Socket (Loktal, Oscillator Tube)	27-6129
Socket (Loktal Bakelite)	27-6131
Socket (Three Prong Aerial)	27-6149
Socket Assembly Dial Lamp	38-9711
Socket Assembly (Cabinet)	38-9712
Socket Assembly (Band Indicator)	38-9625
Sleeve (Tuning Unit Mounting)	28-2257
Sleeve (Push button Switch Mounting)	28-3806
Spring (Tilt Front)	28-8982
Spring (Tilt Front)	28-8983
Speaker (Walnut Cabinet)	36-1515
Speaker Mahogany Cabinet)	36-1530
Terminal Panel (Indicator Loop)	38-6933
Tab (Television)	27-5648
Tab (Remote)	27-5665
Tab (Phono)	27-5666
Tab (Kit)	40-6595

PHILCO RADIO & TELEVISION CORP.

MODEL 41-788
(121, 122)



The code numbers (121, 122) of this model refer to the manner in which the power supply is connected for shipment. Code 121 is shipped with the voltage change switch in the 230 volts, 60 cycle A. C. position. Code 122 is shipped with the switch in the 115 volts, 60 cycle A. C. position.

POWER SUPPLY: 115 or 230 volts A. C., 50 to 60 cycle, 90 watts.

INTERMEDIATE FREQUENCY: 455 K. C.

TUNING RANGES:

Standard Tuning—540 to 1720 K. C.; 2.3 to 7.2 M. C.; 7.2 to 22 M. C.

Spread Band Tuning—9.4 to 9.9 M. C.; 11.4 to 12.0 M. C.; 14.8 to 15.6 M. C.; 17.3 to 18.2 M. C.; 20.9 to 21.9 M. C.

I.F.=455 KC.

JULY, 1940

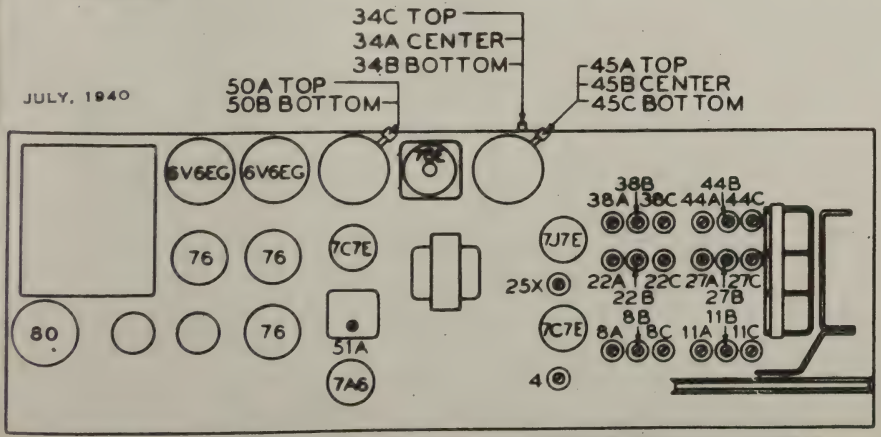
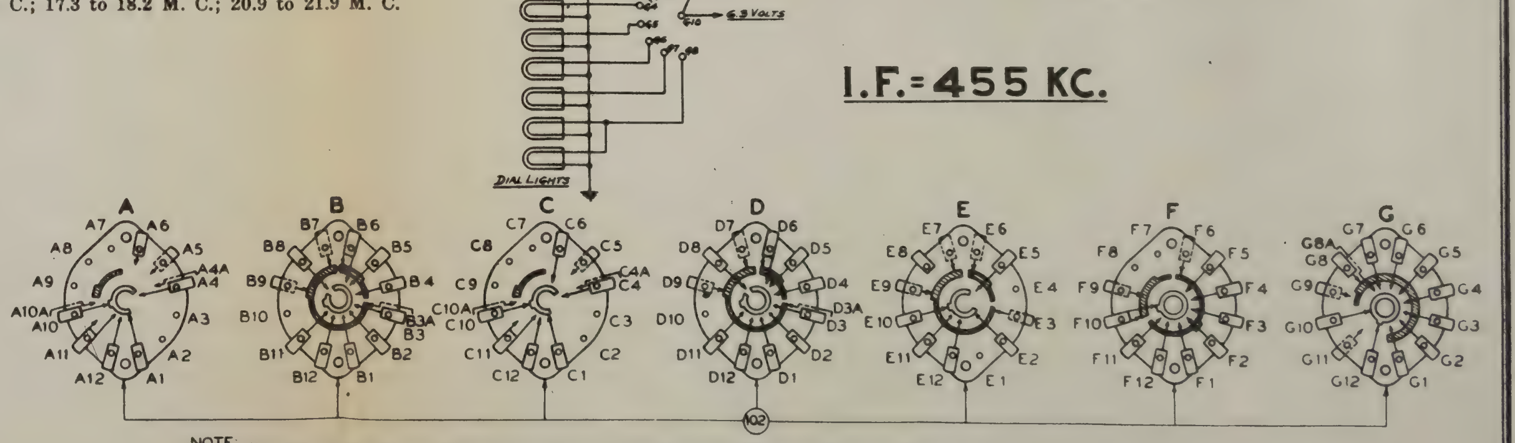


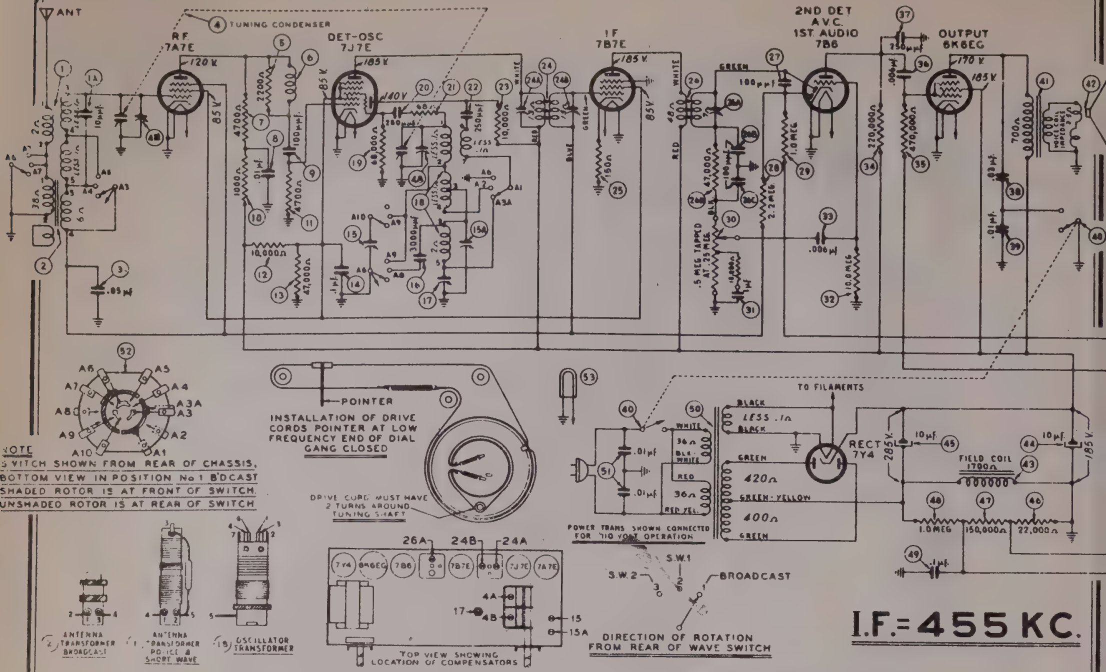
FIG. 6 — TUBE AND COMPENSATOR LOCATIONS, TOP OF CHASSIS



NOTE: SWITCHES SHOWN FROM REAR BOTTOM VIEW OF CHASSIS, IN POSITION NO.1 BROADCAST. SHADED ROTOR IS AT FRONT OF SWITCH WAFER. UNSHADED ROTOR IS AT REAR OF SWITCH WAFER. LETTER INDICATES POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS.

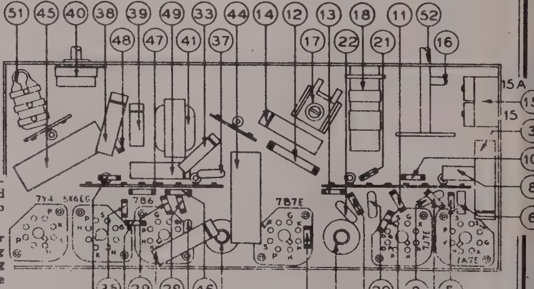
MODEL 41-714

PHILCO RADIO & TELEVISION CORP.


ANT
TUNING CONDENSER
R.F. 7A7E
DET-OSC 7J7E
I.F. 7B7E
2ND DET A.V.C. 1ST AUDIO 7B6
OUTPUT 6K6EG
120 V
85 V
185 V
140 V
170 V
2200Ω
4700Ω
1000Ω
10,000Ω
47,000Ω
68,000Ω
100μμf.
.01μf.
250μμf
280μμf
3000μμf
.05μf
WHITE
GREEN
RED
BLUE
150Ω
.5 MEG TAPPED AT .25 MEG
47,000Ω
2.2 MEG.
1.0 MEG.
10.0 MEG.
.006μf
270,000Ω
700Ω
.03μf.
.01μf.
NOTE
SWITCH SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW IN POSITION No 1 B'DCAST
SHADED ROTOR IS AT FRONT OF SWITCH
UNSHADED ROTOR IS AT REAR OF SWITCH
POINTER
INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED
DRIVE CORD MUST HAVE 2 TURNS AROUND TUNING SHAFT
TO FILAMENTS
BLACK
LESS .1Ω
WHITE
BLK-WHITE
36Ω
RED
RED-YEL
.01μf.
GREEN
420Ω
GREEN-YELLOW
400Ω
POWER TRANS SHOWN CONNECTED FOR 110 VOLT OPERATION
RECT 7Y4
285V
10μf.
FIELD COIL 1700Ω
1.0 MEG
150,000Ω
22,000Ω
ANTENNA TRANSFORMER BROADCAST
ANTENNA TRANSFORMER POLICE & SHORT WAVE
OSCILLATOR TRANSFORMER
26A
24B
24A
4A
4B
15
15A
TOP VIEW SHOWING LOCATION OF COMPENSATORS
S.W.1
S.W.2
BROADCAST
DIRECTION OF ROTATION FROM REAR OF WAVE SWITCH
I.F.=455 KC.

MODEL 41-714

APRIL, 1940.



NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

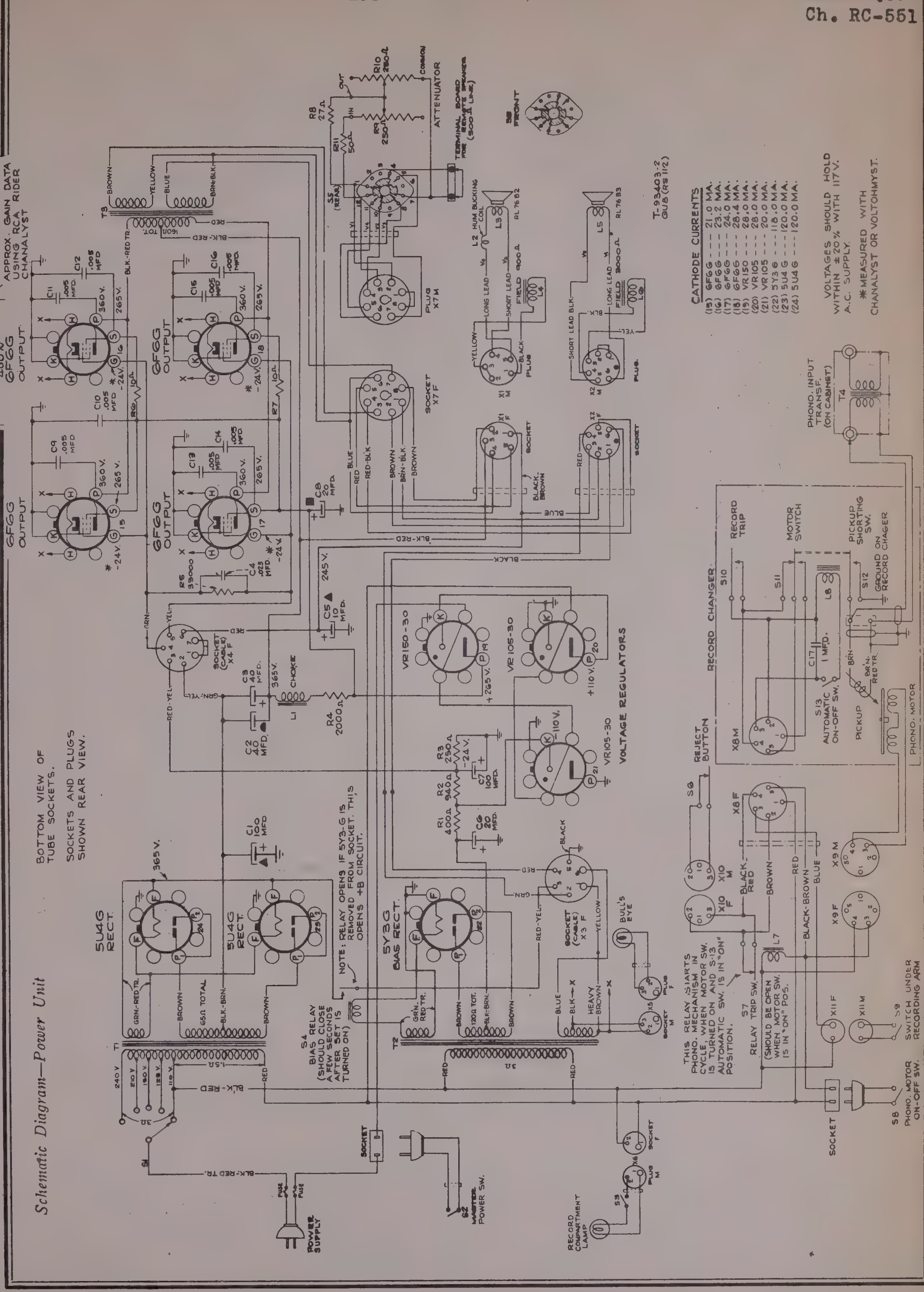
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the right end (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (4B) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20,090 M. C.

Operations in Order	SIGNAL GENERATOR			RECEIVER			
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Lug of Ant. Tuning Condenser Front Section	.1 mfd.	455 K. C.	580 K. C.	Range Switch Broadcast (Position 1) Vol. Max.	24A, 24B, 26A	
2	Ant. Lead	400 ohms	21 M. C.	21 M. C.	Range Switch S. W. Position 3	4B, 4A	Note B Note C
3	Ant. Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch S. W. Position 2	15	Roll Gang
4	Ant. Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch Broadcast Position 1	15A	Roll Gang
5	Ant. Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch Broadcast Position 1	17	Roll Gang

RCA MFG. CO., INC.

MODEL QU8
Ch. RC-551



Schematic Diagram—Power Unit

BOTTOM VIEW OF TUBE SOCKETS.

SOCKETS AND PLUGS SHOWN REAR VIEW.

CATHODE CURRENTS

(15)	6F6G ---	21.0 MA.
(16)	6F6G ---	23.2 MA.
(17)	6F6G ---	24.0 MA.
(18)	6F6G ---	28.4 MA.
(19)	VR150 ---	28.0 MA.
(20)	VR105 ---	28.0 MA.
(21)	VR105 ---	20.0 MA.
(22)	5Y3G ---	118.0 MA.
(23)	5U4G ---	120.0 MA.
(24)	5U4G ---	120.0 MA.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST.

APPROX. GAIN DATA USING RCA RIDER CHANALYST

NOTE: RELAY OPENS IF 5Y3-G IS REMOVED FROM SOCKET. THIS OPENS +B CIRCUIT.

S4 BIAS RELAY (SHOULD CLOSE A FEW SECONDS AFTER SET IS TURNED ON)

THIS RELAY STARTS PHONO. MECHANISM IN CYCLE, WHEN MOTOR SW. IS TURNED ON AND S-13 AUTOMATIC SW. IS IN "ON" POSITION.

S7 RELAY TRIP SW. (SHOULD BE OPEN WHEN MOTOR SW. IS IN "ON" POS.)

T-93403-2 QU8 (RS 112)

PHILCO RADIO & TELEVISION CORP.

MODEL 41-788
(121, 122)

ADJUSTING NORMAL TUNING RANGES

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Tuning Condenser Stator Lug Middle Section	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Band Selector "Brdcst"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Brdcst"	34A, 25X, 4	Note B
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	34A, 25X, 4	
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Band Selector "S.W.1"	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.2"	38A, 22A, 8A	Note C

ADJUSTING BAND SPREAD TUNING RANGES

MECHANICAL ADJUSTMENTS: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and Oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme clockwise position (highest frequency).

2. Adjust location of "antenna" and "R. F." iron cores so that the end of the iron core is 1⁄32" inside the end of the transformer. This is done by loosening the screw which holds the iron core bracket and then sliding the bracket until the correct dimension is obtained.

3. The Oscillator transformers and Iron cores are adjusted in the same manner as given for antenna and R. F. Transformer in operation "2" above, except that the end of the iron core is .24" beyond the end of the transformer. (The diameter of a size "C" steel drill corresponds to this dimension).

4. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjustment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E — Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (38A) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 19.090 M. C.

NOTE D — Before adjustng padders 45A, 45C, 50A, 50B, 51A, turn padder 45B to full clockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

NOTE E — Before adjusting padders, turn the band spread tuning knob to its extreme counter-clockwise position. Set the band spread dial pointer on the first MARK on the left edge (low frequency end) of the 31 meter scale.

NOTE F — To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread hand tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and "R. F." compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD — Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible because it is much easier to align a receiver to a strong signal.

MECHANICAL ADJUSTMENTS OF BAND SPREAD TUNING MECHANISM

1. ADJUSTMENT OF TUNING SHAFT
   End play can be removed by adjusting the rear bearing No. (A) Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.
2. INSTALLING NEW BAND SPREAD TUNING SHAFT
   a. Turn shaft (B) until carriage (C) is approximately six (6) threads from knob end of shaft. See Fig. 1.
   b. Turn shaft counter-clockwise at the same time holding the rear stop washer (D) until all other washers are in contact.
   c. Insert the front end of shaft through the rear of the front bearing. Install front ball bearing and then while holding the R. F. unit in a vertical position with the rear end of the radio up, drop the rear ball bearing into position and assemble the retaining screw.

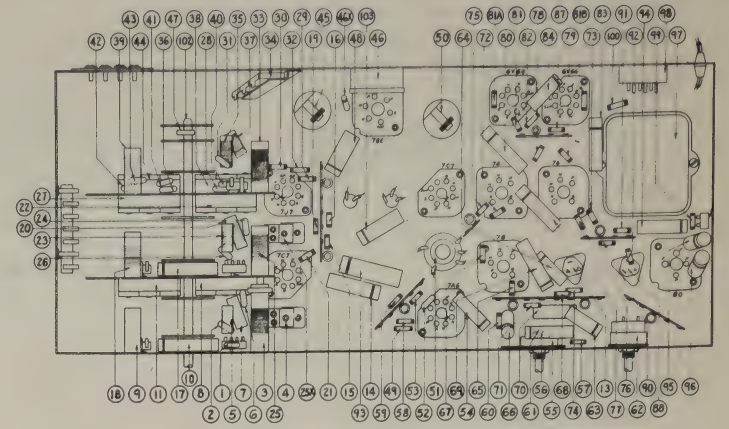

43 41 47 38 40 35 33 30 29 45 46X 103
42 39 44 36 102 28 31 37 34 32 19 16 48 46
75 81A 81 78 87 81B 83 91 94 98
50 64 72 80 82 84 79 73 100 92 99 97
27 22 24 20 23 26
18 9 11 10 17 8 1 7 3 4 25A 21 15 14 49 53 51 69 65 71 70 56 68 57 13 76 90 95 96
2 5 6 25
93 59 58 52 67 54 60 66 61 55 74 63 77 62 88

FIG. 4 — PART LOCATIONS, UNDERSIDE OF CHASSIS

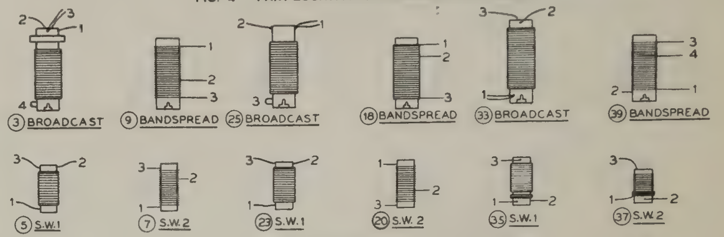


FIG. 5 — R. F. TRANSFORMER WIRING LOCATIONS

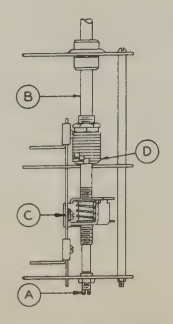
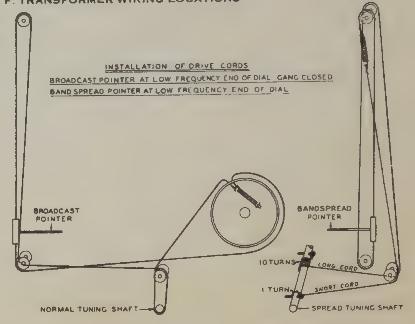


FIG. 1 — BAND SPREAD TUNING MECHANISM

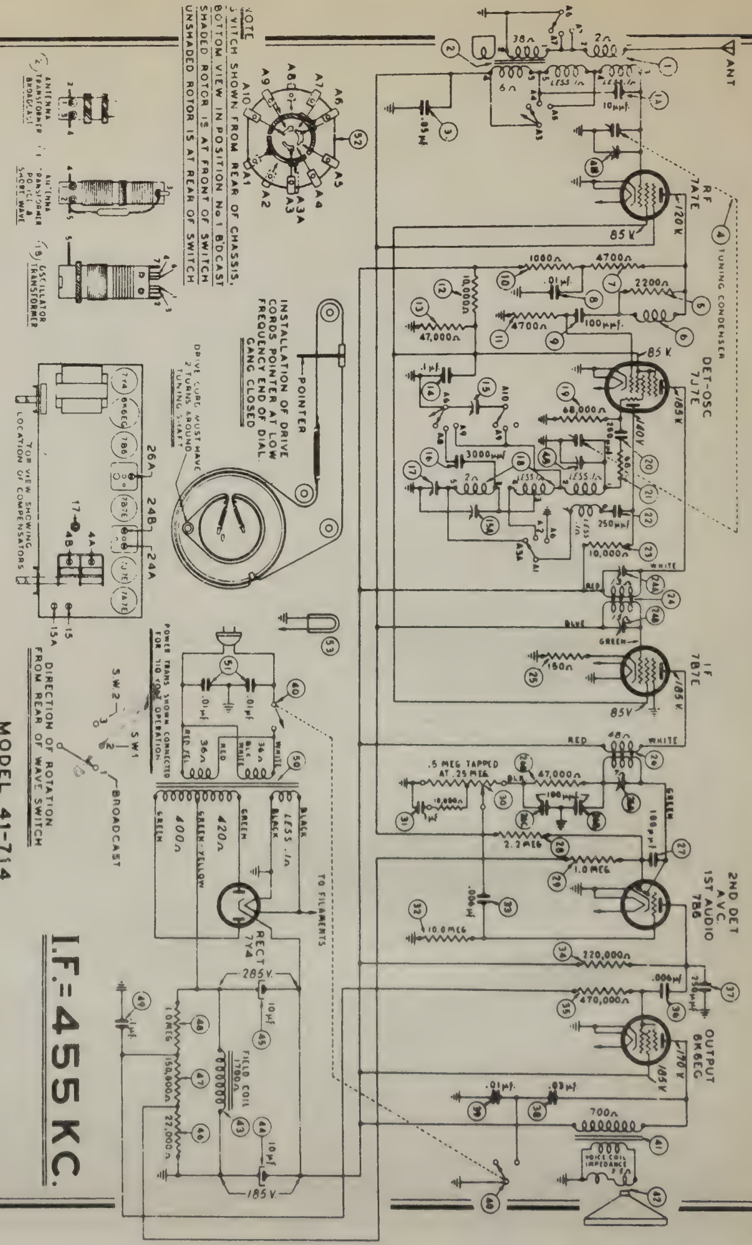


INSTALLATION OF DRIVE CORDS
BROADCAST POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED
BAND SPREAD POINTER AT LOW FREQUENCY END OF DIAL

FIG. 2 — INSTALLING TUNING DRIVE CORDS

MODEL 41-714

PHILCO RADIO & TELEVISION CORP.



NOTE
SWITCH SHOWN FROM REAR OF CHASSIS,
BOTTOM VIEW IN POSITION No.1 B'DCAST
SHADED ROTOR IS AT FRONT OF SWITCH
UNSHADED ROTOR IS AT REAR OF SWITCH

INSTALLATION OF DRIVE
CORDS POINTER AT LOW
FREQUENCY END OF DIAL.
GANG CLOSED

DRIVE CORD MUST HAVE
2 TURNS AROUND
TUNING SHAFT

TOP VIEW SHOWING
LOCATION OF COMPENSATORS

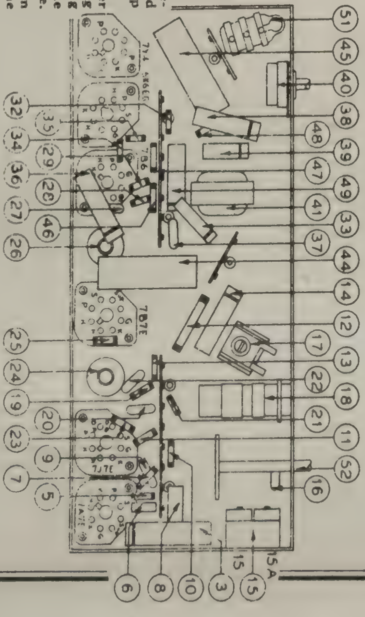
POWER TRANS SHOWN CONNECTED
FOR 110 VOLT OPERATION

DIRECTION OF ROTATION
FROM REAR OF WAVE SWITCH

I.F.=455 KC.

MODEL 41-714

APRIL, 1940.



NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

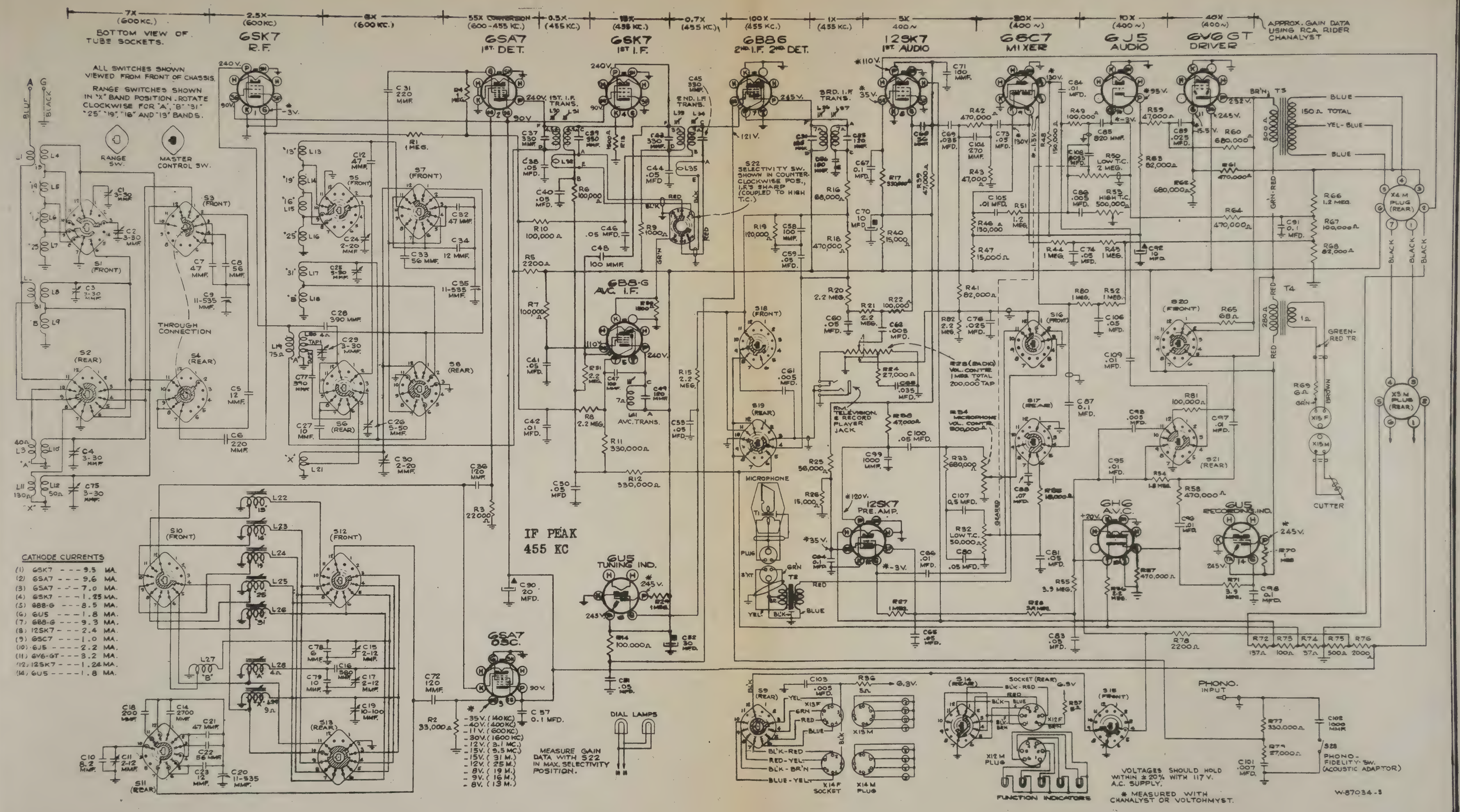
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (4B) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20,090 M. C.

Operations in Order	SIGNAL GENERATOR			RECEIVER		
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators
1	Lug of Ant. Tuning Condenser Front Section	.1 mfd.	455 K. C.	580 K. C.	Range Switch Broadcast (Position 1) Vol. Max.	24A, 24B, 26A
2	Ant. Lead	400 ohms	21 M. C.	21 M. C.	Range Switch S. W. Position 3	4B, 4A Note B Note C
3	Ant. Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch S. W. Position 2	15 Roll Gang
4	Ant. Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch Broadcast Position 1	15A Roll Gang
5	Ant. Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch Broadcast Position 1	17 Roll Gang

RCA MFG. CO., INC.

MODEL QU8
Ch. RC-551

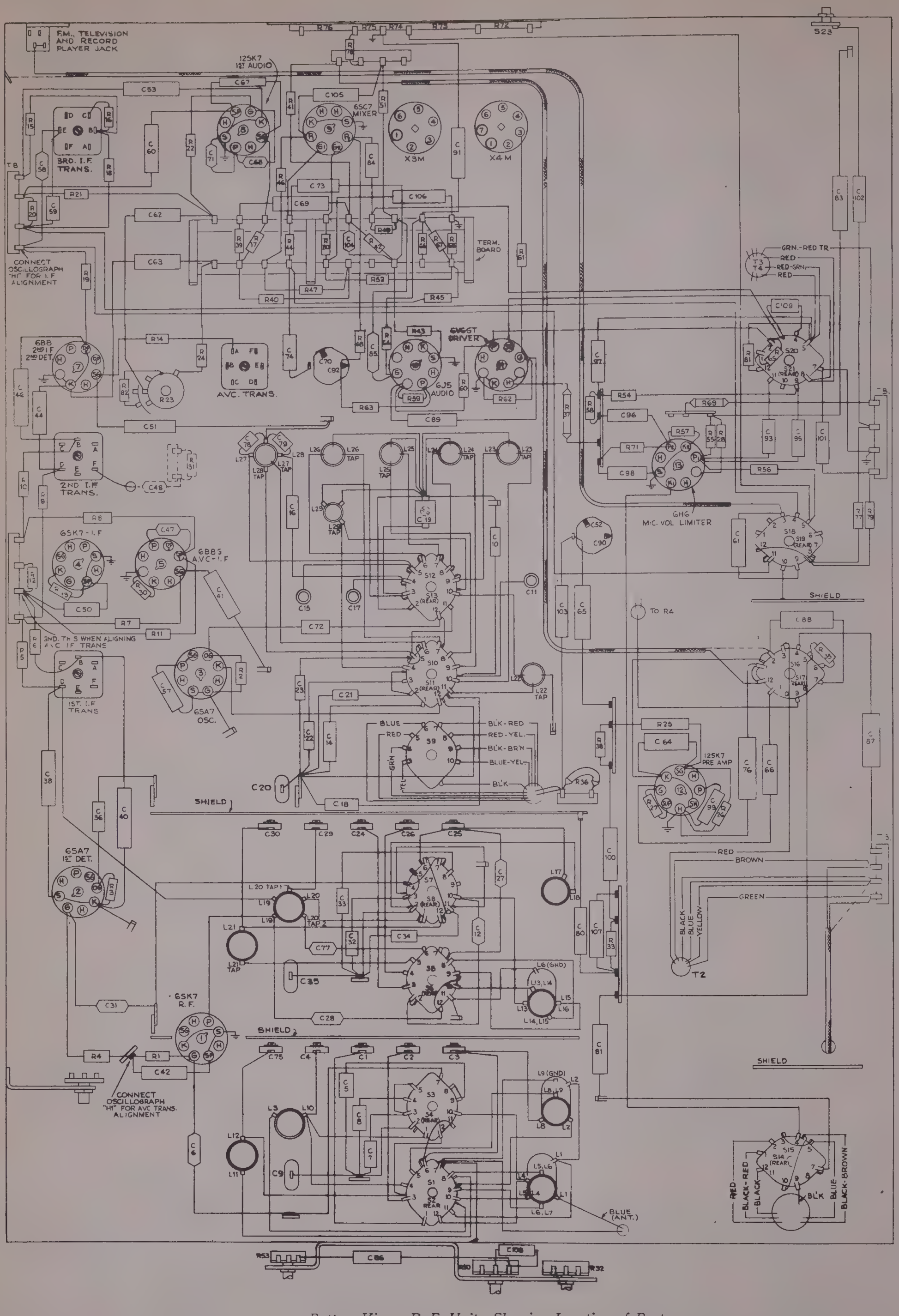


FREQUENCY RANGES	
Long Wave ("X" Band)	140-410 kc (2145-735 m)
Medium Wave ("A" Band)	540-1,720 kc (555-174 m)
Short Wave ("B" Band)	3.1-9.5 mc (97.5-31.5 m)
31 Meter Spread Band	9.45-12 mc (31.8-25.4 m)
25 Meter Spread Band	11.65-15.2 mc (25.6-19.9 m)
19 Meter Spread Band	15.1-17.75 mc (19.9-16.9 m)
16 Meter Spread Band	17.73-18.5 mc (16.9-16.2 m)
13 Meter Spread Band	21.45-22.6 mc (13.95-13.3)

INTERMEDIATE FREQUENCY	455 kc
POWER OUTPUT RATING	
Undistorted	50 watts
Maximum	60 watts
LOUDSPEAKERS (2)	
Type	12 in. Electrodynamic
Voice Coil Impedance	11.5 ohms at 400 cycles

PHONOGRAPH	
Type	Fully Automatic
Record Capacity	Twenty 10 or 12 inch or twenty mixed Records
Turntable Speed	78 r.p.m.
Drive	Motor through reduction gear box direct to turntable
Type Pick-Up	Magnetic
Pickup Impedance	96 ohms at 1,000 cycles

Watts Phono Motor 60 cycle	90
50 cycle	110
POWER SUPPLY RATING	
100-130, 140-160, 195-250 volts, 40-60 cycles	410 watts
PUBLIC ADDRESS USE	
Microphone Type	Velocity (Ribbon) MI-4036-K
Microphone Input Impedance	250 ohms
Output to External Speakers	500 ohm line



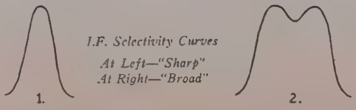
Bottom View—R. F. Unit—Showing Location of Parts

RCA MFG. CO., INC

MODEL Q44
Ch. RC-531

Step	Connect the high side of test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	Turn selectivity control maximum counter-clockwise for maximum selectivity.			
2	6SK7 2nd I-F grid in series with .01 mfd.	455 kc	"A" Band Quiet point between 550-750 kc	L37, L36 Third I-F Transformer
3	6SK7 1st I-F grid in series with .01 mfd.			L34, L33 Second I-F Transformer
4	6SA7 1st Det. grid in series with .01 mfd.			L31, L30 First I-F Transformer
5	With selectivity control in broad position retouch L37, L36 for selectivity curve 2.			
5A	With selectivity control in sharp position see that curve 1 has not changed appreciably.			
6	6SA7 1st Det. grid in series with .01 mfd.	455 kc	"A" Band quiet point 550-750 kc	L39, L38 AVC Transformer*
7	Antenna Terminal in series with 200 mmfd.	360 kc	"X" Band 360 kc (149°)	C19 (osc.)** C30 (det.) C75 (ant.)
8		175 kc	"X" Band 175 kc (51°)	L29 (osc.) (Rock-in)
9	Repeat steps 7 and 8.			
10	Antenna Terminal in series with 200 mmfd.	1,500 kc	"A" Band 1,500 kc (150.5°)	C17 (osc.) C29 (det.) C4 (ant.)
11		600 kc	"A" Band 600 kc (28°)	L28 (osc.) (Rock-in)
12	Repeat steps 10 and 11.			
13	Antenna Terminal in series with 300 ohms	9.5 mc	"31M" Band 9.5 mc (21.5°)	L26 (osc.)*** C25 (det.) C3 (ant.)
14		11.8 mc	"31M" Band 11.8 mc (169.5°)	C11 (osc.)***
15		Repeat steps 13 and 14 until correct on dial.		
16		9.5 mc	"B" Band 9.5 mc (172.5°)	C15 (osc.)***
17		11.8 mc	"25M" Band 11.8 mc (36°)	L25 (osc.)*** C24 (det.) C1 (ant.)
18		15.2 mc	"19M" Band 15.2 mc (37°)	L24 (osc.)***
19		17.75 mc	"16M" Band 17.75 mc (28°)	L23 (osc.)**** C26 (det.) C2 (ant.)
20		21.5 mc	"13M" Band 21.5 mc (59°)	L22 (osc.)****

* Connect oscilloscope to lug C of A.V.C. transformer.
** Core of L29 should be approximately ⅜ inches out before adjusting C19.
*** Use minimum capacity or inductance peak.
**** Use maximum inductance peak.
NOTE: Oscillator tracks above all signals except on 16 and 13 meter bands.

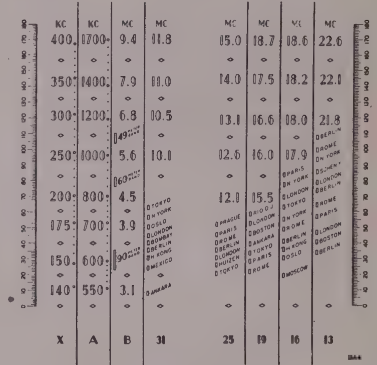

I.F. Selectivity Curves
At Left—"Sharp"
At Right—"Broad"

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dials are fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at the sides.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.



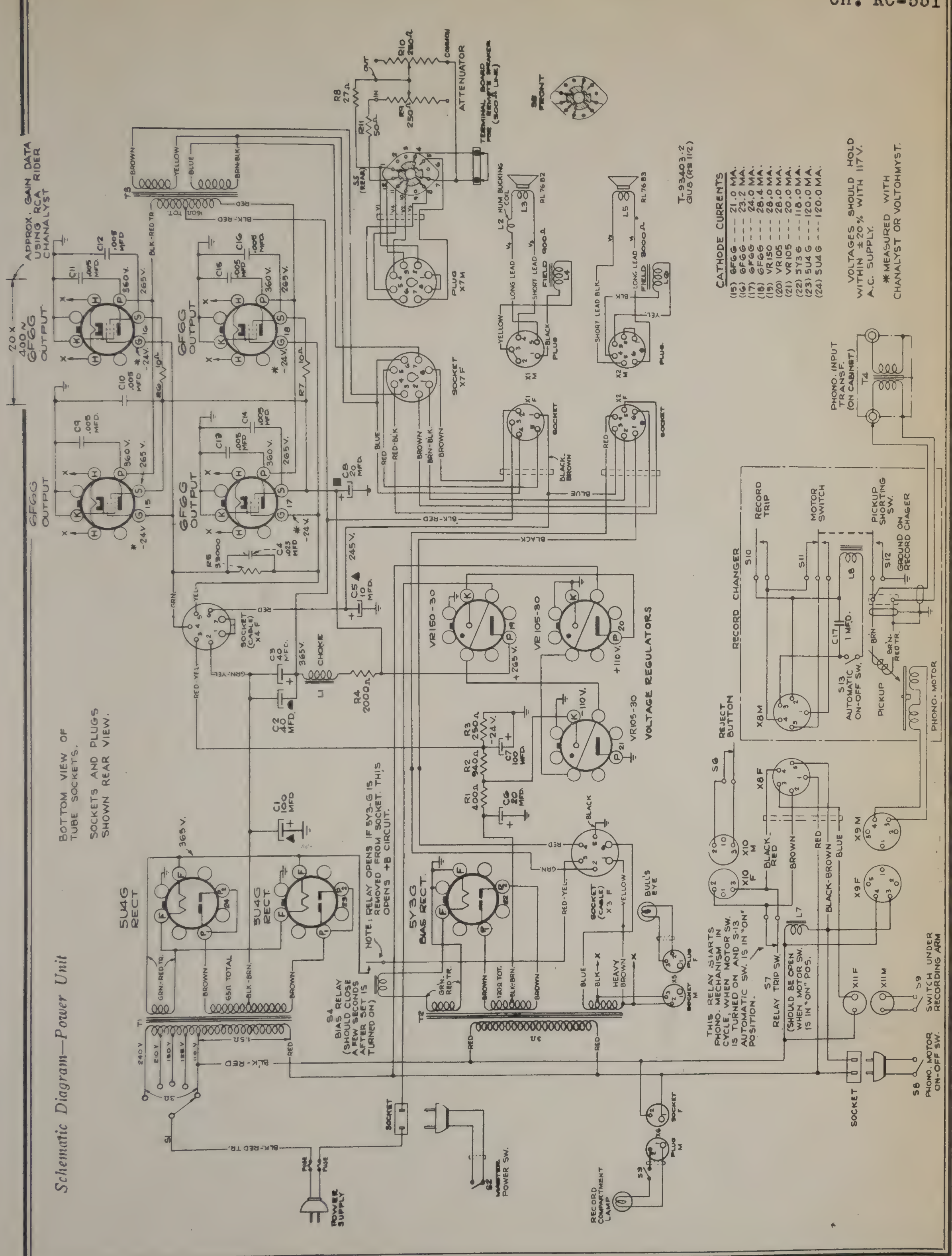
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations by known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

RCA MFG. CO., INC.

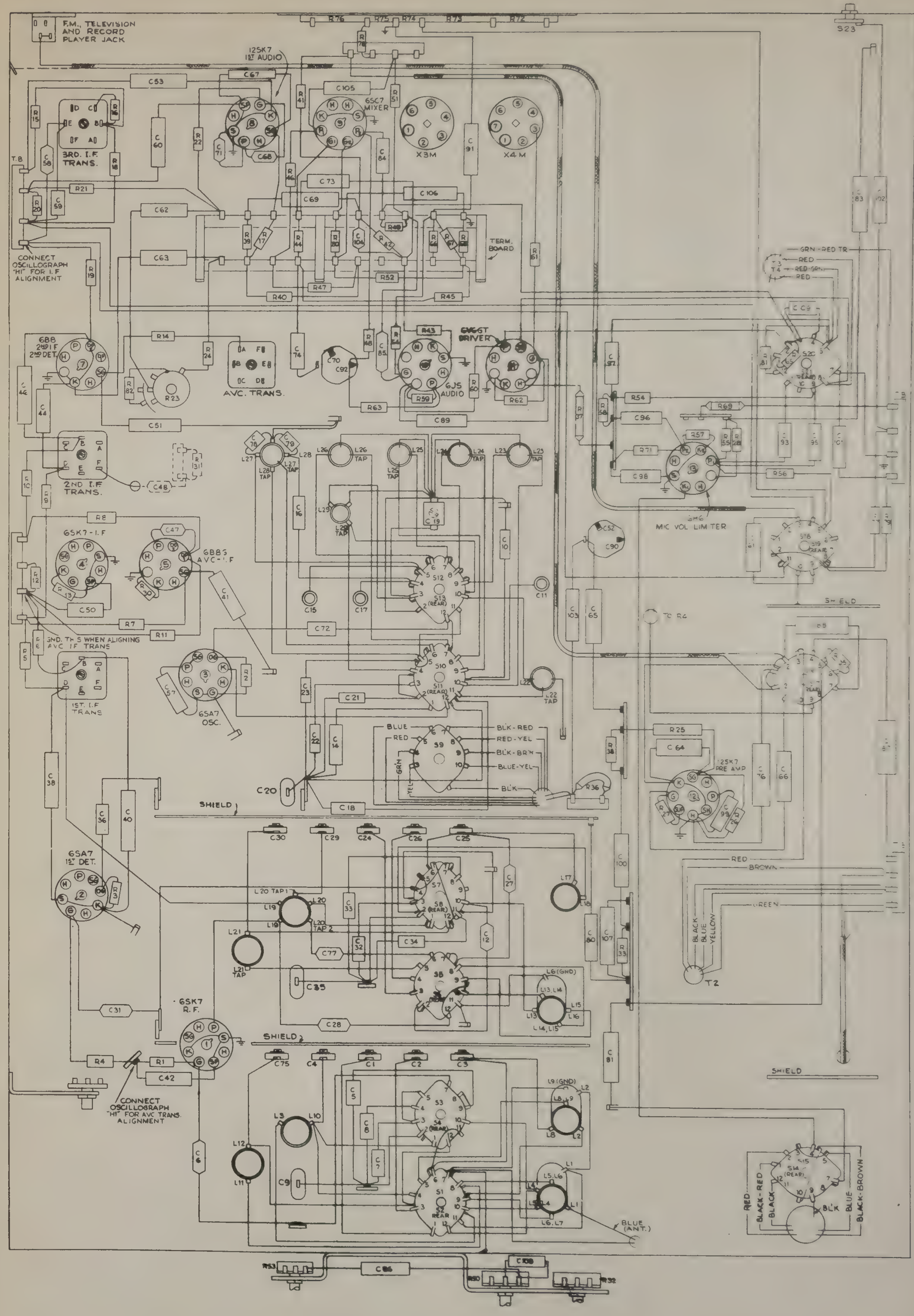
MODEL QU8
Ch. RC-551



Schematic Diagram—Power Unit

MODEL QU8
Ch. RC-551

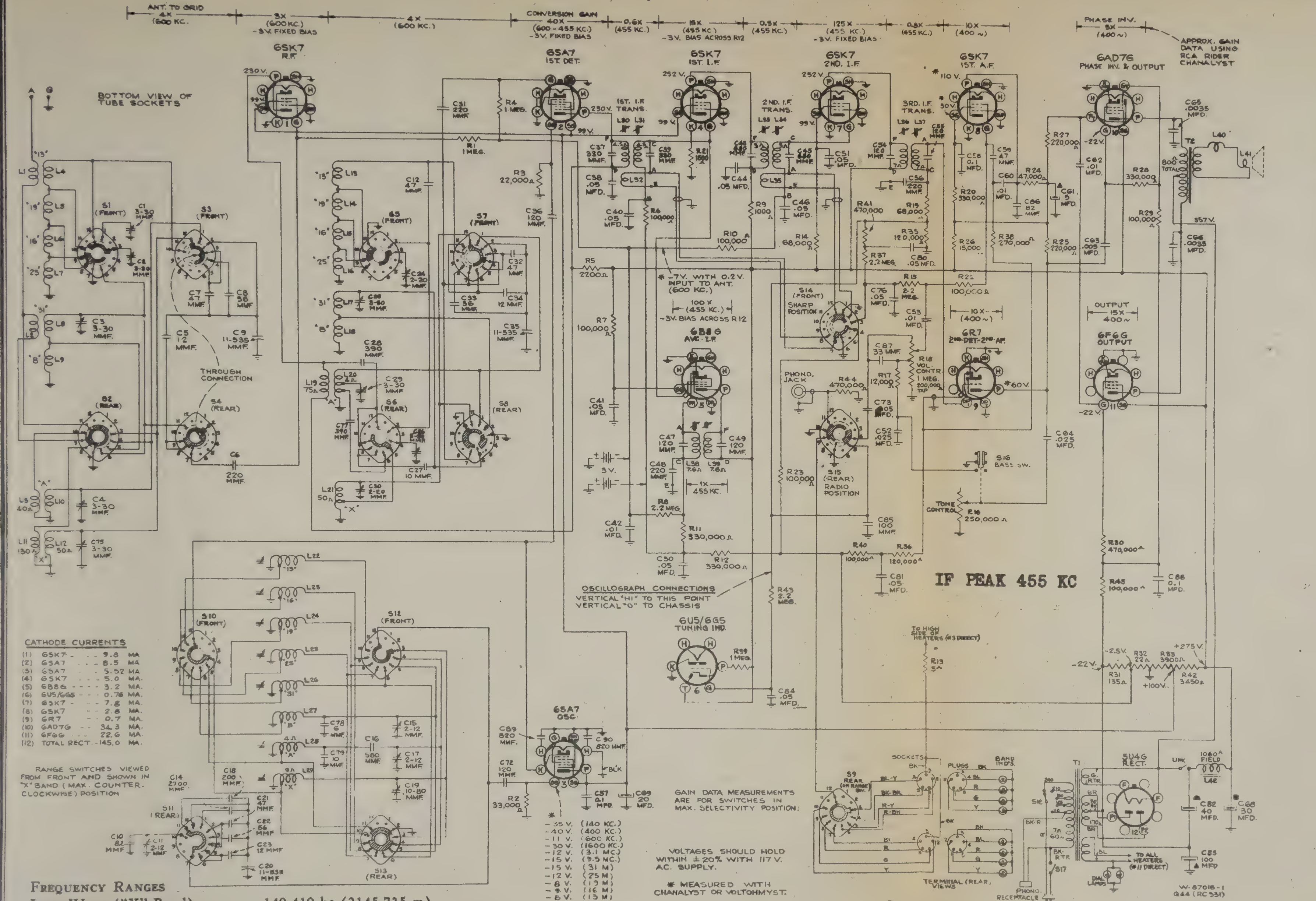
RCA MFG. CO., INC.



Bottom View—R. F. Unit—Showing Location of Parts

MODEL Q44
Ch. RC-531

RCA MFG. CO., INC.



CATHODE CURRENTS

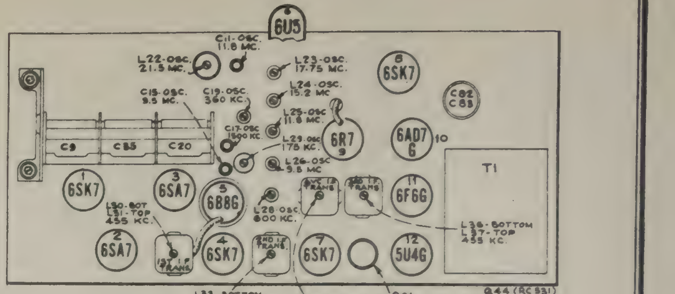
(1)	6SK7	9.8 MA
(2)	6SA7	8.5 MA
(3)	6SA7	5.52 MA
(4)	6SK7	5.0 MA.
(5)	6B8G	3.2 MA.
(6)	6U5/6G5	0.76 MA.
(7)	6SK7	7.8 MA.
(8)	6SK7	2.8 MA.
(9)	6R7	0.7 MA.
(10)	6AD7G	34.3 MA.
(11)	6F6G	22.6 MA.
(12)	TOTAL RECT.	145.0 MA.

RANGE SWITCHES VIEWED FROM FRONT AND SHOWN IN "X" BAND (MAX. COUNTER-CLOCKWISE) POSITION

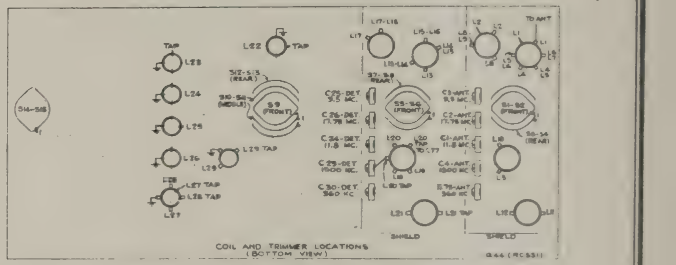
GAIN DATA MEASUREMENTS ARE FOR SWITCHES IN MAX. SELECTIVITY POSITION.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.



Tube and Trimmer Locations (Top View)



Coil and Trimmer Locations (Bottom View)

Precautionary Lead Dress:—

1. All oscillator leads should be kept as short as possible.
2. Both yellow leads in the antenna switch section must be dressed towards the lug end and away from the coil windings, and also held to length.
3. Both yellow leads to adjacent lugs on detector coil must be dressed towards lug end and away from the coil windings, and also held to length.
4. The following leads should be held to length
   - from No. 8 on S1
   - from No. 5 on S2
   - from No. 8 on S5
5. Lead from No. 4 on S15 must be dressed along the chassis away from all heater leads.
6. Lead from No. 5 on S15: well away from all heater leads.
7. The diode lead and the ground lead from the third I-F must be twisted.
8. The diode lead and the ground lead from A.V.C. I-F transformer must be twisted.
9. The lead on No. 9 of S15 should be away from the volume control and first audio tube.
10. The two condensers on the oscillator heater must be as short as possible and dressed away by at least ¼" from the bracket, parts wired to it, the yellow lead, and the oscillator grid lead.
11. Green, blue and double enamel leads from the oscillator coil nearest the rear apron must bear tightly against the styrol; the sprayed mica must likewise bear on the styrol from the opposite side.
12. The oscillator grid coupling condenser must bear tightly against the styrol; the sprayed mica must likewise bear on the styrol from the opposite side.
13. The long ground lead from the oscillator heater must be kept away from all condensers, resistors, and leads to R-F tubes.

FREQUENCY RANGES

Long Wave ("X" Band)	140-410 kc (2145-735 m)
Medium Wave ("A" Band)	540-1,720 kc (555-174 m)
Short Wave ("B" Band)	3.1-9.5 mc (97.5-31.5 m)
31 Meter Spread Band	9.45-11.8 mc (31.8-25.4 m)
25 Meter Spread Band	11.65-15.2 mc (25.6-19.9 m)
19 Meter Spread Band	15.1-17.75 mc (19.9-16.9 m)
16 Meter Spread Band	17.73-18.5 mc (16.9-16.2 m)
13 Meter Spread Band	21.45-22.5 mc (13.95-13.3)

INTERMEDIATE FREQUENCY .... 455 kc

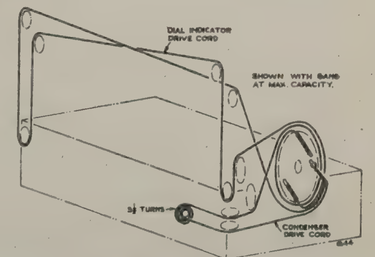
PILOT LAMPS ....10 Type No. 51 6-8 volts, 0.2 amps.

POWER SUPPLY RATING

105-125 volts, 50-60 cycles	125 watts
105-125 volts, 25-60 cycles	125 watts
100-130, 140-160, 195-250 volts, 40-60 cycles	125 watts

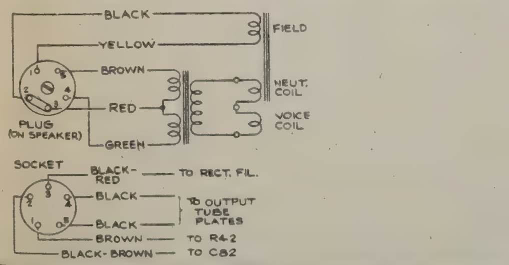
POWER OUTPUT RATING

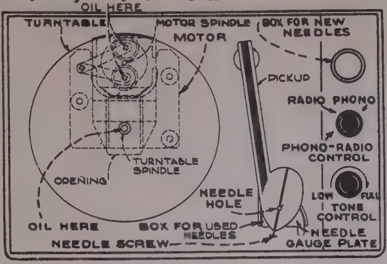
Undistorted	10 watts
Maximum	12 watts



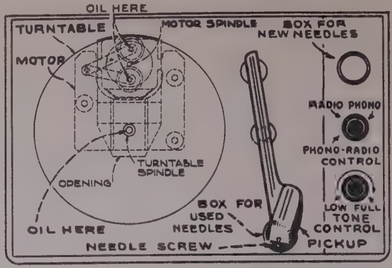
LOUDSPEAKER

Type	10-inch Electrodynamic
Voice Coil Impedance	2.4 ohms at 400 cycles
Identification Number	88885-502





Top View Model QU3C



Top View Model QU3M

The QU3M is equipped with a magnetic pickup, and the QU3C with a crystal pickup. The output of the crystal pickup is fed into the audio end of the receiver through a switch and compensating circuit. On instruments using a magnetic pickup, a transformer and compensating circuit are used between the pickup and the audio input (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the cabinet.

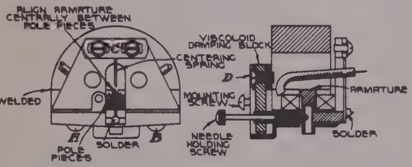
Crystal Pickup:

The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Magnetic Pickup:

The magnetic pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

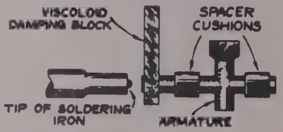


Magnetic Pickup Detau

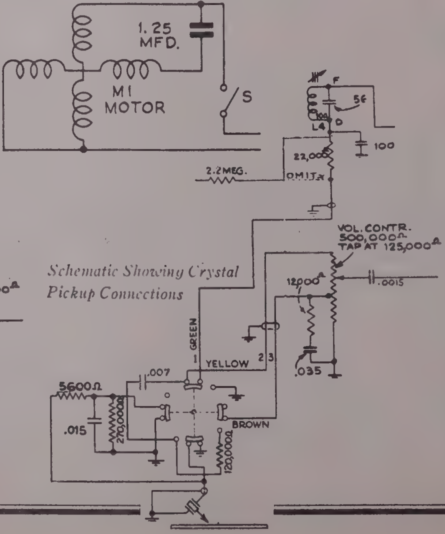
Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

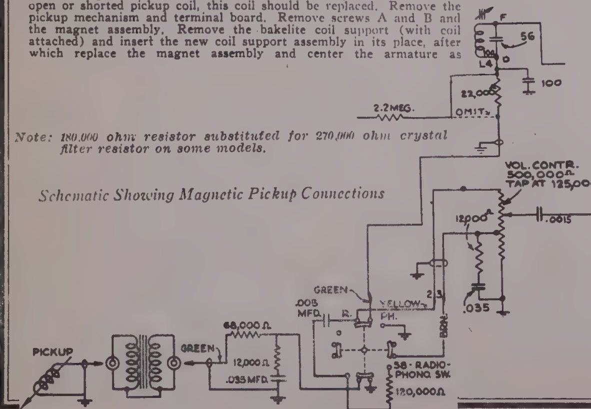
Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.



Attaching Damping Block



Schematic Showing Crystal Pickup Connections



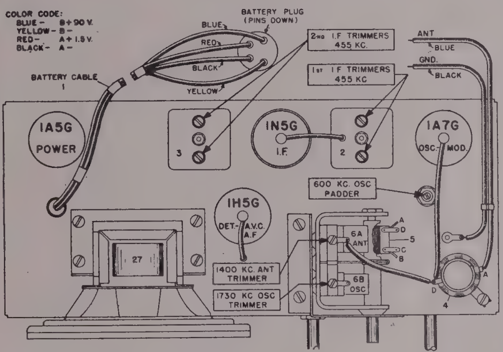
Note: 180.000 ohm resistor substituted for 270.000 ohm crystal filter resistor on some models.

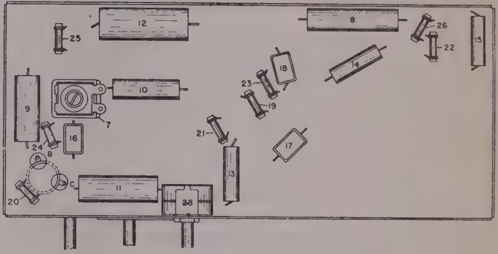
Schematic Showing Magnetic Pickup Connections

SENTINEL RADIO CORP.

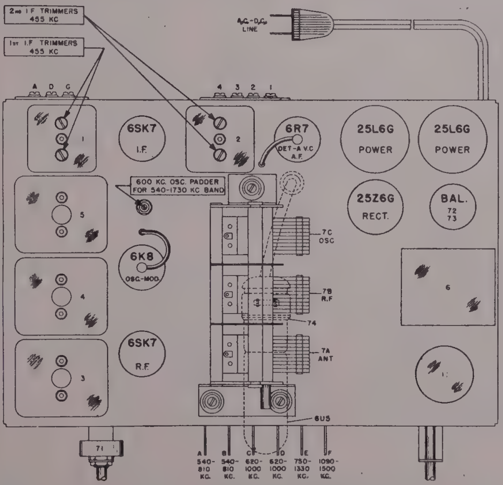
MODEL 210B

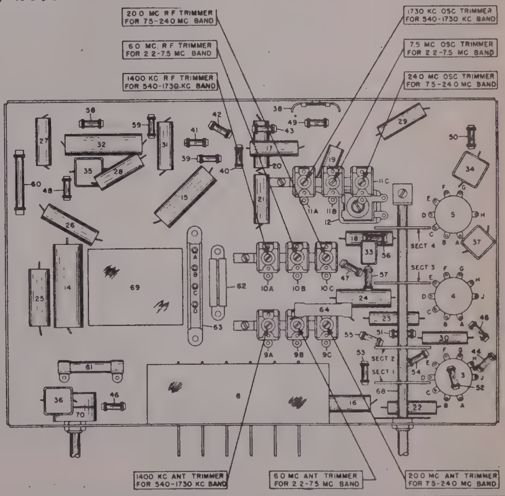
Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7G tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1 Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
2 Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.
3 Approx. 600 K. C.	Approx. 600 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K. C. padder to maximum output.





MODELS 207U, 207UE




20.0 MC R F TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC. R F TRIMMER FOR 2.2-7.5 MC BAND
1400 KC R F TRIMMER FOR 540-1730 KC BAND
1730 KC OSC TRIMMER FOR 540-1730 KC BAND
7.5 MC OSC TRIMMER FOR 2.2-7.5 MC BAND
24.0 MC OSC TRIMMER FOR 7.5-24.0 MC BAND
SECT 4
SECT 3
SECT 2
SECT 1
10A
10B
10C
11A
11B
11C
9A
9B
9C
1400 KC ANT TRIMMER FOR 540-1730 KC BAND
6.0 MC ANT TRIMMER FOR 2.2-7.5 MC BAND
20.0 MC ANT TRIMMER FOR 7.5-24.0 MC BAND

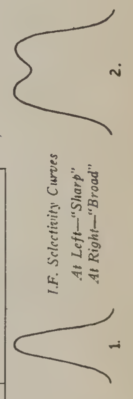
©John F. Rider, Publisher

RCA MFG. CO., INC

MODEL Q44
Ch. RC-531

Step	Connect the high side of test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	Turn selectivity control maximum counter-clockwise for .maximum selectivity.			
2	6SK7 2nd I-F grid in series with .01 mfd.	455 kc	"A" Band Quiet point between 550-750 kc	L37, L36 Third I-F Transformer
3	6SK7 1st I-F grid in series with .01 mfd.			L34, L33 Second I-F Transformer
4	6SA7 1st Det. grid in series with .01 mfd.			L31, L30 First I-F Transformer
5	With selectivity control in broad position retouch L37, L36 for selectivity curve 2.			
5A	With selectivity control in sharp position see that curve 1 has not changed appreciably.			
6	6SA7 1st Det. grid in series with .01 mfd.	455 kc	"A" Band quiet point 550-750 kc	L39, L38 AVC Transformer*
7	Antenna Terminal in series with 200 mmfd.	360 kc	"X" Band 360 kc (149°)	C19 (osc.)** C30 (det.) C75 (ant.)
8		175 kc	"X" Band 175 kc (51°)	L29 (osc.) (Rock-in)
9	Repeat steps 7 and 8.			
10	Antenna Terminal in series with 200 mmfd.	1,500 kc	"A" Band 1,500 kc (150.5°)	C17 (osc.) C29 (det.) C4 (ant.)
11		600 kc	"A" Band 600 kc (26°)	L28 (osc.) (Rock-in)
12	Repeat steps 10 and 11.			
13	Antenna Terminal in series with 300 ohms	9.5 mc	"31M" Band 9.5 mc (21.5°)	L26 (osc.)*** C25 (det.) C3 (ant.)
14		11.8 mc	"31M" Band 11.8 mc (169.5°)	C11 (osc.)***
15		Repeat steps 13 and 14 until correct on dial.		
16		9.5 mc	"B" Band 9.5 mc (172.5°)	C15 (osc.)***
17		11.8 mc	"25M" Band 11.8 mc (36°)	L25 (osc.)*** C24 (det.) C1 (ant.)
18		15.2 mc	"19M" Band 15.2 mc (37°)	L24 (osc.)***
19		17.75 mc	"16M" Band 17.75 mc (28°)	L23 (osc.)**** C26 (det.) C2 (ant.)
20		21.5 mc	"13M" Band 21.5 mc (59°)	L22 (osc.)****

* Connect oscilloscope to lug C of A.V.C. transformer.
** Core of L29 should be approximately ⅝ inches out before adjusting C19.
*** Use minimum capacity or inductance peak.
**** Use maximum inductance peak.
NOTE: Oscillator tracks above all signals except on 16 and 13 meter bands.



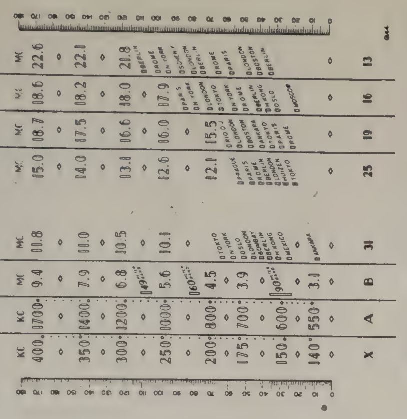
I.F. Selectivity Curves
At Left—"Sharp"
At Right—"Broad"

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dials are fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at the sides.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.



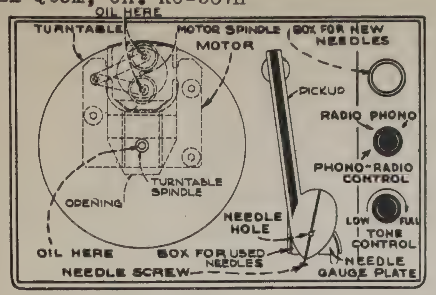
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations by known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

MODEL Q26, Ch. RC-507J
MODEL QU3C, Ch. RC-507F
MODEL QU3M, Ch. RC-507H

RCA MFG. CO., INC.



Top View Model QU3C

The QU3M is equipped with a magnetic pickup, and the QU3C with a crystal pickup. The output of the crystal pickup is fed into the audio end of the receiver through a switch and compensating circuit. On instruments using a magnetic pickup, a transformer and compensating circuit are used between the pickup and the audio input (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the cabinet.

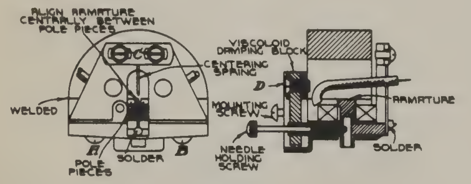
Crystal Pickup:

The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Magnetic Pickup:

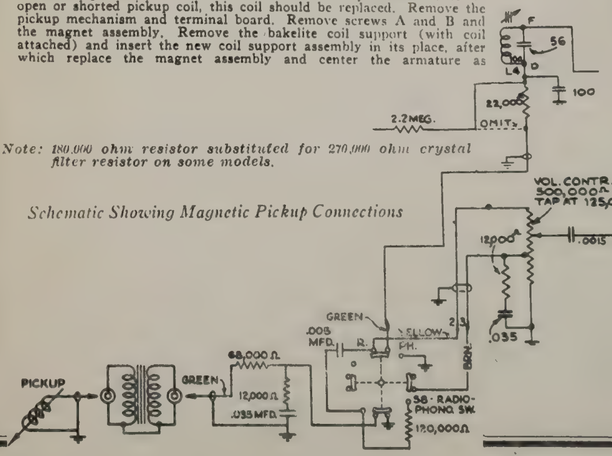
The magnetic pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.



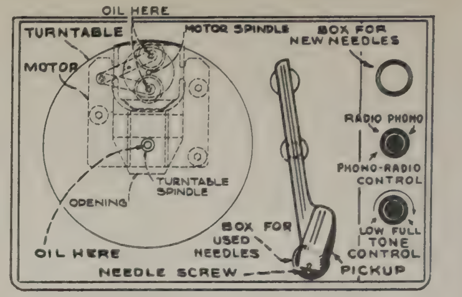
Magnetic Pickup Detau

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.



Note: 180,000 ohm resistor substituted for 270,000 ohm crystal filter resistor on some models.

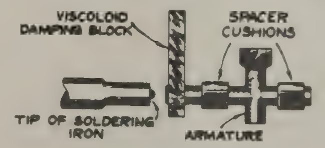
Schematic Showing Magnetic Pickup Connections



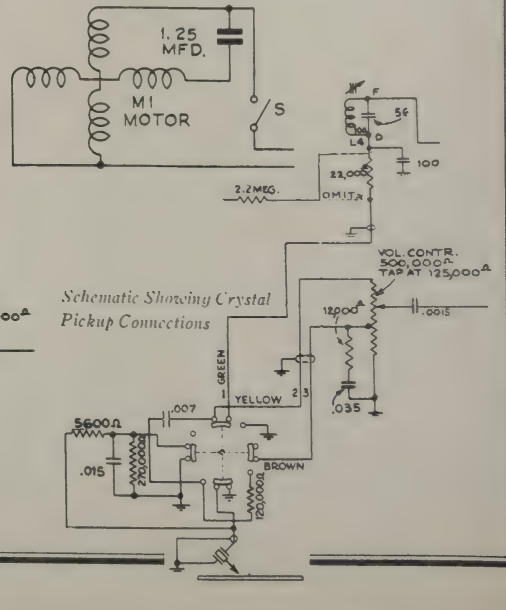
Top View Model QU3M

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.



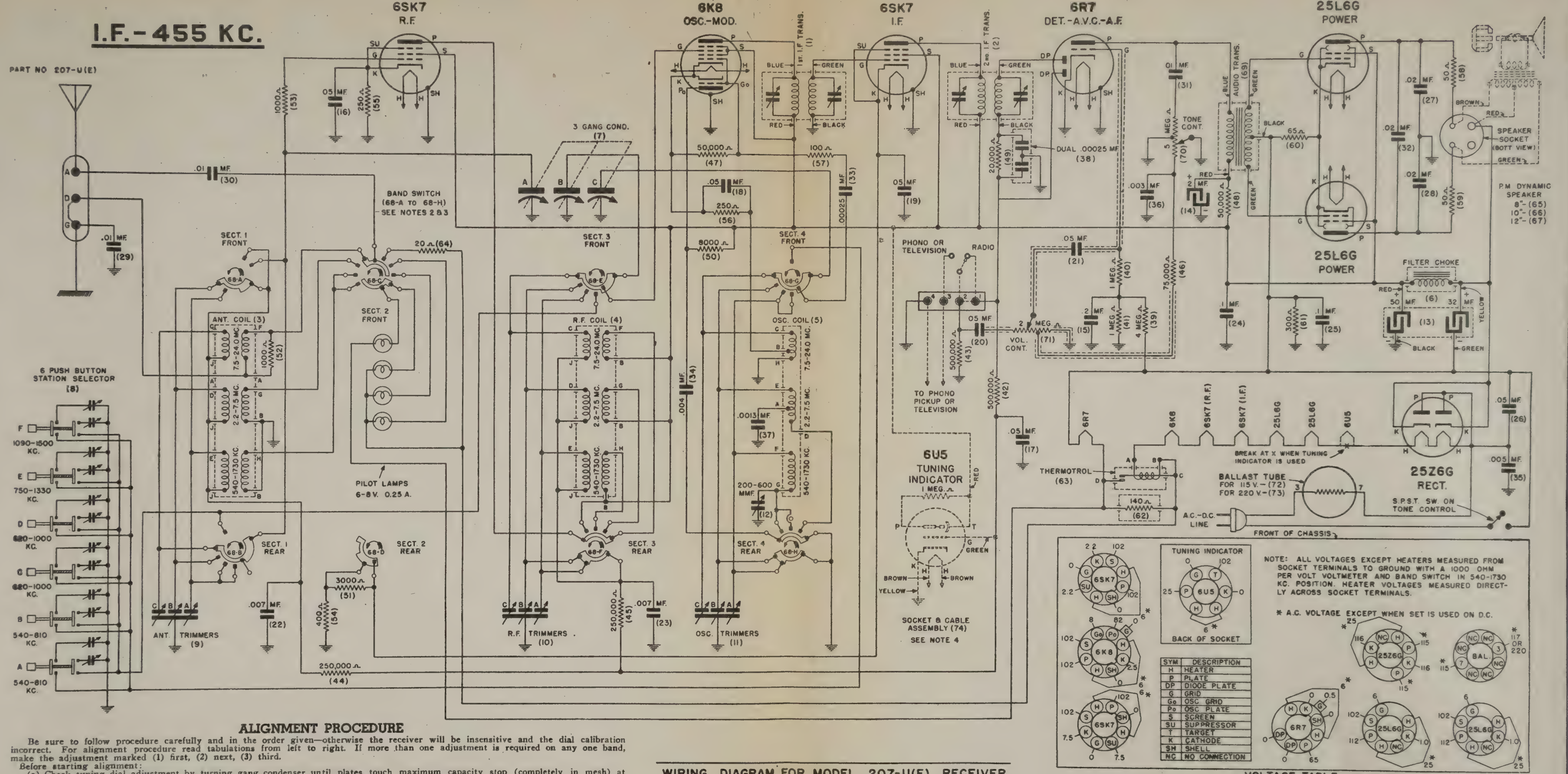
Attaching Damping Block



Schematic Showing Crystal Pickup Connections

SENTINEL RADIO CORP.

**MODELS 207U,
207UE**



WIRING DIAGRAM FOR MODEL 207-U(E) RECEIVER

NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND BAND SWITCH IN 540-1730 KC. POSITION. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

* A.C. VOLTAGE EXCEPT WHEN SET IS USED ON D.C.

SYM	DESCRIPTION
H	HEATER
P	PLATE
DP	DIODE PLATE
G	GRID
Go	OSC. GRID
Po	OSC. PLATE
S	SCREEN
SU	SUPPRESSOR
T	TARGET
K	CATHODE
SH	SHELL
NC	NO CONNECTION

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

4-40

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

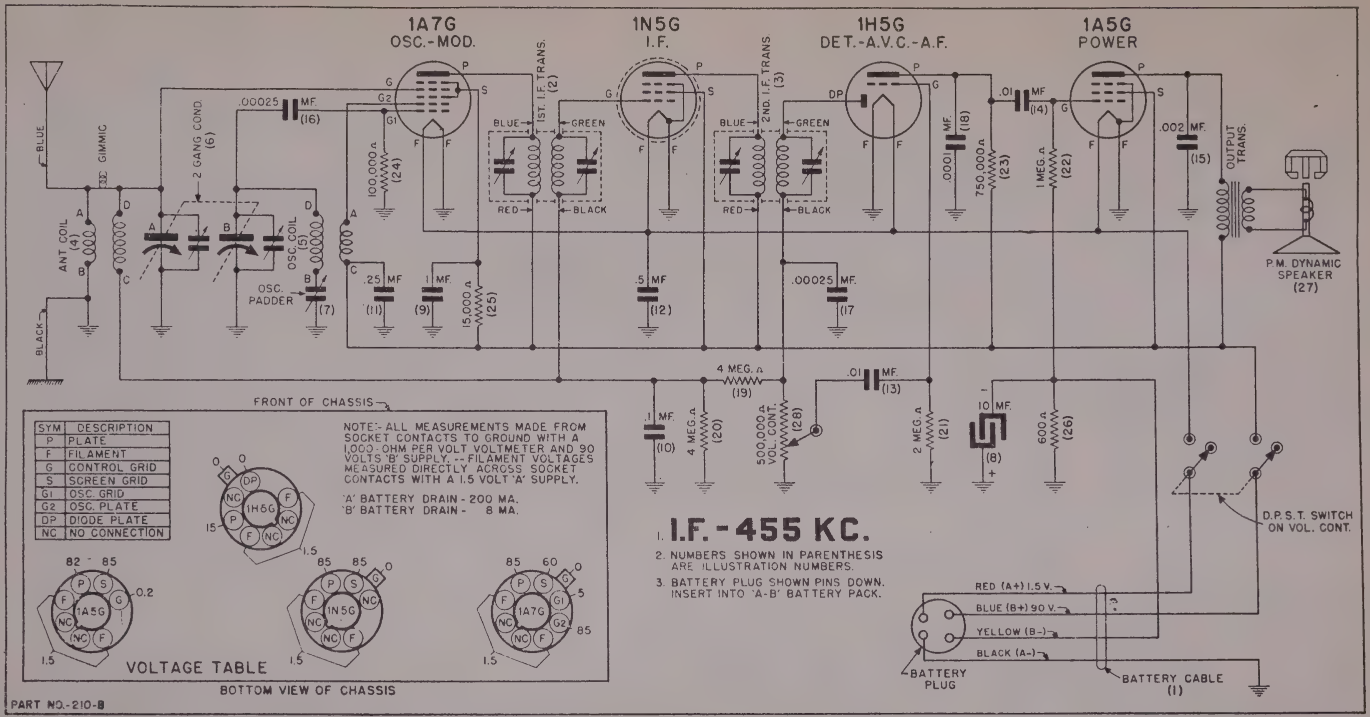
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:		Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator: consisting of:	Attach output of test oscillator to:	
I.F. ALIGNMENT use any band position		Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output
	3	Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.2 TO 7.5 M.C. BAND	1	Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	2	Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output
7.5 TO 24 M.C. BAND	1	Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2	Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna and R.F. trimmers for maximum output

NOTES:

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH VIEWED FROM REAR, SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION.
3. SECTIONS OF BAND SWITCH (68-A TO 68-H) ARE REFERRED TO ON DIAGRAM BEGINNING WITH SECTION № 1 WHICH IS AT KNOB END OF SHAFT.
4. SOME MODELS OF THIS SERIES ARE EQUIPPED WITH 6U5 TUNING INDICATOR, DOTTED LINES SHOW CONNECTIONS
5. REMOVE JUMPER BETWEEN TERMINALS 1 & 2 WHEN SET IS USED FOR PHONO OR TELEVISION OPERATION.



SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC. GRID
G2	OSC. PLATE
DP	DIODE PLATE
NC	NO CONNECTION

NOTE:- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1,000-OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY. -- FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET CONTACTS WITH A 1.5 VOLT 'A' SUPPLY.

'A' BATTERY DRAIN - 200 MA.
'B' BATTERY DRAIN - 8 MA.

1. I.F. - 455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. BATTERY PLUG SHOWN PINS DOWN. INSERT INTO 'A-B' BATTERY PACK.

PARTS LIST

Illus. No.	*Part No.*	*Description*		*List Price*
1	11125	Cable	Battery Assembly with 4 Prong Plug	$ .25
2	10967	Coil	1st I.F. Transformer	1.10
3	10769	Coil	2nd I.F. Transformer	1.10
4	12054	Coil	Antenna	.55
5	11955	Coil	Oscillator	.55
6	11954	Condenser	Tuning Two Gang	1.60
7	3287	Condenser	Padding 340-460 Mmf.	.45
8	1693	Condenser	Tubular Dry Electrolytic 10 Mfd. 25 Volt D.C. Wkg.	.75
9	1151	Condenser	.1 Mfd. 200 Volt	.20
10	1151	Condenser	.1 Mfd. 200 Volt	.20
11	9032	Condenser	.25 Mfd. 200 Volt	.25
12	2131	Condenser	.5 Mfd. 200 Volt	.55
13	9468	Condenser	.01 Mfd. 400 Volt	.17
14	9468	Condenser	.01 Mfd. 400 Volt	.17
15	10762	Condenser	.002 Mfd. 400 Volt	.19
16	9458	Condenser	Mica .00025 Mfd.	.21
17	9458	Condenser	Mica .00025 Mfd.	.21
18	7934	Condenser	Mica .0001 Mfd.	.21
19	1694	Resistor	Carbon 4 Megohm ⅓ Watt	.19
20	1694	Resistor	Carbon 4 Megohm ⅓ Watt	.19
21	2705	Resistor	Carbon 2 Megohm ⅓ Watt	.19
22	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
23	2673	Resistor	Carbon 750,000 Ohm ⅓ Watt	.19
24	8000	Resistor	Carbon 100,000 Ohm ⅓ Watt	.19
25	9385	Resistor	Carbon 15,000 Ohm ⅓ Watt	.19
26	1562	Resistor	Carbon 600 Ohm ⅓ Watt	.19
27	11128	Speaker	P. M. Dynamic 5 in.	4.00
28	11132	Volume Control With D.P.S.T. Switch		.80

MISCELLANEOUS PARTS

Illus. No.	*Part No.*	*Description*		*List Price*
	11108	Bulb	2 Cell 2.2. Volt White Bead Type	.07
	11961	Dial Scale	Calibrated Dial Scale	.25
	8184	Dial Cord	24 in. of 18 lb. Drive Cord	.15
	11017	Dial Shaft	Drive Shaft	.11
	11956	Dial Indicator	Off-On Indicator	.15
	11626	Dial Pointer	Needle	.30
	11963	Dial Crystal	Escutcheon	.75
	8301	Dial Screws	Phillips R.H. No. 2 x ¼ for Mounting Dial	3.00M Net
	4978	Plug	4 Prong Battery Plug	.10
	10207	Knob	Antique Ivory	.08
	11733	Knob	Walnut	.10

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

4-40 PART NO. 210B

Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground through a .1 mfd. condenser. The connection will depend on the type of meter. (The more sensitive type should be connected across the voice coil.)

Connect the ground lead of the signal generator to the receiver chassis. Disconnect the blue wire coming from the antenna terminal strip and allow it to float free of the chassis. The loop wires should be connected to the terminal strip as shown in the circuit diagram when aligning.

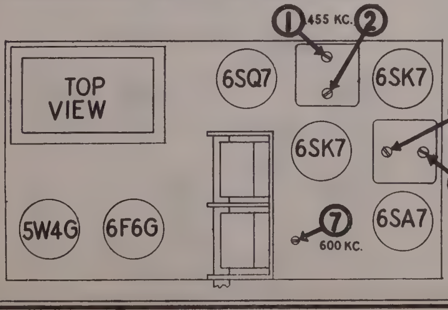
On the phonograph terminal strip, ground the terminal nearest the center of chassis. Connect the two remaining terminals together, using a short piece of wire.

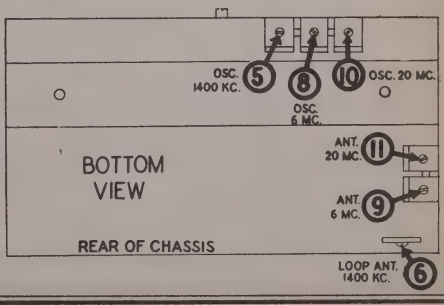
Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

With the gang condenser in full mesh; set the pointer at a point 1⅜" from the left flange of the brown dial plate. This point corresponds to the last mark on the low frequency end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screws on the dial drive drum and push the gang condenser in full mesh with the pointer set properly, then retighten the set screws. See paragraph on "Setting the Dial Pointer".

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Dial Pointer Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Stator of front gang condenser	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I. F.	Adjust for Maximum Output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Black loop wire on terminal strip	1400 KC	Broadcast	1400 KC (2⅛" from right Dial Plate End)	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Black loop wire on terminal strip	1400 KC	Broadcast	Tune to 1400 KC Generator Signal	6	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Black loop wire on terminal strip	600 KC	Broadcast	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until Maximum output is obtained.
400 OHM Carbon Resistor	Black loop wire on terminal strip	6.0 MC	Intermediate	6.0 MC (2⅜" from Right Dial Plate Flange)	8	Intermediate Oscillator	Adjust for Maximum Output. Check to see if proper peak was obtained by tuning in image at approx. 5.1 MC. If image does not appear, realign at 6 MC with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Black loop wire on terminal strip	6.0 MC	Intermediate	Tune to 6.0 MC Generator Signal	9	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Black loop wire on terminal strip	20 MC	Foreign	20 MC (2⅛" from Right Dial Plate End)	10	Foreign Oscillator	Adjust for Maximum Output. Check to see if proper peak was obtained by tuning in image at approx. 19.1 MC. If image does not appear, realign at 20 MC with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Black loop wire on terminal strip	20 MC	Foreign	Tune to 20 MC Generator Signal	11	Foreign Antenna	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

After replacing the set in the cabinet, connect the blue wire coming from the terminal strip to the screw adjacent to this strip, tune in a weak signal near 1400 KC, and adjust trimmer No. 6 for maximum output.



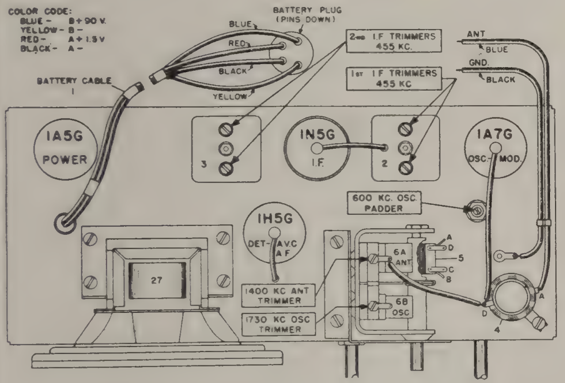


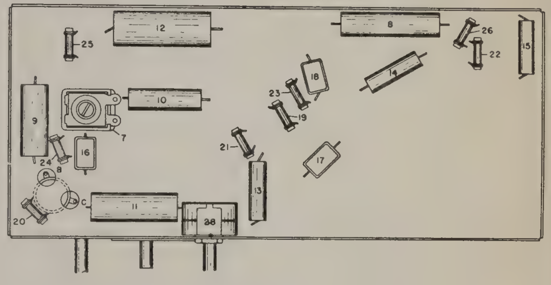
SENTINEL RADIO CORP.

MODELS 207U, 207UE
MODEL 210B

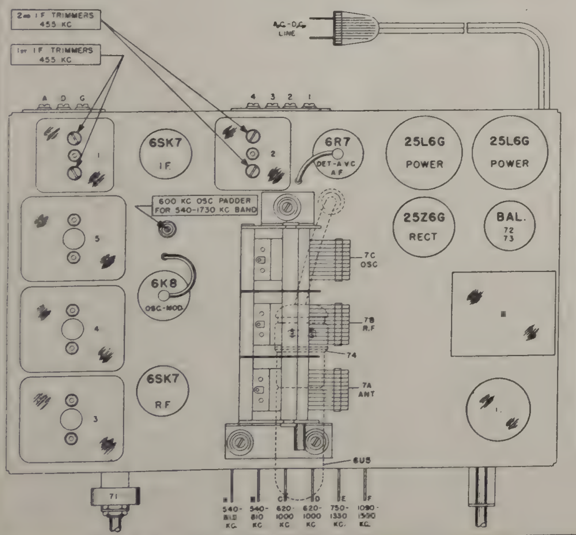
MODEL 210B

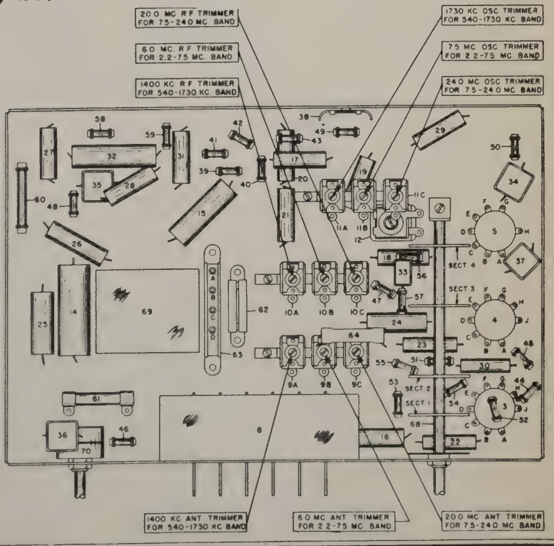
Set receiver dial to:	TEST OSCILLATOR Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7G tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1 Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
2 Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.
3 Approx. 600 K. C.	Approx. 600 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K. C. padder to maximum output.





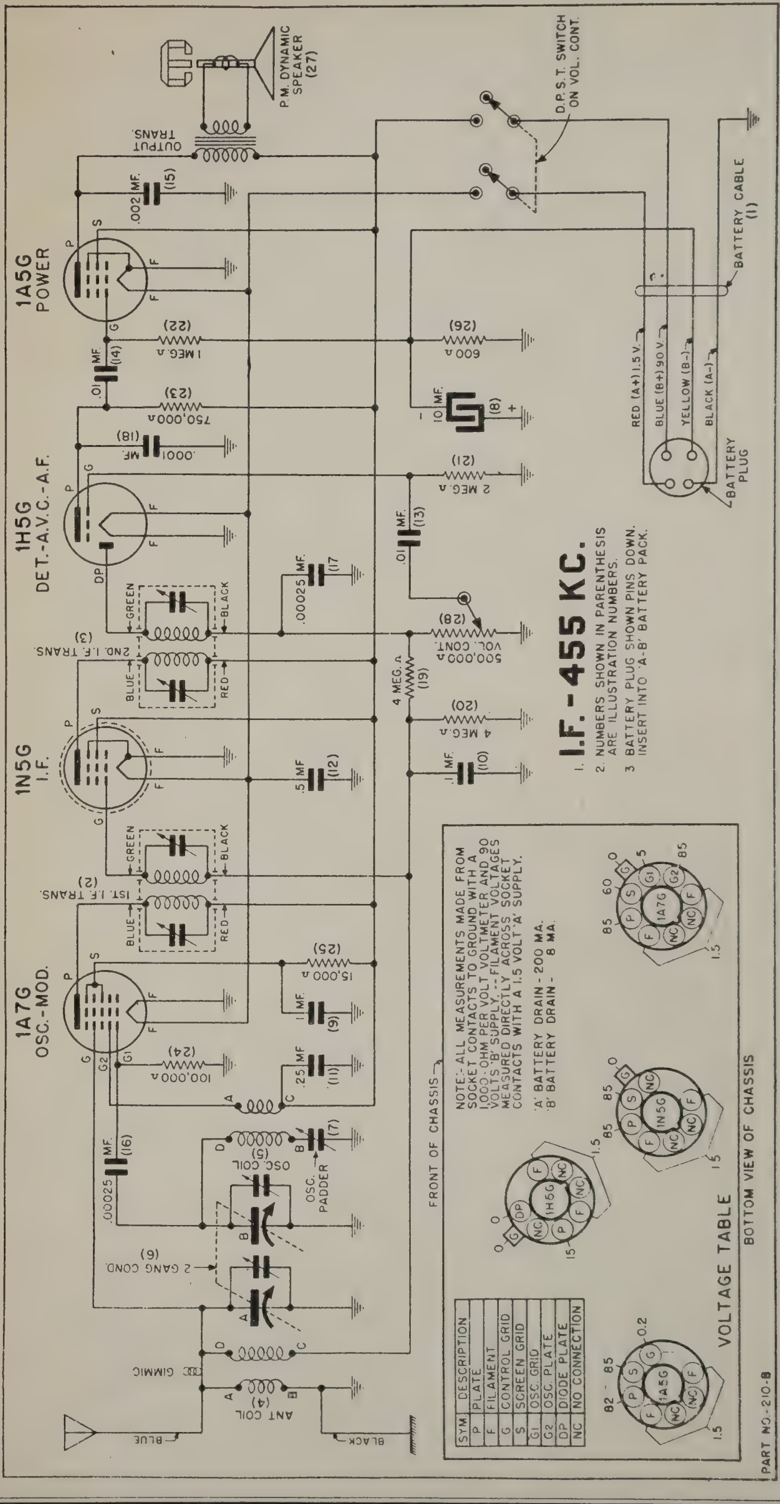
MODELS 207U, 207UE




20.0 MC R.F. TRIMMER FOR 7.5-24.0 MC BAND
6.0 MC R.F. TRIMMER FOR 2.2-7.5 MC BAND
1400 KC R.F. TRIMMER FOR 540-1730 KC BAND
1730 KC OSC TRIMMER FOR 540-1730 KC BAND
7.5 MC OSC TRIMMER FOR 2.2-7.5 MC BAND
24.0 MC OSC TRIMMER FOR 7.5-24.0 MC BAND
1400 KC ANT TRIMMER FOR 540-1730 KC BAND
6.0 MC ANT TRIMMER FOR 2.2-7.5 MC BAND
20.0 MC ANT TRIMMER FOR 7.5-24.0 MC BAND

MODEL 210B

SENTINEL RADIO CORP.



1. I.F. - 455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. BATTERY PLUG SHOWN PINS DOWN. INSERT INTO 'A-B' BATTERY PACK.

NOTE:- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1,000-OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.--FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET CONTACTS WITH A 1.5 VOLT 'A' SUPPLY.

'A' BATTERY DRAIN - 200 MA.
'B' BATTERY DRAIN - 8 MA.

SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC. GRID
G2	OSC. PLATE
DP	DIODE PLATE
NC	NO CONNECTION

VOLTAGE TABLE

BOTTOM VIEW OF CHASSIS

PART NO.-210-B

PARTS LIST

Illus. No.	Part No.		Description	List Price
1	11125	Cable	Battery Assembly with 4 Prong Plug	$ .25
2	10967	Coil	1st I.F. Transformer	1.10
3	10769	Coil	2nd I.F. Transformer	1.10
4	12054	Coil	Antenna	.55
5	11955	Coil	Oscillator	.55
6	11954	Condenser	Tuning Two Gang	1.60
7	3287	Condenser	Padding 340 460 Mmf.	.45
8	1693	Condenser	Tubular Dry Electrolytic 10 Mfd. 25 Volt D.C. Wkg.	.75
9	1151	Condenser	.1 Mfd. 200 Volt	.20
10	1151	Condenser	.1 Mfd. 200 Volt	.20
11	9032	Condenser	.25 Mfd. 200 Volt	.25
12	2131	Condenser	.5 Mfd. 200 Volt	.55
13	9468	Condenser	.01 Mfd. 400 Volt	.17
14	9468	Condenser	.01 Mfd. 400 Volt	.17
15	10762	Condenser	.002 Mfd. 400 Volt	.19
16	9458	Condenser	Mica .00025 Mfd.	.21
17	9458	Condenser	Mica .00025 Mfd.	.21
18	7934	Condenser	Mica .0001 Mfd.	.21
19	1694	Resistor	Carbon 4 Megohm 1/3 Watt	.19
20	1694	Resistor	Carbon 4 Megohm 1/3 Watt	.19
21	2705	Resistor	Carbon 2 Megohm 1/3 Watt	.19
22	7998	Resistor	Carbon 1 Megohm 1/3 Watt	.19
23	2673	Resistor	Carbon 750,000 Ohm 1/3 Watt	.19
24	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
25	9385	Resistor	Carbon 15,000 Ohm 1/3 Watt	.19
26	1562	Resistor	Carbon 600 Ohm 1/3 Watt	.19
27	11128	Speaker	P. M. Dynamic 5 in.	4.00
28	11132	Volume Control	With D.P.S.T. Switch	.80

MISCELLANEOUS PARTS

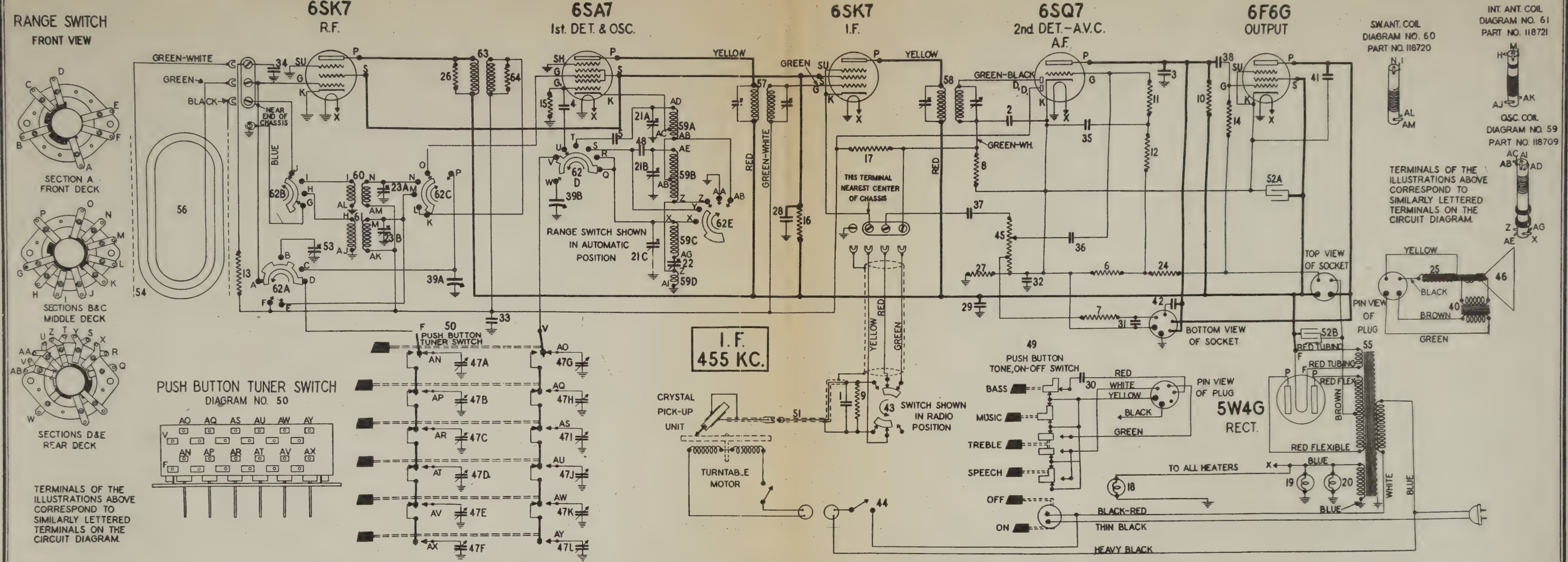
Illus. No.	Part No.		Description	List Price
	11108	Bulb	2 Cell 2.2. Volt White Bead Type	.07
	11961	Dial Scale	Calibrated Dial Scale	.25
	8184	Dial Cord	24 in. of 18 lb. Drive Cord	.15
	11017	Dial Shaft	Drive Shaft	.11
	11956	Dial Indicator	Off-On Indicator	.15
	11626	Dial Pointer	Needle	.30
	11963	Dial Crystal	Escutcheon	.75
	8301	Dial Screws	Phillips R.H. No. 2 x 1/4 for Mounting Dial	3.00M Net
	4978	Plug	4 Prong Battery Plug	.10
	10207	Knob	Antique Ivory	.08
	11733	Knob	Walnut	.10

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

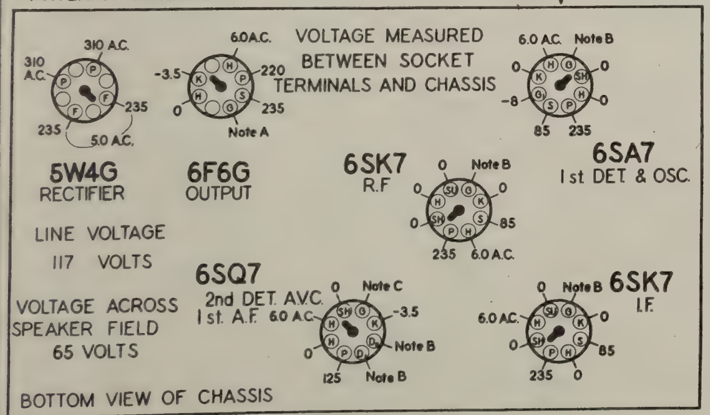
4-40 PART NO. 210B

STEWART-WARNER CORP.

MODEL 01-6F9
Chassis 01-6F



SOCKET VOLTAGES



REAR OF CHASSIS

NOTE A: The bias on the control grid of the 6F6G tube is —16 volts measured across resistors No. 6 and 24.

NOTE B: The bias on control grids of the 6SK7 R.F., 6SK7 I.F., 6SA7 1st Det. tubes and the diode plates of the 6SQ7 tube, is —3.5 volts measured across resistor No. 27.

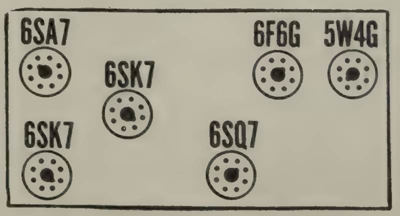
NOTE C: The bias on the control grid of the 6SQ7 tube is —1.5 volts measured across resistor No. 6.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL PARTS LIST

Diagram Number	Part Number	Description	List Price
1	81156	Condenser—mica—.001 mfd.	$0.30
2-3	83539	Condenser—mica 260 mmfd.	.20
4	85061	Condenser—mica 51 mmfd.	.15
5	85440	Condenser—mica .00351 mfd. 3%	.40
6	88465	Resistor—wire wound 25 ohms—½ watt	.15
7	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
8-9-10	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
11-12	110554	Resistor—carbon 1 megohm ¼ watt	.12
13-14	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
15	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
16	110575	Resistor—carbon 12,000 ohms 2 watts	.30
17	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
18	110629	Lamp—6.3 volt—.25 amps	.15
19-20	112636	Lamp—dial (frosted) 6-8 volt—.25 amp.	.25
21A-21B-21C	113319	Condenser—trimmer—(3 section)	.54
22	113346	Condenser—padding	.38
23A-23B	114937	Condenser—2 section trimmer	.40
24	114970	Resistor—wire wound 240 ohms 1 watt	.15
25	U-115061	Speaker—electro dynamic 12"	10.50
26	116053	Resistor—carbon 68,000 ohms 1/10 watt	.12
27	116077	Resistor—carbon 150 ohms ¼ watt 10%	$0.12
28-29	116625	Condenser—.1 mfd. 600 volt	.25
30-31	116640	Condenser—.01 mfd. 600 volt	.15
32	116706	Condenser—.2 mfd. 600 volt	.35
33-34-35	116819	Condenser—.05 mfd. 600 volt	.20
36-37-38	116893	Condenser—.02 mfd. 600 volt	.15
39A-39B	116996	Condenser—variable gang	3.30
40	U-117004	Transformer—output for U-115061 speaker	2.50
41-42	117022	Condenser—.002 mfd. 600 volt	.15
43	117067	Switch (radio phono)	.55
44	117068	Switch for phono motor	.60
45	117069	Volume control	.85
46	U-117071	Cone and voice coil assembly for U-115061 speaker	2.30
47A to 47L	117081	Push button trimmer gang condenser assembly	5.20
48	117113	Condenser—mica .00176 mfd.	.30
49	117115	Switch—push button for tone control etc.	2.30
50	117126	Switch—push button for tuning	2.40
51	117127	Cable (phono pickup)	.40
52A-52B	118421	Condenser—electrolytic 10-15 mfd. 450 volts	1.50
53	118431	Condenser—trimmer	$0.22
54	118475	Shield for loop antenna	1.00
55	118498	Power transformer	5.00
56	118696	Loop antenna assembly complete	2.75
57	118707	Transformer—1st I.F.	1.20
58	118708	Transformer—2nd I.F.	1.20
59A to 59D	118709	Coil—complete oscillator assembly	1.00
60	118720	Coil—short wave antenna	.50
61	118721	Coil—police antenna	.40
62A to 62E	118725	Range switch	2.10
63	118727	Transformer—R.F.	1.00
64	118801	Resistor—10,000 ohms 1/10 watt	.12

TUBE LOCATIONS



Rear of Chassis

MODEL 01-6F9
Chassis 01-6F

STEWART-WARNER CORP.

HINTS ON REMOVING AND REPLACING CHASSIS

The suggestions given here will facilitate the servicing of this receiver. To remove the chassis for service purposes, proceed as follows:

1. Pull off the volume control and range switch knobs at front of cabinet. Pull off tuning knob on top of cabinet. Take care not to lose the paper washers underneath the knobs.
2. Pull off the shaft extension on the tuning shaft.
3. Using a 5/16" socket wrench, remove the three screws holding down the chassis. Two of these screws are located in recesses in the wooden blocks at the sides of the chassis. The third one is located near the bottom of the receiver chassis at the front of the cabinet. The chassis then rests only on the rubber bushings which are on top of the three mounting blocks.
4. Slide chassis off blocks. The chassis will now drop down enough to permit placing it on a box or other support so it can be serviced without the necessity of removing any wires or cables.

When removing a chassis, put a few drops of speaker cement on each of the three rubber bushings and put them in their proper places on top of the mounting blocks. This will facilitate the replacement of the chassis, as the rubber bushings will be held in place by the cement.

If it becomes necessary to remove the chassis completely from the cabinet, in addition to the items mentioned, the following procedure must also be used:

a. Remove the five wood screws holding the wooden panel at the front of the record changer compartment. This panel will then lift out, exposing to view the tone control switch, on-off switches for both motor and receiver, radio-phono switch, and the pilot light.
b. Disconnect the green, red, and yellow leads from the terminals on the chassis. Also disconnect the shield covering these wires. Remove the speaker and tone control plugs from their respective sockets. Remove the wood screw mounting the pilot light bracket.
c. Disconnect the wires coming from the loop antenna.
d. Remove the wood screws holding the entire switch assembly. The thin black wire and the black and red wire can now be unsoldered from the on-off switch. Note to which terminal of the switch each wire goes, so that they can be replaced properly. Also remove the heavy black wire extending from the receiver chassis to the motor on-off switch. If one wishes to cut and splice these three wires steps "a" and "c" may be omitted. The chassis can now be removed from the cabinet.
e. When replacing either the tone control switch or the chassis into the cabinet, difficulty may be experienced because the push buttons will spring inwards. This slight difficulty can be overcome by lightly wedging a toothpick or other fairly soft material between each push button and the escutcheon to hold the buttons out.

LOOP CONNECTIONS

BUILT-IN ANTENNA: The loop forms the antenna coil for the broadcast position and must therefore be connected at all times. The loop shield should be grounded in the broadcast position by connecting the blue wire coming from the terminal strip to the terminal provided on the chassis. On the intermediate and short wave positions the shield serves as the antenna.

EXTERNAL ANTENNA: When an external antenna is to be used, connect it to the screw nearest the end of the chassis on the antenna terminal strip. The black wire should remain connected to this same screw at all times.

When the external antenna is to be used on all bands, disconnect the blue wire from the chassis and tape it.

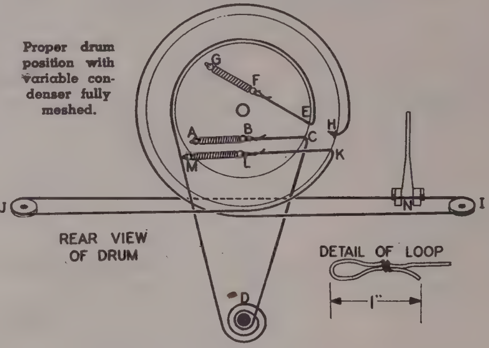
When you wish to use the built-in antenna on broadcast and the external antenna on the intermediate and short wave positions, connect the blue wire to the chassis.

SETTING THE DIAL POINTER

Since the dial scale is printed on the escutcheon glass, the serviceman will not know whether the pointer is set correctly unless the set is in place in the cabinet. With the gang condenser in full mesh, the dial pointer should be at a point 1⅜ inches from the left end of the brown dial plate. If the pointer is not set correctly, loosen the two set screws holding the dial drum to the condenser shaft. Then hold the condenser in full mesh and move the dial drum until the pointer reaches the proper point, then tighten the set screws.

When replacing the chassis in the cabinet, be sure it is in the position giving most accurate dial calibration.

REPLACING THE DRIVE CORDS



TO REPLACE THE DIAL DRIVE CORD

1. 19¾ inches of dial drive cord (Part No. 117057) are required. Make a one-inch loop in each end of this cord, using a dial cord clip, (Part No. 114955) (See sketch above for detail of loop).
2. Fasten a tension spring (Part No. 113177) to tab A and fasten one end of the cord to the spring at point B.
3. Pass the other end of the dial cord through hole C in the inner drum.
4. Make two and a half turns of the cord about tuning shaft D.
5. Continue the cord clockwise about the inner drum and pass it through hole E.
6. Fasten a tension spring, (Part No. 113177) to the other loop of the cord at point F and fasten the spring to the tab G.

TO REPLACE THE POINTER DRIVE CORD

1. 37" of pointer drive cord, (Part No. 116948) are required. Fasten an eyelet (Part No. 88348) at a point one-half inch from one end of this cord.
2. Fashion a one-inch loop at the other end of the pointer cord, (see detail of loop in illustration), using a dial cord clip (Part No. 114955).
3. Pass the loop end of the cord outward through hole H in the larger drum.
4. Continue the cord counter-clockwise around the larger drum and around the rear of pulley I.
5. Go from pulley I around the front of pulley J and counter-clockwise around the larger drum to hole K.
6. Pass the loop through hole K and fasten it to one end of a tension spring (Part No. 113177) at point L, the other end of the spring being fastened to point M.
7. Clip the dial pointer to the cord. With the drum in the position shown, and with the gang condenser in full mesh, fasten the pointer so that it is at a point 1⅜" from the left end of the brown dial plate.

FOR AUTOMATIC RECORD CHANGER, SEE VOLUME XI, PAGES 11-9, 11-10, 11-11

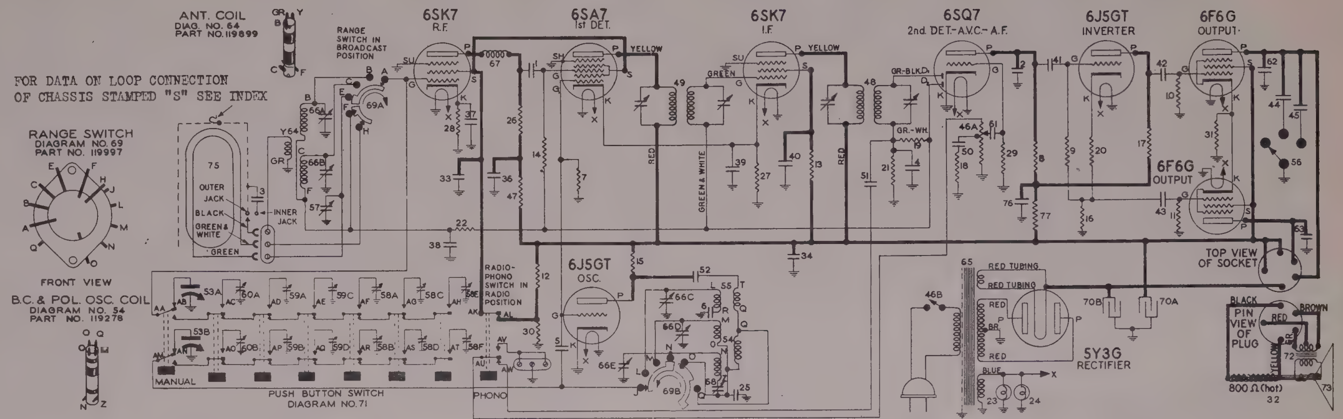
MISCELLANEOUS PARTS

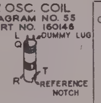
Part Number	Description	List Price
117117	Cable—motor	$0.38
118747	Call tabs and instructions	.45
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive (supplied in 2 ft. lengths)	.15
117028	Dial plate & pulley assembly	1.00
118712	Dial scale & escutcheon	1.65
117029	Drive drum & bushing	.50
116998	Escutcheon for push buttons	.30
88348	Eyelet—for dial cord	Per Dz. .05
117131	Indicator button (bulls eye)	.12
116773	Knob—tuning or volume	.10
117586	Light shield	.12
84571	Needle cup for phono	.10
116952	Pin for push buttons	.02
117114	Plug (male for motor cable)	.15
117036	Pointer assembly	.28
116999	Push buttons	.08
116970	Record changer unit	44.95
117019	Reflector—for pilot lights	.04
81145	Retaining ring—for drive shaft	Per C $0.50
113463	Rubber bushing—chassis mtg.	.03
83624	Screw—self tapping 8 x ¼	.01
85040	Screw—No. 6 Hex. Hd.	Per C .35
85827	Set Screw—8-32 Square Head	.02
113191	Screw—special No. 8-32 x 1⅛	.01
114914	Screw—special head—for mtg.	Per Dz. .15
81834	Socket—6 prong	.10
110501	Socket—4 prong (for speaker)	.16
116690	Socket—small octal base	.12
114117	Socket—dial lamp	.18
117123	Socket—for pilot light	.26
111090	Spacer—steel, mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
116981	Spring—for pointer	.02
117458	Spring—for push buttons	.05
84412	Terminal strip—phono	.03
117103	Tuning shaft	.06
117102	Tuning shaft extension	.10
111456	Washer—spring washers	Per C .50
116530	Washer (paper) for back of knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORP. 11-9B1-Z to 11-9B9-Z
Chassis 11-9B, 11-9B-Z
MODELS 11-9B1 to 11-9B9

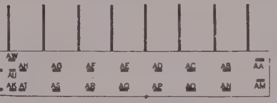
FOR DATA ON LOOP CONNECTION OF CHASSIS STAMPED "S" SEE INDEX




S.W. OSC. COIL
DIAGRAM NO. 55
PART NO. 160146

PUSH BUTTON TRIMMER RANGES

TRIMMER CONDENSERS	11-9B RANGE	11-9B-Z RANGE
58E & 58F	540 to 1000 KC.	540 to 1000 KC.
58C & 58D	540 to 1000 KC.	540 to 1000 KC.
58A & 58B	540 to 1000 KC.	750 to 1375 KC.
59C & 59D	750 to 1375 KC.	750 to 1375 KC.
59A & 59B	750 to 1375 KC.	980 to 1550 KC.
60A & 60B	980 to 1550 KC.	990 to 1550 KC.


PUSH BUTTON SWITCH
PART NO. 119288

LETTERED POINTS ON PICTORIAL VIEWS CORRESPOND TO IDENTICAL POINTS ON THE CIRCUIT DIAGRAM.

NOTE
RESISTOR 26 AND COND. 36 ARE OMITTED ON CHASSIS STAMPED "S". RESISTOR 47 CONNECTS DIRECTLY TO COIL 67.

I.F. 455 KC

FOR OTHER DATA SEE INDEX

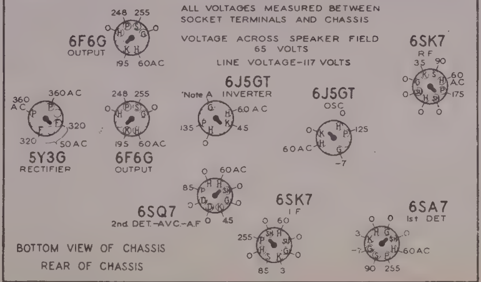
SOCKET VOLTAGES

RADIO-PHONO SWITCH IN RADIO POSITION
VOLUME ON FULL WITH NO SIGNAL
DIAL TUNED TO 540 KC.

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS

LINE VOLTAGE-117 VOLTS



BOTTOM VIEW OF CHASSIS
REAR OF CHASSIS

USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT.
NOTE A: The bias on the 6J5GT inverter grid is —.5 volts measured across resistor No. 20.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3-4	83783	Condenser—mica, 110 mmfd.	.20
5	85061	Condenser—mica, 51 mmfd.	.15
6	88587	Condenser—mica .0042 mfd.	.35
7	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
8	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
9 to 11	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
12	110561	Resistor—carbon 15,000 ohms 2 watts	.30
13-14	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
15 to 17	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
18	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
19	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
20	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
21-22	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
23-24	112636	Lamp—6.3 volt -.25 amps (frosted)	.25
25	112426	Condenser—mica 1650 mmfd.	.30
26	112952	Resistor—carbon 3,300 ohms ¼ watt (see note above)	.10
27	112974	Resistor—carbon 220 ohms ¼ watt	.15
28	112978	Resistor—insulated 470 ohms ¼ watt (used only in chassis not stamped with letter)	.12
	110556	Resistor—330 ohms ¼ watt (used only on chassis stamped "S")	.12
29	112975	Resistor—carbon 10 meg. ¼ watt	.12
30	112997	Resistor—carbon 22,000 ohms 1 watt	.15
31	114334	Resistor—wire wound 360 ohms 2 watts	.20
32	M-115110	Speaker—Dynamic—12" (11-9B8 only)	14.00
	M-115111	Speaker—Dynamic—10" (11-9B6 only)	8.60
	M-115118	Speaker—Dynamic—12" (11-9B7 only)	14.00
33 to 35	116625	Condenser—.1 mfd 600 volt	.25
36	116819	Condenser—.05 mfd. 600 volt (see note at left)	.20
37 to 40	116819	Condenser—.05 mfd. 600 volt	.20
41 to 44	116893	Condenser—.02 mfd. 600 volt	.15
45	118487	Condenser—.07 mfd. 600 volts	.25
46A-46B	118669	Volume control—1 meg. (with switch)	1.40
47	118805	Resistor—carbon 10,000 ohms 1 watt	.12
48	119024	Transformer—2nd I.F	1.15
49	119042	Transformer—1st I.F.	1.10
50	116893	Condenser—.02 mfd. 600 volt	.15
51-52	119193	Condenser—.01 mfd. 600 volt	.15
53A-53B	119291	Condenser—variable tuning	2.75
54	119278	Coil—B.C. & Police Oscillator	.60
55	160146	Coil—Short Wave Osc.	.58
56	119289	Switch—tone	.60
57	119345	Condenser—trimmer for loop	.20
58A to 60B	119753	Trimmer—for P.B. trimmers (low freq.) (see table)	.24
	119663	Trimmer for P.B. trimmers (med. freq.) (see table)	.24
	119664	Trimmer for P.B. trimmers (high freq.) (see table)	.24
61 to 63	119817	Condenser—.004 mfd. 600 volt	.15
64	119899	Coil—antenna	.18
65	119900	Transformer—power (50-60 cycle)	4.80
	160460	Transformer—power (25 cycle)	6.90
66A to 66E	119902	Trimmer condenser—five sections	.75
67	119903	Coil—compensating	.12
68	119934	Condenser—padder	.36
69A-69B	119997	Range switch	1.10
70A-70B	160008	Condenser—electrolytic 15-30 mfd. 450 volt	1.50
71	119288	Switch—push button	2.50
72	M-160464	Transformer—output (11-9B8)	1.60
	M-160427	Transformer—output (11-9B6)	1.80
	M-160462	Transformer—output (11-9B7)	1.80
73	M-160465	Cone & Voice coil (11-9B8)	1.60
	M-160428	Cone & Voice coil (11-9B6)	1.80
	M-160463	Cone & Voice coil (11-9B7)	1.80
75	160157	Loop antenna (complete) (used on chassis not stamped with letter)	3.60
	161290	Loop antenna (complete) (used only on chassis stamped "S")	3.60
76	116706	Condenser—.2 mfd. 600 volt	.35
77	110565	Resistor—22,000 ohms ¼ watt	.12

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground through a .1 mfd. condenser. The connection will depend on the type of meter. (The more sensitive type should be connected across the voice coil.)

Connect the ground lead of the signal generator to the receiver chassis. Disconnect the blue wire coming from the antenna terminal strip and allow it to float free of the chassis. The loop wires should be connected to the terminal strip as shown in the circuit diagram when aligning.

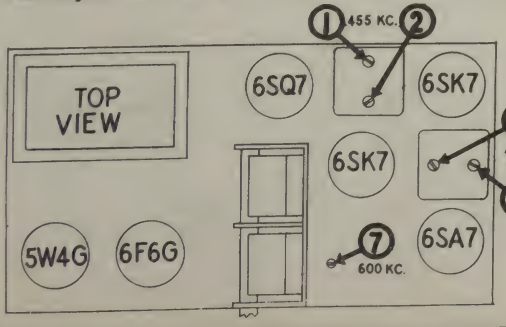
On the phonograph terminal strip, ground the terminal nearest the center of chassis. Connect the two remaining terminals together, using a short piece of wire.

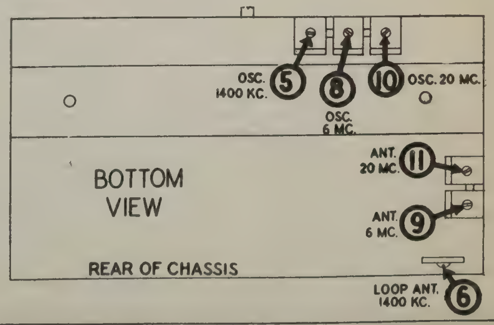
Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

With the gang condenser in full mesh; set the pointer at a point 1⅜" from the left flange of the brown dial plate. This point corresponds to the last mark on the low frequency end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screws on the dial drive drum and push the gang condenser in full mesh with the pointer set properly, then retighten the set screws. See paragraph on "Setting the Dial Pointer".

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Dial Pointer Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Stator of front gang condenser	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I. F.	Adjust for Maximum Output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Black loop wire on terminal strip	1400 KC	Broadcast	1400 KC (2⅛" from right Dial Plate End)	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Black loop wire on terminal strip	1400 KC	Broadcast	Tune to 1400 KC Generator Signal	6	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Black loop wire on terminal strip	600 KC	Broadcast	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until Maximum output is obtained.
400 OHM Carbon Resistor	Black loop wire on terminal strip	6.0 MC	Intermediate	6.0 MC (2⅜" from Right Dial Plate Flange)	8	Intermediate Oscillator	Adjust for Maximum Output. Check to see if proper peak was obtained by tuning in image at approx. 5.1 MC. If image does not appear, realign at 6 MC with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Black loop wire on terminal strip	6.0 MC	Intermediate	Tune to 6.0 MC Generator Signal	9	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Black loop wire on terminal strip	20 MC	Foreign	20 MC (2⅛" from Right Dial Plate End)	10	Foreign Oscillator	Adjust for Maximum Output. Check to see if proper peak was obtained by tuning in image at approx. 19.1 MC. If image does not appear, realign at 20 MC with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Black loop wire on terminal strip	20 MC	Foreign	Tune to 20 MC Generator Signal	11	Foreign Antenna	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

After replacing the set in the cabinet, connect the blue wire coming from the terminal strip to the screw adjacent to this strip, tune in a weak signal near 1400 KC, and adjust trimmer No. 6 for maximum output.





HINTS ON REMOVING AND REPLACING CHASSIS

The suggestions given here will facilitate the servicing of this receiver. To remove the chassis for service purposes, proceed as follows:

1. Pull off the volume control and range switch knobs at front of cabinet. Pull off tuning knob on top of cabinet. Take care not to lose the paper washers underneath the knobs.
2. Pull off the shaft extension on the tuning shaft.
3. Using a 5/16" socket wrench, remove the three screws holding down the chassis. Two of these screws are located in recesses in the wooden blocks at the sides of the chassis. The third one is located near the bottom of the receiver chassis at the front of the cabinet. The chassis then rests only on the rubber bushings which are on top of the three mounting blocks.
4. Slide chassis off blocks. The chassis will now drop down enough to permit placing it on a box or other support so it can be serviced without the necessity of removing any wires or cables.

When removing a chassis, put a few drops of speaker cement on each of the three rubber bushings and put them in their proper places on top of the mounting blocks. This will facilitate the replacement of the chassis, as the rubber bushings will be held in place by the cement.

If it becomes necessary to remove the chassis completely from the cabinet, in addition to the items mentioned, the following procedure must also be used:

a. Remove the five wood screws holding the wooden panel at the front of the record changer compartment. This panel will then lift out, exposing to view the tone control switch, on-off switches for both motor and receiver, radio-phono switch, and the pilot light.
b. Disconnect the green, red, and yellow leads from the terminals on the chassis. Also disconnect the shield covering these wires. Remove the speaker and tone control plugs from their respective sockets. Remove the wood screw mounting the pilot light bracket.
c. Disconnect the wires coming from the loop antenna.
d. Remove the wood screws holding the entire switch assembly. The thin black wire and the black and red wire can now be unsoldered from the on-off switch. Note to which terminal of the switch each wire goes, so that they can be replaced properly. Also remove the heavy black wire extending from the receiver chassis to the motor on-off switch. If one wishes to cut and splice these three wires steps "a" and "c" may be omitted. The chassis can now be removed from the cabinet.
e. When replacing either the tone control switch or the chassis into the cabinet, difficulty may be experienced because the push buttons will spring inwards. This slight difficulty can be overcome by lightly wedging a toothpick or other fairly soft material between each push button and the escutcheon to hold the buttons out.

LOOP CONNECTIONS

BUILT-IN ANTENNA: The loop forms the antenna coil for the broadcast position and must therefore be connected at all times. The loop shield should be grounded in the broadcast position by connecting the blue wire coming from the terminal strip to the terminal provided on the chassis. On the intermediate and short wave positions the shield serves as the antenna.

EXTERNAL ANTENNA: When an external antenna is to be used, connect it to the screw nearest the end of the chassis on the antenna terminal strip. The black wire should remain connected to this same screw at all times.

When the external antenna is to be used on all bands, disconnect the blue wire from the chassis and tape it.

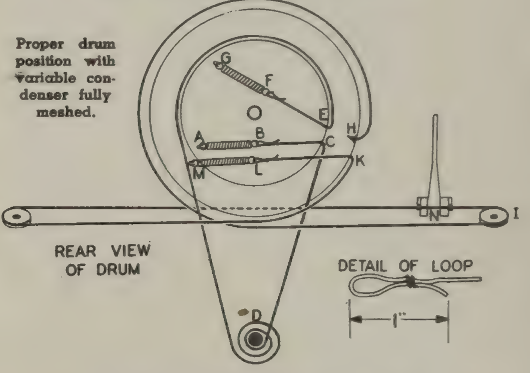
When you wish to use the built-in antenna on broadcast and the external antenna on the intermediate and short wave positions, connect the blue wire to the chassis.

SETTING THE DIAL POINTER

Since the dial scale is printed on the escutcheon glass, the serviceman will not know whether the pointer is set correctly unless the set is in place in the cabinet. With the gang condenser in full mesh, the dial pointer should be at a point 1⅜ inches from the left end of the brown dial plate. If the pointer is not set correctly, loosen the two set screws holding the dial drum to the condenser shaft. Then hold the condenser in full mesh and move the dial drum until the pointer reaches the proper point, then tighten the set screws.

When replacing the chassis in the cabinet, be sure it is in the position giving most accurate dial calibration.

REPLACING THE DRIVE CORDS



TO REPLACE THE DIAL DRIVE CORD

1. 19¾ inches of dial drive cord (Part No. 117057) are required. Make a one-inch loop in each end of this cord, using a dial cord clip, (Part No. 114955) (See sketch above for detail of loop).
2. Fasten a tension spring (Part No. 113177) to tab A and fasten one end of the cord to the spring at point B.
3. Pass the other end of the dial cord through hole C in the inner drum.
4. Make two and a half turns of the cord about tuning shaft D.
5. Continue the cord clockwise about the inner drum and pass it through hole E.
6. Fasten a tension spring, (Part No. 113177) to the other loop of the cord at point F and fasten the spring to the tab G.

TO REPLACE THE POINTER DRIVE CORD

1. 37" of pointer drive cord, (Part No. 116948) are required. Fasten an eyelet (Part No. 88348) at a point one-half inch from one end of this cord.
2. Fashion a one-inch loop at the other end of the pointer cord, (see detail of loop in illustration), using a dial cord clip (Part No. 114955).
3. Pass the loop end of the cord outward through hole H in the larger drum.
4. Continue the cord counter-clockwise around the larger drum and around the rear of pulley I.
5. Go from pulley I around the front of pulley J and counter-clockwise around the larger drum to hole K.
6. Pass the loop through hole K and fasten it to one end of a tension spring (Part No. 113177) at point L, the other end of the spring being fastened to point M.
7. Clip the dial pointer to the cord. With the drum in the position shown, and with the gang condenser in full mesh, fasten the pointer so that it is at a point 1⅜" from the left end of the brown dial plate.

FOR AUTOMATIC RECORD CHANGER, SEE VOLUME XI, PAGES 11-9, 11-10, 11-11

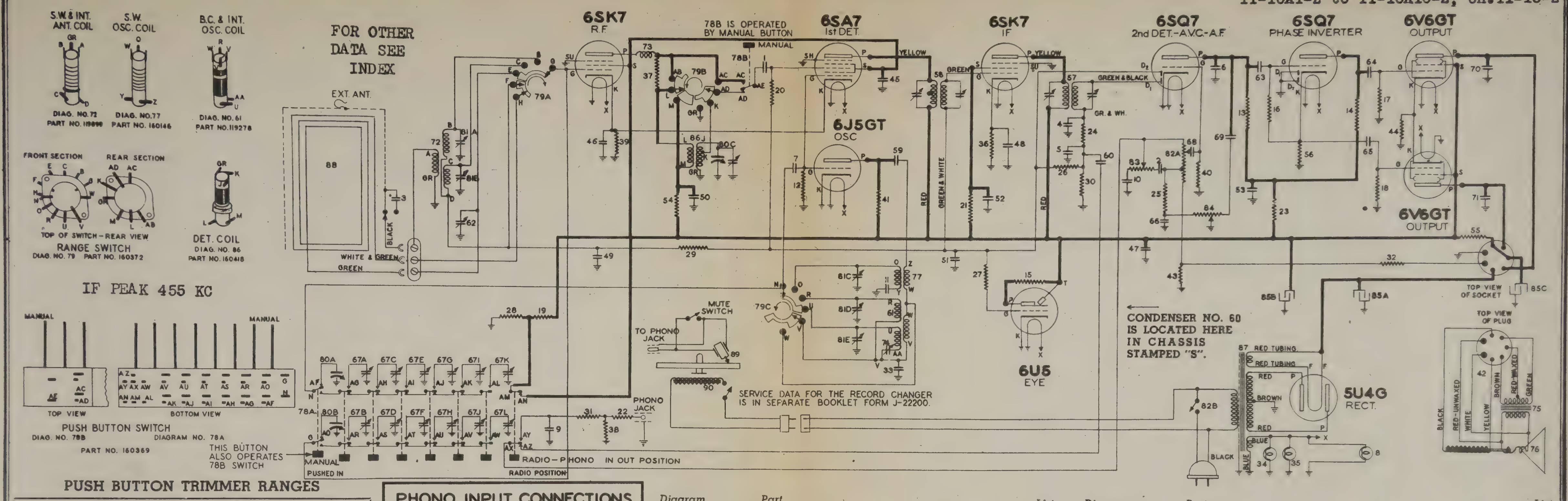
MISCELLANEOUS PARTS

Part Number	Description	List Price
117117	Cable—motor	$0.38
118747	Call tabs and instructions	.45
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
117057	Cord—drive (supplied in 2 ft. lengths)	.15
117028	Dial plate & pulley assembly	1.00
118712	Dial scale & escutcheon	1.65
117029	Drive drum & bushing	.50
116998	Escutcheon for push buttons	.30
88348	Eyelet—for dial cord ... Per Dz.	.05
117131	Indicator button (bulls eye)	.12
116773	Knob—tuning or volume	.10
117586	Light shield	.12
84571	Needle cup for phono	.10
116952	Pin for push buttons	.02
117114	Plug (male for motor cable)	.15
117036	Pointer assembly	.28
116999	Push buttons	.08
116970	Record changer unit	44.95
117019	Reflector for pilot lights	.04
81145	Retaining ring—for drive shaft ... Per C	$0.50
113463	Rubber bushing—chassis mtg.	.03
83624	Screw—self tapping 8 x ¼	.01
85040	Screw—No. 6 Hex. Hd. ... Per C	.35
85827	Set Screw—8-32 Square Head	.02
113191	Screw—special No. 8-32 x 1⅛	.01
114914	Screw—special head—for mtg. ... Per Dz.	.15
81834	Socket—6 prong	.10
110501	Socket—4 prong (for speaker)	.16
116690	Socket—small octal base	.12
114117	Socket—dial lamp	.18
117123	Socket—for pilot light	.26
111090	Spacer—steel, mechanism mtg. to chassis	.02
113177	Spring—dial cord tension	.09
116981	Spring—for pointer	.02
117458	Spring—for push buttons	.05
84412	Terminal strip—phono	.03
117103	Tuning shaft	.06
117102	Tuning shaft extension	.10
111456	Washer—spring washers ... Per C	.50
116530	Washer (paper) for back of knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORP.

MODELS 11-10A1 to 11-10A10, Ch.11-10A
11-10A1-Z to 11-10A10-Z, Ch.11-10-Z



FOR OTHER DATA SEE INDEX

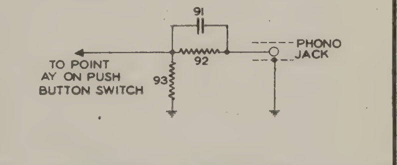
IF PEAK 455 KC

CONDENSER NO. 60 IS LOCATED HERE IN CHASSIS STAMPED "S".

PUSH BUTTON TRIMMER RANGES

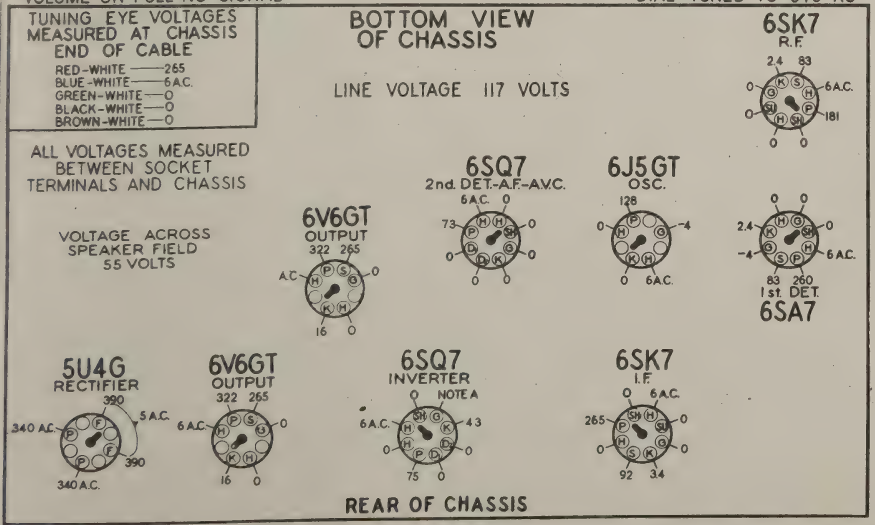
TRIMMER CONDENSERS	11-10A RANGE	11-10A-Z RANGE
67L & 67K	540 KC. to 1000 KC.	540 KC. to 1000 KC.
67J & 67I	540 KC. to 1000 KC.	540 KC. to 1000 KC.
67H & 67G	540 KC. to 1000 KC.	750 KC. to 1375 KC.
67F & 67E	750 KC. to 1375 KC.	750 KC. to 1375 KC.
67D & 67C	750 KC. to 1375 KC.	980 KC. to 1550 KC.
67B & 67A	980 KC. to 1550 KC.	980 KC. to 1550 KC.

PHONO INPUT CONNECTIONS FOR CHASSIS STAMPED "S"



VOLUME ON FULL NO SIGNAL

DIAL TUNED TO 540 KC



TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE

RED-WHITE—265
BLUE-WHITE—6 A.C.
GREEN-WHITE—0
BLACK-WHITE—0
BROWN-WHITE—0

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

VOLTAGE ACROSS SPEAKER FIELD 55 VOLTS

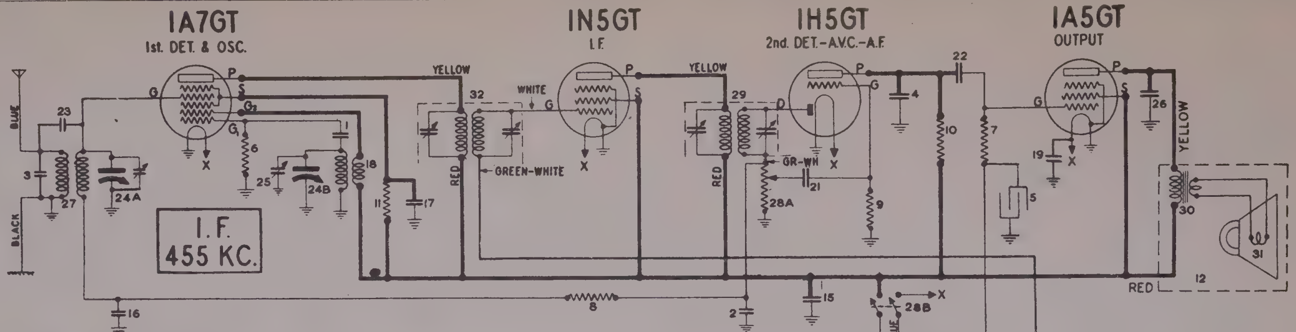
USE A VOLTMETER OF 1000 OHMS PER VOLT.
NOTE A: The grid of the 6SQ7 inverter tube is at a positive potential with respect to chassis.

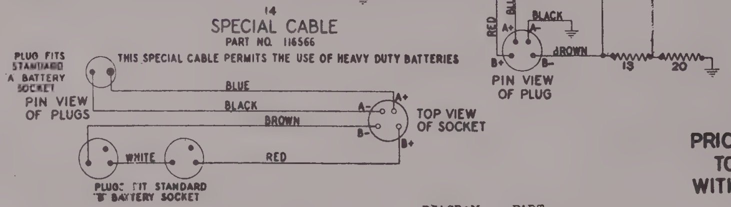
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

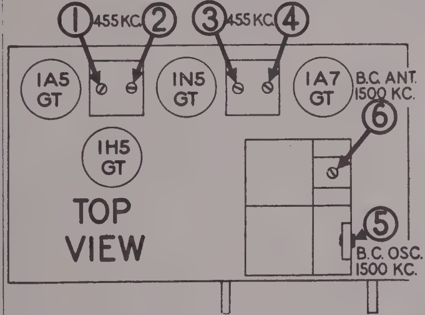
Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$ .20
3 to 6	83783	Condenser—mica 110 mmfd.	.20
7	85061	Condenser—mica, 51 mmfd.	15
8	85296	Lamp—turntable light 6 to 8 volt (Mazda 51)	16
9-10	85394	Condenser—mica 510 mmfd.	.25
11	88587	Condenser—mica .0042 mfd.	.35
12	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
13-14	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
15	110554	Resistor—carbon—1 meg. ¼ watt	.12
16-17-18	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
19	110561	Resistor—carbon 15,000 ohms 2 watts	.30
20 to 23	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
24-25	110566	Resistor—carbon 33,000 ohms ¼ watt	.12
26-27	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
28	110575	Resistor—carbon 12,000 ohms 2 watts	.30
29-30-31	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
32	110588	Resistor—carbon 6,800 ohms ¼ watt	.12
33	112426	Condenser—mica 1,650 mmfd.	.30
34-35	112636	Lamp—dial (frosted) 6-8 volt .25 amp.	.25
36	112951	Resistor—carbon 400 ohms ¼ watt	.12
37	112952	Resistor—carbon 3,300 ohms ¼ watt	.10
38	112962	Resistor—carbon 150,000 ohms ¼ watt	.12
39	112974	Resistor—carbon 220 ohms ¼ watt	.15
40	112975	Resistor—carbon 10 meg. ¼ watt	.12
41	112997	Resistor—carbon 22,000 ohms 1 watt	.15
42	M-115113	Speaker—dynamic 12"	10.00
43	116062	Resistor—carbon 150 ohms ¼ watt	.12
44	116094	Resistor—220 ohms 2 watts—wire wound	.20
45 to 48	116625	Condenser—.1 mfd. 600 volt	.25
49 to 53	116819	Condenser—.05 mfd. 600 volt	.20
54	118805	Resistor—carbon 10,000 ohms 1 watt	.12
55	118821	Resistor—carbon 1,500 ohms 2 watts	.25
56	118825	Resistor—carbon 180,000 ohms ¼ watt	.12
57	119024	Transformer—2nd I. F.	1.15
58	119042	Transformer—1st I. F.	1.10
59	119193	Condenser—.01 mfd. 600 volt	.15
60	119193 119875	Condenser—.01 mfd. 600 volt Condenser—.002 mfd. 600 volt (used only on chassis stamped "S")	15 .15
61	119278	Coil—B. C. & Intermediate oscillator	.60
62	119345	Condenser—trimmer	.20
63	119414 119193	Condenser—.02 mfd. 600 volt Condenser—.01 mfd. 600 volt (used only on chassis stamped "S")	.15 .15
64-65	119414	Condenser—.02 mfd. 600 volt	.15
66	119416	Condenser—.008 mfd. 600 volt	.15
67A to 67L	119662 119663 119664	Condenser—P.B. trimmers (low freq.) Condenser—P.B. trimmers (med. freq.) Condenser—P.B. trimmers (high freq.)	.24 .24 .24
68	119817 119875	Condenser—.004 mfd. 600 volt Condenser—.002 mfd. 600 volt (used only on chassis stamped "S")	.15 .15
69	119817	Condenser—.004 mfd. 600 volt	.15
70-71	119875 160430	Condenser—.002 mfd. 600 volt Condenser—.001 mfd. 600 volt (used only on chassis stamped "S")	.15 .15
72	119899	Coil—intermediate and S. W. antenna	.70
73	119903	Coil—compensating	.18
74	119934	Condenser—padder	.36
75	M-160132	Transformer—output for M-115113 speaker	2.00
76	M-160133	Cone & Voice coil for M-115113 speaker	1.75
77	160146	Coil—S. W. Oscillator	.58
78A-78B	160369	Switch—push button	3.00
79A to 79C	160372	Switch—range	1.50
80A to 80C	160373	Condenser—variable tuning	3.20
81A to 81E	160406	Condenser—trimmer (5 section)	.70
82A-82B	160412	Volume control—2 meg. (with switch)	1.40
83	160413	Tone control (treble) 5 meg.	.85
84	160414	Tone control (bass) 1 meg.	.95
85A to 85C	160417	Condenser—electrolytic A (20 mfd.), B (15 mfd.), C (5 mfd.) 450 W. V.	2.00
86	160418	Det. Coil	.90
87	160420	Transformer—power (50-60 cycle)	7.00
88	160568	Loop antenna complete	3.70
89	161289	Crystal cartridge	5.00
90	160086	Motor—60 cycle, phono (See separate manual)	5.95
91	83539	Condenser—mica 260 mmfd.	.20
92	110554	Resistor—carbon 1 meg. ¼ watt	.12
93	110564	Resistor—carbon 100,000 ohms ¼ watt	.12

MODEL 12-4D1
Chassis 12-4D

STEWART-WARNER CORP.



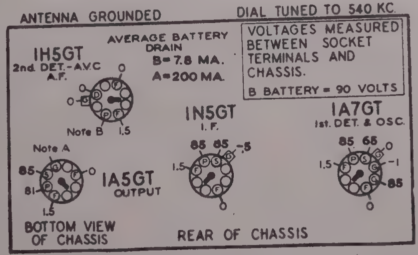

14
SPECIAL CABLE
PART NO. 116566
THIS SPECIAL CABLE PERMITS THE USE OF HEAVY DUTY BATTERIES
PLUG FITS STANDARD 'A' BATTERY SOCKET
PIN VIEW OF PLUGS
BLUE
BLACK
BROWN
WHITE
RED
A+
A-
B-
B+
TOP VIEW OF SOCKET
PLUG FIT STANDARD 'B' BATTERY SOCKET
28B
X
PIN VIEW OF PLUG
13
20



PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FOR ALIGNMENT SEE INDEX

SOCKET VOLTAGES



NOTE A: The bias for the control grid of the 1A5GT tube is -5 volts measured across resistors 13 & 20.

NOTE B: Due to the high resistance of plate resistor NO. 10 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmfd.	.20
3-4	85061	Condenser - mica 51 mmfd.	.15
5	110377	Condenser - elect. 10 mfd. 35V.	.80
6	110553	Resistor - carbon 220,000 ohms 1/4 watt	.12
7	110554	Resistor - carbon 1 meg. ¼ watt	.12
8-9	110580	Resistor - carbon 3.3 meg. ¼ W.	.12
10	110591	Resistor - carbon 680,000 ohms 1/4 watt	.12
11	112995	Resistor - carbon 15,000 ohms 1/4 watt	.12
12	M-115126	Speaker - P.M. (6")	5.50
13	116078	Resistor - 560 ohms 1/4 watt	.12
14	116566	Battery cable - for heavy duty batteries	.85
15	118206	Condenser - .25 mfd. 600 volt	.35
16-17	116819	Condenser - .05 mfd. 600 volt	.20
18	117741	Coil - oscillator	.35
19	118206	Condenser - .25 mfd. 150 volt	.35
20	118843	Resistor - carbon 47 ohms ¼ W.	.12
21	119817	Condenser - .004 mfd. 600 volt	.15
22	119193	Condenser - .01 mfd. 600 volt	.15
23	119466	Capacitor - wire (2 mmfd.)	.12
24A - 24B	119528	Condenser - tuning(with drum)	2.90
25	119719	Condenser - trimmer	.16
26	119875	Condenser - .002 mfd. 600 volt	.15
27	161323	Coil - antenna	1.00
28A - 28B	161325	Volume control-½ meg. with switch	1.50
29	161330	Transformer - 2nd I.F.	1.00
30	M-161332	Transformer - output for M-115126 speaker	.90
31	M-161334	Cone & Voice coil for M-115126 speaker	1.20
32	161340	Transformer - 1st I.F.	1.00

MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
116549	Cable - battery	.45
114955	Clamp - for dial cord	.01
112745	Clip - coil mounting	.01
113019	Clip - dial scale retaining	.01
117057	Cord - drive (supplied in 3 foot lengths)	.15
161333	Dial scale	.24
116411	Indicator lever assembly	.09
160219	Knob - push on	.06
88631	Plug - 4 prong, male	.06
119718	Pointer	.14
81145	Retaining ring - for tuning shaft----Per C	.50
116690	Socket - octal base	.12
113169	Spring - for indicator lever	.01
114968	Spring - dial cord tension	.03
161327	Tuning shaft	.18
111456	Washer - spring washer----Per C	.50
161328	Window - dial	.38

WESTERN AUTO SUPPLY CO.

MODEL D1042
Early and Issue A

SPECIFICATIONS

Power Consumption - 103 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 8 Watts Undistorted
9 Watts Maximum

Selectivity - 29.5 KC Broad at 1000 times Signal
(Sharp)

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - 12" Electro-Dynamic

Tuning Frequency Range

B Range .... 528 to 1730 KC
C Range ....2200 to 7000 KC
D Range ....7000 to 22000 KC

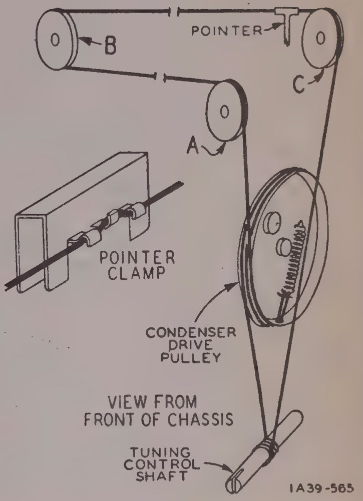
Sensitivity —External Antenna—(For 0.5 Watt output)

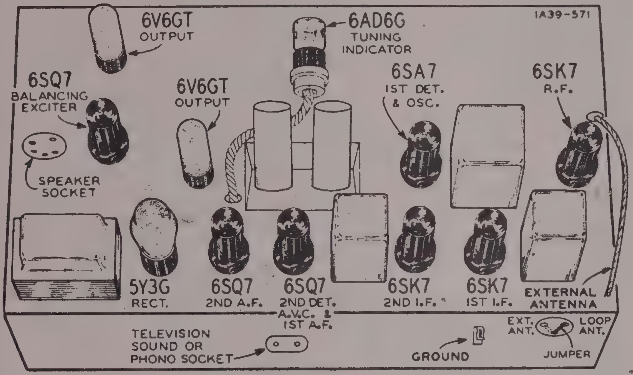
B Range .... 1.0 Microvolt Average
C Range .... 1.0 Microvolt Average
D Range .... 3.0 Microvolts Average

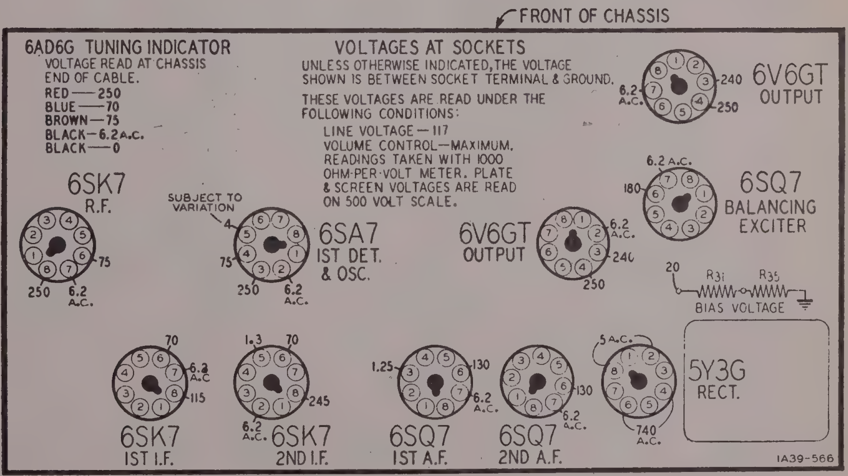
ISSUE A
MARCH 1940
SERIAL NO
575,001 UP

6 STATION BUTTONS
11 TUBES
3 BANDS

TRUETONE
CHROMATIC
CONTROL







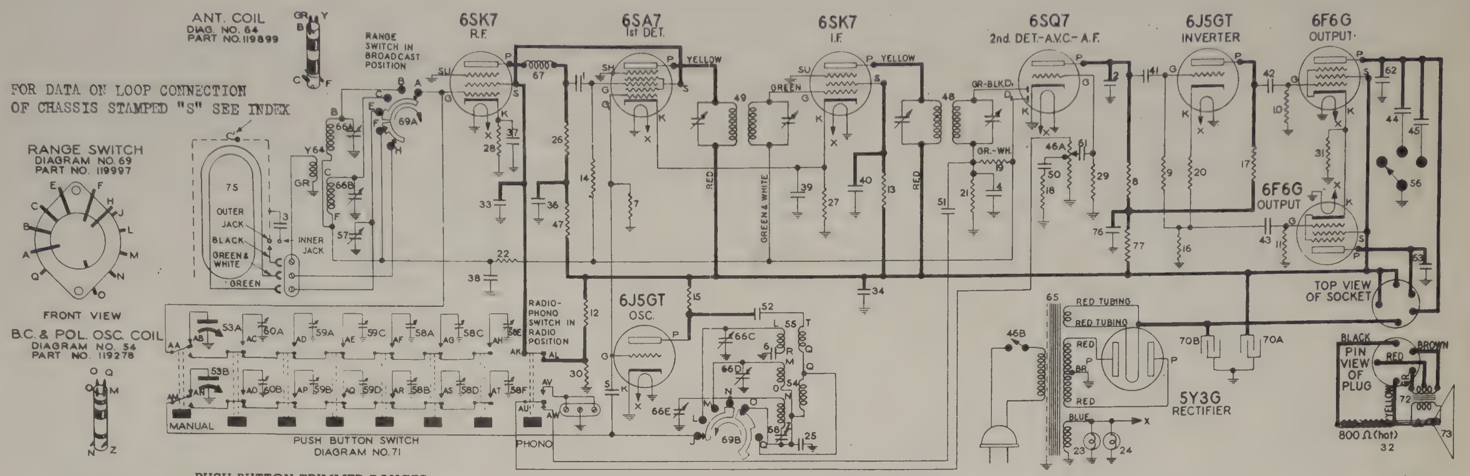
6AD6G TUNING INDICATOR
VOLTAGE READ AT CHASSIS END OF CABLE.
RED — 250
BLUE — 70
BROWN — 75
BLACK — 6.2 A.C.
BLACK — 0

VOLTAGES AT SOCKETS
UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND.

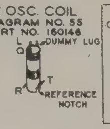
THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS:
LINE VOLTAGE — 117
VOLUME CONTROL — MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

BOTTOM VIEW OF CHASSIS

STEWART-WARNER CORP. 11-9B1-Z to 11-9B9-Z
Chassis 11-9B, 11-9B-Z
MODELS 11-9B1 to 11-9B9

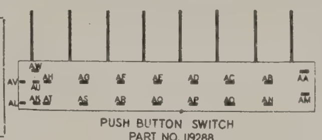


ANT. COIL DIAG. NO. 64 PART NO. 119899
FOR DATA ON LOOP CONNECTION OF CHASSIS STAMPED "S" SEE INDEX
RANGE SWITCH DIAGRAM NO. 69 PART NO. 119997
FRONT VIEW
B.C. & POL. OSC. COIL DIAGRAM NO. 54 PART NO. 119278
RANGE SWITCH IN BROADCAST POSITION
6SK7 R.F.
6SA7 1st DET.
6SK7 I.F.
6SQ7 2nd DET.-A.V.C.-A.F.
6J5GT INVERTER
6F6G OUTPUT
6F6G OUTPUT
6J5GT OSC.
RADIO-PHONO SWITCH IN RADIO POSITION
MANUAL
PHONO
PUSH BUTTON SWITCH DIAGRAM NO. 71
TOP VIEW OF SOCKET
PIN VIEW OF PLUG
5Y3G RECTIFIER
RED TUBING
800 Ω (hot)
32
YELLOW
GREEN & WHITE
RED
BLUE
BROWN
BLACK



PUSH BUTTON TRIMMER RANGES

TRIMMER CONDENSERS	11-9B RANGE	11-9B-Z RANGE
58E & 58F	540 to 1000 KC.	540 to 1000 KC.
58C & 58D	540 to 1000 KC.	540 to 1000 KC.
58A & 58B	540 to 1000 KC.	750 to 1375 KC.
59C & 59D	750 to 1375 KC.	750 to 1375 KC.
59A & 59B	750 to 1375 KC.	980 to 1550 KC.
60A & 60B	980 to 1550 KC.	980 to 1550 KC.



PUSH BUTTON SWITCH
PART NO. 119288

LETTERED POINTS ON PICTORIAL VIEWS CORRESPOND TO IDENTICAL POINTS ON THE CIRCUIT DIAGRAM.

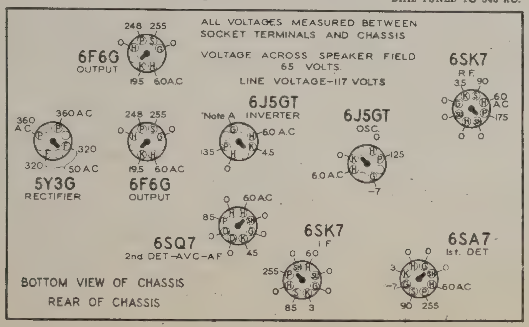
NOTE
RESISTOR 26 AND COND. 36 ARE OMITTED ON CHASSIS STAMPED "S". RESISTOR 47 CONNECTS DIRECTLY TO COIL 67.

I.F. 455 KC

FOR OTHER DATA SEE INDEX

SOCKET VOLTAGES

RADIO-PHONO SWITCH IN RADIO POSITION
VOLUME ON FULL WITH NO SIGNAL
DIAL TUNED TO 540 KC.



USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT.
NOTE A: The bias on the 6J5GT inverter grid is —.5 volts measured across resistor No. 20.

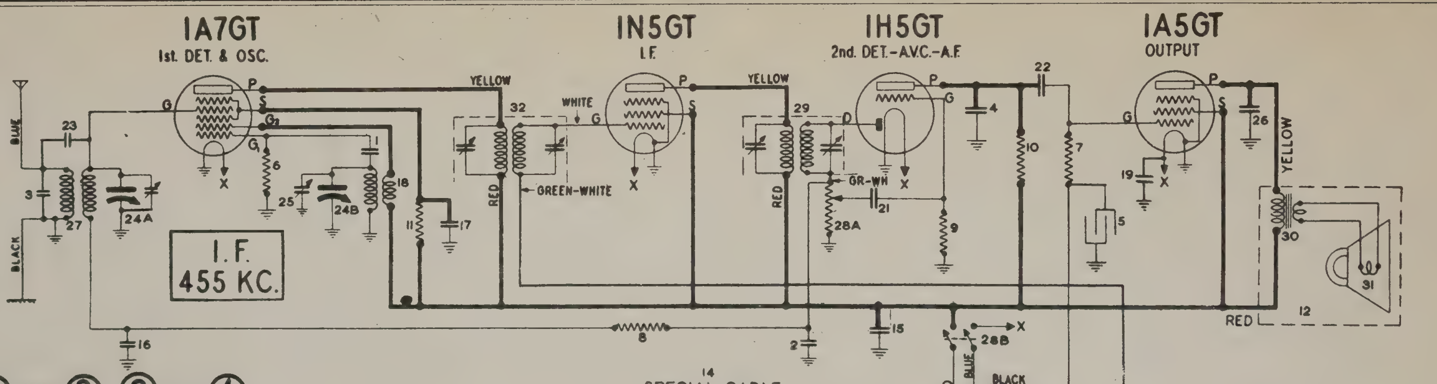
ELECTRICAL PARTS

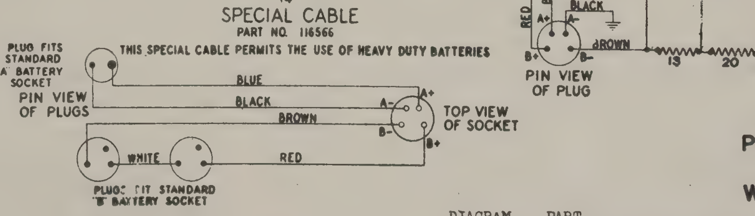
Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3-4	83783	Condenser—mica, 110 mmfd.	.20
5	85061	Condenser—mica, 51 mmfd.	.15
6	88587	Condenser—mica .0042 mfd.	.35
7	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
8	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
9 to 11	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
12	110561	Resistor—carbon 15,000 ohms 2 watts	.30
13-14	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
15 to 17	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
18	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
19	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
20	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
21-22	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
23-24	112636	Lamp—6.3 volt—.25 amps (frosted)	.25
25	112426	Condenser—mica 1650 mmfd.	.30
26	112952	Resistor—carbon 3,300 ohms ¼ watt (see note above)	.10
27	112974	Resistor—carbon 220 ohms ¼ watt	.15
28	112978 110556	Resistor—insulated 470 ohms ¼ watt (used only in chassis not stamped with letter) Resistor—330 ohms ¼ watt (used only on chassis stamped "S")	.12 .12
29	112975	Resistor—carbon 10 meg. ¼ watt	.12
30	112997	Resistor—carbon 22,000 ohms 1 watt	.15
31	114334	Resistor—wire wound 360 ohms 2 watts	.20
32	M-115110 M-115111 M-115118	Speaker—Dynamic—12" (11-9B8 only) Speaker—Dynamic—10" (11-9B6 only) Speaker—Dynamic—12" (11-9B7 only)	14.00 8.60 14.00
33 to 35	116625	Condenser—.1 mfd. 600 volt	.25
36	116819	Condenser—.05 mfd. 600 volt (see note at left)	.20
37 to 40	116819	Condenser—.05 mfd. 600 volt	.20
41 to 44	116893	Condenser—.02 mfd. 600 volt	.15
45	118487	Condenser—.07 mfd. 600 volts	.25
46A-46B	118669	Volume control—1 meg. (with switch)	1.40
47	118805	Resistor—carbon 10,000 ohms 1 watt	.12
48	119024	Transformer—2nd I.F.	1.15
49	119042	Transformer—1st I.F.	1.10
50	116893	Condenser—.02 mfd. 600 volt	.15
51-52	119193	Condenser—.01 mfd. 600 volt	.15
53A-53B	119291	Condenser—variable tuning	2.75
54	119278	Coil—B.C. & Police Oscillator	.60
55	160146	Coil—Short Wave Osc.	.58
56	119289	Switch—tone	.60
57	119345	Condenser—trimmer for loop	.20
58A to 60B	119753 119663 119664	Trimmer—for P.B. trimmers (low freq.) (see table) Trimmer for P.B. trimmers (med. freq.) (see table) Trimmer for P.B. trimmers (high freq.) (see table)	.24 .24 .24
61 to 63	119817	Condenser—.004 mfd. 600 volt	.15
64	119899	Coil—antenna	.18
65	119900 160460	Transformer—power (50-60 cycle) Transformer—power (25 cycle)	4.80 6.90
66A to 66E	119902	Trimmer condenser—five sections	.75
67	119903	Coil—compensating	.12
68	119934	Condenser—padder	.36
69A-69B	119997	Range switch	1.10
70A-70B	160008	Condenser—electrolytic 15-30 mfd. 450 volt	1.50
71	119288	Switch—push button	2.50
72	M-160464 M-160427 M-160462	Transformer—output (11-9B8) Transformer—output (11-9B6) Transformer—output (11-9B7)	1.60 1.80 1.80
73	M-160465 M-160428 M-160463	Cone & Voice coil (11-9B8) Cone & Voice coil (11-9B6) Cone & Voice coil (11-9B7)	1.60 1.80 1.80
75	160157 161290	Loop antenna (complete) (used on chassis not stamped with letter) Loop antenna (complete) (used only on chassis stamped "S")	3.60 3.60
76	116706	Condenser—.2 mfd. 600 volt	.35
77	110565	Resistor—22,000 ohms ¼ watt	.12

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

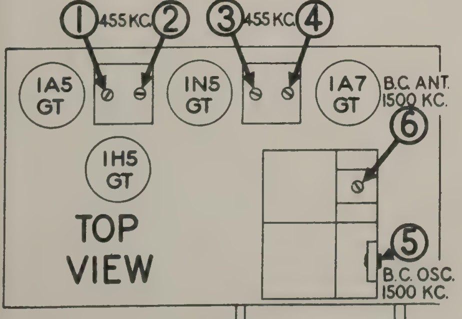
MODEL 12-4D1
Chassis 12-4D

STEWART-WARNER CORP.



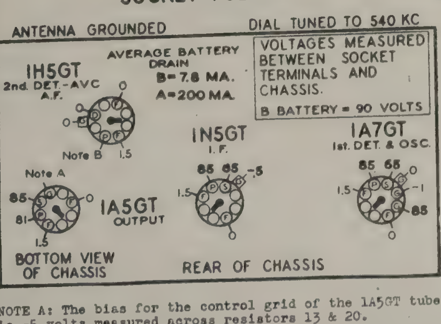


14
SPECIAL CABLE PART NO. 116566
THIS SPECIAL CABLE PERMITS THE USE OF HEAVY DUTY BATTERIES
PLUG FITS STANDARD 'A' BATTERY SOCKET
PIN VIEW OF PLUGS
PLUG FIT STANDARD 'B' BATTERY SOCKET
BLUE
BLACK
BROWN
WHITE
RED
TOP VIEW OF SOCKET
PIN VIEW OF PLUG
A+ A- B- B+
28B
13
20



SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC



NOTE A: The bias for the control grid of the 1A5GT tube is -5 volts measured across resistors 13 & 20.

NOTE B: Due to the high resistance of plate resistor NO. 10 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

FOR ALIGNMENT SEE INDEX

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmfd.	.20
3-4	85061	Condenser - mica 51 mmfd.	.15
5	110377	Condenser - elect. 10 mfd. 35V.	.80
6	110553	Resistor - carbon 220,000 ohms 1/4 watt	.12
7	110554	Resistor - carbon 1 meg. ¼ watt	.12
8-9	110580	Resistor - carbon 3.3 meg. ¼ W.	.12
10	110591	Resistor - carbon 680,000 ohms 1/4 watt	.12
11	112995	Resistor - carbon 15,000 ohms 1/4 watt	.12
12	M-115126	Speaker - P.M. (6")	5.50
13	116078	Resistor - 560 ohms 1/4 watt	.12
14	116566	Battery cable - for heavy duty batteries	.85
15	118206	Condenser - .25 mfd. 600 volt	.35
16-17	116819	Condenser - .05 mfd. 600 volt	.20
18	117741	Coil - oscillator	.35
19	118206	Condenser - .25 mfd. 150 volt	.35
20	118843	Resistor - carbon 47 ohms ¼ W.	.12
21	119817	Condenser - .004 mfd. 600 volt	.15
22	119193	Condenser - .01 mfd. 600 volt	.15
23	119466	Capacitor - wire (2 mmfd.)	.12
24A - 24B	119528	Condenser - tuning (with drum)	2.90
25	119719	Condenser - trimmer	.16
26	119875	Condenser - .002 mfd. 600 volt	.15
27	161323	Coil - antenna	1.00
28A - 28B	161325	Volume control-½ meg. with switch	1.50
29	161330	Transformer - 2nd I.F.	1.00
30	M-161332	Transformer - output for M-115126 speaker	.90
31	M-161334	Cone & Voice coil for M-115126 speaker	1.20
32	161340	Transformer - 1st I.F.	1.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
116549	Cable - battery	.45
114955	Clamp - for dial cord	.01
112745	Clip - coil mounting	.01
113019	Clip - dial scale retaining	.01
117057	Cord - drive (supplied in 3 foot lengths)	.15
161333	Dial scale	.24
116411	Indicator lever assembly	.09
160219	Knob - push on	.06
88631	Plug - 4 prong, male	.06
119718	Pointer	.14
81145	Retaining ring - for tuning shaft ----Per C	.50
116690	Socket - octal base	.12
113169	Spring - for indicator lever	.01
114968	Spring - dial cord tension	.03
161327	Tuning shaft	.18
111456	Washer - spring washer ----Per C	.50
161328	Window - dial	.38

MODEL D1042
Early and Issue A

WESTERN AUTO SUPPLY CO.

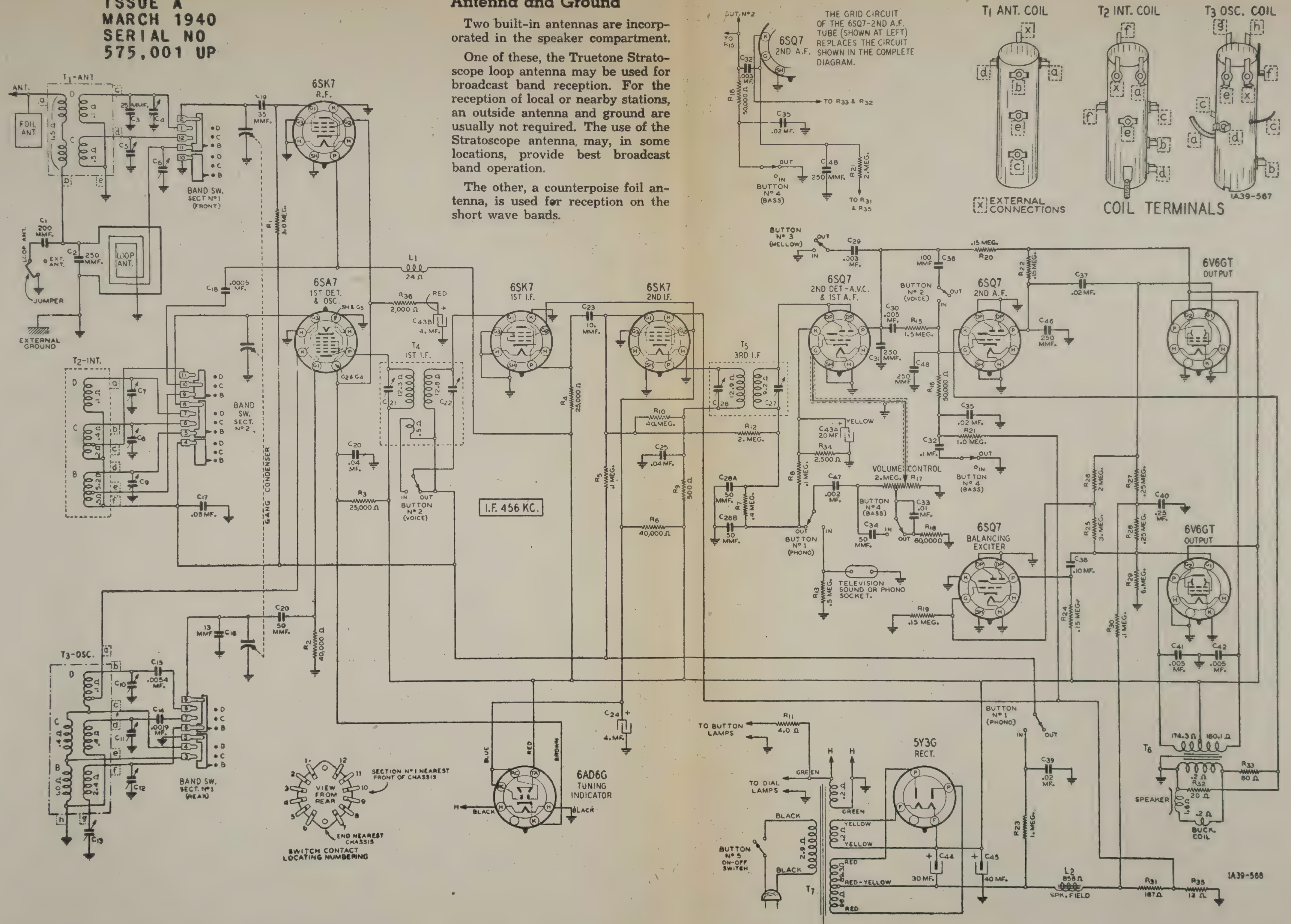
ISSUE A
MARCH 1940
SERIAL NO
575,001 UP

Antenna and Ground

Two built-in antennas are incorporated in the speaker compartment.

One of these, the Truetone Stratoscope loop antenna may be used for broadcast band reception. For the reception of local or nearby stations, an outside antenna and ground are usually not required. The use of the Stratoscope antenna may, in some locations, provide best broadcast band operation.

The other, a counterpoise foil antenna, is used for reception on the short wave bands.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Button No. 2 (Voice)—pulled out all adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. and 400 ohms.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
All adjustments with the exception of the Loop Range B adjustment are made with the loop disconnected and the chassis out of the cabinet.				Wire jumper in Antenna Selector Socket on BACK of chassis may be in either position for all adjustments with the exception of the Loop Range B adjustment—See Note D.	
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C21) & (C22) 3rd I.F. (C26) & (C27)
RANGE B					
1730 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Int. Range B (C9)
600 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note B
RANGE C—See Note C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C11)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C5) Int. Range C (C8)
RANGE D—See Note C					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C4) Int. Range D (C7) Rock Rotor—See Note B
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	See Note E Loop Trimmer (C6)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

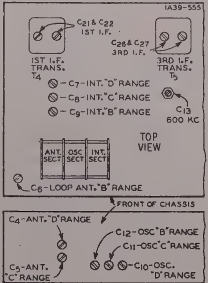
After each range is completed, repeat the procedure as a final check.

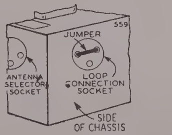
NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Insert a wire jumper as shown in illustration on this page in Loop Connection Socket located on SIDE of chassis.

NOTE D—Remove wire jumper from Loop Connection Socket located on SIDE of chassis. Wire jumper in Antenna Selector Socket on BACK of chassis should be inserted in LOOP position—see illustration on page 1. Re-install set in cabinet and reconnect loop. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from Stratoscope loop in cabinet.





NOTE E—Turn knob of Stratoscope loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Television Sound or Phonograph Connections

Should Television programs become available in your community, the excellent audio amplifier and speaker system of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the back panel of the chassis base is a 2 hole socket at which connections are made. The leads from a television receiver or from a phono pickup can be inserted in the socket.

When phonograph or television sound reproduction is desired, button No. 1—See illustration on page 2 — should be pushed in to the "Television Sound or Phono" position. For radio reception, the button should be pulled out to the "Radio" position.

Procedure for Setting the Station Buttons

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Any button may be used for any station you can receive, **although it** will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Setting a Station Button

Pull the chromatic control button No. 2 out to the sharp tuning position—

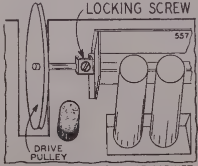
Now unlock the push button tuning mechanism from the back of the radio. On the drive pulley shaft and at the left side (from back of radio) of the push button tuning assembly is a locking screw—See illustration.

Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver.

Using a small handled screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob, using the tuning eye as a guide.



VIEW FROM BACK OF CABINET

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in.* It is better to start with the left hand button.

Hold *this* button all the way in.

With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Slowly release the button after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

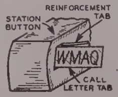
Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver. Then, with the SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads.

Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



If, at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Removing Button Escutcheon and Lower Row of Buttons

Pull off volume control knob. Take out the 5 screws on the push button escutcheon and raise this escutcheon as far as possible.

Each button of the lower row of buttons is held on its plunger shaft with a spring which fits into a slot on the shaft.

Insert a screwdriver under the bottom of the escutcheon and push the spring off the bottom of the button. Then slip the screwdriver between the spring and the button and rotate the spring until it slips out of the button slot. Then pull the button off. After the 5 buttons of the lower row are removed, the escutcheon plate may be taken off the cabinet.

To replace the lower row of push buttons on the plunger shafts, first put the push button escutcheon back in place. Then replace the spring in the slot on each button and push each button back on the shaft (with the flat portion of the spring at the top of the plunger) until the spring drops in the slot on the shaft.

Drive Cord Replacement

Use a drive cord approximately 74 inches in length. Tie a large knot with a small loop at one end of the new drive cord. Thread other end of cord up through hole in rim of condenser drive pulley. Pull cord through hole until large knot is flush against pulley rim.

Turn gang condenser to completely closed position.

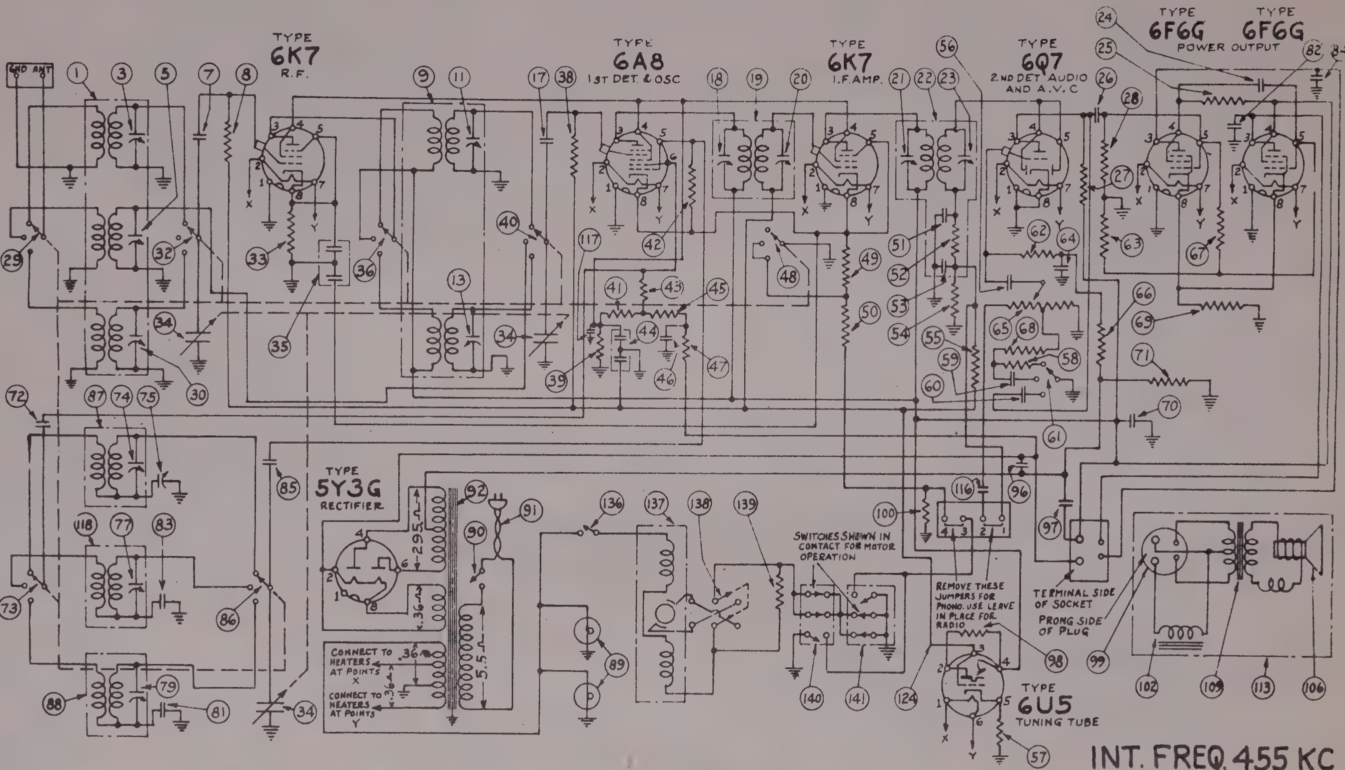
Wind ¼ turn in a clockwise direction (from right side of chassis) around condenser drive pulley. Wind cord over pulleys A, B, and C as shown in illustration. Wind 4½ turns in a clockwise direction (from front of chassis) around tuning control shaft. Turns should progress toward the chassis.

Turn gang condenser to full open position. Wind 1¼ turns in a clockwise direction (from right side of chassis) around condenser drive pulley. This turn should be at left side (from front of chassis) of pulley groove. Pass cord through hole in pulley rim. Secure tension spring to cord loop. Knot other end of cord to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-342



SOCKET VOLTAGES

TUBE	STAGE	FIL.	PIN NO	PLATE	PIN NO	SCREEN	PIN NO.	BIAS	CATH
6K7	R.F.	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		3.5
6A8	1st Det & Osc	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		5.8
6K7	I.F. AMP.	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		5.8
6Q7	2nd Det. Av&Af	6.0	2 TO 7	100	1 TO 3			-1.7	
6F6G	Pwr Output	6.0	2 TO 7	228	1 TO 3	234.	1 TO 4		18.
6F6G	Pwr Output	6.0	2 TO 7	226	1 TO 3	255.	1 TO 4		18.
5Y3G	RECTIFIER	4.6	2 TO 8						355.

WINDING RESISTANCES

POS	PRIMARY		SECONDARY		POS	PRIMARY		SECONDARY	
	OHMS		OHMS			OHMS		OHMS	
1	21.	B-C.	4,2	B-C	87	1.6	B-C	7.5	B-C
	0.4	POLICE	1.2	POLICE	88	0.9	S-W	0.3	S-W
	0.7	S-W	0.3	S-W	102	1000	FIELD		
9	1.9	B-C	11	B-C	106	1 8	VOICE COIL		
	1.4	S-W	0.3	S-W	109	500.	OUTPUT TR	1.5	OUTPUT TR
19	8.8		8.8		118	0.8	POLICE	1.2	POLICE
22	8 8		8.8						

FOR OTHER DATA, SEE INDEX

SPECIFICATIONS

Power Consumption - 103 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 8 Watts Undistorted
9 Watts Maximum

Selectivity - 29.5 KC Broad at 1000 times Signal
(Sharp)

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - 12" Electro-Dynamic

Tuning Frequency Range

B Range .... 528 to 1730 KC
C Range ....2200 to 7000 KC
D Range ....7000 to 22000 KC

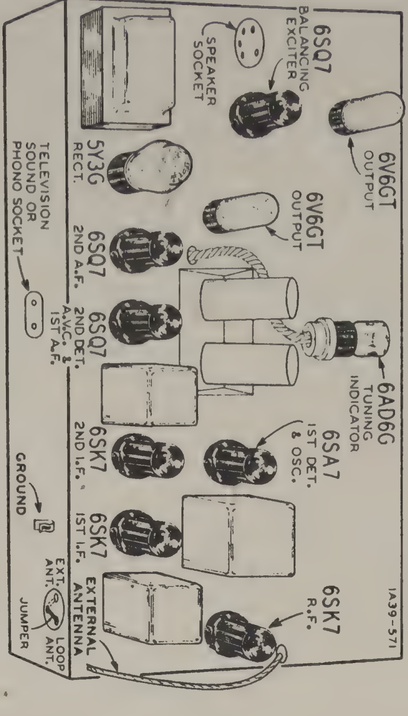
Sensitivity —External Antenna—(For 0.5 Watt output)

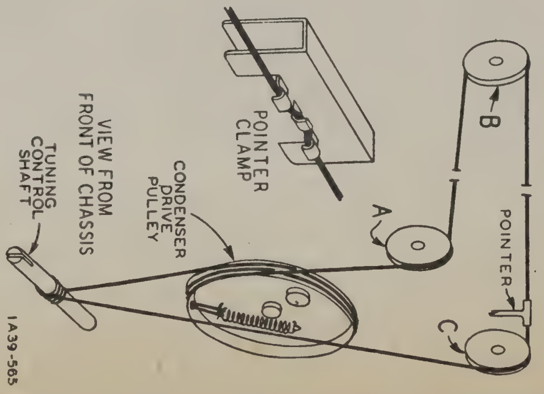
B Range .... 1.0 Microvolt Average
C Range .... 1.0 Microvolt Average
D Range .... 3.0 Microvolts Average

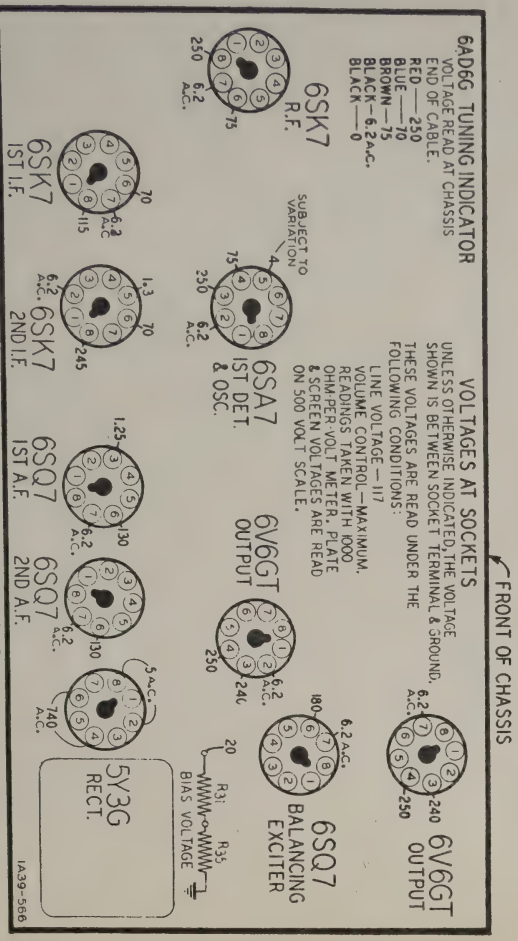
ISSUE A
MARCH 1940
SERIAL NO
575,001 UP

6 STATION BUTTONS
11 TUBES
3 BANDS

TRUETONE
CHROMATIC
CONTROL







BOTTOM VIEW OF CHASSIS

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Button No. 2 (Voice)—pulled out all adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
All adjustments with the exception of the Loop Range B adjustment are made with the loop disconnected and the chassis out of the cabinet.				Wire jumper in Antenna Selector Socket on BACK of chassis may be in either position for all adjustments with the exception of the Loop Range B adjustment—See Note D.	
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C21) & (C22) 3rd I.F. (C26) & (C27)
RANGE B					
1730 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Int. Range B (C9)
600 KC	R. F. Grid	.1 mf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note B
RANGE C—See Note C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C11)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C5) Int. Range C (C8)
RANGE D—See Note C					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C4) Int. Range D (C7) Rock Rotor—See Note B
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	See Note E Loop Trimmer (C6)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

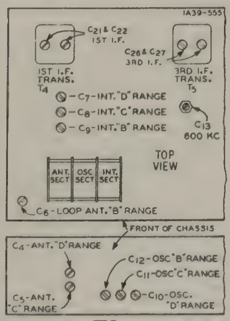
After each range is completed, repeat the procedure as a final check.

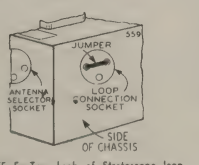
NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Insert a wire jumper as shown in illustration on this page in Loop Connection Socket located on SIDE of chassis.

NOTE D—Remove wire jumper from Loop Connection Socket located on SIDE of chassis. Wire jumper in Antenna Selector Socket on BACK of chassis should be inserted in LOOP position—see illustration on page 1. Re-install set in cabinet and reconnect loop. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from Stratoscope loop in cabinet.





NOTE E—Turn knob of Stratoscope loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Television Sound or Phonograph Connections

Should Television programs become available in your community, the excellent audio amplifier and speaker system of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the back panel of the chassis base is a 2 hole socket at which connections are made. The leads from a television receiver or from a phono pickup can be inserted in the socket.

When phonograph or television sound reproduction is desired, button No. 1—See illustration on page 2 — should be pushed in to the "Television Sound or Phono" position. For radio reception, the button should be pulled out to the "Radio" position.

Procedure for Setting the Station Buttons

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Setting a Station Button

Pull the chromatic control button No. 2 out to the sharp tuning position—

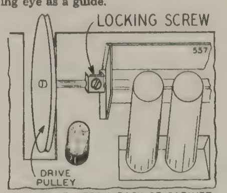
Now unlock the push button tuning mechanism from the back of the radio. On the drive pulley shaft and at the left side (from back of radio) of the push button tuning assembly is a locking screw—See illustration.

Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver.

Using a small handled screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob, using the tuning eye as a guide.



VIEW FROM BACK OF CABINET

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with the left hand button.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Slowly release the button after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

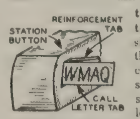
Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver. Then, with the SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads.

Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



If, at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Removing Button Escutcheon and Lower Row of Buttons

Pull off volume control knob. Take out the 5 screws on the push button escutcheon and raise this escutcheon as far as possible.

Each button of the lower row of buttons is held on its plunger shaft with a spring which fits into a slot on the shaft.

Insert a screwdriver under the bottom of the escutcheon and push the spring off the bottom of the button. Then slip the screwdriver between the spring and the button and rotate the spring until it slips out of the button slot. Then pull the button off. After the 5 buttons of the lower row are removed, the escutcheon plate may be taken off the cabinet.

To replace the lower row of push buttons on the plunger shafts, first put the push button escutcheon back in place. Then replace the spring in the slot on each button and push each button back on the shaft (with the flat portion of the spring at the top of the plunger) until the spring drops in the slot on the shaft.

Drive Cord Replacement

Use a drive cord approximately 74 inches in length. Tie a large knot with a small loop at one end of the new drive cord. Thread other end of cord up through hole in rim of condenser drive pulley. Pull cord through hole until large knot is flush against pulley rim.

Turn gang condenser to completely closed position.

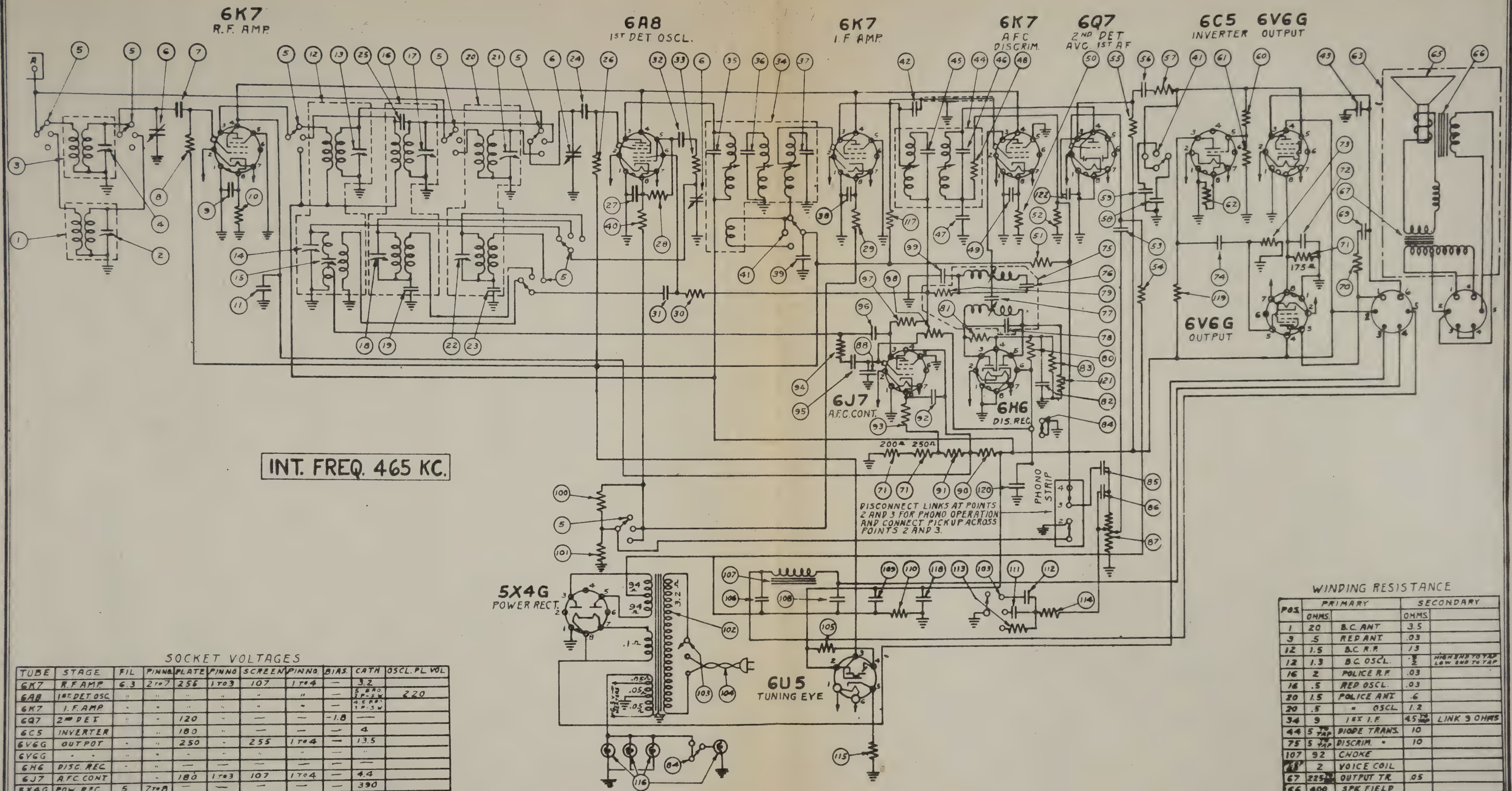
Wind 1/4 turn in a clockwise direction (from right side of chassis) around condenser drive pulley. Wind cord over pulleys A, B, and C as shown in illustration. Wind 4½ turns in a clockwise direction (from front of chassis) around tuning control shaft. Turns should progress toward the chassis.

Turn gang condenser to full open position. Wind 1¼ turns in a clockwise direction (from right side of chassis) around condenser drive pulley. This turn should be at left side (from front of chassis) of pulley groove. Pass cord through hole in pulley rim. Secure tension spring to cord loop. Knot other end of cord to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord-See illustration.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-334



SOCKET VOLTAGES

TUBE	STAGE	FIL	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.	BIAS.	CATH	OSCL. PL VOL
6K7	R.F. AMP.	6.3	2 TO 7	255	1 TO 3	107	1 TO 4	—	3.2	
6A8	1ST. DET OSC.	"	"	"	"	"	"	—	5 BRO. 3 P-S W	220
6K7	I. F. AMP.	"	"	"	"	"	"	—	4.5 RED 3 P-S W	
6Q7	2ND DET	"	"	120	"	—	—	-1.8	—	
6C5	INVERTER		"	180	"	—	—	—	4	
6V6G	OUTPOT	"	"	250	"	255	1 TO 4	—	13.5	
6V6G	" "	"	"	"	"	"	"	—	"	
6H6	DISC. REC.	"	"	—	—	—	—	—	—	
6J7	A.F.C. CONT.		"	180	1 TO 3	107	1 TO 4	—	4.4	
5X4G	POW. REC.	5	7 TO 8	—	—	—	—	—	390	
6U5	EYE	6.3	1 TO 6	255	—	—	—	—	175	

WINDING RESISTANCE

POS.	PRIMARY		SECONDARY	
	OHMS.		OHMS.	
1	20	B.C. ANT	3.5	
3	.5	RED ANT.	.03	
12	1.5	B.C. R.F.	13	
12	1.3	B.C. OSCL.	.5 2	HIGH END TO TAP LOW END TO TAP
16	2	POLICE R.F.	.03	
16	.5	RED OSCL.	.03	
20	1.5	POLICE ANT.	.6	
20	.5	" OSCL.	1.2	
34	9	1ST I.F.	45 TO TAP	LINK 9 OHMS
44	5 TO TAP	DIODE TRANS.	10	
75	5 TO TAP	DISCRIM. "	10	
107	92	CHOKE		
65	2	VOICE COIL		
67	225Ω	OUTPUT TR.	.05	
66	400	SPK FIELD		

ELECTRICAL SPECIFICATIONS

Power Consumption	115 Watts
Maximum Output	14 Watts
Maximum Undistorted Output	10 Watts
Tuning Ranges	(Brown Band 535 - 1800 KC. (Green Band 1700 - 6000 KC. (Red Band 5800 - 18500 KC.
Line-Up Frequencies	I.F. 465 KC., 1500 KC., 600 KC., 5000 KC., 16,000 KC.

FOR OTHER DATA, SEE INDEX

MODEL WR-334
MODEL WR-342

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-334

Dia. #	Part #	Description of Parts
1	RC 95312	Short-wave antenna coil
2		4-35 mmf. trimmer - part of RC 95312
3	RC 95311	Broadcast antenna coil
4		4-35 mmf. trimmer - part of RC 95311
5	SW 9586	Wave change switch
6	CG 9566	Variable gang condenser
7	CM 9519	500 mmf. mica condenser .
8	RE 1043	100,000 ohm, 1/2 W. resistor
9	CW 2-05	.05 mfd., 200 V. condenser
10	RE 3313	330 ohm, 1/2 W. resistor
11	CW 4-10	.1 mfd., 400 V. condenser
12	RC 95313	Broadcast composite coil
13		4-35 mmf. trimmer - part of RC 95313
14		5-25 mmf. trimmer - part of RC 95313
15		300-600 mmf. oscillator lag cond. -
16	RC 95315	Short-wave composite coil
17-18		4-35 mmf. trimmer - part of RC 95315
19		.0034 mfd. oscillator lag condenser -
20	RC 95314	Police composite coil
21		10 mmf. trimmer - part of RC 95314
22		4-35 mmf. trimmer - part of RC 95314
23		.001 mfd. oscillator lag condenser -
24	CM 9519	500 mmf. mica condenser
25		10 mmf. mica condenser - part of RC 95315
26	RE 1043	100,000 ohm, 1/2 W. resistor
27	CW 2-05	.05 mfd., 200 V. condenser
28	RE 4733	47,000 ohm, 1/2 W. resistor
29	RE 2713	270 ohm, 1/2 W. resistor
30	RE 562412	5600 ohm, 1 W. resistor
31	CW 4-01	.01 mfd., 400 V. condenser
32	CM 9513	100 mmf. mica condenser
33	RE 1213	120 ohm, 1/2 W. resistor
34	IC 95117	1st I.F. transformer
35		100 mmf. trimmer - part of IC 95117
36-37		107 mmf. trimmer - part of IC 95117
38	CW 2-05	.05 mfd., 200 V. condenser
39	CW 4-05	.05 mfd., 400 V. condenser
40	RE 2213	220 ohm, 1/2 W. resistor
41	SW 9588	Treble control switch
42	CM 9548	5 mmf. mica condenser
43	CM 953	50 mmf. mica condenser
44	IC 95115	I.F. diode coil
45-46		107 mmf. trimmers - part of IC 95115
47	CM 9513	100 mmf. mica condenser
48	RE 4733	47,000 ohm, 1/2 W. resistor
49	CW 2-05	.05 mfd., 200 V. condenser
50	RE 3313	330 ohm, 1/2 W. resistor
51	RE 4743	470,000 ohm, 1/2 W. resistor
52	RE 4743	470,000 ohm, 1/2 W. resistor
53	CW 4-02	.02 mfd., 400 V. condenser
54	RE 4743	470,000 ohm, 1/2 W. resistor
55	RE 2243	220,000 ohm, 1/2 W. resistor
56	CW 4-02	.02 mfd., 400 V. condenser
57	RE 4733	47,000 ohm, 1/2 W. resistor
58	CW 6-003	.003 mfd., 600 V. condenser
59	CW 6-001	.001 mfd., 600 V. condenser
60	RE 3943	390,000 ohm, 1/2 W. resistor
61	RE 6833	68,000 ohm, 1/2 W. resistor
62	RE 5613	560 ohm, 1/2 W. resistor
63	SK 9584	Speaker
65	DM 9528	Speaker diaphragm assembly
66	CL 9570	Speaker field coil
67	TR 95151	Speaker output transformer
69	CW 6-001	.001 mfd., 600 V. condenser
70	RE 223412	22,000 ohm, 1 W. resistor
71	RE 95141	200-250 ohm - voltage divider resistor
72	CE 9569	12 mfd., 50 V. electrolytic condenser
73	RE 4743	470,000 ohm, 1/2 W. resistor
74	CW 4-02	.02 mfd., 400 V. condenser
75	IC 95116	Descriminator coil
76-78		107 mmf. trimmers - part of IC 95116
77		100 mmf. trimmers - part of IC 95116
79	RE 2222	2200 ohm, 1/2 W. resistor
80	RE 1053	1 meg., 1/2 W. resistor
81	RE 4743	470,000 ohm, 1/2 W. resistor
82	CW 4-05	.05 mfd., 400 V. condenser
83	RE 1053	1 meg., 1/2 W. resistor
84	SW 9589	A.F.C. switch
85	CW 4-02	.02 mfd., 400 V. condenser
86	CM 953	50 mmf. mica condenser
87	VR 9555	2 meg. mid-tapped volume control
88	CM 9516	25 mmf. mica condenser
90	RE 1036	10,000 ohm, 1/2 W. resistor
91	RE 1534	15,000 ohm, 1/2 W. resistor
92	CW 4-05	.05 mfd., 400 V. condenser
93	RE 3313	330 ohm, 1/2 W. resistor
94	RE 4733	47,000 ohm, 1/2 W. resistor
95	CM 953	50 mmf. mica condenser
96	CM 9519	500 mmf. mica condenser
97	RE 4733	47,000 ohm, 1/2 W. resistor
98	RE 4743	47,000 ohm, 1/2 W. resistor
99	CW 4-05	.05 mfd., 400 V. condenser
100	RE 1013	100 ohm, 1/2 W. resistor
101	RE 2233	22,000 ohm, 1/2 W. resistor
102	TR 95125	Power transformer 105-125 V., 50-60 cy
103	SW 9587	On-Off and bass switch
104	CB 9512	Line cable
105		1 meg. resistor - part of CB 95161
106	CE 9554	18 mfd., 450 V. electrolytic condenser
107	TR 9573	Choke
108	CE 9570	18 mfd., 450 V. electrolytic condenser
109	CE 9562	18 mfd., 300 V. electrolytic condenser
110	RE 1203	12 ohm, 1/2 W. resistor
111	CW 6-005	.005 mfd., 600 V. condenser
112	CW 6-002	.002 mfd., 200 V. condenser
113	RE 1043	100,000 ohm, 1/2 W. resistor
114	RE 1043	100,000 ohm, 1/2 W. resistor
115	RE 3313	330 ohm, 1/2 W. resistor
116	LP 9510	Dial lamp 6.3 V., .25 amp.
117	RE 4743	470,000 ohm, 1/2 W. resistor
118	CW 4-10	.1 mfd., 400 V. condenser
119	RE 1033	10,000 ohm, 1/2 W. resistor
120	CW 4-10	.1 mfd., 400 V. condenser
121	RE 4743	470,000 ohm, 1/2 W. resistor
122	CW 6-001	.001 mfd., 600 V. condenser

MODEL WR-342

Dia. #	Part #	
1	RC 95306	Antenna composite coil
3,5		4-35 mmf. trimmer condenser
7	CM 9519	.0005 mfd. mica condenser
8	RE 2743	270,000 ohm, 1/2 W. resistor
9	RC 95307	R.F. composite coil
11,13		4-35 mmf. trimmer condenser
17	CM 9519	.0005 mfd. mica condenser
18		80-200 mmf. trimmer condenser
19	IC 95119	1st I.F. coil assembly
20		80-200 mmf. trimmer condenser
21		80-200 mmf. trimmer condenser
22	IC 95120	2nd I.F. coil assembly
23		80-200 mmf. trimmer condenser
24	CW 4-01	.01 mfd., 400 V. condenser
25	RE 1023	1,000 ohm, 1/2 W. resistor
26	CW 4-02	.02 mfd., 400 V. condenser
27	RE 1043	100,000 ohm, 1/2 W. resistor
28	RE 1843	180,000 ohm, 1/2 W. resistor
29	SW 95103	Wave-change switch
30		4-35 mmf. trimmer condenser
33	RE 3913	390 ohm, 1/2 W. resistor
34	CG 9576	Gang condenser
35	CW 9535	.1-.1 mfd., 400 V. dual condenser.
38	RE 2743	270,000 ohm, 1/2 W. resistor
39	RE 6833	68,000 ohm, 1/2 W. resistor
41	RE 1033	10,000 ohm, 1/2 W. resistor
42	RE 4733	47,000 ohm, 1/2 W. resistor
43	RE 472412	4700 ohm, 1 W. resistor
44	CW 9535	.1-.1 mfd., 400 V. dual condenser
45	RE 103522	10,000 ohm, 2 W. resistor
46	CE 9568	8 mfd., 450 V. electrolytic condenser
47	RE 682522	6800 ohm, 2 W. resistor
49	RE 1513	150 ohm, 1/2 W. resistor
50	RE 1513	150 ohm, 1/2 W. resistor
51	CM 9513	.0001 mfd. mica condenser
52	RE 4733	47,000 ohm, 1/2 W. resistor
53	CM 9513	.0001 mfd. mica condenser -
54	RE 4743	470,000 ohm, 1/2 W. resistor
55	RE 4743	470,000 ohm, 1/2 W. resistor
56	CW 2-02	.02 mfd., 200 V. condenser
57	RE 2713	270 ohm, 1/2 W. resistor
58	RE 1043	100,000 ohm, 1/2 W. resistor
59	CW 6-002	.002 mfd., 600 V. condenser
60	CW 4-02	.02 mfd., 400 V. condenser
61	SW 95102	Tone control switch
62	RE 2253	2.2 meg., 1/2 W. resistor
63	RE 4743	470,000 ohm, 1/2 W. resistor
64	CW 2-10	.1 mfd., 200 V. condenser
65	VR 9561	Volume control - 2 meg. mid-tapped
66	RE 4743	470,000 ohm, 1/2 W. resistor
67	RE 3343	330,000 ohm, 1/2 W. resistor
68	RE 1043	100,000 ohm, 1/2 W. resistor
69	RE 271412	270 ohm, 1 W. resistor
70	CW 4-10	.1 mfd., 400 V. condenser
71	RE 1803	18 ohm, 1/2 W. resistor
72	CW 6-005	.005 mfd., 600 V. condenser
74		4-35 mmf. trimmer condenser - part of RC 95308
75	CS 9585	225-700 mmf. oscillator series (lag) condenser
77		4-35 mmf. trimmer condenser - part of RC 95309
79		4-35 mmf. trimmer condenser - part of RC 95310
80	CM 9545	4,050 mmf. mica condenser
82	CW 6-002	.002 mfd., 600 V. condenser
83	CM 9544	1375 mmf. mica condenser ...
84	CW 6-002	.002 mfd., 600 V. condenser
85	CM 9513	.0001 mfd. mica condenser
87	RC 95308	Broadcast oscillator coil
88	RC 95310	Short-wave oscillator coil
89	LP 9510	Dial lamp - 6.3 Volt, .25 Amp
90		Switch - part of VR 9561
91	CB 9512	Line cable and plug assembly
92	TR 95162	Power transformer - 105-125 V., 50-60 Cycle
96	CE 9554	18 mfd., 450 V. electrolytic condenser
97	CE 9562	18 mfd., 300 V. electrolytic condenser
98		1 meg., 1/4 W. resistor - part of CB 95151
99		Speaker plug - part of speaker
100	RE 1033	10,000 ohm, 1/2 W. resistor
102	CL 9572	Speaker field coil
106	DM 9528	Speaker diaphragm
109	TR 95150	Speaker output transformer
113	SK 9585	Speaker
116	CW 2-02	.02 mfd., 200 V. condenser
117	CW 9547	.5 mfd., 400 V. condenser
118	RC 95309	Police oscillator coil
124	CB 95151	Tuning tube cable and plug assembly
136	SW 95101	Switch
137	MO 951	Motor
138	SW 9582	Motor reversing switch
139	RE 95144	1.5 ohm resistor
140	SW 9584	Switch
141	SW 9599	Switch

HERE'S NEWS!

PUBLICATION
OF
SUCCESSFUL SERVICING

Rider's *FREE* House-organ
Resumed July 1946!

A publication dedicated to the technical and financial advancement of the electronic maintenance man.

It will keep you abreast of new developments in the electronic field, timely articles on practical maintenance, changes in manufacturer's schematics, etc. . . . these are vital to you . . . this FREE service is yours for the asking.

Mail This Coupon TODAY!

JOHN F. RIDER PUBLISHER, INC.
Att.: Successful Servicing
404 Fourth Avenue
New York 16, N. Y.

(Please PRINT your NAME and ADDRESS)

Kindly mail your FREE house-organ SUCCESSFUL SERVICING to:

....
Name

....
Street

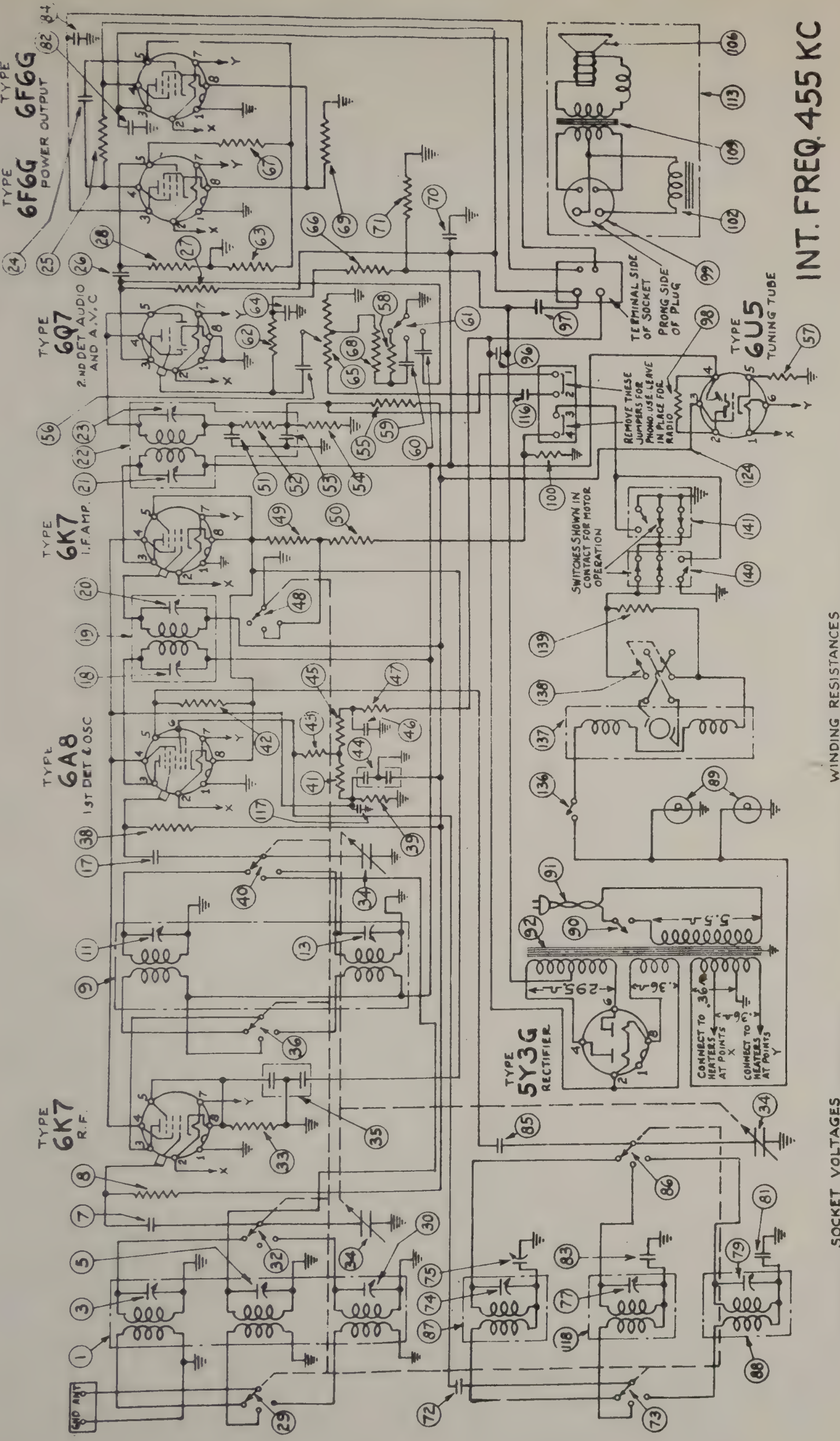
....
City Zone State

Check the following . . .

Are you a —
- SERVICEMAN ☐
- DEALER ☐
- ENGINEER ☐
- HAM ☐
- STUDENT ☐

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-342


TYPE 6F6G POWER OUTPUT
TYPE 6F6G
TYPE 6Q7 2ND DET. AUDIO AND A.V.C
TYPE 6K7 I.F. AMP
TYPE 6A8 1ST DET & OSC
TYPE 6K7 R.F.
TYPE 6U5 TUNING TUBE
TYPE 5Y3G RECTIFIER
INT. FREQ. 455 KC
TERMINAL SIDE OF SOCKET
PRONG SIDE OF PLUG
REMOVE THESE JUMPERS FOR PHONO. USE. LEAVE IN PLACE FOR RADIO
SWITCHES SHOWN IN CONTACT FOR MOTOR OPERATION
CONNECT TO HEATERS AT POINTS X
CONNECT TO HEATERS AT POINTS Y
GND ANT
5.5
29.5
36

FOR OTHER DATA, SEE INDEX

WINDING RESISTANCES

POS	PRIMARY OHMS	PRIMARY	SECONDARY OHMS	SECONDARY	POS	PRIMARY OHMS	PRIMARY	SECONDARY OHMS	SECONDARY
1	21.	B-C.	4.2	B-C	87	1.6	B-C	7.5	B-C
	0.4	POLICE	1.2	POLICE	88	0.9	S-W	0.3	S-W
	0.7	S-W	0.3	S-W	102	1000	FIELD		
9	1.9	B-C	11	B-C	106	1.8	VOICE COIL		
	1.4	S-W	0.3	S-W	109	500.	OUTPUT TR	1.5	OUTPUT TR
19	8.8		8.8		118	0.8	POLICE	1.2	POLICE
22	8.8		8.8						

SOCKET VOLTAGES

TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.	BIAS	CATH
6K7	R.F.	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		3.5
6A8	1ST DET & OSC	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		5.8
6K7	I.F. AMP.	6.0	2 TO 7	252	1 TO 3	108.	1 TO 4		5.8
6Q7	2ND DET. AMP.	6.0	2 TO 7	100	1 TO 3			-1.7	
6F6G	PWR OUTPUT	6.0	2 TO 7	228	1 TO 3	234.	1 TO 4		18.
6F6G	PWR OUTPUT	6.0	2 TO 7	226	1 TO 3	255.	1 TO 4		18.
5Y3G	RECTIFIER	4.6	2 TO 8						355.

MODEL WR-334
MODEL WR-342

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-334

Dia. #	Part #	Description of Parts
1	RC 95312	Short-wave antenna coil
2		4-35 mmf. trimmer - part of RC 95312
3	RC 95311	Broadcast antenna coil
4		4-35 mmf. trimmer - part of RC 95311
5	SW 9586	Wave change switch
6	CG 9566	Variable gang condenser
7	CM 9519	500 mmf. mica condenser .
8	RE 1043	100,000 ohm, 1/2 W. resistor
9	CW 2-05	.05 mfd., 200 V. condenser
10	RE 3313	330 ohm, 1/2 W. resistor
11	CW 4-10	.1 mfd., 400 V. condenser
12	RC 95313	Broadcast composite coil
13		4-35 mmf. trimmer - part of RC 95313
14		5-25 mmf. trimmer - part of RC 95313
15		300-600 mmf. oscillator lag cond. -
16	RC 95315	Short-wave composite coil
17-18		4-35 mmf. trimmer - part of RC 95315
19		.0034 mfd. oscillator lag condenser -
20	RC 95314	Police composite coil
21		10 mmf. trimmer - part of RC 95314
22		4-35 mmf. trimmer - part of RC 95314
23		.001 mfd. oscillator lag condenser -
24	CM 9515	500 mmf. mica condenser
25		10 mmf. mica condenser - part of RC 95315
26	RE 1043	100,000 ohm, 1/2 W. resistor
27	CW 2-05	.05 mfd., 200 V. condenser
28	RE 4733	47,000 ohm, 1/2 W. resistor
29	RE 2713	270 ohm, 1/2 W. resistor
30	RE 562412	5600 ohm, 1 W. resistor
31	CW 4-01	.01 mfd., 400 V. condenser
32	CM 9513	100 mmf. mica condenser
33	RE 1213	120 ohm, 1/2 W. resistor
34	IC 95117	1st I.F. transformer
35		100 mmf. trimmer - part of IC 95117
36-37		107 mmf. trimmer - part of IC 95117
38	CW 2-05	.05 mfd., 200 V. condenser
39	CW 4-05	.05 mfd., 400 V. condenser
40	RE 2213	220 ohm, 1/2 W. resistor
41	SW 9588	Treble control switch
42	CM 9548	5 mmf. mica condenser
43	CM 953	50 mmf. mica condenser
44	IC 95115	I.F. diode coil
45-46		107 mmf. trimmers - part of IC 95115
47	CM 9513	100 mmf. mica condenser
48	RE 4733	47,000 ohm, 1/2 W. resistor
49	CW 2-05	.05 mfd., 200 V. condenser
50	RE 3313	330 ohm, 1/2 W. resistor
51	RE 4743	470,000 ohm, 1/2 W. resistor
52	RE 4743	470,000 ohm, 1/2 W. resistor
53	CW 4-02	.02 mfd., 400 V. condenser
54	RE 4743	470,000 ohm, 1/2 W. resistor
55	RE 2243	220,000 ohm, 1/2 W. resistor
56	CW 4-02	.02 mfd., 400 V. condenser
57	RE 4733	47,000 ohm, 1/2 W. resistor
58	CW 6-003	.003 mfd., 600 V. condenser
59	CW 6-001	.001 mfd., 600 V. condenser
60	RE 3943	390,000 ohm, 1/2 W. resistor
61	RE 6833	68,000 ohm, 1/2 W. resistor
62	RE 5613	560 ohm, 1/2 W. resistor
63	SK 9584	Speaker
65	DM 9528	Speaker diaphragm assembly
66	CL 9570	Speaker field coil
67	TR 95151	Speaker output transformer
69	CW 6-001	.001 mfd., 600 V. condenser
70	RE 223412	22,000 ohm, 1 W. resistor
71	RE 95141	200-250 ohm - voltage divider resistor
72	CE 9569	12 mfd., 50 V. electrolytic condenser
73	RE 4743	470,000 ohm, 1/2 W. resistor
74	CW 4-02	.02 mfd., 400 V. condenser
75	IC 95116	Descriminator coil
76-78		107 mmf. trimmers - part of IC 95116
77		100 mmf. trimmers - part of IC 95116
79	RE 2222	2200 ohm, 1/2 W. resistor
80	RE 1053	1 meg., 1/2 W. resistor
81	RE 4743	470,000 ohm, 1/2 W. resistor
82	CW 4-05	.05 mfd., 400 V. condenser
83	RE 1053	1 meg., 1/2 W. resistor
84	SW 9589	A.F.C. switch
85	CW 4-02	.02 mfd., 400 V. condenser
86	CM 953	50 mmf. mica condenser
87	VR 9555	2 meg. mid-tapped volume control
88	CM 9516	25 mmf. mica condenser
90	RE 1036	10,000 ohm, 1/2 W. resistor
91	RE 1534	15,000 ohm, 1/2 W. resistor
92	CW 4-05	.05 mfd., 400 V. condenser
93	RE 3313	330 ohm, 1/2 W. resistor
94	RE 4733	47,000 ohm, 1/2 W. resistor
95	CM 953	50 mmf. mica condenser
96	CM 9519	500 mmf. mica condenser
97	RE 4733	47,000 ohm, 1/2 W. resistor
98	RE 4743	47,000 ohm, 1/2 W. resistor
99	CW 4-05	.05 mfd., 400 V. condenser
100	RE 1013	100 ohm, 1/2 W. resistor
101	RE 2233	22,000 ohm, 1/2 W. resistor
102	TR 95125	Power transformer 105-125 V., 50-60 cy
103	SW 9587	On-Off and bass switch
104	CB 9512	Line cable
105		1 meg. resistor - part of CB 95151
106	CE 9554	18 mfd., 450 V. electrolytic condenser
107	TR 9573	Choke
108	CE 9570	18 mfd., 450 V. electrolytic condenser
109	CE 9562	18 mfd., 300 V. electrolytic condenser
110	RE 1203	12 ohm, 1/2 W. resistor
111	CW 6-005	.005 mfd., 600 V. condenser
112	CW 6-002	.002 mfd., 200 V. condenser
113	RE 1043	100,000 ohm, 1/2 W. resistor
114	RE 1043	100,000 ohm, 1/2 W. resistor
115	RE 3313	330 ohm, 1/2 W. resistor
116	LP 9510	Dial lamp 6.3 V., .25 amp.
117	RE 4743	470,000 ohm, 1/2 W. resistor
118	CW 4-10	.1 mfd., 400 V. condenser
119	RE 1033	10,000 ohm, 1/2 W. resistor
120	CW 4-10	.1 mfd., 400 V. condenser
121	RE 4743	470,000 ohm, 1/2 W. resistor
122	CW 6-001	.001 mfd., 600 V. condenser

MODEL WR-342

Dia. #	Part #	Description
1	RC 95306	Antenna composite coil
3,5		4-35 mmf. trimmer condenser
7	CM 9519	.0005 mfd. mica condenser
8	RE 2743	270,000 ohm, 1/2 W. resistor
9	RC 95307	R.F. composite coil
11,13		4-35 mmf. trimmer condenser
17	CM 9519	.0005 mfd. mica condenser
18		80-200 mmf. trimmer condenser
19	IC 95119	1st I.F. coil assembly
20		80-200 mmf. trimmer condenser
21		80-200 mmf. trimmer condenser
22	IC 95120	2nd I.F. coil assembly
23		80-200 mmf. trimmer condenser
24	CW 4-01	.01 mfd., 400 V. condenser
25	RE 1023	1,000 ohm, 1/2 W. resistor
26	CW 4-02	.02 mfd., 400 V. condenser
27	RE 1043	100,000 ohm, 1/2 W. resistor
28	RE 1843	180,000 ohm, 1/2 W. resistor
29	SW 95103	Wave-change switch
30		4-35 mmf. trimmer condenser
33	RE 3913	390 ohm, 1/2 W. resistor
34	CG 9576	Gang condenser
35	CW 9535	.1-.1 mfd., 400 V. dual condenser.
38	RE 2743	270,000 ohm, 1/2 W. resistor
39	RE 6833	68,000 ohm, 1/2 W. resistor
41	RE 1033	10,000 ohm, 1/2 W. resistor
42	RE 4733	47,000 ohm, 1/2 W. resistor
43	RE 472412	4700 ohm, 1 W. resistor
44	CW 9535	.1-.1 mfd., 400 V. dual condenser
45	RE 103522	10,000 ohm, 2 W. resistor
46	CE 9568	8 mfd., 450 V. electrolytic condenser
47	RE 682522	6800 ohm, 2 W. resistor
49	RE 1513	150 ohm, 1/2 W. resistor
50	RE 1513	150 ohm, 1/2 W. resistor
51	CM 9513	.0001 mfd. mica condenser
52	RE 4733	47,000 ohm, 1/2 W. resistor
53	CM 9513	.0001 mfd. mica condenser -
54	RE 4743	470,000 ohm, 1/2 W. resistor
55	RE 4743	470,000 ohm, 1/2 W. resistor
56	CW 2-02	.02 mfd., 200 V. condenser
57	RE 2713	270 ohm, 1/2 W. resistor
58	RE 1043	100,000 ohm, 1/2 W. resistor
59	CW 6-002	.002 mfd., 600 V. condenser
60	CW 4-02	.02 mfd., 400 V. condenser
61	SW 95102	Tone control switch
62	RE 2253	2.2 meg., 1/2 W. resistor
63	RE 4743	470,000 ohm, 1/2 W. resistor
64	CW 2-10	.1 mfd., 200 V. condenser
65	VR 9561	Volume control - 2 meg. mid-tapped
66	RE 4743	470,000 ohm, 1/2 W. resistor
67	RE 3343	330,000 ohm, 1/2 W. resistor
68	RE 1043	100,000 ohm, 1/2 W. resistor
69	RE 271412	270 ohm, 1 W. resistor
70	CW 4-10	.1 mfd., 400 V. condenser
71	RE 1803	18 ohm, 1/2 W. resistor
72	CW 6-005	.005 mfd., 600 V. condenser
74		4-35 mmf. trimmer condenser - part of RC 95308
75	CS 9585	225-700 mmf. oscillator series (lag) condenser
77		4-35 mmf. trimmer condenser - part of RC 95309
79		4-35 mmf. trimmer condenser - part of RC 95310
80	CM 9545	4,050 mmf. mica condenser
82	CW 6-002	.002 mfd., 600 V. condenser
83	CM 9544	1375 mmf. mica condenser ...
84	CW 6-002	.002 mfd., 600 V. condenser
85	CM 9513	.0001 mfd. mica condenser
87	RC 95308	Broadcast oscillator coil
88	RC 95310	Short-wave oscillator coil
89	LP 9510	Dial lamp - 6.3 Volt, .25 Amp
90		Switch - part of VR 9561
91	CB 9512	Line cable and plug assembly
92	TR 95162	Power transformer - 105-125 V., 50-60 Cycle
96	CE 9554	18 mfd., 450 V. electrolytic condenser
97	CE 9562	18 mfd., 300 V. electrolytic condenser
98		1 meg., 1/4 W. resistor - part of CB 95151
99		Speaker plug - part of speaker
100	RE 1033	10,000 ohm, 1/2 W. resistor
102	CL 9572	Speaker field coil
106	DM 9528	Speaker diaphragm
109	TR 95150	Speaker output transformer
113	SK 9585	Speaker
116	CW 2-02	.02 mfd., 200 V. condenser
117	CW 9547	.5 mfd., 400 V. condenser
118	RC 95309	Police oscillator coil
124	CB 95151	Tuning tube cable and plug assembly
136	SW 95101	Switch
137	MO 951	Motor
138	SW 9582	Motor reversing switch
139	RE 95144	1.5 ohm resistor
140	SW 9584	Switch
141	SW 9599	Switch

HERE'S NEWS!

PUBLICATION
OF
SUCCESSFUL SERVICING

Rider's *FREE* House-organ Resumed July 1946!

A publication dedicated to the technical and financial advancement of the electronic maintenance man.

It will keep you abreast of new developments in the electronic field, timely articles on practical maintenance, changes in manufacturer's schematics, etc. . . . these are vital to you . . . this FREE service is yours for the asking.

Mail This Coupon TODAY!

JOHN F. RIDER PUBLISHER, INC.
Att.: Successful Servicing
404 Fourth Avenue
New York 16, N. Y.

(Please PRINT your NAME and ADDRESS)

Kindly mail your FREE house-organ SUCCESSFUL SERVICING to:

....
Name

....
Street

....
City Zone State

Check the following . . .

Are you a — SERVICEMAN ☐
DEALER ☐
ENGINEER ☐
HAM ☐
STUDENT ☐

PERPETUAL

TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

VOLUME XII

by

JOHN F. RIDER

JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue New York 16, N. Y.

Other RIDER *Books*

INSIDE THE VACUUM TUBE

CATHODE-RAY TUBE AT WORK

SERVICING SUPERHETERODYNES

SERVICING RECEIVERS BY MEANS OF RESISTANCE MEASUREMENT

PERPETUAL TROUBLE SHOOTER'S MANUAL

VOLUMES I TO V ABRIDGED (ONE VOLUME)
VOLUME VI
VOLUME VII
VOLUME VIII
VOLUME IX
VOLUME X
VOLUME XI
VOLUME XII
VOLUME XIII
VOLUME XIV

AUTOMATIC RECORD CHANGERS AND RECORDERS

ALIGNING PHILCO RECEIVERS, VOLUMES I AND II

AUTOMATIC FREQUENCY CONTROL SYSTEMS

FREQUENCY MODULATION

SERVICING BY SIGNAL TRACING

THE OSCILLATOR AT WORK

THE METER AT WORK

VACUUM TUBE VOLTMETERS

RESONANCE AND ALIGNMENT

AUTOMATIC VOLUME CONTROL

ALTERNATING CURRENTS IN RADIO RECEIVERS

D-C. VOLTAGE DISTRIBUTION IN RADIO RECEIVERS

AUTOMATIC RECORD CHANGERS AND RECORDERS

A-C. CALCULATION CHARTS BY R. LORENZEN

The servicing data appearing on Philco, RCA and other pages carrying individual copyright notices, are copyrighted by the respective companies and are reproduced herein with their permission.

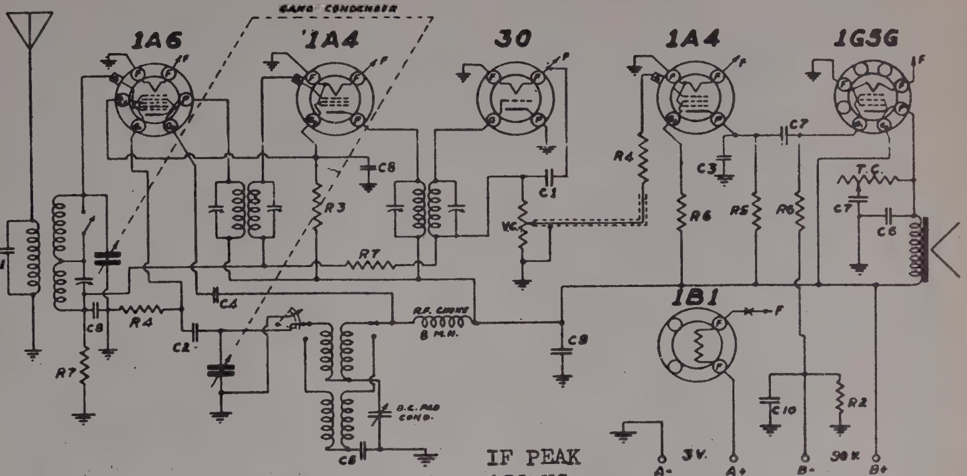
Entire contents copyrighted 1941, *by John F. Rider.*

Printed in U. S. A.

This edition is produced in full compliance with
the Government regulations for conserving paper.

MODELS B10543,B10544

ALLIED RADIO CORP.



IF PEAK
456 KC

CONDENSERS

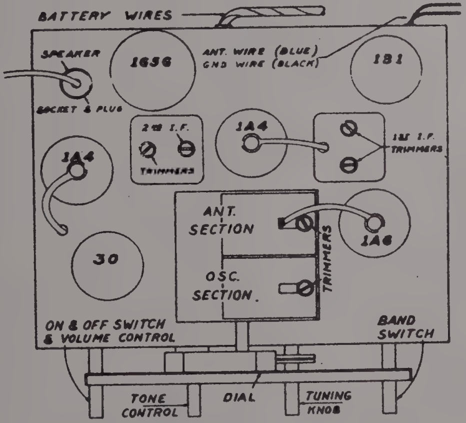
Nº	MFD.	
1	.0001	MICA
2	.00025	"
3	.0005	"
4	.001	"
5	.0015.	"
6	.002	200 VOLTS
7	.01	200 "
8	.05	200 "
9	.25	
10	10.0	ELECT. 25 V.

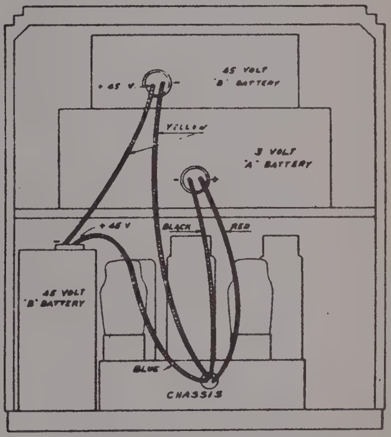
RESISTORS

Nº	OHMS	WATTS
1	50.	1/4
2	535. ± 5%	1/2
3	10,000.	1/3
4	50,000.	1/4
5	200,000.	1/4
6	1. MEG.	1/4
7	2. MEG.	1/4

V.C. - VOLUME CONTROL - 1 MEGOHM.
T.C. - TONE CONTROL - 100,000 OHMS.
SWITCHES IN BROADCAST POSITION.

FREQUENCY RANGE -
535 to 1730 KC
2.2 to 6.5 MC





IF ALIGNMENT - Wave change Sw. in BC position. Gang condenser at minimum, generator at 456 KC, output to 1A6 CG thru .05 MFD condenser, Generator grounded to receiver, align four trimmers of IF transformers.

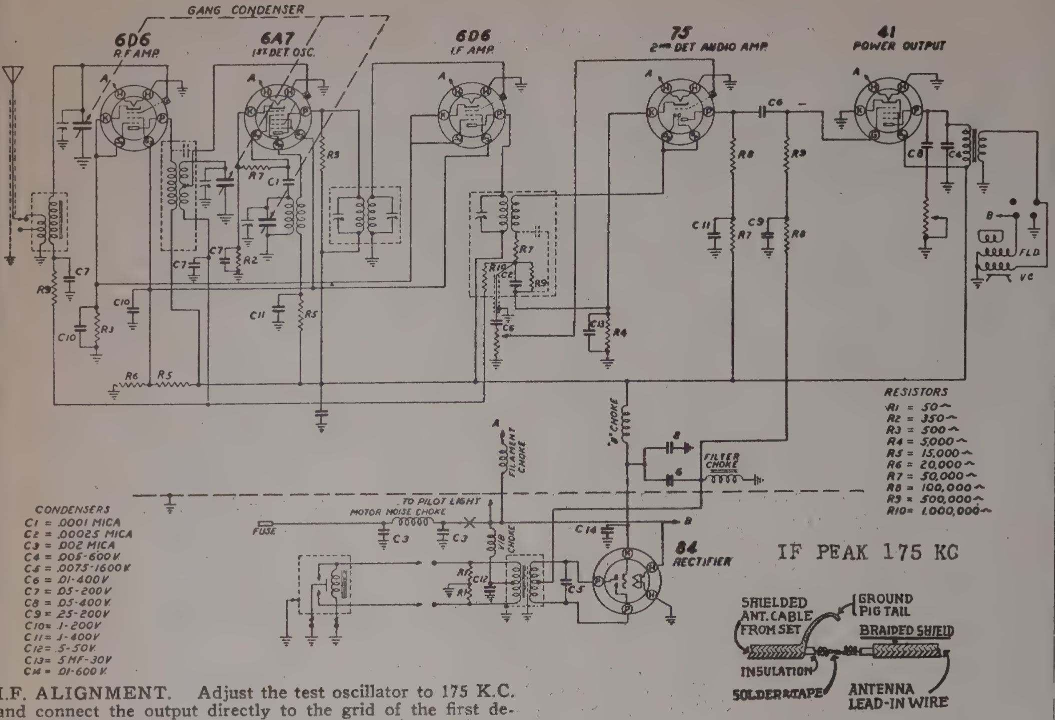
BROADCAST - Generator connected to antenna lead thru 200 MMFD condenser, and set at 1400 KC. Gang condenser at minimum. Trim oscillator then Antenna trimmers. Pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - Generator at 6000 KC, start rotating gang condenser from HF end, when signal is heard, adjust antenna trimmer (SW) for maximum peak.

Repeat all adjustments for maximum performance.

MODEL B10550

ALLIED RADIO CORP.



CONDENSERS
C1 = .0001 MICA
C2 = .00025 MICA
C3 = .002 MICA
C4 = .005-600V.
C5 = .0075-1600V.
C6 = .01-400V
C7 = .05-200V
C8 = .05-400V.
C9 = 25-200V
C10 = .1-200V
C11 = .1-400V
C12 = .5-50V.
C13 = 5MF-30V
C14 = .01-600V.

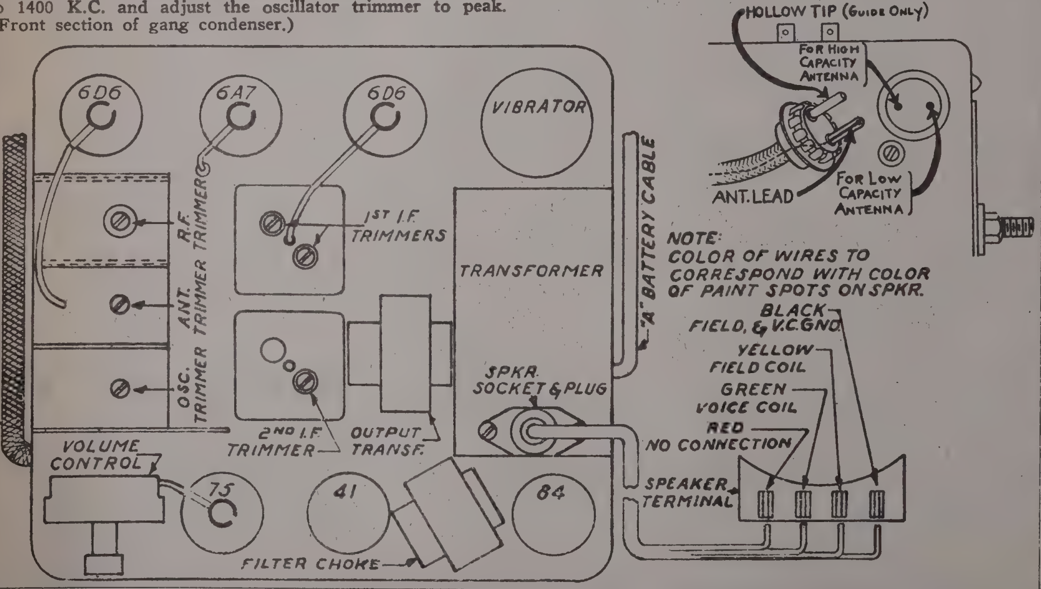
RESISTORS
R1 = 50~
R2 = 350~
R3 = 500~
R4 = 5,000~
R5 = 15,000~
R6 = 20,000~
R7 = 50,000~
R8 = 100,000~
R9 = 500,000~
R10 = 1,000,000~

IF PEAK 175 KC

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

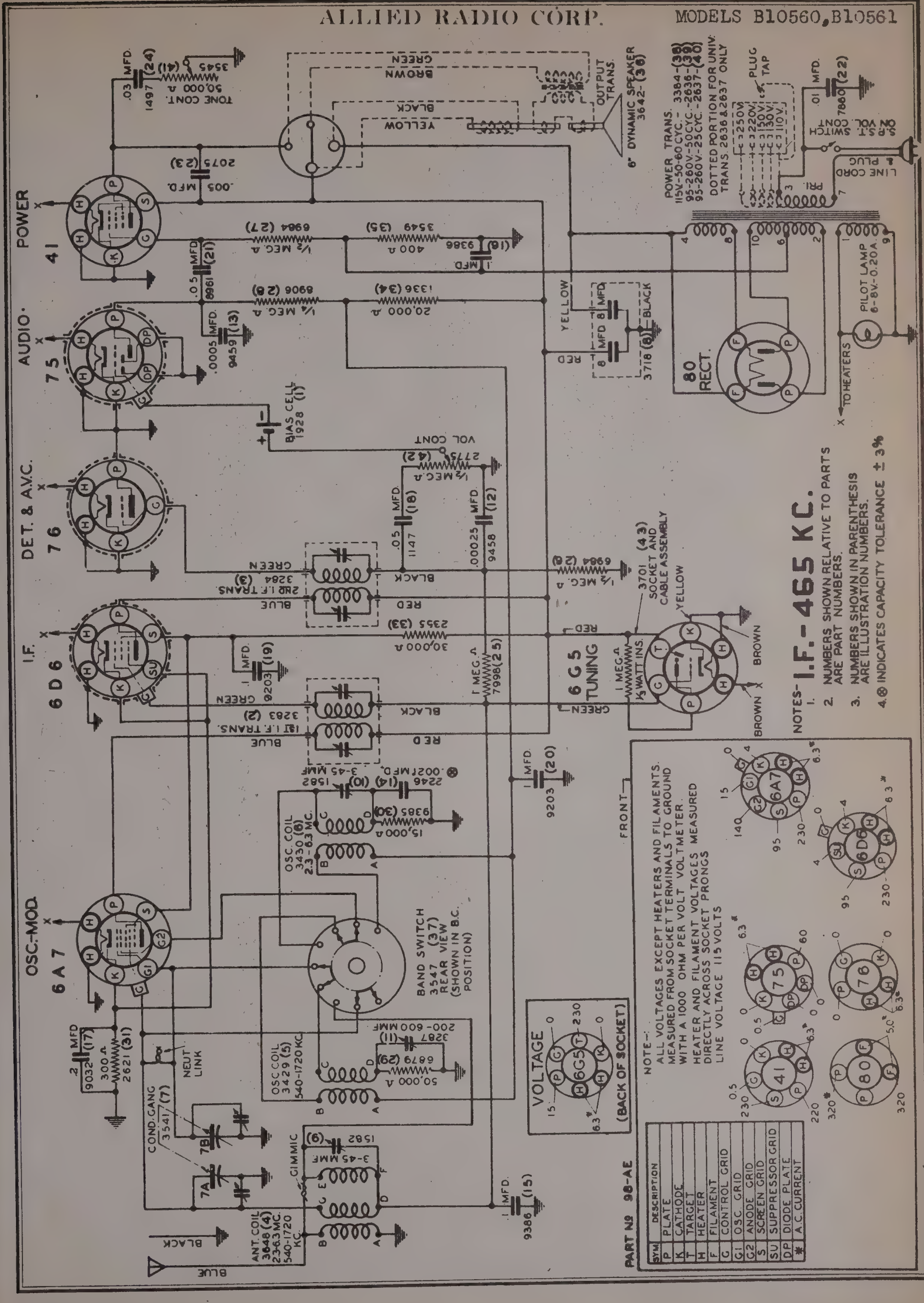
R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.



NOTE: COLOR OF WIRES TO CORRESPOND WITH COLOR OF PAINT SPOTS ON SPKR.
BLACK FIELD, & V.C. GND.
YELLOW FIELD COIL
GREEN VOICE COIL
RED NO CONNECTION

ALLIED RADIO CORP.

MODELS B10560,B10561



POWER TRANS.
115V-50-60CYC.- 3384-(38)
95-260V-50CYC.-2636-(39)
95-260V-25CYC.-2637-(40)
DOTTED PORTION FOR UNIV. TRANS. 2636&2637 ONLY

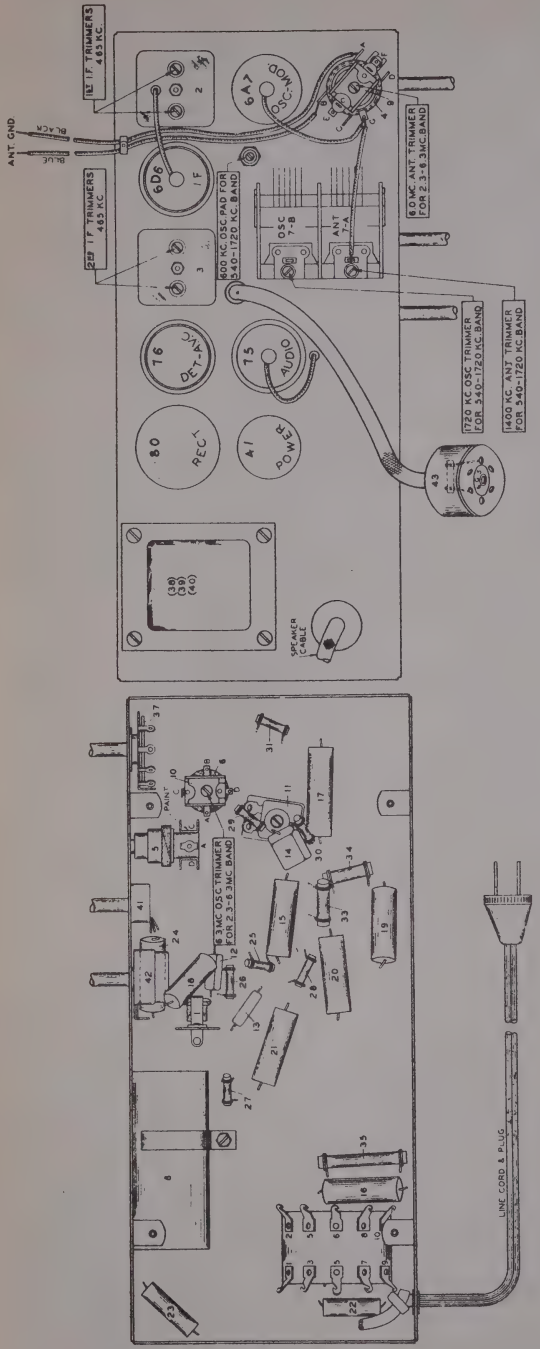
NOTES-
1. I.F. - 465 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ± 3%

NOTE:- ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET PRONGS. LINE VOLTAGE 115 VOLTS

PART NO 98-AE

SYM	DESCRIPTION
P	PLATE
K	CATHODE
T	TARGET
H	HEATER
F	FILAMENT
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID
DP	DIODE PLATE
*	A.C. CURRENT

ALLIED RADIO CORP.


1st I.F. TRIMMERS 465 KC.
2nd I.F. TRIMMERS 465 KC
ANT. GND.
BLACK
BLUE
6A7 OSC.-MOD.
6D6 I.F.
76 DET-AVC
75 AUDIO
80 RECT
41 POWER
43
600 KC. OSC. PAD FOR 540-1720 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.3-6.3 MC. BAND
OSC 7-B
ANT 7-A
1720 KC. OSC TRIMMER FOR 540-1720 KC. BAND
1400 KC. ANT TRIMMER FOR 540-1720 KC. BAND
(38) (39) (40)
SPEAKER CABLE
6.3 MC OSC TRIMMER FOR 2.3-6.3 MC. BAND
PAINT
LINE CORD & PLUG

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.

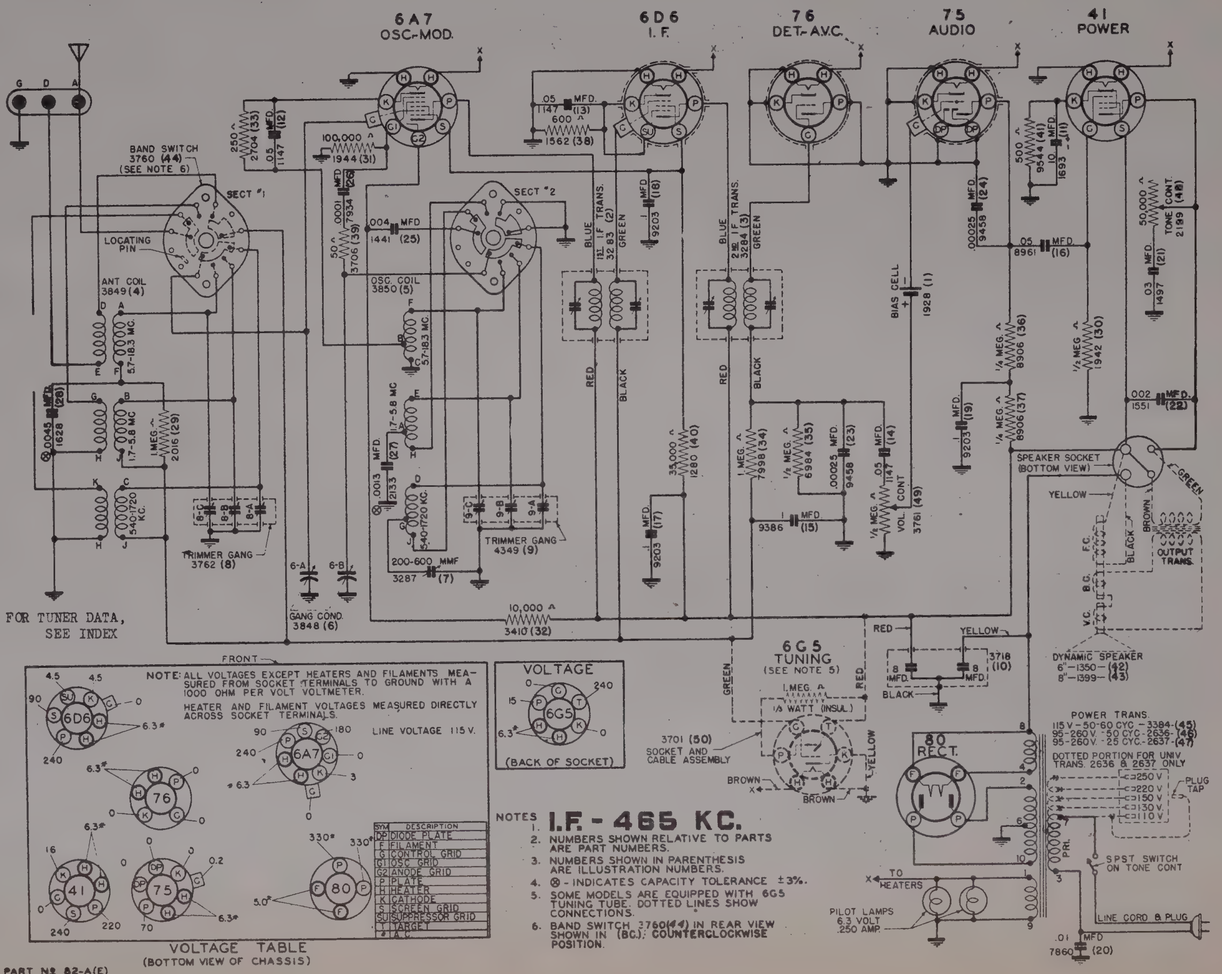
(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.

(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.

ALLIED RADIO CORP.

MODELS B10572, B10585, B10586



FOR TUNER DATA, SEE INDEX

NOTE: ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.

HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

LINE VOLTAGE 115 V.

SYM	DESCRIPTION
DP	DIODE PLATE
F	FILAMENT
G	CONTROL GRID
G1	OSC GRID
G2	ANODE GRID
P	PLATE
H	HEATER
K	CATHODE
S	SCREEN GRID
SU	SUPPRESSOR GRID
T	TARGET
*	A.C.

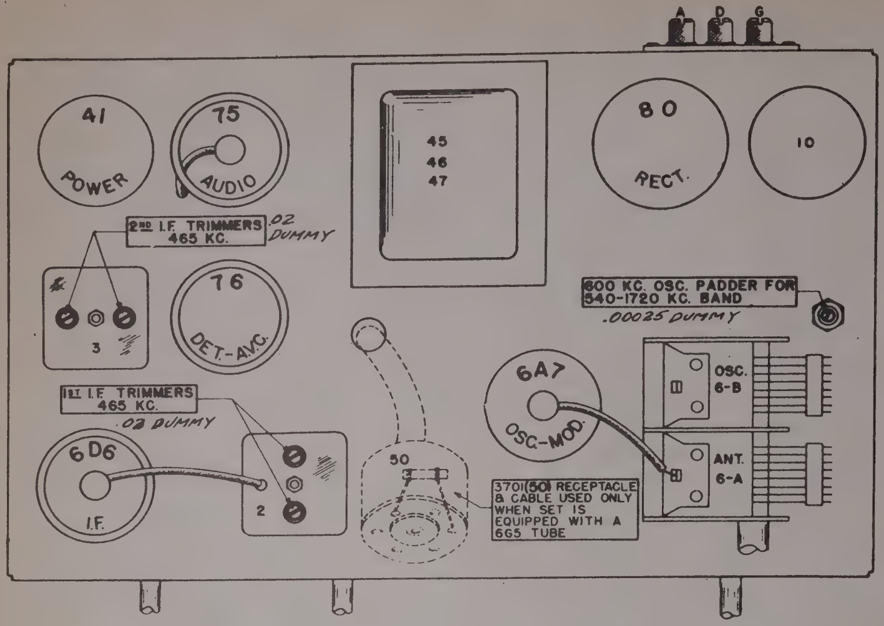
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART Nº 82-A(E)

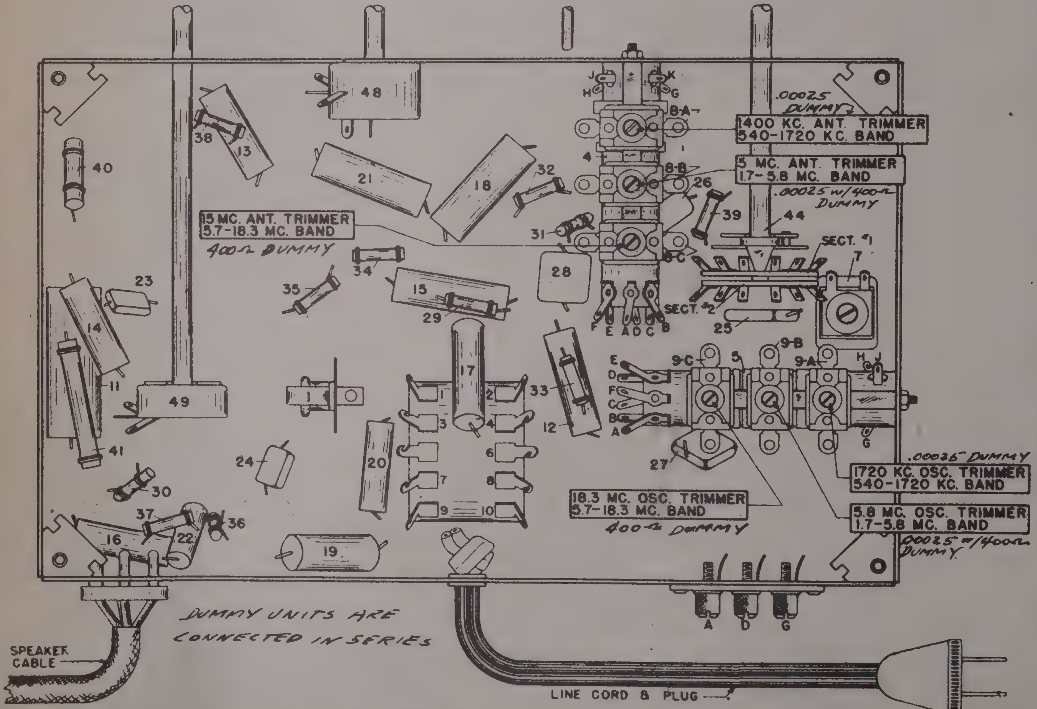
NOTES
1. **I.F. - 465 KC.**
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ - INDICATES CAPACITY TOLERANCE ±3%.
5. SOME MODELS ARE EQUIPPED WITH 6G5 TUNING TUBE. DOTTED LINES SHOW CONNECTIONS.
6. BAND SWITCH 3760(44) IN REAR VIEW SHOWN IN (BC.): COUNTERCLOCKWISE POSITION.

MODELS B10572,B10585,
B10586

ALLIED RADIO CORP.


A
D
G
41
POWER
75
AUDIO
45
46
47
80
RECT.
10
2ND I.F. TRIMMERS 465 KC.
.02 DUMMY
3
76
DET.-A.V.C.
600 KC. OSC. PADDER FOR 540-1720 KC. BAND
.00025 DUMMY
6A7
OSC.-MOD.
OSC. 6-B
ANT. 6-A
1ST I.F. TRIMMERS 465 KC.
.02 DUMMY
6D6
I.F.
2
50
3701(50) RECEPTACLE & CABLE USED ONLY WHEN SET IS EQUIPPED WITH A 6G5 TUBE

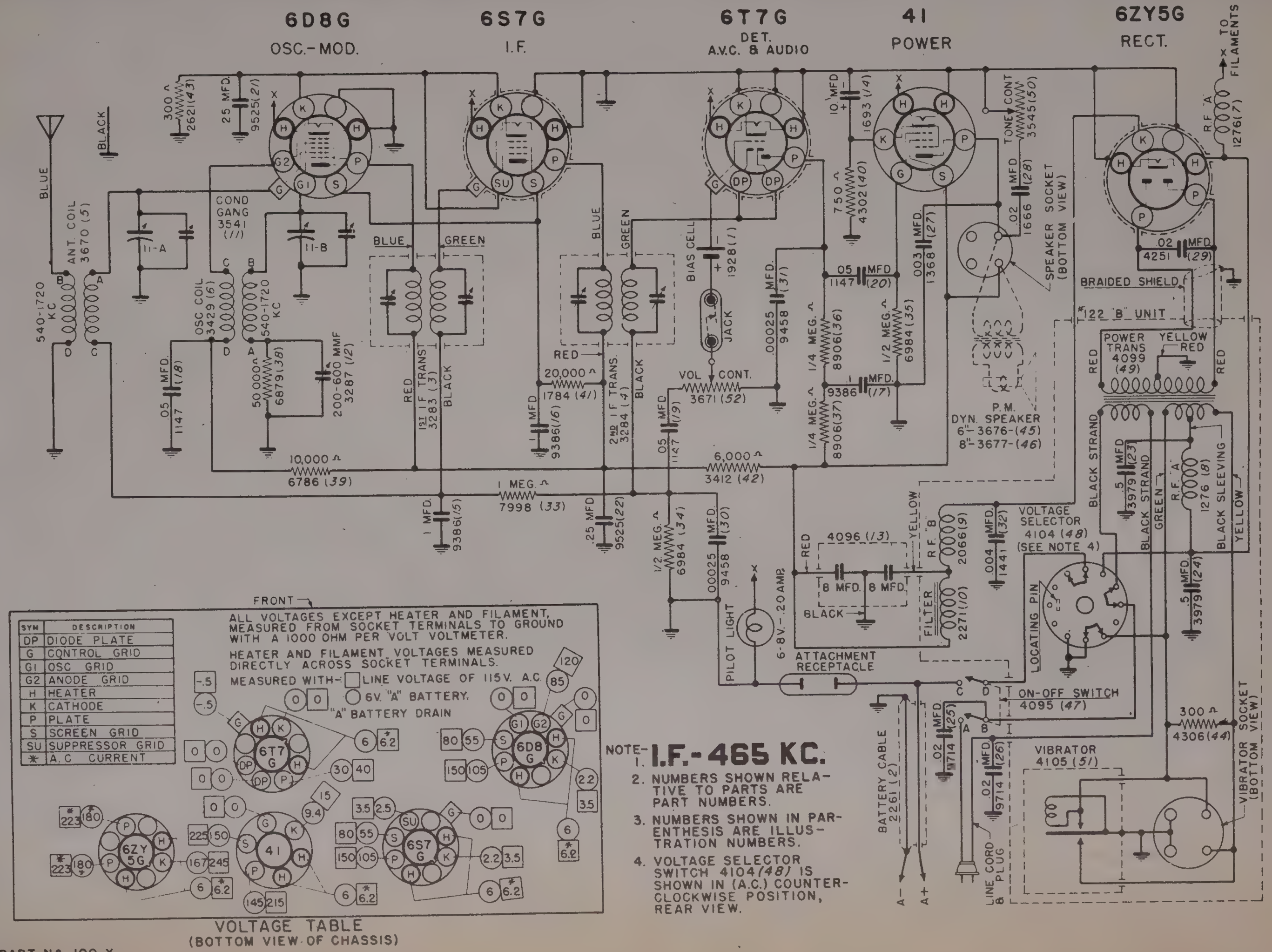
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



DUMMY UNITS ARE CONNECTED IN SERIES

MODEL B10575

ALLIED RADIO CORP.



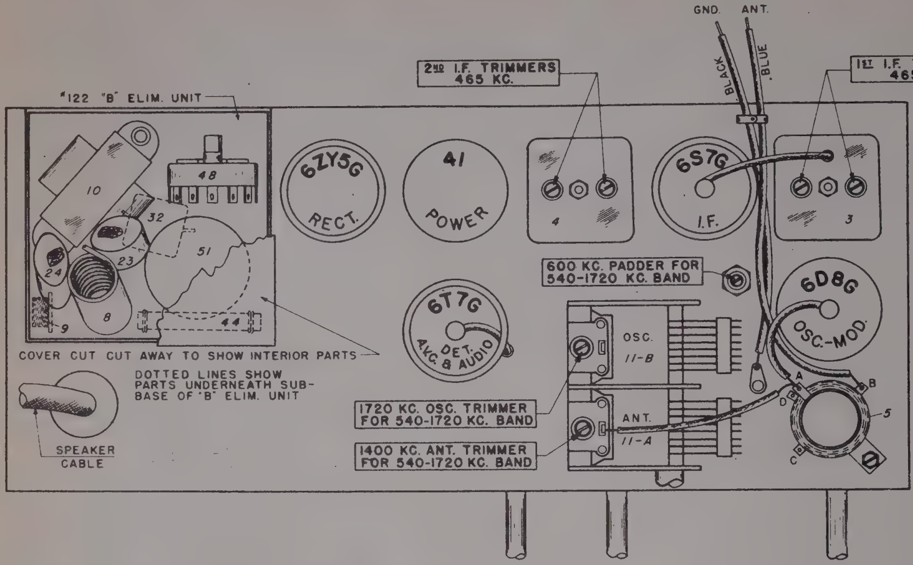
SYM	DESCRIPTION
DP	DIODE PLATE
G	CONTROL GRID
GI	OSC GRID
G2	ANODE GRID
H	HEATER
K	CATHODE
P	PLATE
S	SCREEN GRID
SU	SUPPRESSOR GRID
*	A.C CURRENT

NOTE-1. **I.F.-465 KC.**
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. VOLTAGE SELECTOR SWITCH 4104*(48)* IS SHOWN IN (A.C.) COUNTER-CLOCKWISE POSITION, REAR VIEW.

PART Nº 100-X

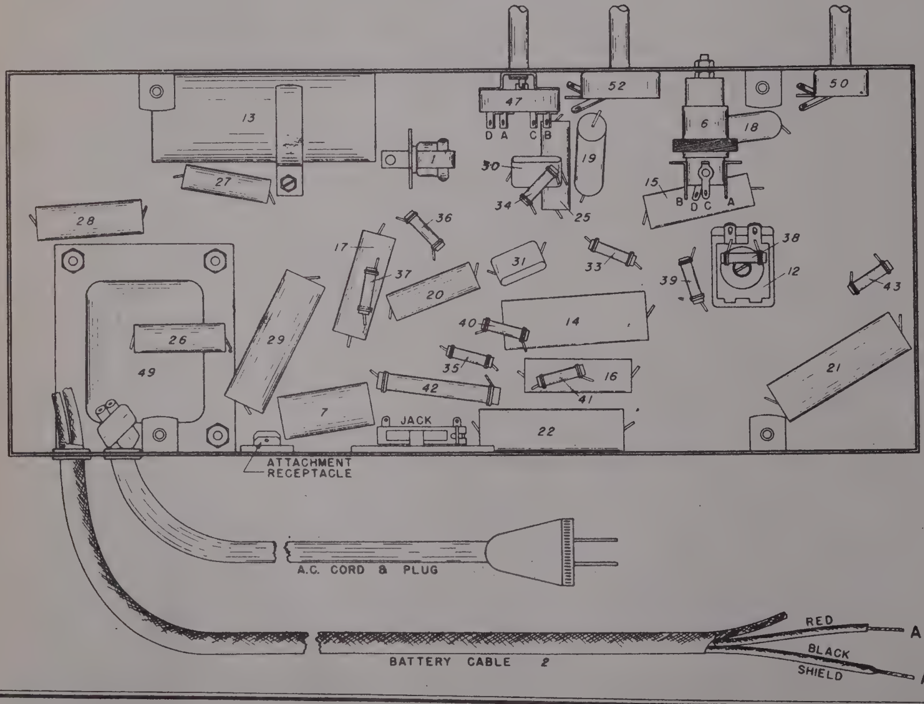
MODEL B10575

ALLIED RADIO CORP.


GND.
ANT.
BLACK
BLUE
2ND I.F. TRIMMERS 465 KC.
1ST I.F. TRIMMERS 465 KC.
#122 "B" ELIM. UNIT
10
48
32
51
23
24
8
9
44
6ZY5G RECT.
41 POWER
4
6S7G I.F.
3
600 KC. PADDER FOR 540-1720 KC. BAND
6D8G OSC.-MOD.
6T7G DET. AVC. & AUDIO
OSC. 11-B
ANT. 11-A
A
B
C
D
5
1720 KC. OSC. TRIMMER FOR 540-1720 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
COVER CUT CUT AWAY TO SHOW INTERIOR PARTS
DOTTED LINES SHOW PARTS UNDERNEATH SUB-BASE OF "B" ELIM. UNIT
SPEAKER CABLE

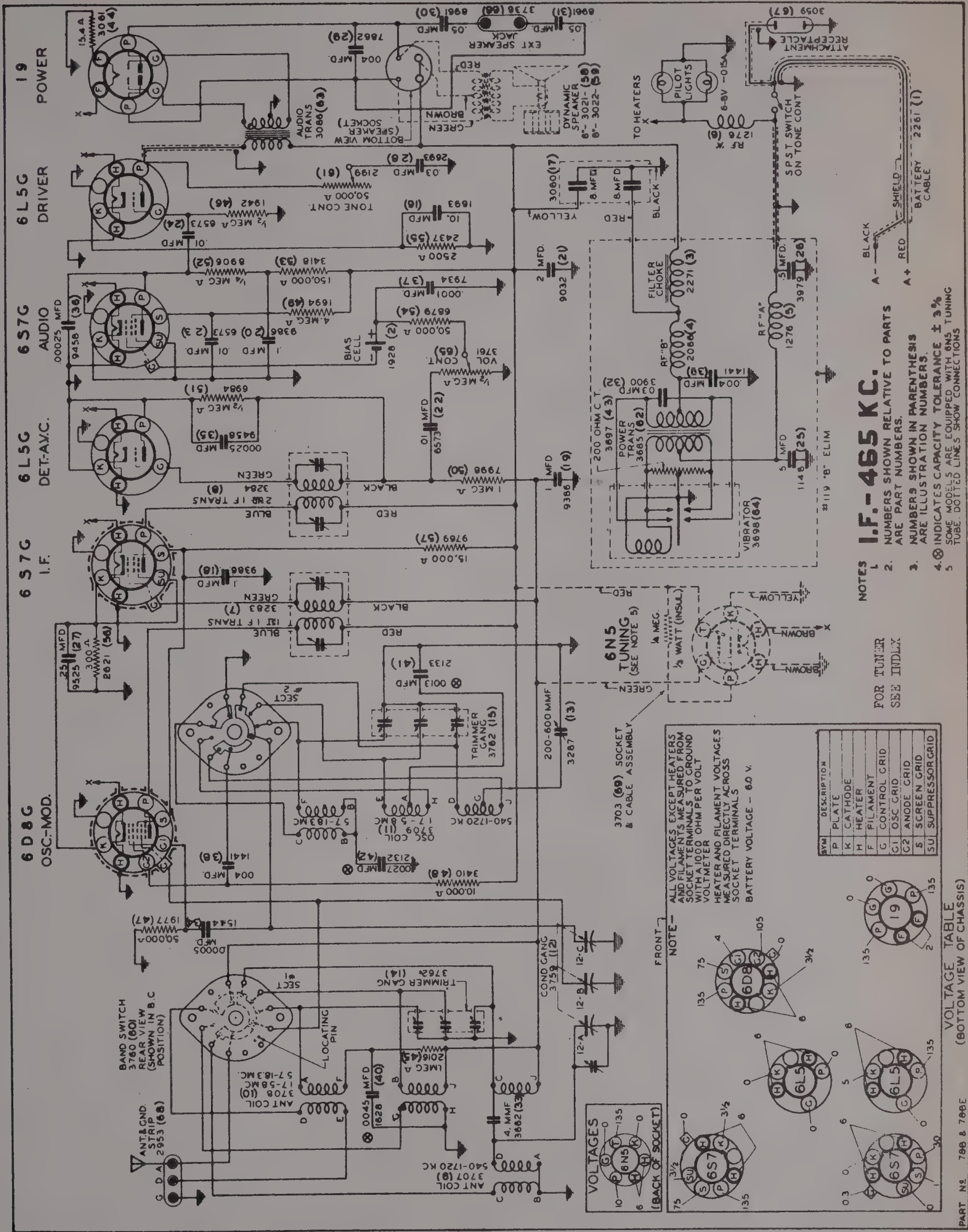
USE THE FOLLOWING DUMMY ANTENNAS----
I.F.---.02 MFD CONDENSER
540-1720 KC---.00025 MFD CONDENSER
(CONNECT DUMMIES IN SERIES WITH SIGNAL LEAD)

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



MODELS B10600,B10601,B10602,
B10604,B10605.
B10603

ALLIED RADIO CORP.



NOTES
1. I.F.-465 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ± 3%
5 SOME MODELS ARE EQUIPPED WITH 6N5 TUNING TUBE. DOTTED LINES SHOW CONNECTIONS

FOR TUNER SEE INDEX

NOTE— ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. BATTERY VOLTAGE — 6.0 V.

SYM	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
F	FILAMENT
G	CONTROL GRID
G1	OSC GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID

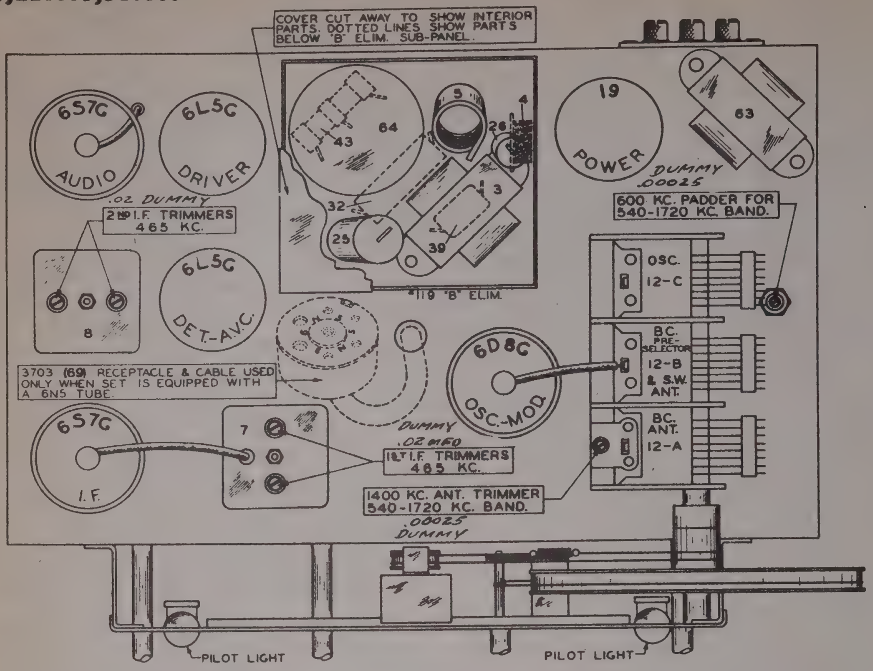
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)

VOLTAGES (BACK OF SOCKET)

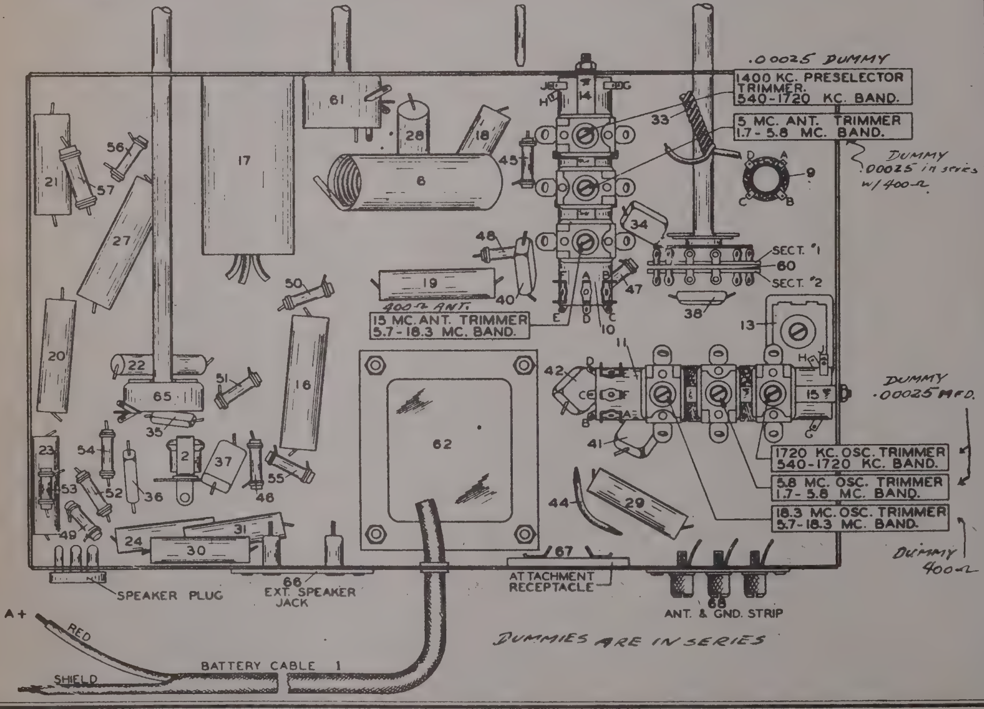
PART Nº 788 & 788E

MODELS B10600,B10601,B10602,
B10603,B10604,B10605

ALLIED RADIO CORP.

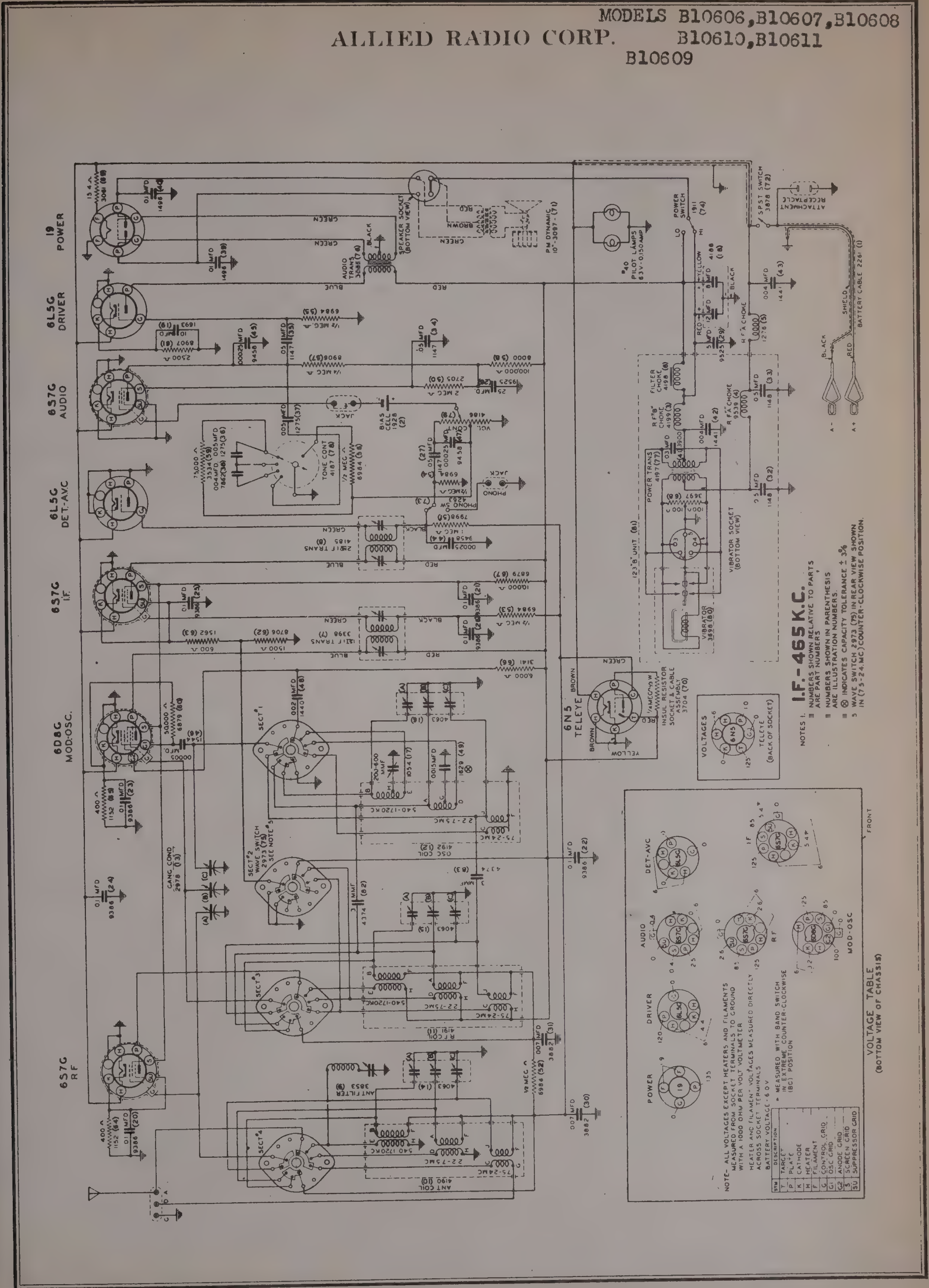

COVER CUT AWAY TO SHOW INTERIOR PARTS. DOTTED LINES SHOW PARTS BELOW 'B' ELIM. SUB-PANEL.
6S7G AUDIO
6L5G DRIVER
6L5G DET.-A.V.C.
6S7G I.F.
6D8G OSC.-MOD.
19 POWER
64
43
5
4
26
3
32
25
39
63
#119 'B' ELIM.
.02 DUMMY
2ND I.F. TRIMMERS 465 KC.
8
3703 (69) RECEPTACLE & CABLE USED ONLY WHEN SET IS EQUIPPED WITH A 6N5 TUBE.
7
DUMMY .02 MFD
1ST I.F. TRIMMERS 465 KC.
1400 KC. ANT. TRIMMER 540-1720 KC. BAND.
.00025 DUMMY
DUMMY .00025
600 KC. PADDER FOR 540-1720 KC. BAND.
OSC. 12-C
B.C. PRE-SELECTOR 12-B & S.W. ANT.
B.C. ANT. 12-A
PILOT LIGHT
PILOT LIGHT

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



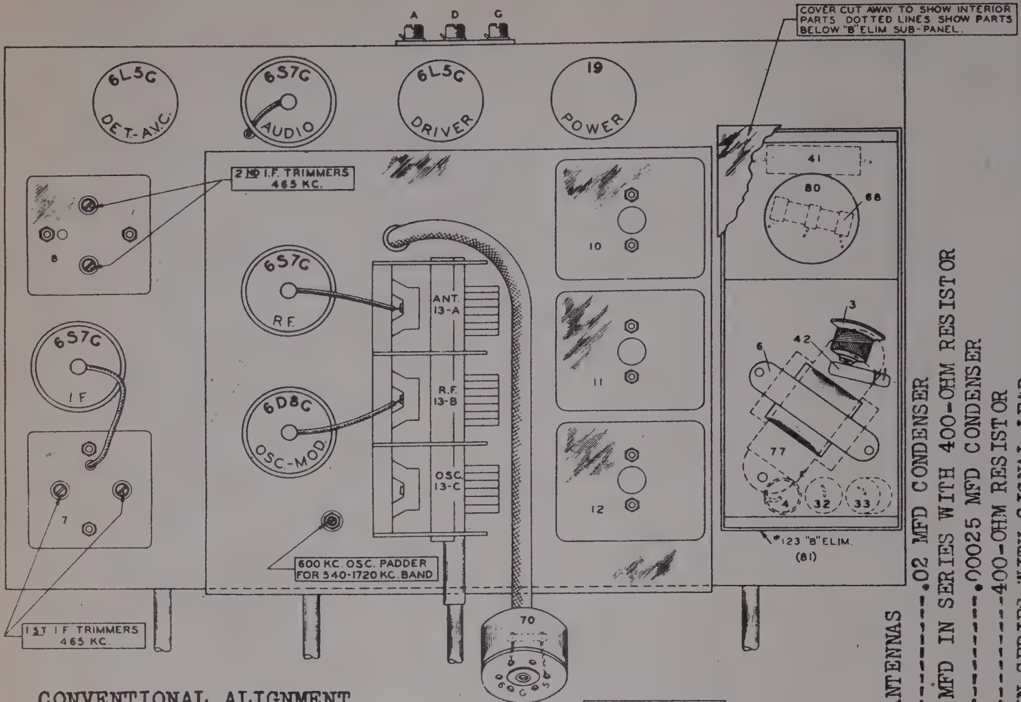
MODELS B10606,B10607,B10608
B10610,B10611
B10609

ALLIED RADIO CORP.



MODELS B10606,B10607,B10608,
B10609,B10610,B10611

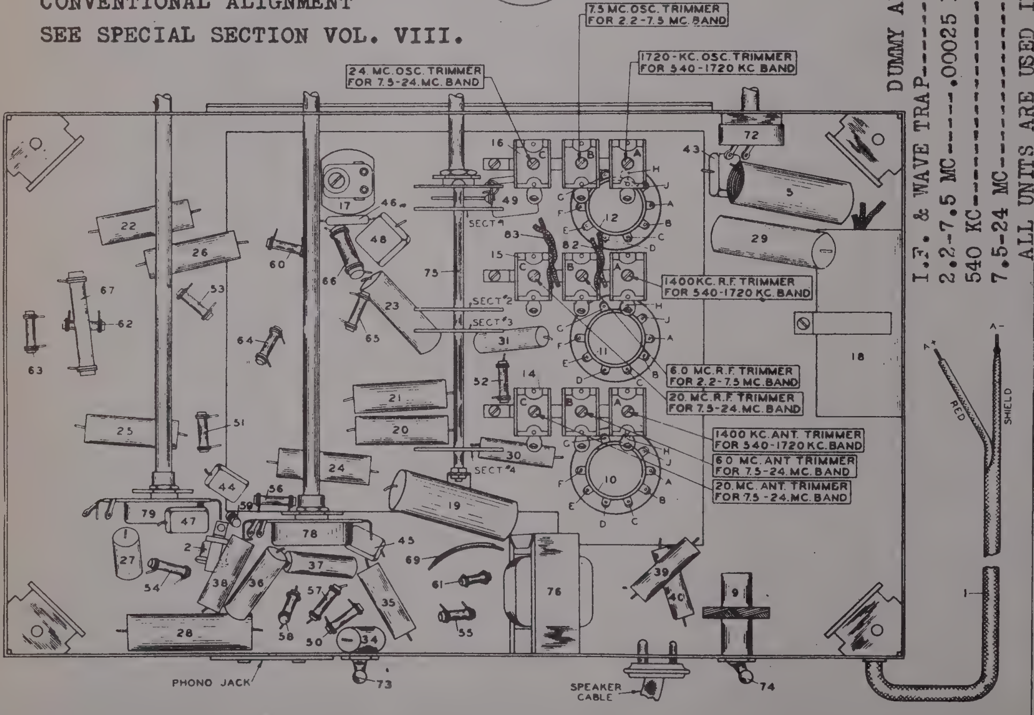
ALLIED RADIO CORP.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

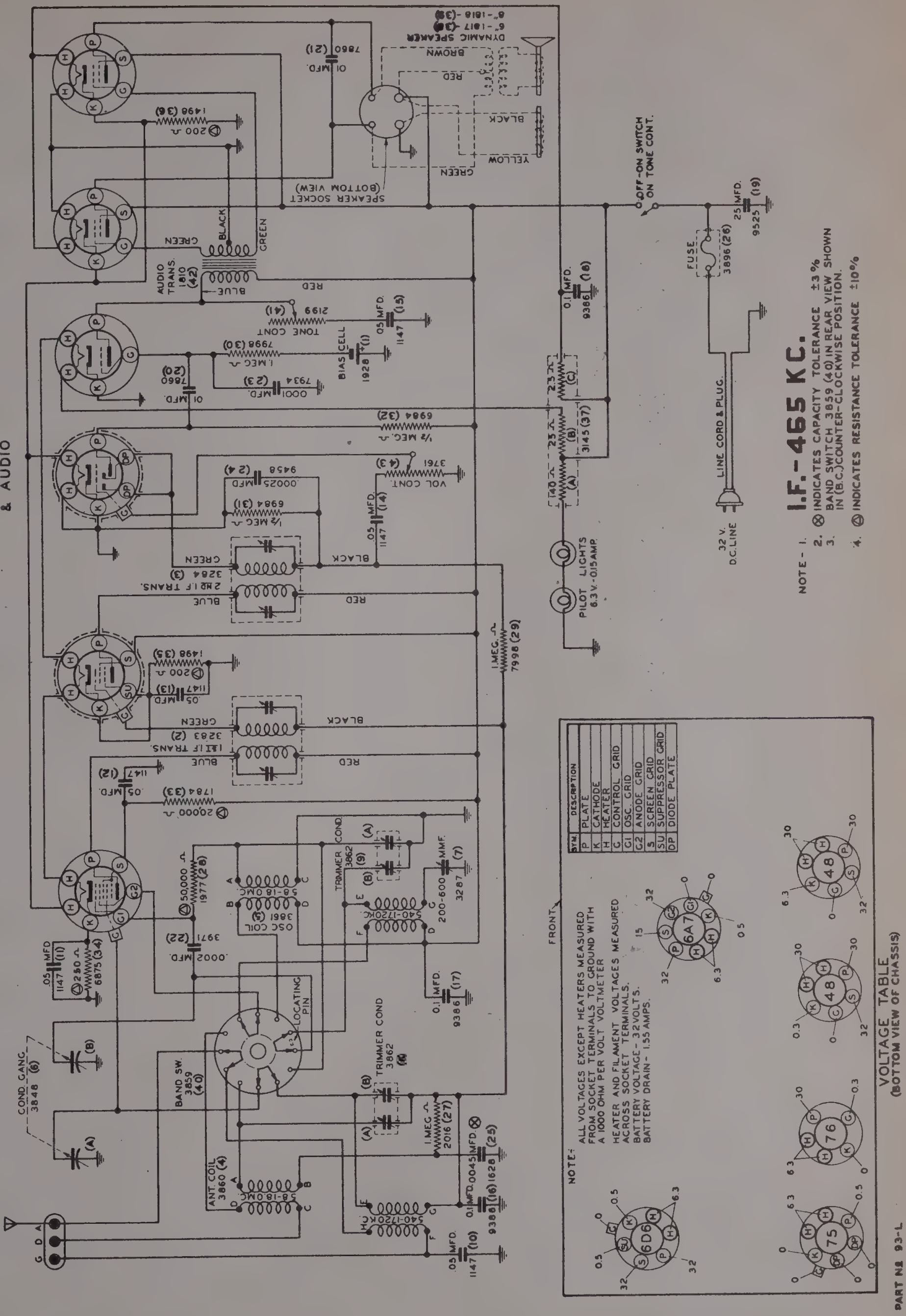
DUMMY ANTENNAS

I.F. & WAVE TRAP------------.02 MFD CONDENSER
2.2-7.5 MC------.00025 MFD IN SERIES WITH 400-OHM RESISTOR
540 KC-------------------.00025 MFD CONDENSER
7.5-24 MC-----------------400-OHM RESISTOR
ALL UNITS ARE USED IN SERIES WITH SIGNAL LEAD


7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
1720-KC. OSC. TRIMMER FOR 540-1720 KC BAND
24. MC. OSC. TRIMMER FOR 7.5-24. MC. BAND
1400 KC. R.F. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
20. MC. R.F. TRIMMER FOR 7.5-24. MC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. ANT. TRIMMER FOR 7.5-24. MC. BAND
20. MC. ANT. TRIMMER FOR 7.5-24. MC. BAND
SECT #1
SECT #2
SECT #3
SECT #4
A
B
C
D
E
F
G
H
J
1
2
5
9
10
11
12
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
34
35
36
37
38
39
40
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
69
72
73
74
75
76
78
79
82
83
PHONO JACK
SPEAKER CABLE
A+
A-
RED
SHIELD

MODELS B10612,B10615,B10617

ALLIED RADIO CORP.



NOTE - 1. I.F.-465 K C.
2. ⊗ INDICATES CAPACITY TOLERANCE ±3%
3. BAND SWITCH 3859 (40) IN REAR VIEW SHOWN IN (B.C.) COUNTER-CLOCKWISE POSITION.
4. ◎ INDICATES RESISTANCE TOLERANCE ±10%

NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER AND FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS.
BATTERY VOLTAGE - 32 VOLTS.
BATTERY DRAIN - 1.55 AMPS.

SYM.	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
C	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID
DP	DIODE PLATE

VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

ELIMINATION OF INTERFERENCE CAUSED BY A 32-VOLT LIGHT PLANT

General

Two kinds of static-like noise may be heard when you operate your 32 volt radio at the same time the generating plant is charging the plant batteries.

Static-like noise, due to the action of the brushes on the commutator, may reach the set through the supply lines. Such noise can generally be eliminated by the use of .5 Mfd. 200 volt condensers, as shown in Figs. 1 and 3.

Static-like noise, due to the operation of the high tension circuit may radiate through the air to the antenna of the set. Radiation has been found to extend a half mile in extreme cases. Proper placement of the antenna, along with the use of a spark plug suppressor and correct shielding will entirely eliminate this type of noise.

When eliminating these electrical disturbances always apply the remedies given in the order in which they appear.

Usual Installations

Install spark plug suppressor on the spark plug and connect the high tension lead to the suppressor, as shown in Figure 3.

For four cylinder plants use four spark plug suppressors, one attached to each spark plug.

CAUTION: Disconnect batteries from generator before attaching suppressor equipment.

Connect one .5 Mfd. 200 volt condenser between one positive brush and the generator frame and one condenser between one negative brush and the generator frame as shown in Figure 1.

FOUR CYLINDER PLANTS. For four cylinder plants attach a condenser to the positive and negative brushes as shown in Figure 2.

Extreme Cases

To determine if the high tension wiring is radiating into the antenna disconnect the antenna and ground from the receiver and if the noise is eliminated or materially reduced, the noise is being picked up by the antenna. In such a case, obtain a piece of electrician's loom which will just slide over the high tension wire and a piece of copper braid shielding which will just slip over the loom. Cut a piece of loom just long enough to cover the high tension wire from the coil to the spark plug suppressor. Cut a piece of shielding that will be one inch shorter than the loom when the shielding is extended over the loom.

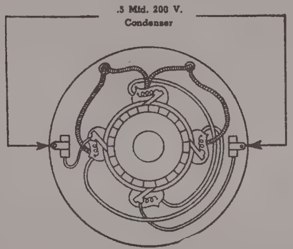


Fig. 1

Ignition Noise on Battery Leads

Sometimes the ignition interference will travel up the battery leads. This condition can be corrected as follows: Attach a .5 Mfd. condenser between the POSITIVE terminal at the top of the control box and the frame of the box. (Be sure the frame of the box is well grounded to the generator frame.) Attach a .5 Mfd. condenser between the NEGATIVE terminal at the top of the control box and the control box frame.

Ignition Interference on Supply Leads

In extreme cases the ignition interference will travel up the supply leads to the radio receiver. This condition can be corrected by attaching a .5 Mfd. condenser between the ungrounded side of the line (in the main switch box) and ground (or the grounded side of the line if one side of the line is grounded).

Grounding

Some cases may require a thorough grounding of the system. This may be accomplished by running a No. 12 B. & S. gauge wire from the generator frame to a good ground. Conduit and metal switch boxes should also be grounded.

If it is necessary to ground one side of the supply lines, first ground them temporarily, one at a time through a 32 volt lamp. One side of the line will light the light, the other will not. The side which WILL NOT light the light should be grounded.

DO NOT apply any of the remedies listed under "Extreme Cases", before trying the ones listed under "Usual Cases".

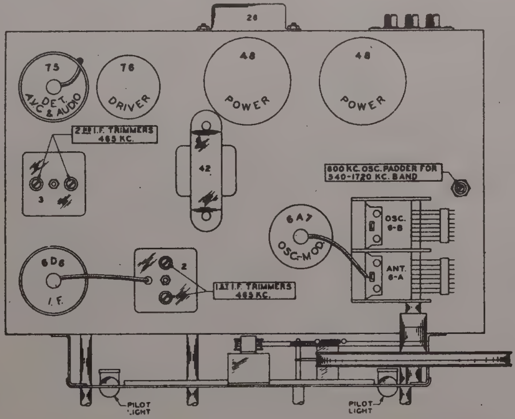
Slip the loom over the high tension lead. Slip the shielding over the loom so that it is one-half inch from each end of the loom. Wrap some fine copper wire around the shielding near the end of the shielding to hold the shielding in place. Solder the wire to the shielding so it will not slip due to plant vibration. The shield may be taped in place if the tape is very adhesive. DO NOT USE FRICTION TAPE.

Solder a short braid pig-tail to the shielding and ground it under the nearest screw in the generator frame.

This receiver is designed for operation on 32 volt battery plants only and must not be used on battery plants of a HIGHER RATED VOLTAGE than 32 volts without a voltage regulator.

The power plug attached to the end of the power cord must be inserted correctly IN THE 32 VOLT POWER SUPPLY OUTLET OR RECEPTACLE, OTHERWISE THE SET WILL NOT OPERATE. If after inserting the plug and turning the receiver on, the set does not operate after approximately two minutes, remove this plug and turn it half-way around and reinsert it in the power receptacle.

A 4 AMPERE FUSE is located on the back of the chassis underneath receptacle marked "Fuse" and protects the receiver from damage should a defect occur in the set or if it is connected to the improper power supply. Continued burning out of fuses on the proper power supply is indicative of some defect. THE WARRANTY IS VOID IF THE RECEIVER IS OPERATED WITH THE FUSE SHORTED OUT OR WITH A FUSE LARGER THAN 4 AMPERES.



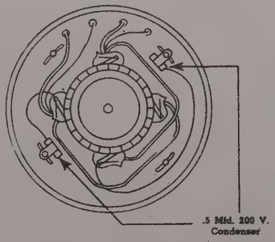


Fig. 2

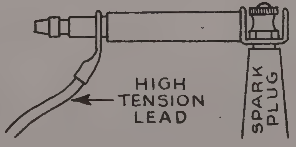
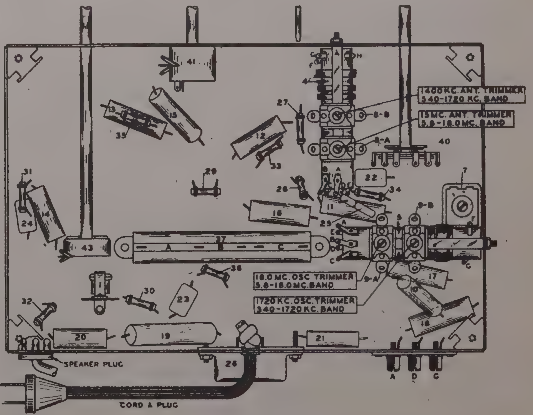
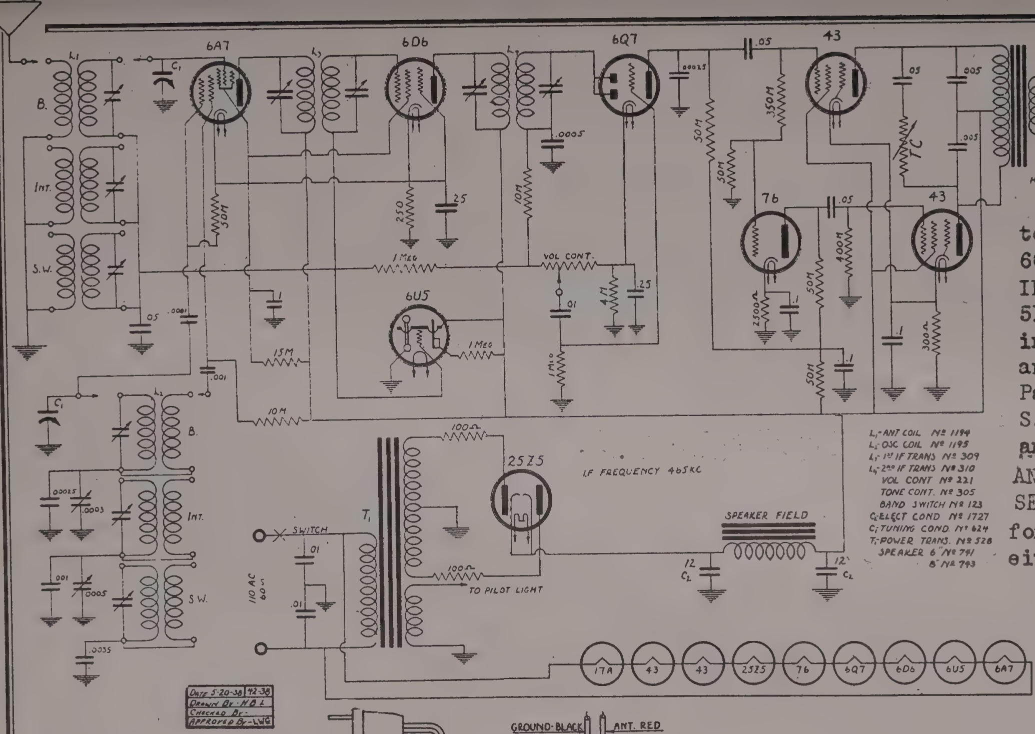


Fig. 3


41
13
15
35
12
27
33
1400 KC. ANT. TRIMMER 540-1720 KC. BAND
15 MC. ANT. TRIMMER 5.8-18.0 MC. BAND
8-B
8-A
40
31
24
14
29
28
22
34
7
43
16
11
25
37
A
B
C
9-B
9-A
5
38
30
23
17
10
18
18.0 MC. OSC TRIMMER 5.8-18.0 MC. BAND
1720 KC. OSC. TRIMMER 540-1720 KC. BAND
32
20
19
21
SPEAKER PLUG
26
CORD & PLUG
A
D
G

MODELS B10704,B10705

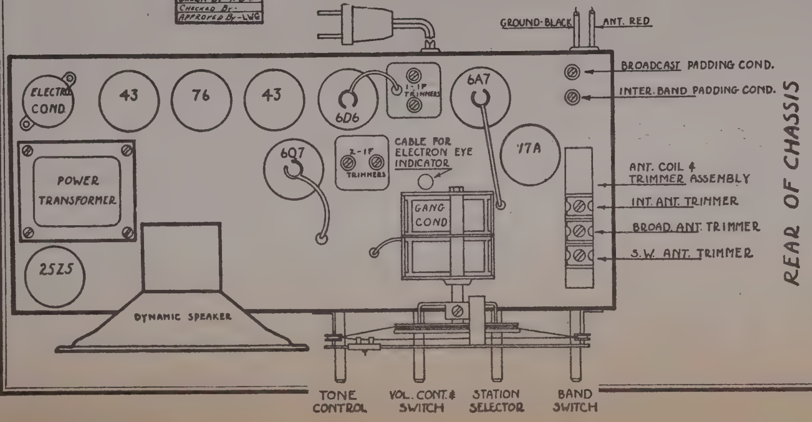
ALLIED RADIO CORP.

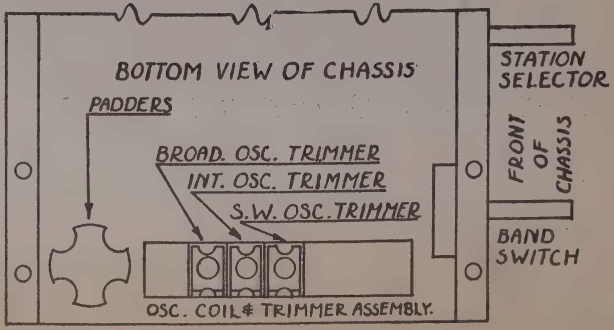


ALIGNMENT

I.F. 465 KC to grid of 6A7. Adj. IF trimmers. B.C.BAND. Osc. and dial at 1400 KC,.0002 mfd. dummy, Vol. Contr. max. Adjust B.C. OSC. trimmer to max. Similarly B.C. Pad at 600 KC. Then recheck at 1400 KC. INT. BAND. Dial and osc. at 5100 KC .0002 mfd. with 400 ohm in series as dummy. Adj. ANT. and OSC trimmers to max. Adj. Pad at 1800 KC. Recheck 5100 KC. S.W. BAND. 400 ohm dummy. Osc. and dial at 15 MC. Adjust S.W. ANT. and OSC trimmers to max. SENSITIVITY Check at 6000 KC for proper alignment. If receiver lacks sensitivity check the .0035 mica condenser for short circuit.

IF PEAK 465 KC



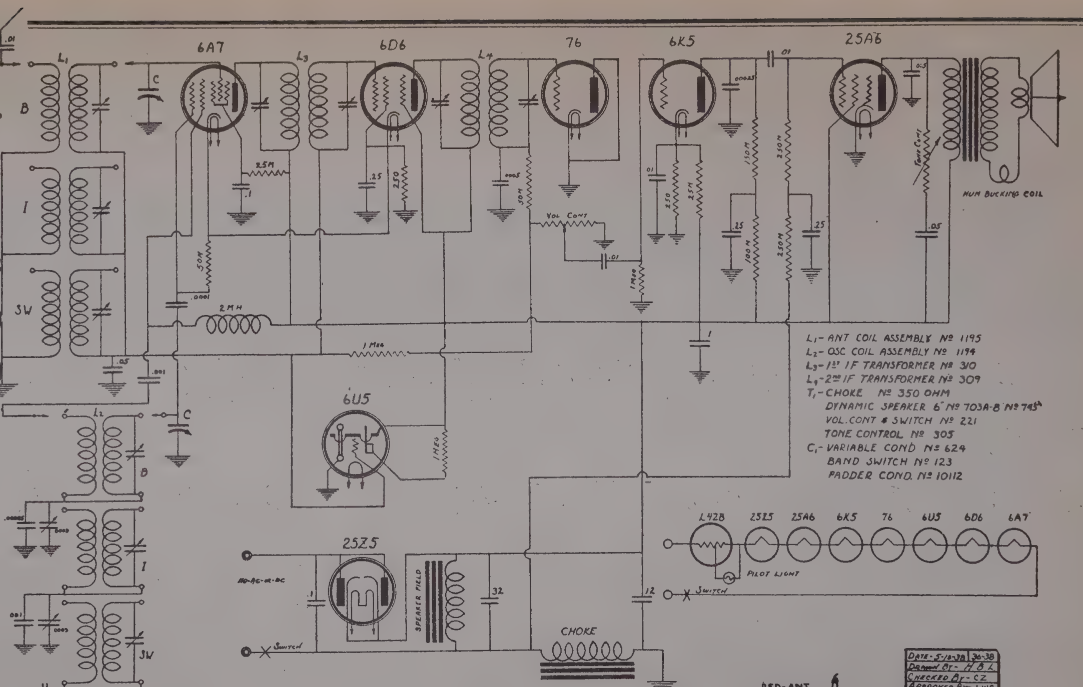


MODELS B10708,B10709,B10710

ALLIED RADIO CORP.

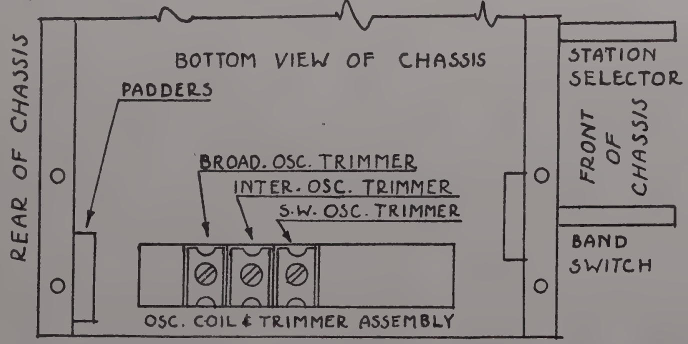
ALIGNMENT

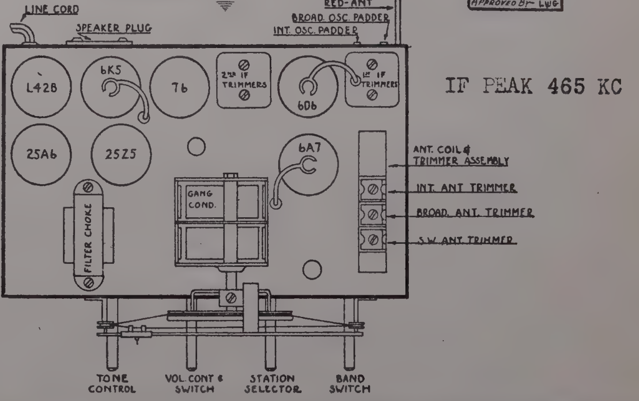
I.F. 465 KC. to grid of 6a7 , Adjust IF trimmers. B.C.Band. Osc at 1400 KC .0002 dummy, Vol. Contr. at max. Dial at 1400 KC Adjust B.C.OSC trim. to max. Similarly B.C. Pad at 600 KC. Recheck 1400KC INT.BAND. Dial and Osc. at 5100KC,.0002 mfd. cond with 400 ohm series res. as dummy. Adjust ant. and osc. trimmers to max. Adjust Pad at 1800 KC. Recheck adjustment 5100KC S.W.BAND. 400 ohm dummy Oscillator and dial at 15 MC. adjust S.W. ant. and osc. trimmers to max. Check sensitivity at 6000 KC to check for proper alignment. If the receiver lacks sensitivity check the .0035 cond. (mica) for short circuit.



L1 - ANT COIL ASSEMBLY № 1195
L2 - OSC COIL ASSEMBLY № 1194
L3 - 1ST IF TRANSFORMER № 310
L4 - 2ND IF TRANSFORMER № 309
T1 - CHOKE № 350 OHM
DYNAMIC SPEAKER 6" № 703A-8 № 745
VOL.CONT & SWITCH № 221
TONE CONTROL № 305
C1 - VARIABLE COND № 624
BAND SWITCH № 123
PADDER COND. № 10112

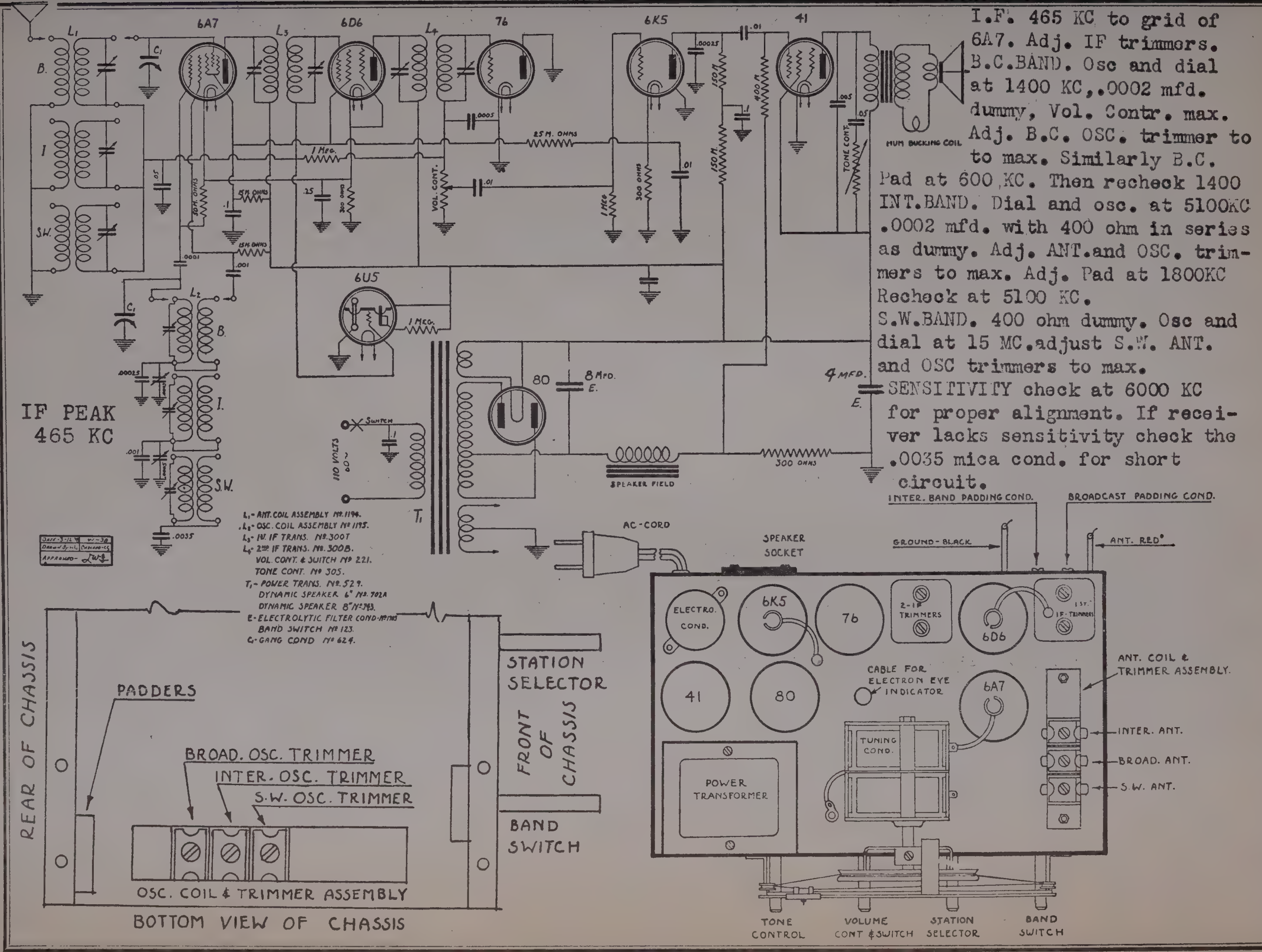
DATE - 5-10-38 | 36-38
DRAWN BY - H B L
CHECKED BY - CZ
APPROVED BY - LWG





IF PEAK 465 KC

ALLIED RADIO CORP. MODELS B10713,B10714,B10715



I.F. 465 KC to grid of 6A7. Adj. IF trimmers.

B.C.BAND. Osc and dial at 1400 KC, .0002 mfd. dummy, Vol. Contr. max. Adj. B.C. OSC. trimmer to to max. Similarly B.C. Pad at 600 KC. Then recheck 1400

INT.BAND. Dial and osc. at 5100KC .0002 mfd. with 400 ohm in series as dummy. Adj. ANT.and OSC. trimmers to max. Adj. Pad at 1800KC Recheck at 5100 KC.

S.W.BAND. 400 ohm dummy. Osc and dial at 15 MC.adjust S.W. ANT. and OSC trimmers to max.

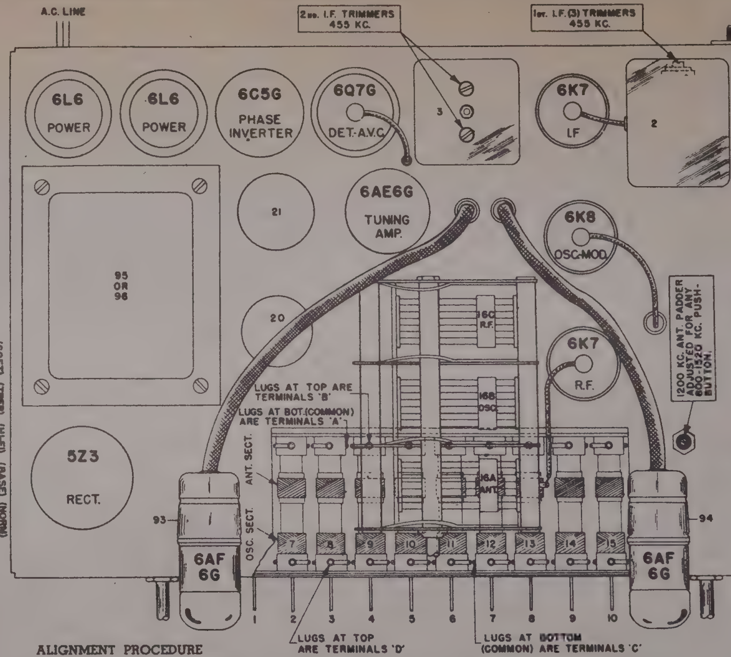
SENSITIVITY check at 6000 KC for proper alignment. If receiver lacks sensitivity check the .0035 mica cond. for short circuit.

IF PEAK
465 KC

L1 - ANT. COIL ASSEMBLY No. 1194.
L2 - OSC. COIL ASSEMBLY No 1195.
L3 - 1st. IF TRANS. No. 300T
L4 - 2nd. IF TRANS. No. 300B.
VOL. CONT. & SWITCH No 221.
TONE CONT. No 305.
T1 - POWER TRANS. No. 529.
DYNAMIC SPEAKER 6" No. 702A
DYNAMIC SPEAKER 8" No. 743.
E - ELECTROLYTIC FILTER COND - No 1763
BAND SWITCH No 123.
C1 - GANG COND No 624.

MODEL E10797

ALLIED RADIO CORP.



ALIGNMENT PROCEDURE

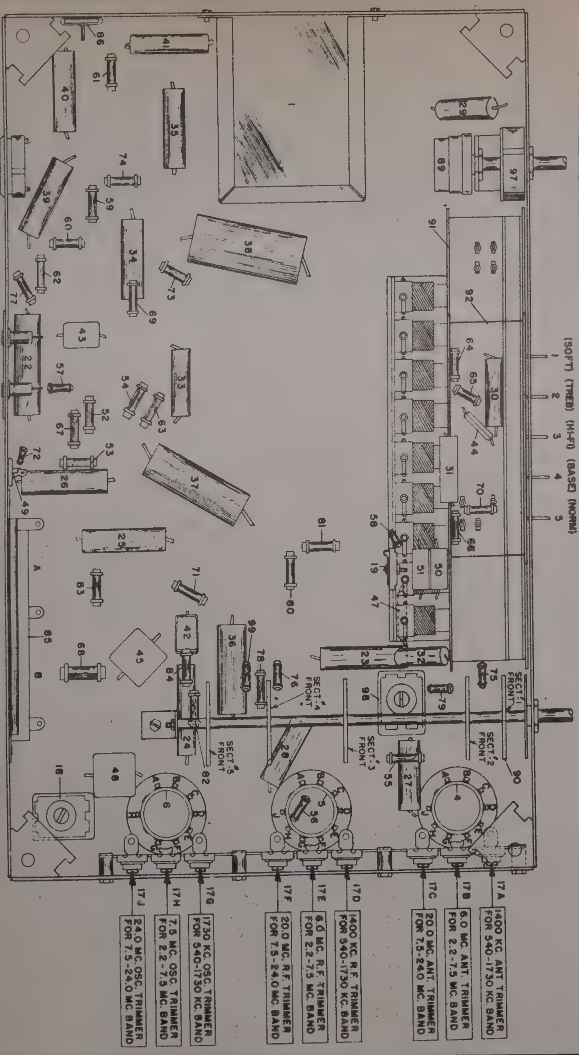
Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I.F. ALIGNMENT use any band position	Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	(1) Exactly 1730 K.C.	Exactly 1730 K.C	00025 Mfd. condenser	Receiver antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	00025 Mfd. condenser	Receiver antenna lead	While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output.
	(3) Approx. 600 K.C.	Approx. 600 K.C.	00025 Mfd. condenser	Receiver antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.2 TO 7.5 M.C. BAND	(1) Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna lead	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	(2) Exactly 6. M.C.	Exactly 6 M.C.	400 Ohm carbon resistor	Receiver antenna lead	While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output
7.5 TO 24 M.C. BAND	(1) Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna lead	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Approx. 20 M.C.	Exactly 20 M.C	400 Ohm carbon resistor	Receiver antenna lead	While rocking gang condenser adjust 20 M.C. antenna and R.F. trimmers for maximum output.


(SOFT) (TREB) (HI-FI) (BASE) (NORM)
1 2 3 4 5
SECT-1 FRONT
SECT-2 FRONT
SECT-3 FRONT
SECT-4 FRONT
SECT-5 FRONT
17A 1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
17B 6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
17C 20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
17D 1400 KC. R.F. TRIMMER FOR 540-1730 KC. BAND
17E 6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
17F 20.0 MC. R.F. TRIMMER FOR 7.5-24.0 MC. BAND
17G 1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
17H 7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
17J 24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
1
4
5
6
18
19
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
89
90
91
92
96
97
98
99
A
B

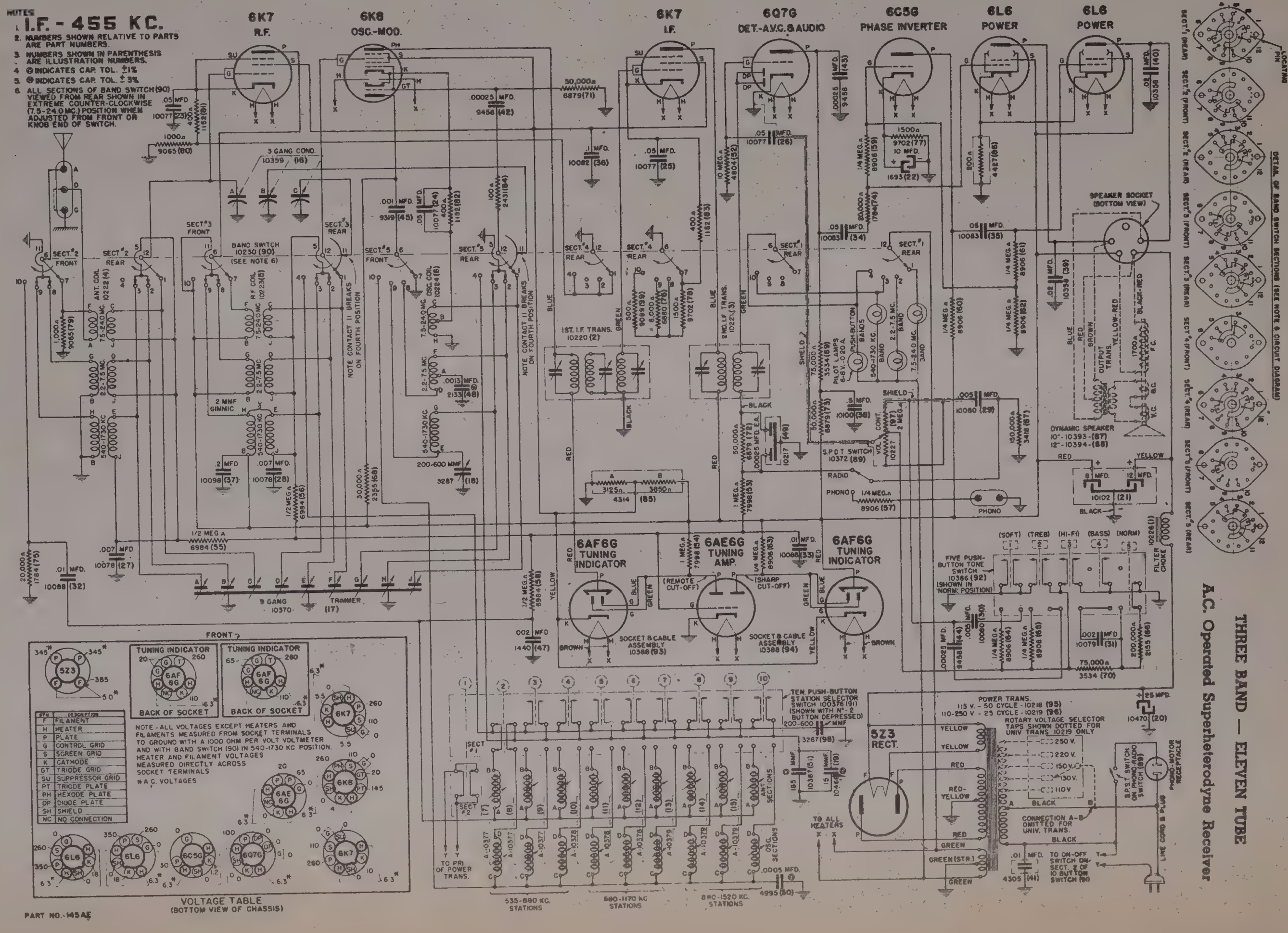
©John F. Rider, Publisher

MODEL E10797

ALLIED RADIO CORP.

THREE BAND — ELEVEN TUBE

A.C. Operated Superheterodyne Receiver


DETAIL OF BAND SWITCH SECTIONS (SEE NOTE 6 CIRCUIT DIAGRAM)
LOCATING PIN
SECT.#1 (REAR)
SECT.#2 (FRONT)
SECT.#2 (REAR)
SECT.#3 (FRONT)
SECT.#3 (REAR)
SECT.#4 (FRONT)
SECT.#4 (REAR)
SECT.#5 (FRONT)
SECT.#5 (REAR)
6K7 R.F.
6K8 OSC.-MOD.
6K7 I.F.
6Q7G DET.-A.V.C.& AUDIO
6C5G PHASE INVERTER
6L6 POWER
6L6 POWER
5Z3 RECT.
6AF6G TUNING INDICATOR
6AE6G TUNING AMP.
6AF6G TUNING INDICATOR
BAND SWITCH 10230 (90) (SEE NOTE 6)
3 GANG COND. 10359 (16)
9 GANG 10370
TRIMMER (17)
ANT. COIL 10222 (4)
R.F. COIL 10223 (5)
OSC. COIL 10224 (6)
1ST. I.F. TRANS. 10220 (2)
2ND. I.F. TRANS. 10221 (3)
NOTE CONTACT 11 BREAKS ON FOURTH POSITION
SPEAKER SOCKET (BOTTOM VIEW)
DYNAMIC SPEAKER 10"-10393-(87) 12"-10394-(88)
OUTPUT TRANS.
PILOT LAMPS 6-8V.-0.20A.
S.P.D.T. SWITCH 10372 (89)
RADIO
PHONO
FILTER CHOKE 10226 (1)
FIVE PUSH-BUTTON TONE SWITCH 10386 (92) (SHOWN IN 'NORM' POSITION)
(SOFT) (TREB) (HI-FI) (BASS) (NORM)
SOCKET & CABLE ASSEMBLY 10388 (93)
SOCKET & CABLE ASSEMBLY 10388 (94)
(REMOTE CUT-OFF)
(SHARP CUT-OFF)
TEN PUSH-BUTTON STATION SELECTOR SWITCH 10037G (91) (SHOWN WITH N°-2 BUTTON DEPRESSED)
535-880 KC. STATIONS
680-1170 KC STATIONS
880-1520 KC. STATIONS
ANT SECTIONS
OSC. SECTIONS
TO PRI. OF POWER TRANS.
TO ALL HEATERS
POWER TRANS. 115 V. - 50 CYCLE - 10218 (95) 110-250 V - 25 CYCLE - 10219 (96)
ROTARY VOLTAGE SELECTOR TAPS SHOWN DOTTED FOR UNIV. TRANS. 10219 ONLY
CONNECTION A-B OMITTED FOR UNIV. TRANS.
TO ON-OFF SWITCH ON SECT. 2 OF 10 BUTTON SWITCH (91)
S.P.S.T. SWITCH ON PHONO-RADIO SWITCH (89)
PHONO-MOTOR RECEPTACLE
LINE CORD & PLUG
TUNING INDICATOR
BACK OF SOCKET
FRONT
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
PART NO.-145AE

NOTES

1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊙ INDICATES CAP. TOL. ±1%
5. ⊕ INDICATES CAP. TOL. ± 3%
6. ALL SECTIONS OF BAND SWITCH (90) VIEWED FROM REAR SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.

SYM.	DESCRIPTION
F	FILAMENT
H	HEATER
P	PLATE
G	CONTROL GRID
S	SCREEN GRID
K	CATHODE
GT	TRIODE GRID
SU	SUPPRESSOR GRID
PT	TRIODE PLATE
PH	HEXODE PLATE
DP	DIODE PLATE
SH	SHIELD
NC	NO CONNECTION

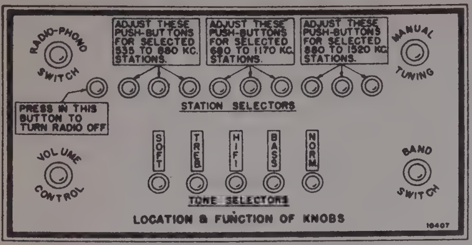
NOTE - ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND WITH BAND SWITCH (90) IN 540-1730 KC POSITION. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS

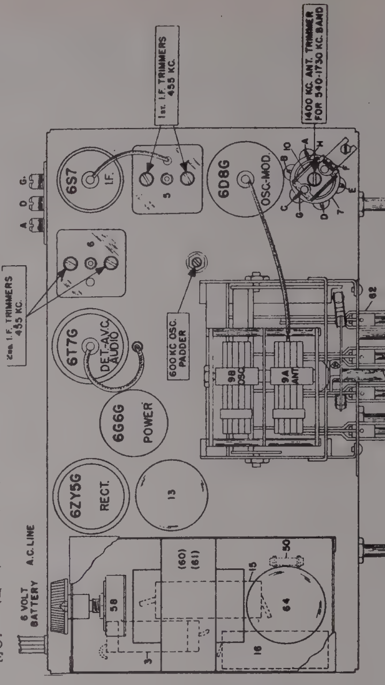
* A.C. VOLTAGES

MODEL E10797
MODEL E10882A

ALLIED RADIO CORP.

MODEL E10797


RADIO-PHONO SWITCH
ADJUST THESE PUSH-BUTTONS FOR SELECTED 535 TO 880 KC. STATIONS.
ADJUST THESE PUSH-BUTTONS FOR SELECTED 680 TO 1170 KC. STATIONS.
ADJUST THESE PUSH-BUTTONS FOR SELECTED 880 TO 1520 KC. STATIONS.
MANUAL TUNING
PRESS IN THIS BUTTON TO TURN RADIO OFF
STATION SELECTORS
SOFT
TREB
HIFI
BASS
NORM
VOLUME CONTROL
BAND SWITCH
TONE SELECTORS
LOCATION & FUNCTION OF KNOBS
18407



MODEL E10882A

PUSH- BUTTON ADJUSTMENT

Nine stations operating in the 1500-540 kilocycle band may be automatically push button tuned by properly setting each station selector push button.

AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATIONS BE SURE TO SET EACH ONE.

Before Attempting to Set Push Buttons Be Sure to:

(a) Have aerial which will be used with the radio attached to the receiver when setting push buttons.
(b) Operate radio at least 15 minutes before adjusting push buttons.
(c) Obtain transmitter frequency—number of kilocycles—and call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

Adjust Push Buttons for Selected Stations by:

(a) Rotate band switch knob to the NEXT TO MAXIMUM RIGHT HAND POSITION—540-1730 KILOCYCLE BAND MANUAL TUNING POSITION.

(b) Using regular manual tuning knob carefully tune in one of the selected stations whose transmitter frequency is somewhere between 535-880 kilocycles. Make a mental note of the kind of program on this station, so that when push button is adjusted for this particular station (as instructed in paragraph (e)) it will be easy to recognize the station by the type of program being transmitted.

(c) Rotate band switch knob to maximum right hand position.

(d) Press in one of the three push buttons marked 535-880 kylocycles on diagram.
NOTE: STATION MAY DISAPPEAR, BE DISTORTED OR IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.

(e) GRASP END OF PUSH BUTTON JUST PRESSED IN AND BY SLOWLY TURNING THIS BUTTON CAREFULLY TUNE IN THE SELECTED 535-880 KILOCYCLE STATION THAT WAS PREVIOUSLY TUNED IN WITH MANUAL CONTROL.
Slowly—turn first in one direction, then if the wanted station is not heard turn in opposite direction. WATCH TUNING EYE AND ADJUST SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER—AT WHICH POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.

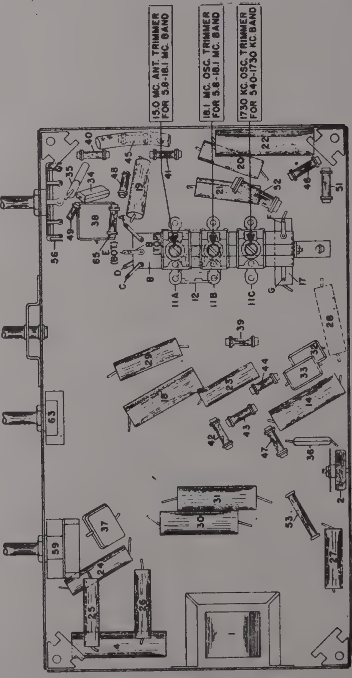
(f) Press station call letter of the station just tuned in out of call letter sheet supplied and insert into depression adjacent to push button just adjusted.

(g) After the first 535-880 kilocycle push button has been properly set, the other eight push buttons should be adjusted in the same manner preferably in the following order:
1. Set remaining two push buttons marked 535-880 kilocycles on diagram for any two stations operating between 535-880 kilocycles.
2. The three push buttons marked 680-1170 kilocycles on diagram should be adjusted for any three selected stations operating between 680 and 1170 kilocycles.
3. Adjust the three push buttons marked 880-1520 kilocycles on diagram for any three selected stations operating between 880 and 1520 kilocycles.

IMPORTANT

For Manual Tuning the Band Switch must be in next to maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set, Band Switch must be in maximum right hand position.

MODEL E10882A


15.0 MC. ANT. TRIMMER FOR 5.8-18.1 MC. BAND
18.1 MC. OSC. TRIMMER FOR 5.8-18.1 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
40
35
34
45
48
19
41
22
20
21
52
46
51
49
38
56
65
8
(BOT)
11A
12
11B
11C
17
C
D
39
28
44
33
18
25
42
43
47
36
63
31
30
37
53
2
59
24
25
26
27
1
4

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

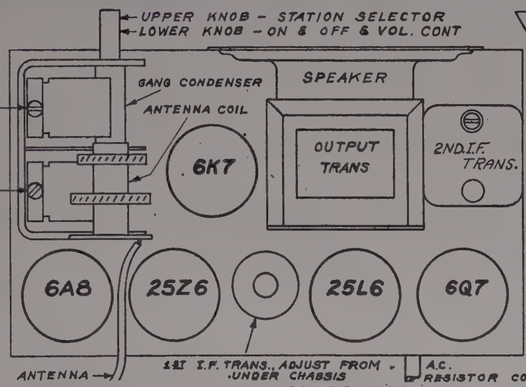
Use an accurately calibrated test oscillator with some type of output measuring device.

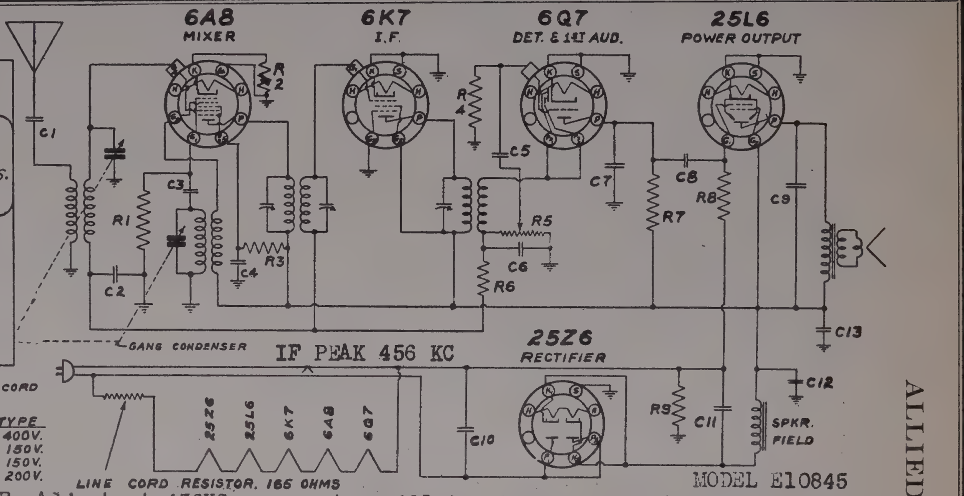
Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below and:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I.F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6D8G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C.	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1400 K.C. antenna trimmer for maximum output.
	3 Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.8 to 18.1 M.C. BAND	1 Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak, is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 15 M.C. antenna trimmer for maximum output.

MODEL E10845
MODEL E10860

ALLIED RADIO CORP.





MODEL E10845

RESISTORS

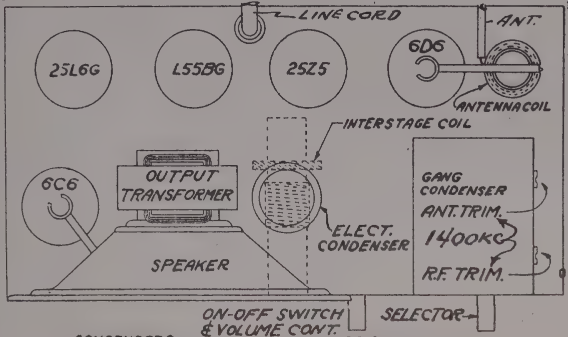
Nº	OHMS	WATTS	SPL.
R1	50,000	¼	
R2	110	¼	
R3	40,000	¼	
R4	15 Meg.	¼	
R5	500,000		VOL. CONT.
R6	2 Meg.	¼	
R7	250,000	¼	
R8	500,000	¼	
R8	150	¼	±10%

CONDENSERS

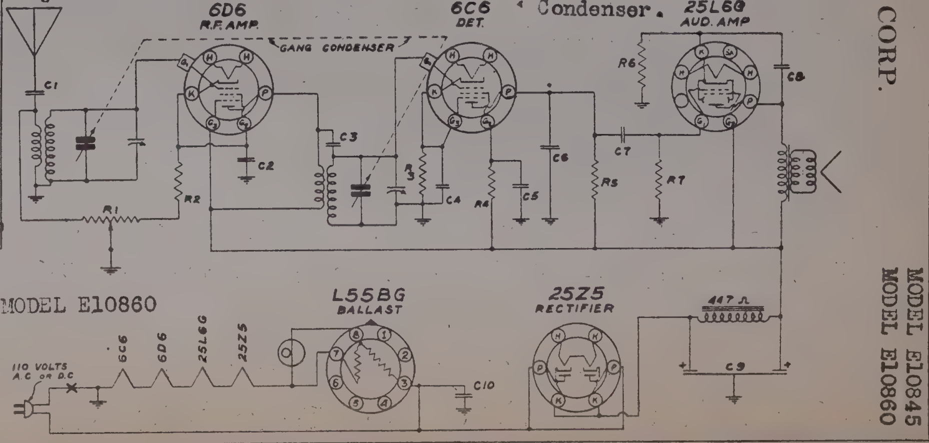
Nº	Mfd.	TYPE	Nº	Mfd.	TYPE
C1	.000250	MICA	C10	.05	400V.
C2	.02	400V.	C11	30.	150V.
C3	.000050	MICA	C12	10.	150V.
C4	.01	400V.	C13	.05	200V.
C5	.01	300V.			
C6	.00025	MICA			
C7	.0005	MICA			
C8	.01	400V.			
C9	.005	600V.			

I.F. Adjust at 456KC, connect oscillator to grid of 6A8 through .05 mfd. condenser, align all three trimmers to peak.

B.C. Adjust at 1730 KC through a .0001 mfd. condenser for oscillator trimmer. Peak antenna trimmer at 1400 KC



Adjust antenna and R.F. trimmers at 1400 KC , use a 100 mmf. Condenser.



MODEL E10860

CONDENSERS

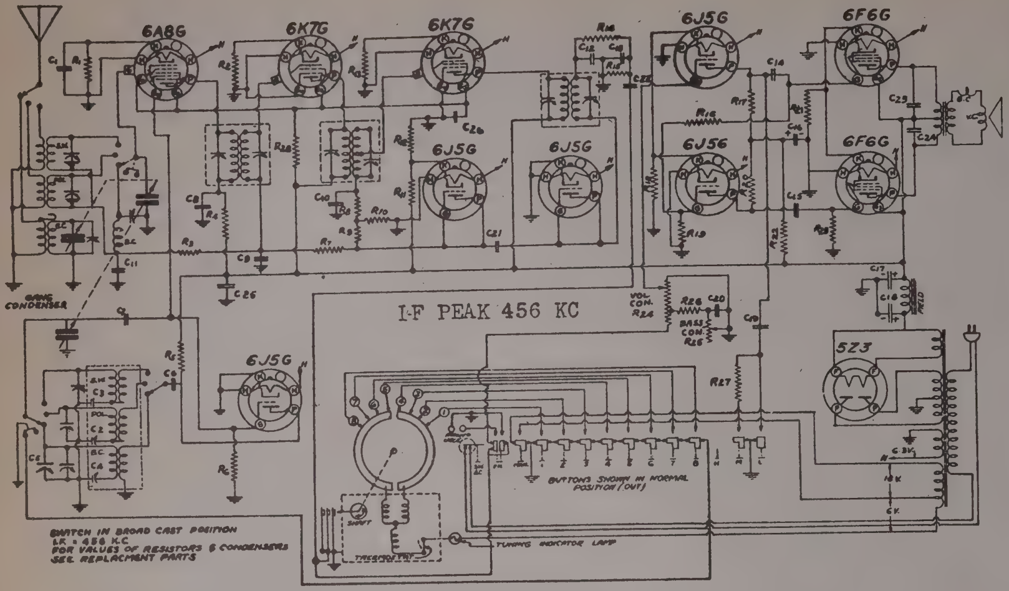
Nº	CAPACITY	TYPE
C1	.002 MFD.	400V.
C2	.1 "	200V
C3	1.5 mmf.	GIMMIK
C4	.25 Mfd.	200V.
C5	.1 "	200V.
C6	.0002 "	600V.
C7	.01 "	400V.
C8	.02 "	400V.
C9	16.0-16.0-	150V ELECT

RESISTORS

Nº	OHMS R.	WATTS	
R1	75,000		VOL. CONT.
R2	250	¼	
R3	25,000	¼	
R4	2,000,000	¼	
R5	500,000	¼	
R6	110	½	WIRE WOUND
R7	500,000	¼	
C10	.1 Mfd	400 V	

MODEL E10850

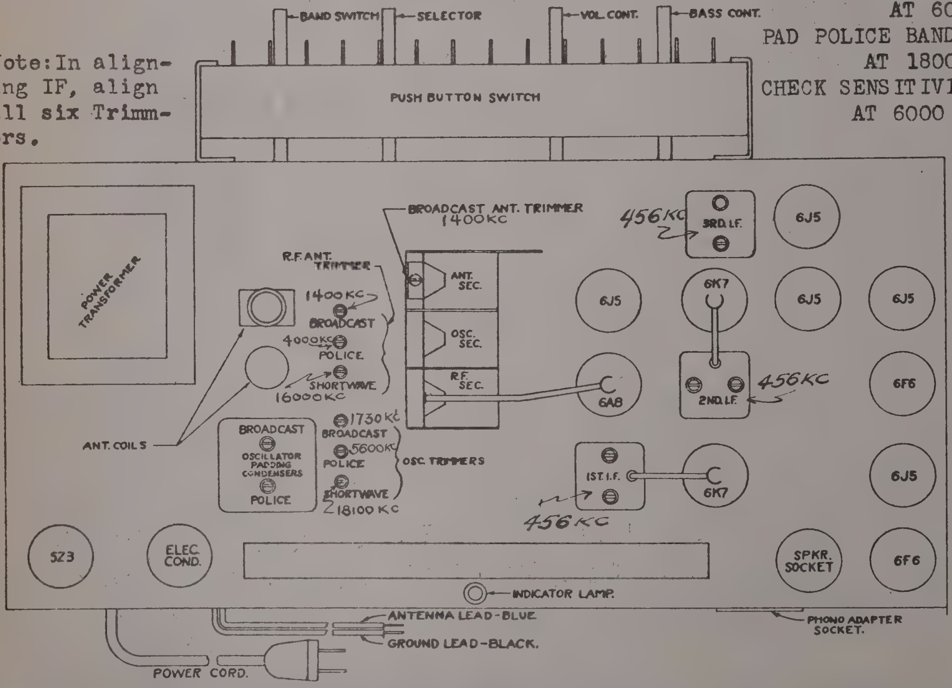
ALLIED RADIO CORP.



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

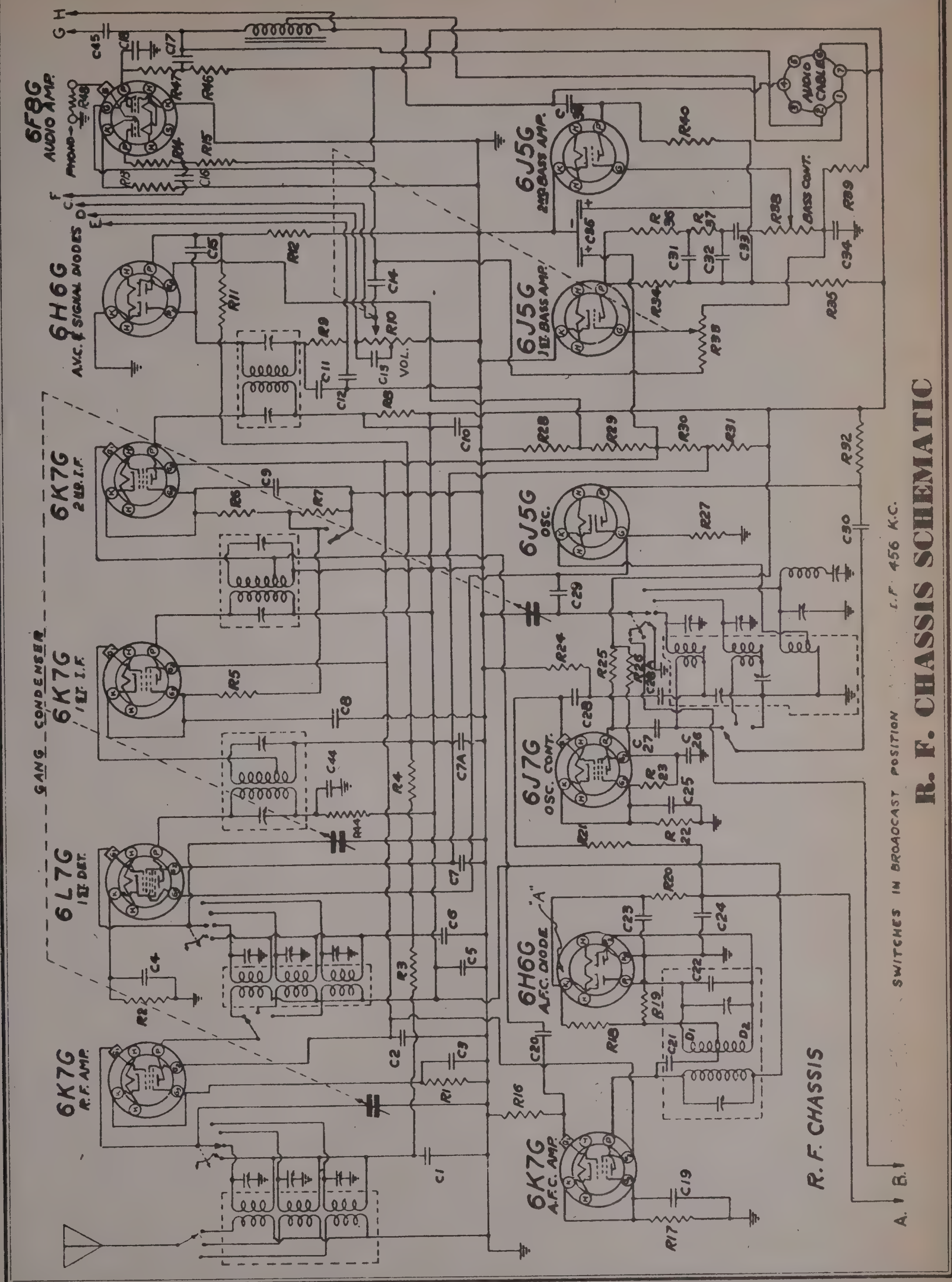
PAD BROADCAST BAND AT 600KC
PAD POLICE BAND AT 1800 KC
CHECK SENSITIVITY AT 6000 KC

Note: In aligning IF, align all six Trimmers.



ALLIED RADIO CORP

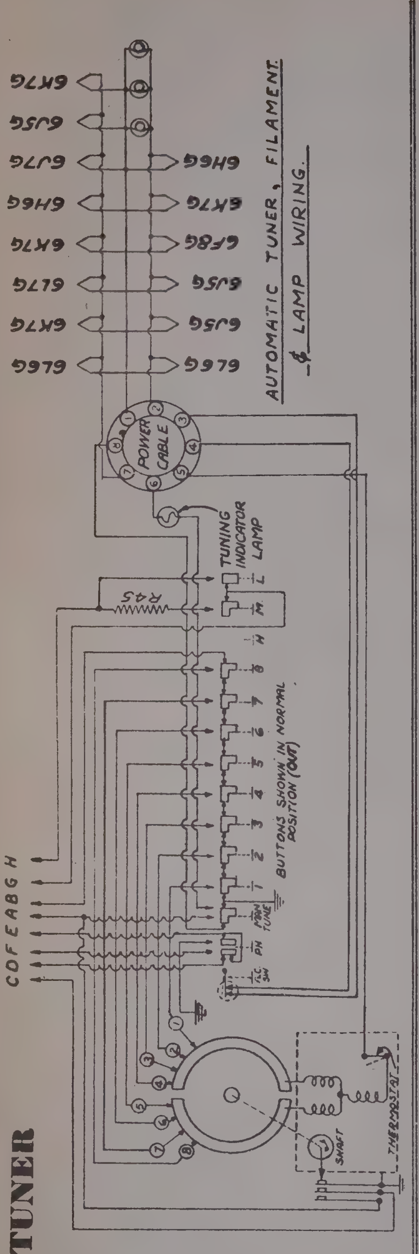
MODEL E10880



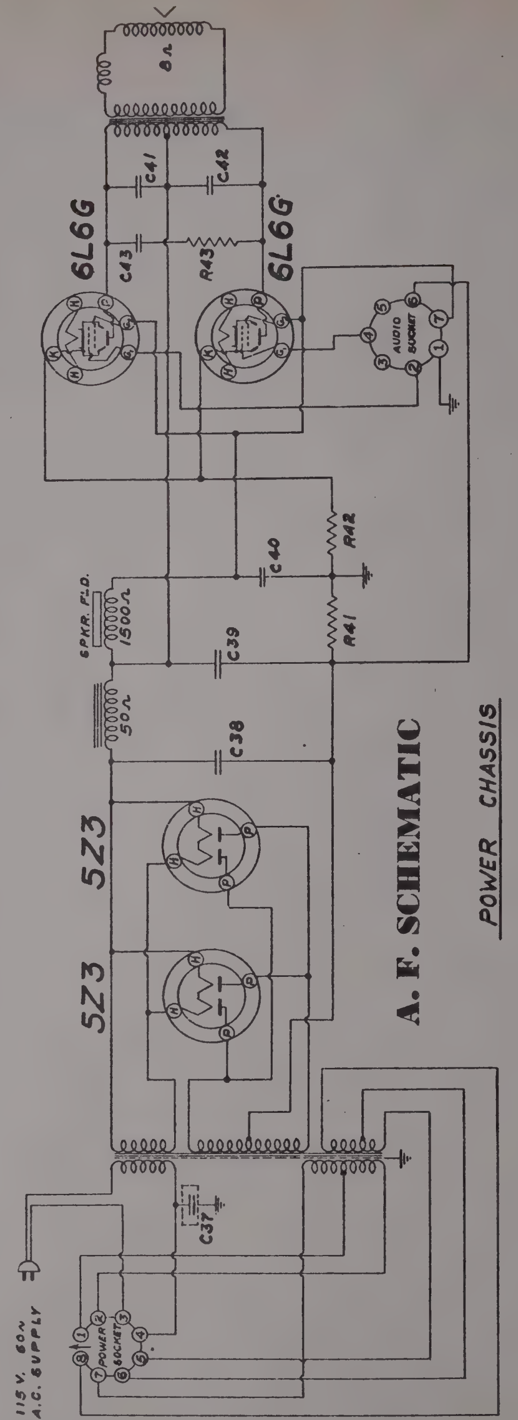
R. F. CHASSIS SCHEMATIC

MODEL E10880

ALLIED RADIO CORP.



TUNER

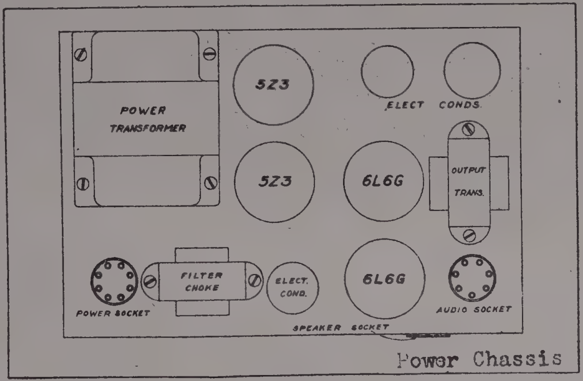


A. F. SCHEMATIC

POWER CHASSIS

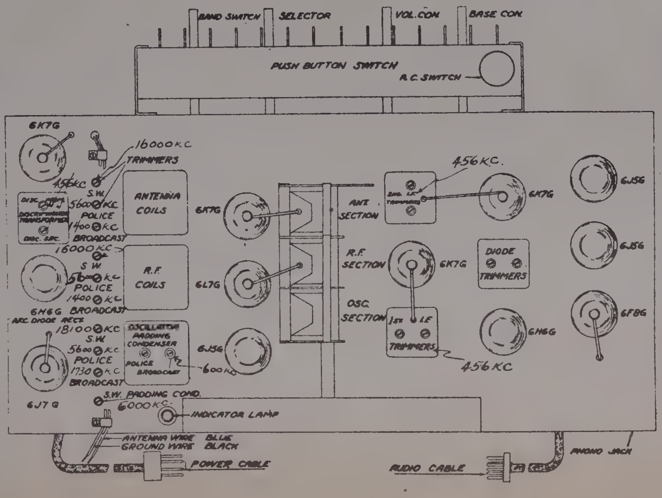
FOR TUNER DATA, SEE INDEX

CONVENTIONAL ALIGNMENT--SEE SPECIAL SECT. VOL. VIII



Power Chassis

CHASSIS LAYOUT DIAGRAMS



This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (KC) (173 to 560 Meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters) and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). **Never plug into a DC outlet.**

FLOATING CHASSIS (IMPORTANT) **Loosen the four (4) mounting screws) and two (2) hook bolts that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws. NOTE: Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument. cabinet or tubes.**

GROUND Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bed can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

REPLACEMENT PARTS LIST

CARBON RESISTORS

R 1-P1729	750 Ohm	¼ Watt 10%
R 2-P2020	700 Ohm	¼ Watt 10%
R 3-P280	100,000 Ohm	¼ Watt
R 4-P280	100,000 Ohm	¼ Watt
R 5-P376	750 Ohm	¼ Watt
R 6-P1729	750 Ohm	¼ Watt 10%
R 7-P2019	600 Ohm	¼ Watt 10%
R 8-P1216	5,000 Ohm	¼ Watt
R 9-P419	20,000 Ohm	¼ Watt
R10-P1989	250,000 Ohm	Volume Control
R11-P137	500,000 Ohm	¼ Watt
R12-P137	500,000 Ohm	¼ Watt
R13-P756	2,000 Ohm	¼ Watt
R14-P167	10,000 Ohm	¼ Watt
R15-P419	20,000 Ohm	¼ Watt
R16-P1114	2,000,000 Ohm	¼ Watt
R17-P1729	750 Ohm	¼ Watt 10%
R18-P137	500,000 Ohm	¼ Watt
R19-P137	500,000 Ohm	¼ Watt
R20-P1114	2,000,000 Ohm	¼ Watt
R21-P137	500,000 Ohm	¼ Watt
R22-P2024	1,100 Ohm	¼ Watt 5%
R23-P2021	25,000 Ohm	½ Watt 10%
R24-P1950	350 Ohm	¼ Watt 10%
R25-P166	25,000 Ohm	¼ Watt
R26-P1215	35,000 Ohm	1 Watt
R27-P417	50,000 Ohm	¼ Watt
R28-P2022	450 Ohm	¼ Watt 10%
R32-P165	25,000 Ohm	1 Watt
R33-P1989	500,000 Ohm	Bass Boost on Volume Control
R34-P166	25,000 Ohm	¼ Watt
R35-P673	10,000 Ohm	½ Watt
R36-P167	10,000 Ohm	¼ Watt
R37-P419	20,000 Ohm	¼ Watt
R38-P1991	500,000 Ohm	Bass Control
R39-P137	500,000 Ohm	¼ Watt
R40-P166	25,000 Ohm	¼ Watt
R43-P1944	15,000 Ohm	2 Watt
R44-P278	1,000 Ohm	¼ Watt
R45-P167	10,000 Ohm	¼ Watt
R46-P166	25,000 Ohm	¼ Watt
R47-P2018	7,000 Ohm	¼ Watt 10%
R48-P137	500,000 Ohm	¼ Watt

PAPER CONDENSERS

C 1-P334	.05	Mfd. 400 V.	
C 2-P141	.25	Mfd. 200 V.	
C 3-P142	.1	Mfd. 200 V.	
C 4-P142	.1	Mfd. 200 V.	
C 5-P1789	.25	Mfd. 400 V.	
C 6-P334	.05	Mfd. 400 V.	
C 7-P142	.1	Mfd. 200 V.	
C7A-P334	.05	Mfd. 400 V.	
C 8-P142	.1	Mfd. 200 V.	
C 9-P142	.1	Mfd. 200 V.	
C10-P334	.05	Mfd. 400 V.	
C14-P334	.05	Mfd. 400 V.	
C16-P334	.05	Mfd. 400 V.	
C17-P1789	.25	Mfd. 400 V.	
C19-P142	.1	Mfd. 200 V.	
C23-P142	.1	Mfd. 200 V.	
C24-P142	.1	Mfd. 200 V.	
C25-P142	.1	Mfd. 200 V.	
C26-P276	.1	Mfd. 400 V.	
C27-P904	.002	Mfd. 600 V.	
C31-P334	.05	Mfd. 400 V.	
C32-P276	.1	Mfd. 400 V.	
C33-P276	.1	Mfd. 400 V.	
C34-P141	.25	Mfd. 200 V.	
C36-P1789	.25	Mfd. 400 V.	
C37-P2030	.02	Mfd. 600 V.	Metal Clad
C41-P904	.002	Mfd. 600 V.	
C42-P904	.002	Mfd. 600 V.	
C43-P1079	.01	Mfd. 1000 V.	
C44-P334	.05	Mfd. 400 V.	
C45-P334	.05	Mfd. 400 V.	

MICA CONDENSERS

C11-P480	.0001	Mfd.
C12-P480	.0001	Mfd.
C13-P817	.00025	Mfd.
C15-P1382	.00005	Mfd.
C18-P336	.0005	Mfd.
C20-P672	.001	Mfd.
C21-P480	.0001	Mfd.
C28-P672	.001	Mfd.
C28A-P1044	.0002	Mfd.
C29-P480	.0001	Mfd.
C30-P818	.002	Mfd.

CANDOHM RESISTORS

R29	P2013	2400 Ohms
R30		2258 Ohms
R31		2260 Ohms
R41	P2010	150 Ohms
R42		31 Ohms

ELECTROLYTIC CONDENSERS

C35	4	100 W. V.	Dry
	4	250 W. V.	
C38	25	450 W. V.	Wet
C39	12	450 W. V.	
C40	25	300 W. V.	

ADJUSTABLE CONDENSERS

P1980A	Variable Condensers
P1682	Trimmer Condenser (Osc.)
P2009	4 Gang Trimmer Strip
P2008	3 Gang Trimmer Strip

TRANSFORMERS AND COILS

P2000	Power Transformer
P2001	1st I.F. Transformer
P2002	2nd I.F. Transformer
P2003	3rd I.F. Transformer
P1940	Discriminator Coil
G5494	Oscillator Coil Assembly
G5497	R.F. Coil Assembly
G5499	Antenna Coil Assembly
P2005	Iron Core Filter Choke
P2006	Iron Core Audio Choke
P2007	Output Transformer
G5501	Tracking Coil

MISCELLANEOUS

P1928	Tube Socket
P1153	5Z3 Tube Socket
P945	Speaker Socket
P2014	Cable Socket
P929	A.C. Line Cord
P1988	Power Cable
P1987	Audio Cable
P1989	Volume Control
P1991	Bass Control
P1986	Band Change Switch
G5793	Electric Tuner Cable
P2017	12" Dynamic Speaker
P1504	Pilot Light Bulb
P1503	Pilot Light Socket
P1455	Tube Shield
P1456	Tube Shield Base
P2694	Push Button Switch
P2689	Rubber Drive Belt
P2688	Dial Scale
P2644	Dial Pointer
P2532	Tilt Escutcheon
P2619	Push Button Escutcheon
P2698	Bass Control Escutcheon
P2699	Band Switch Escutcheon
G5462	Lower Segment Adjustment Bracket and Contact
G5463	Upper Segment Adjustment Bracket and Contact
P2690	Electric Motor
P2677	Ivory Push Button Knob
P2678	Walnut Push Button Knob
P2720	Band Switch Knob and Bass Control Knob
P2721	Selector Knob
P2722	Volume Control Knob

MODEL E10850
MODEL E10880

ALLIED RADIO CORP

ELECTRIC TUNER

MODELS E10850 and E10880

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH: The push button switch consists of eight (8) brown push buttons flanked on either side by three (3) white push buttons.

SELECTOR MECHANISM: The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

ELECTRIC MOTOR: The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

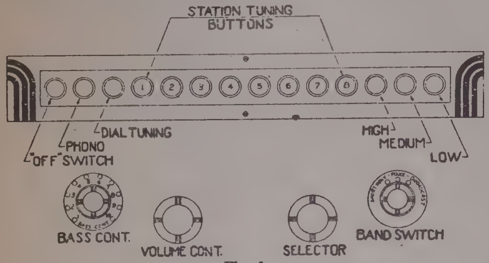


Fig. 1

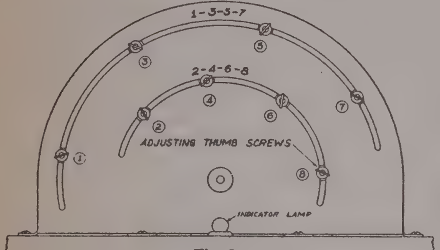


Fig. 2

SETTING UP STATIONS The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word "OFF" found in the call letter sheet.

NOTE: In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. Note: Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver.

PARTS LIST FOR MODEL E10850

RESISTORS

R 1—P140	500 Ohm ¼ Watt
R 2—P1950	350 Ohm ¼ Watt 10%
R 3—P139	250,000 Ohm ¼ Watt
R 4—P481	3,000 Ohm ¼ Watt
R 5—P673	10,000 Ohm ½ Watt
R 6—P417	50,000 Ohm ¼ Watt
R 7—P137	500,000 Ohm ¼ Watt
R 9—P137	1,000,000 Ohm ¼ Watt
R11—P2731	25,000 Ohm 1 Watt
R12—P278	600 Ohm ¼ Watt
R13—P1950	350 Ohm ¼ Watt
R14—P417	50,000 Ohm ¼ Watt
R15—P139	250,000 Ohm ¼ Watt
R16—P1220	200,000 Ohm ¼ Watt
R17—P166	25,000 Ohm ¼ Watt
R18—P376	750 Ohm ¼ Watt
R19—P258	15,000 Ohm ¼ Watt
R20—P166	25,000 Ohm ¼ Watt
R21—P2732	220 Ohm 2 Watt
R22—P167	10,000 Ohm ¼ Watt
R23—P139	250,000 Ohm ¼ Watt
R24	Volume Control—2,000,000 Ohms
R25	Bass Control—1,000,000 Ohms
R26—P1217	60,000 Ohm ¼ Watt
R27—P167	10,000 Ohm ¼ Watt
R28—P165	25,000 Ohm ¼ Watt
R29	Speaker Field—600 Ohm

TRANSFORMERS AND COILS

P2710	Power Transformer
P1930	1st I.F. Transformer
P2704	2nd I.F. Transformer
P2711	3rd I.F. Transformer
G5794	Oscillator Coil Assembly
G5310	Police and Short Wave Antenna Coil
G5347	Broadcast Antenna Coil

PAPER CONDENSERS

C 1—P148	.05 Mfd. 200 V.
C 2	Police Band Padder—(.0008—.0016 Mfd.)
C 4	Broadcast Band Padder—(.003—.0006 Mfd.)
C 6—P1322	.005 Mfd. 500 V.
C 8—P276	.1 Mfd. 400 V.
C 9—P148	.05 Mfd. 200 V.
C11—P142	.1 Mfd. 200 V.
C14—P334	.05 Mfd. 400 V.
C15—P334	.05 Mfd. 400 V.
C19—P334	.05 Mfd. 400 V.
C20—P1322	.005 Mfd. 600 V.
C22—P148	.05 Mfd. 200 V.
C23—P1322	.005 Mfd. 600 V.
C24—P1322	.005 Mfd. 600 V.
C25—P276	.1 Mfd. 400 V.
C26—P276	.1 Mfd. 400 V.
C28—P148	.05 Mfd. 200 V.

MISCELLANEOUS

P1928	Tube Socket
P1153	5Z3 Socket
P945	Speaker Socket
P2705	Volume Control
P2706	Bass Control
G5788	Band Switch and Lead Assembly
P929	A.C. Line Cord
P1455	Tube Shield
P1456	Tube Shield Base
P2716	12" Dynamic Speaker

MICA CONDENSERS

C 3—P1683	.004 Mfd.
C 7—P480	.0001 Mfd.
C12—P480	.0001 Mfd.
C13—P480	.0001 Mfd.
C21—P1382	.00025 Mfd.
C27—P480	.0001 Mfd.

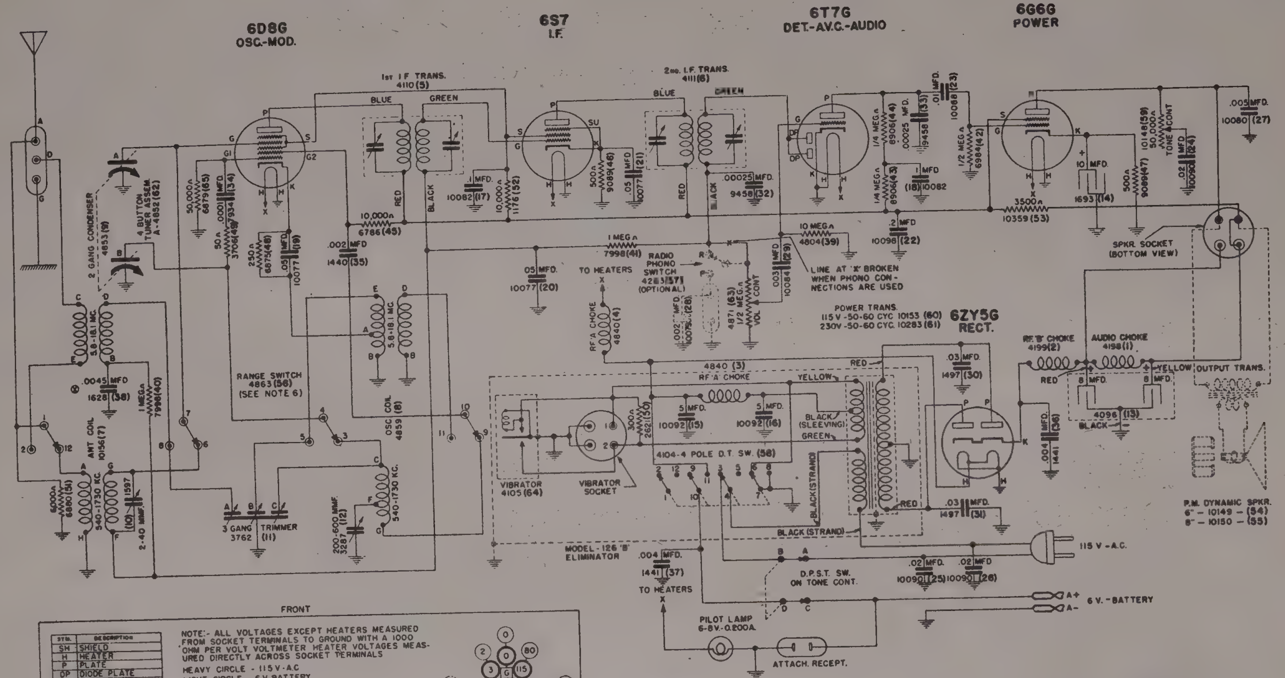
ELECTROLYTIC CONDENSERS

C16 } C17 } P1939	Dual Electrolytic
C18—P1937	Electrolytic

ADJUSTABLE CONDENSERS

P1918A	Variable Condenser
P2743	Gang Trimmer Strip
P1682	Oscillator Padder Condensers
P2694	Push Button Switch
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P2690	Electric Motor
P2689	Rubber Drive Belt
P2688	Dial Scale
P2644	Dial Pointer
G5462	Lower Segment Adjustment Bracket and Contact
G5463	Upper Segment Adjustment Bracket and Contact

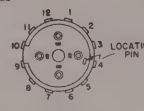
ALLIED RADIO CORP



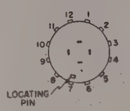
NOTES:- 1. **I.F. - 455 KC.**

2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ±3%
5. SOME MODELS ARE EQUIPPED WITH PHONO-RADIO SWITCH AND JACK. DOTTED LINES SHOW CONNECTIONS.
6. BAND SWITCH 4863(54) VIEWED FROM REAR SHOWN IN CLOCKWISE (540-1730 KC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
7. VOLTAGE SELECTOR SWITCH 4104 (56) VIEWED FROM REAR, SHOWN IN CLOCK-WISE (110V.-A.C.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.

FOR ALIGNMENT SEE INDEX



REAR VIEW OF BAND SWITCH PART N°-4863



REAR VIEW OF VOLTAGE SEL. SWITCH PART N°-4104

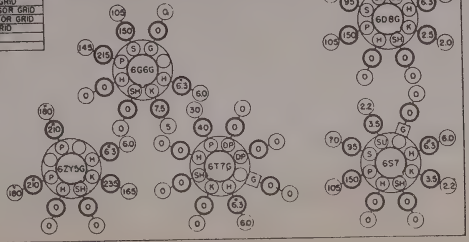
FRONT

SYM.	DESCRIPTION
SH	SHIELD
H	HEATER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID
G1	OSCILLATOR GRID
G2	ANODE GRID
K	CATHODE
*	A.C.

NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS

HEAVY CIRCLE - 115 V-A.C

LIGHT CIRCLE - 6 V. BATTERY



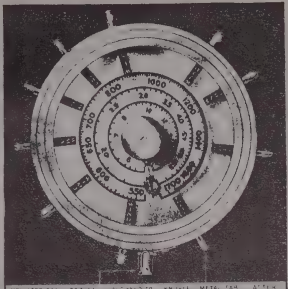
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART N°-144-X

6 Volt Storage Battery or 110 Volt 60 Cycle A. C. Operated
TWO BAND—FIVE TUBE SUPERHETERODYNE RECEIVER

FOR OTHER DATA, SEE INDEX

SERVICE NOTES for "AUTOMATIC-TUNE" WHEEL DIAL



TO TUNE: GRASP KNURLED METAL TAB BELOW THE STATION CALL LETTER OF THE DESIRED STATION BETWEEN THUMB AND FOREFINGER AND SWING DIAL UNTIL KNURLED TAB IS UNDERNEATH INDICATOR STOP.

AFTER PROPERLY SETTING TAB HOLDERS, FIRMLY TIGHTEN SO THAT THEY CANNOT MOVE ON DIAL RAIL.

FROM 1 TO 10 STATIONS OPERATING ON FREQUENCIES SEPARATED BY 40 KILOCYCLES OR MORE MAY BE AUTOMATIC TUNE ...... BY PROPERLY SETTING TAB HOLDERS

FIG. 1

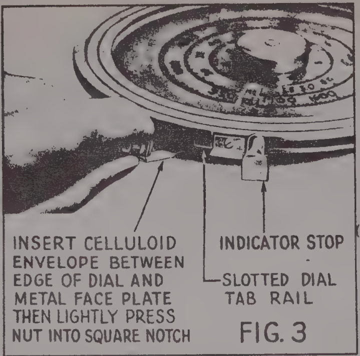

INSERT CELLULOID ENVELOPE BETWEEN EDGE OF DIAL AND METAL FACE PLATE THEN LIGHTLY PRESS NUT INTO SQUARE NOTCH
INDICATOR STOP
SLOTTED DIAL TAB RAIL

FIG. 3

While an "AUTOMATIC-TUNE" tab may be set for distant weak stations, better results will be obtained if the stations selected for "AUTOMATIC-TUNE" are strong nearby or local stations.

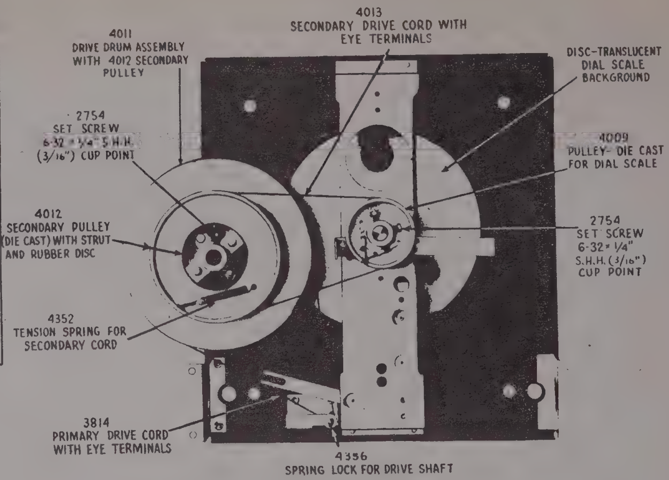
AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC-TUNE", OBTAIN THE FREQUENCIES USED AND CALL LETTERS OF THESE STATIONS AND SET STATION TABS BY:

1. Lay station call letter tab sheet on flat surface and with a razor or sharp knife cut out desired station tab by cutting around black edges of each desired tab.
2. To illustrate the proper setting of station paper strip and metal tab holder the receiver is shipped from the factory with a station tab properly set for Station WGN 720 kilocycles.
   Carefully note that the station call letter tab appears directly below the 720 kilocycle calibration on the face of the dial and that the knurled tab is firmly screwed down on slotted tab rail. If Station WGN is not one of the selected stations or if a tab is to be set for a station which operates on a frequency less than 720 kilocycles, remove WGN celluloid envelope and station call letter paper strip by:
   (a) Loosen tab holder by grasping knurled end of metal tab with finger tips and turn one or two turns to the left.
   (b) Slide the metal holder tab to square notch in dial tab rail—adjacent to permanently attached tab stop—and pull outward on tab until it is pulled free from tab holder rail.
   (c) Slide the celluloid envelope out of the metal tab frame.
3. **PLACE EACH SELECTED STATION CALL LETTER PAPER STRIP INSIDE OF CELLULOID ENVELOPE BY:**
   (a) Hold celluloid envelope with curved end upward.
   (b) Place station call letter paper strip inside of celluloid envelope with printed call letters upward.
4. **INSERT CELLULOID ENVELOPE INTO A METAL TAB FRAME BY:**
   (a) Hold curved end of celluloid envelope towards metal knurled tab holder and insert celluloid into metal frame.
   (b) Gently push celluloid inward until curved end of envelope touches edge of celluloid envelope tab frame.
   (c) Arrange tabs in numerical order according to station frequency.
5. **SET THE METAL TAB HOLDERS ON DIAL BY:** (See Fig. 3)
   (a) Set the first metal tab holder for the station that broadcasts on the lowest frequency—least number of kilocycles—and then set the next station tab for the selected station operating on the next lowest frequency, continuing on in this way until a tab has been set for all of the selected stations.
   (b) Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.
   (c) Insert celluloid envelope between edge of dial and metal face plate—Lightly press nut on end of knurled tab into square notch in slotted dial rail—then slide tab holder along rail until the knurled tab is underneath the indicator stop on the dial at which point station call letter strip will appear directly below the indicator line on the face of the dial.
   (d) Tighten tab holders as much as possible without moving dial by turning knurled tab to the right—then swing dial so knurled tab is away from indicator stop on the dial and firmly tighten so that it cannot move on the dial rail. DO NOT USE PLIERS TO TIGHTEN.

REPLACING No. 4000 DIAL GLASS SCALE ASSEMBLY

As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.

DIAL MECHANISM


4011
DRIVE DRUM ASSEMBLY WITH 4012 SECONDARY PULLEY
4013
SECONDARY DRIVE CORD WITH EYE TERMINALS
DISC-TRANSLUCENT DIAL SCALE BACKGROUND
2754
SET SCREW
6-32 × 1/4" S.H.H.
(3/16") CUP POINT
4009
PULLEY- DIE CAST FOR DIAL SCALE
4012
SECONDARY PULLEY (DIE CAST) WITH STRUT AND RUBBER DISC
2754
SET SCREW
6-32 × 1/4"
S.H.H. (3/16")
CUP POINT
4352
TENSION SPRING FOR SECONDARY CORD
3814
PRIMARY DRIVE CORD WITH EYE TERMINALS
4356
SPRING LOCK FOR DRIVE SHAFT

WHEN INSTALLING PART No. 4000 GLASS ASSEMBLY WITH No. 4005 SHAET ATTACHED carefully follow procedure in order given:

(a) Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.

b) Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.

(c) Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.

(d) Loosen the two set screws in brass spacer collar on the No. 4005 shaft.

(e) Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retighten brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

TO INSTALL No. 3814 PRIMARY DRIVE CORD:

(a) Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in CLOCKWISE direction.

(b) Hook No. 3462 tension spring into loops at end of dial cord.

NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.

"Automatic Tune" Wheel Dial

TO INSTALL No. 4013 SECONDARY DRIVE CORD:

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4352 & 3462 tension springs.

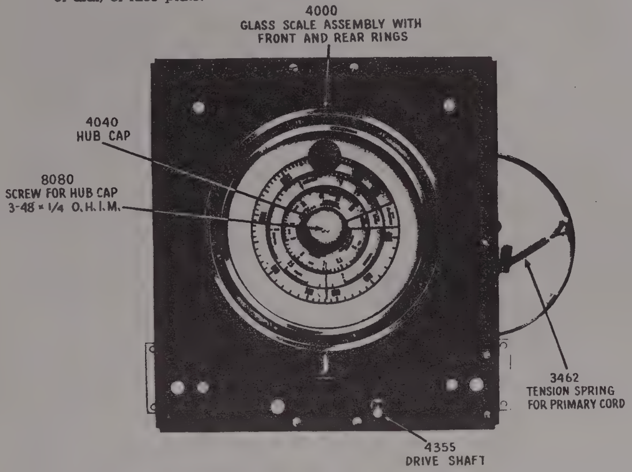
(a) Looking at the front of the dial rotate dial scale COUNTER-CLOCKWISE until dial stop is reached.

(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.

(c) Looking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the cadmium plated dial face plate bracket in dial mechanism picture.

(d) Hook No. 4352 tension spring in dial cord loop.

(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.

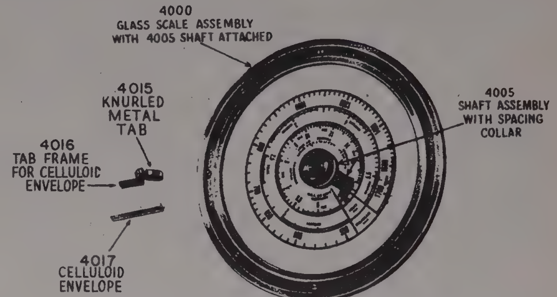

4000
GLASS SCALE ASSEMBLY WITH FRONT AND REAR RINGS
4040
HUB CAP
8080
SCREW FOR HUB CAP
3-48 × 1/4 O.H.I.M.
3462
TENSION SPRING FOR PRIMARY CORD
4355
DRIVE SHAFT

(f) Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at the front of dial, wrap cord one complete turn CLOCKWISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.

(g) Firmly tighten No. 2754 set screws in small die cast pulley.

NOTE************************

FOR##1,MODEL NUMBERS ARE B10600,-1,-2,-3,-4,-5
" ##2, " " " B10572,-85,-86
" ##3, " " " B10565,-6,-7,-8
" ##4, " " " B10590,-1,-2,-3,-5,-6


4000
GLASS SCALE ASSEMBLY WITH 4005 SHAFT ATTACHED
4015
KNURLED METAL TAB
4016
TAB FRAME FOR CELLULOIC ENVELOPE
4017
CELLULOID ENVELOPE
4005
SHAFT ASSEMBLY WITH SPACING COLLAR

COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON

SEE NOTE BELOW

Part No.	Part Name	Description	List Price
205	Dial Assembly	Used With Model 1 Complete Assembly Less Escutcheon	$12.75
206	Dial Assembly	Used With Model 1 Complete Assembly Less Escutcheon	12.75
207	Dial Assembl·	Used With Model 2 Complete Assembly Less Escutcheon	12.75
201	Dial Assembly	Used With Model 2 & 3 Complete Assembly Less Escutcheon	12.75
204	Dial Assembly	Used With Model 4 Complete Assembly Less Escutcheon	12.25

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

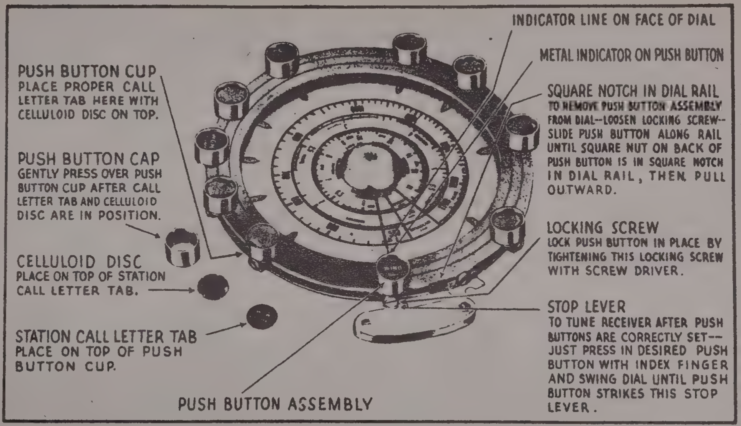
Part No.	Part Name	Description	List Price
4016	Celluloid Envelope	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
3995	Band Indicator Assem.	For Model 1 & 4 SEE NOTE	.75
3992	Band Indicator Assem.	For Model 2 & 3 BELOW	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Coupler	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 1	.50
3984	Disc	Translucent Dial Scale Background for Model 2 & 3	.55
4024	Disc	Translucent Dial Scale Background for Model 2	.55
4029	Disc	Translucent Dial Scale Background for Model 1 & 4	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4017	Frame	Metal Holder for Celluloid Envelope	.05
4040	Hub Cap		.15
4015	Knurled Tab		.05
4009	Pulley	Dial Scale Drive (Die Cast)	.45
4000	Scale	Calibrated Glass Scale With 4005 Shaft Assem.	2.75
8071	Screw	For Hub Cap 3-48 x ¼" O.H.I.M.	.005
2754	Screw	For Pulley 6-32 x ¼" S.H.H. Cup Point	.01
4356	Spring Lock	For Drive Shaft	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

Prices are subject to change without notice.

ALLIED RADIO CORP.

SERVICE NOTES for PUSH BUTTON DIAL

FOR OTHER ASSEMBLIES SEE "AUTOMATIC TUNE" WHEEL DIAL ASSEMBLIES.


INDICATOR LINE ON FACE OF DIAL
METAL INDICATOR ON PUSH BUTTON
SQUARE NOTCH IN DIAL RAIL
TO REMOVE PUSH BUTTON ASSEMBLY FROM DIAL--LOOSEN LOCKING SCREW--SLIDE PUSH BUTTON ALONG RAIL UNTIL SQUARE NUT ON BACK OF PUSH BUTTON IS IN SQUARE NOTCH IN DIAL RAIL, THEN PULL OUTWARD.
PUSH BUTTON CUP
PLACE PROPER CALL LETTER TAB HERE WITH CELLULOID DISC ON TOP.
PUSH BUTTON CAP
GENTLY PRESS OVER PUSH BUTTON CUP AFTER CALL LETTER TAB AND CELLULOID DISC ARE IN POSITION.
LOCKING SCREW
LOCK PUSH BUTTON IN PLACE BY TIGHTENING THIS LOCKING SCREW WITH SCREW DRIVER.
CELLULOID DISC
PLACE ON TOP OF STATION CALL LETTER TAB.
STOP LEVER
TO TUNE RECEIVER AFTER PUSH BUTTONS ARE CORRECTLY SET--JUST PRESS IN DESIRED PUSH BUTTON WITH INDEX FINGER AND SWING DIAL UNTIL PUSH BUTTON STRIKES THIS STOP LEVER.
STATION CALL LETTER TAB
PLACE ON TOP OF PUSH BUTTON CUP.
PUSH BUTTON ASSEMBLY

FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY KILOCYCLES OR MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SETTING PUSH BUTTONS.

IT IS A SIMPLE MATTER TO "AUTOMATIC TUNE" AFTER THE STATION PUSH BUTTONS HAVE BEEN PROPERLY SET—JUST PLACE INDEX FINGER INTO THE PUSH BUTTON HAVING CALL LETTERS OF THE DESIRED STATION PUSHING INWARD—THEN SWING DIAL UNTIL DIAL STOPS, AT WHICH POINT THE DESIRED STATION SHOULD BE PROPERLY TUNED IN AND THE METAL INDICATOR ATTACHED TO THE PUSH BUTTON SHOULD POINT TO THE INDICATOR LINE ON FACE OF DIAL. If reception is slightly distorted—which may be particularly noticeable when tuning weak stations—retune for maximum clarity by using conventional tuning knobs.

WHILE A PUSH BUTTON MAY BE SET FOR DISTANT WEAK STATIONS BETTER RESULTS WILL BE OBTAINED IF THE STATIONS SELECTED FOR AUTOMATIC PUSH BUTTON TUNING ARE STRONG NEARBY OR LOCAL STATIONS.

AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC PUSH BUTTON TUNE" OBTAIN THE FREQUENCY USED AND CALL LETTERS OF THESE STATIONS AND SET PUSH BUTTONS BY:

To illustrate the proper installation and setting of the Push Buttons the receiver is shipped from the factory with a Push Button properly set for station WGN, Chicago, 720 kilocycles. If station WGN is not one of the selected stations, remove call letters by:

a. Grasp cap section of Push Button between fingers and gently pull outward until it is clear of dial.
b. Carefully remove the station call letter tab and celluloid disc.

SET STATION PUSH BUTTON BY:

a. Gently press desired round paper station call letter tabs out of station tab sets.
b. Always set the first push button for the desired station that broadcasts on the lowest frequency—the least number of kilocycles—and then set the next push button for the selected station operating on the next lowest frequency, continuing on in this manner until a Push Button has been set for all of the desired stations.
c. Loosen Push Button locking screw and remove cups on all Push Buttons by grasping cap between fingers and gently pulling outward—then remove celluloid discs.
d. Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.
e. Slide the Push Button nearest to the low frequency end of dial scale—without moving dial—until metal indicator attached to Push Button is exactly even with the indicator line on the face of the dial,—then with a small screw driver firmly lock Push Button in place by tightening Push Button locking screw.
f. Place printed paper station call letter tab, having call letters of station tuned in—on top of Push Button cup, then—place celluloid protective disc on top of this and gently press Push Button cap firmly down over Push Button cup.
g. Next set a Push Button for the desired station operating on the next lowest frequency in the same manner as above and continue on in this way until all the Push Buttons have been properly set.

AFTER THE TEN PUSH BUTTONS HAVE BEEN PROPERLY SET THEY WILL NOT REQUIRE FURTHER ATTENTION — EXCEPT WHEN MOVED FROM THEIR POSITION OR WHEN AN ADDITIONAL TAB IS INCLUDED WHICH WOULD DISTURB THE POSITION OF THE OTHER TABS.

PARTS LIST

COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

SEE NOTE BELOW

Part No.	Part Name	Description	List Price
211	Dial Assembly	Used With Model 1 Complete Assembly Less Escutcheon	$12.75
212	Dial Assembly	Used With Model 1 Complete Assembly Less Escutcheon	12.75
208	Dial Assembly	Used With Model 2 Complete Assembly Less Escutcheon	12.75
209	Dial Assembly	Used With Model 2 & 3 Complete Assembly Less Escutcheon	12.75
210	Dial Assembly	Used With Model 4 Complete Assembly Less Escutcheon	12.25

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

Part No.	Part Name	Description	List Price
4047	Cap	Push Button	.15
4046	Celluloid Disc	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
4041	Cup Assembly	Push Button—With Clip and Compression Spring	.15
3995	Band Indicator Assem.	For Model 1 & 4 SEE NOTE BELOW	.75
3992	Band Indicator Assem.	For Model 2 & 3	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Coupler	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 1	.50
3984	Disc	Translucent Dial Scale Background for Model 2 & 3	.55
4024	Disc	Translucent Dial Scale Background for Model 2	.55
4029	Disc	Translucent Dial Scale Background for Model 1 & 4	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4040	Hub Cap		.15
4009	Pulley	Dial Scale Drive (Die Cast)	.45
4039	Plate	Slide Stop	.10
4000	Scale	Calibrated Glass Scale With 4005 Shaft Assem.	2.75
8071	Screw	For Hub Cap 3-48 x ¼" O.H.I.M.	.005
2754	Screw	For Pulley 6-32 x ¼" S.H.H. Cup Point	.01
4037	Slide Stop	Push Button Stop	.10
4356	Spring Lock	For Drive Shaft	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

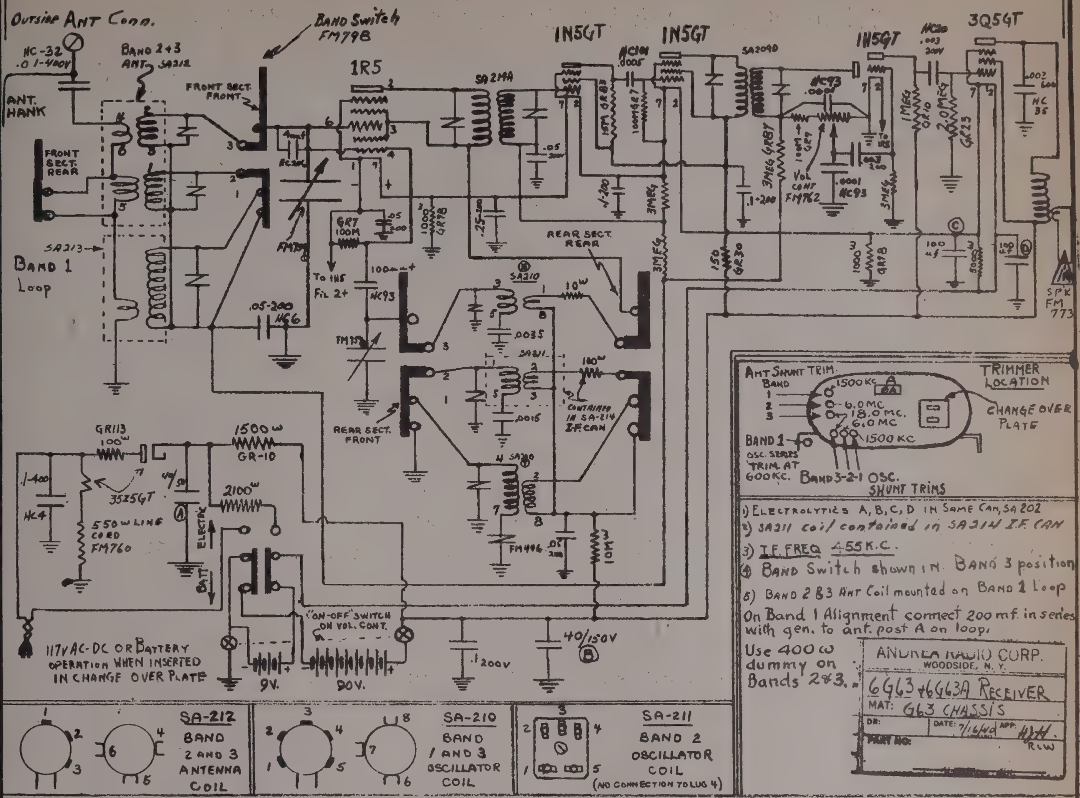
Prices are subject to change without notice.

When ordering parts be sure to mention part number and order all parts from:

NOTE**********************

FOR##1,MODEL NUMBERS ARE B10600,-1,-2,-3,-4,-5
" ##2, " " " B10572,-86,-85
" ##3, " " " B10565,-6,-7,-8
" ##4, " " " B10590,-1,-2,-3,-5,-6

ANDREA RADIO CORP. Models 6G63, 6G63A, Ch. 6G3
Model G42, Ch. PH2



1) Electrolytics A, B, C, D in Same Can, SA 202
2) SA311 coil contained in SA214 I.F. CAN
3) I.F. FREQ 455 K.C.
4) Band Switch shown in Band 3 position
5) Band 2 & 3 Ant Coil mounted on Band 1 Loop

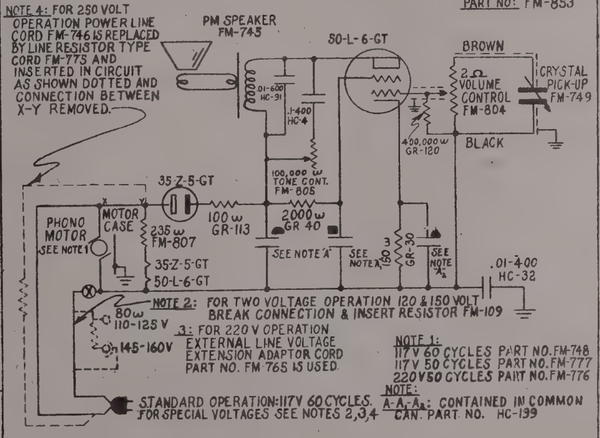
On Band 1 Alignment connect 200 mf. in series with gen. to ant. post A on loop.

Use 400 ω dummy on Bands 2 & 3.

ANDREA RADIO CORP.
WOODSIDE, N. Y.
6G63 + 6G63A RECEIVER
MAT: G63 CHASSIS
DR: DATE: 7/16/40 APP: HJH. RLW
PART NO:

PART NO: FM-853

NOTE 4: FOR 250 VOLT OPERATION POWER LINE CORD FM-746 IS REPLACED BY LINE RESISTOR TYPE CORD FM-775 AND INSERTED IN CIRCUIT AS SHOWN DOTTED AND CONNECTION BETWEEN X-Y REMOVED.



NOTE 2: FOR TWO VOLTAGE OPERATION 120 & 150 VOLT BREAK CONNECTION & INSERT RESISTOR FM-109

3: FOR 220 V OPERATION EXTERNAL LINE VOLTAGE EXTENSION ADAPTOR CORD PART NO. FM-765 IS USED.

NOTE 1:
117 V 60 CYCLES PART NO. FM-748
117 V 50 CYCLES PART NO. FM-777
220 V 50 CYCLES PART NO. FM-776

STANDARD OPERATION: 117 V 60 CYCLES.
FOR SPECIAL VOLTAGES SEE NOTES 2, 3, 4

NOTE:
A-A1-A2: CONTAINED IN COMMON CAN. PART NO. HC-199

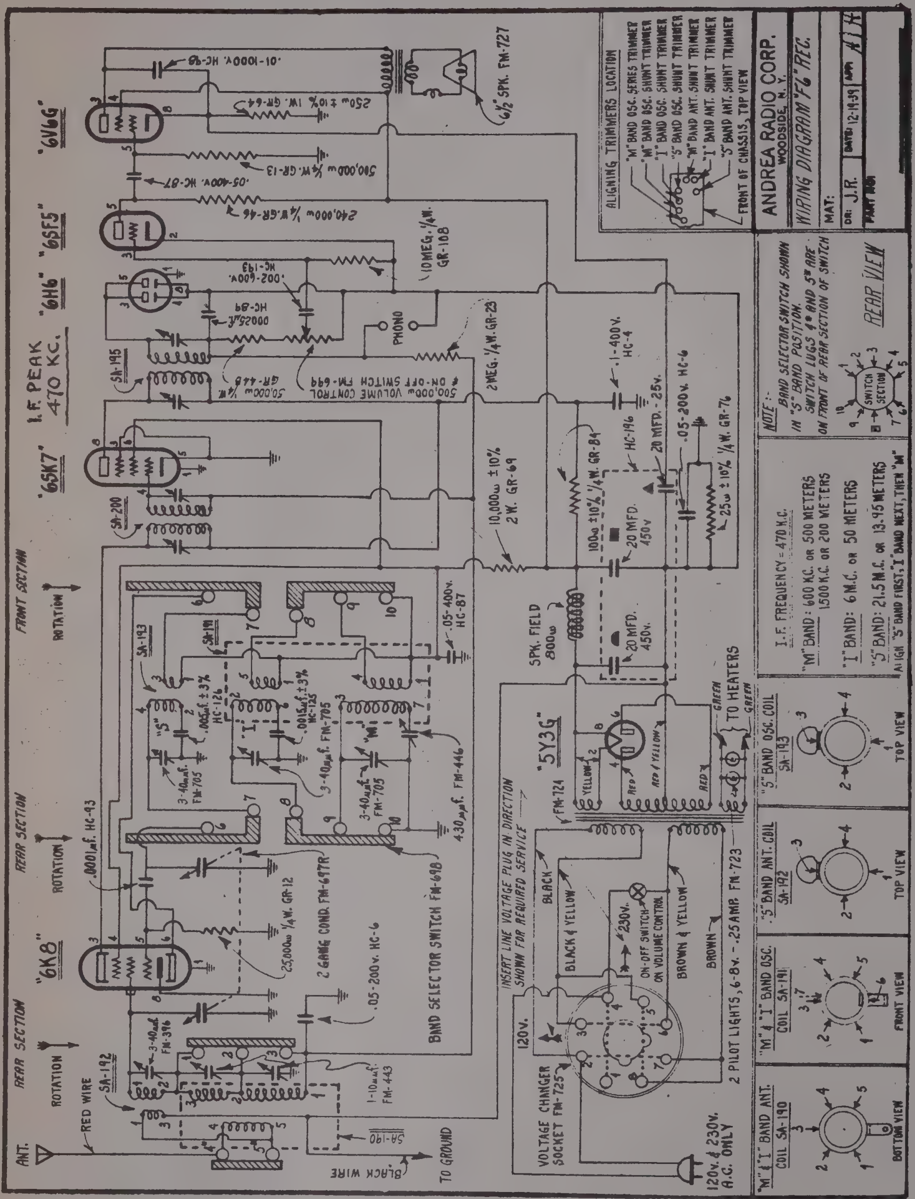
MODEL: G42　　CHASSIS: PH2

POWER CONSUMPTION AT 117 VOLTS 60 CYCLES 40 WATTS

DRAWN BY: HE 1/20/41

Model 43F6. Ch. F6

ANDREA RADIO CORP.



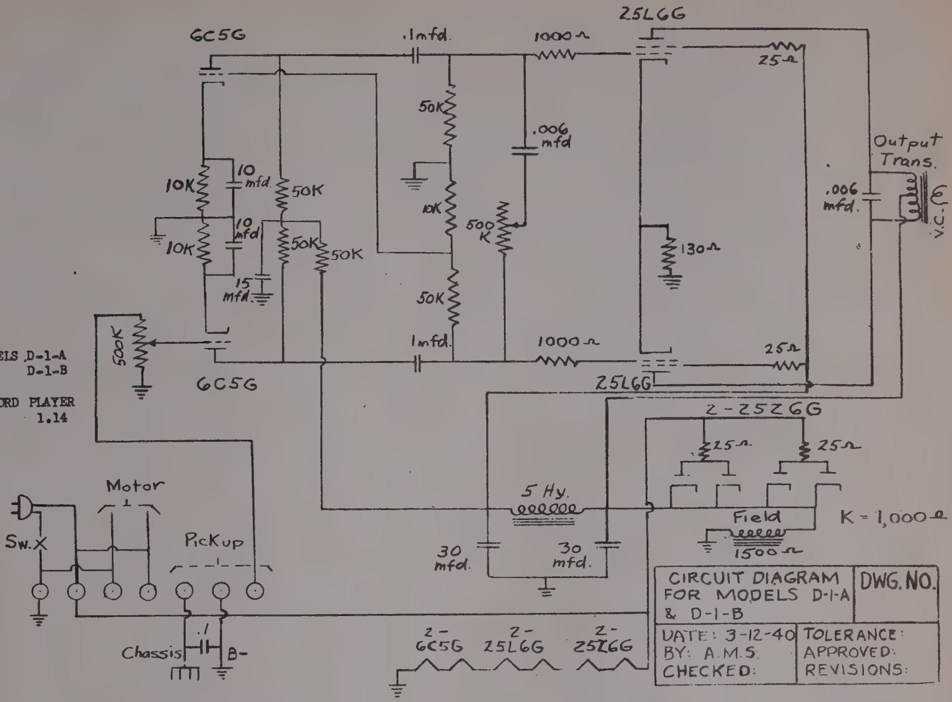
ALIGNMENT NOTE: Use 0.1 mf condenser as dummy antenna when aligning the i-f transformers; use a 400-ohm resistor for the S and I bands and a 0.00025-mf condenser for the M band.

ANSLEY RADIO CORP.

MODELS D-1-A, D-1-B
MODEL D-10A

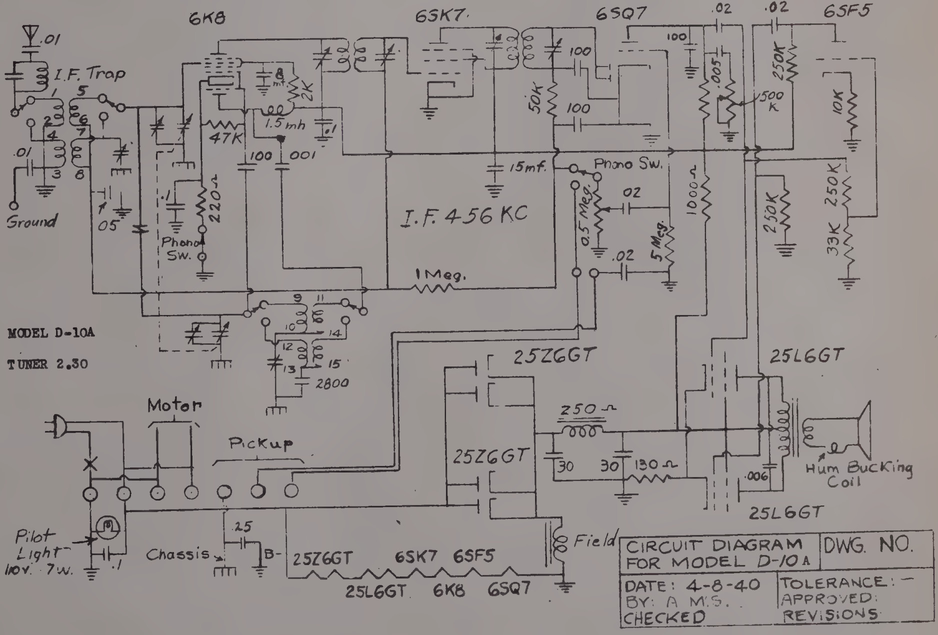
MODELS D-1-A
D-1-B

RECORD PLAYER
1.14



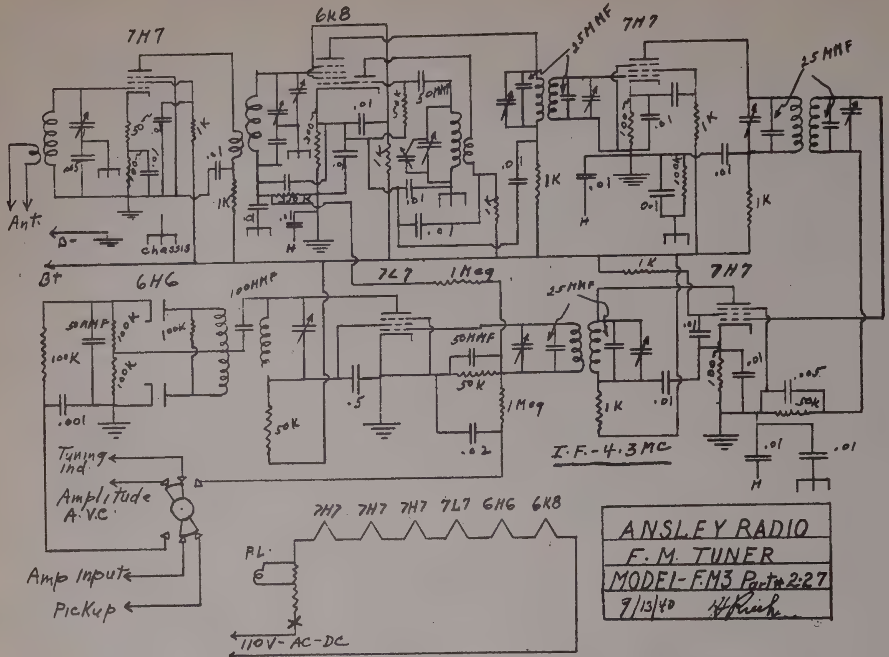
MODEL D-10A

TUNER 2.30



MODEL FM-3

ANSLEY RADIO CORP.



Directions for Alignment of the FM Tuner

Remove the grid lead from the 6K8 converter tube. Connect the live side of the signal generator to the grid of the 6K8 through a small mica condenser 200 to 500 mmf. Connect the ground side of the signal generator through a similar condenser to the lead that was removed from the cap of the tube. Connect a resistor of 200 to 500 ohms between the grid of the tube and the grid lead. Connect the ground or shield of the signal generator to B--. Be sure that there is no direct connection between the signal generator and an external ground or directly to the power supply line.

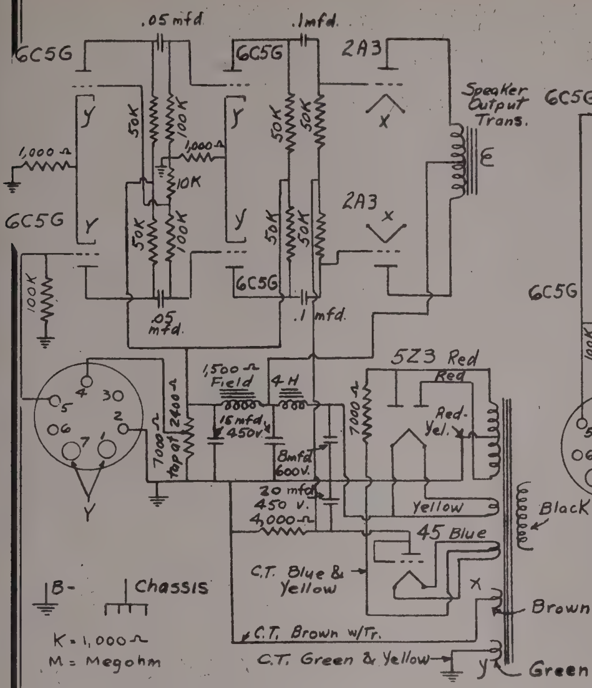
Using a 5,000 ohm per volt D.C. meter with a voltage range of 20 volts as a resonance indicator, connect it across the 50,000 ohm limiting resistor. Set the signal generator at 4.3 M.C. and set the attenuator for about a 5-volt reading on the voltmeter. Align the three I.F. coils for a maximum reading, the same as an amplitude set.

Check the shape of the resonance curve by changing the signal generator to 4.2 M.C. and 4.4 M.C. The output reading either side of resonance should be about the same.

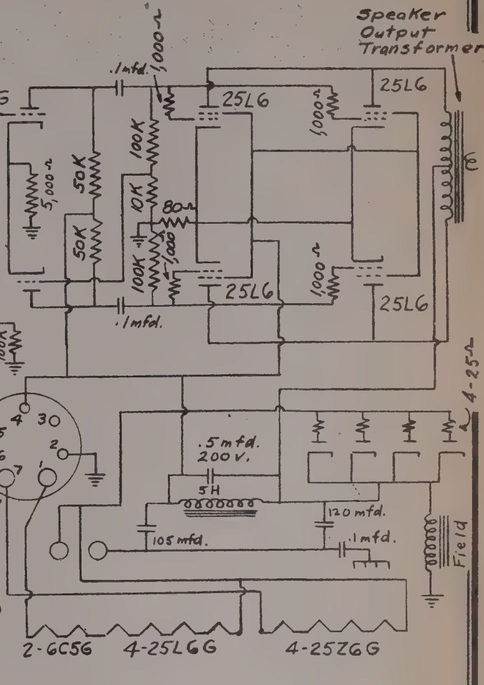
To align the discriminator, connect the signal generator, the same as for the I.F. alignment. Set the generator at 4.3 M.C. Connect the voltmeter across the two diode load resistors. Using an insulated screw driver adjust the secondary trimmer to zero voltage. Shift the signal generator to 4.2 M.C. and 4.4 M.C. Adjust the primary trimmer so that the D.C. readings are equal and opposite in polarity.

To align the R.F. and oscillator, connect the signal generator to the two leads at the back of the chassis. With the generator set at 40 M.C. adjust the oscillator, R.F. and antenna trimmers for maximum signal with the set tuned to the low frequency end of the dial, 50 M.C. and check the frequency and the alignment.

ANSLEY RADIO CORP.

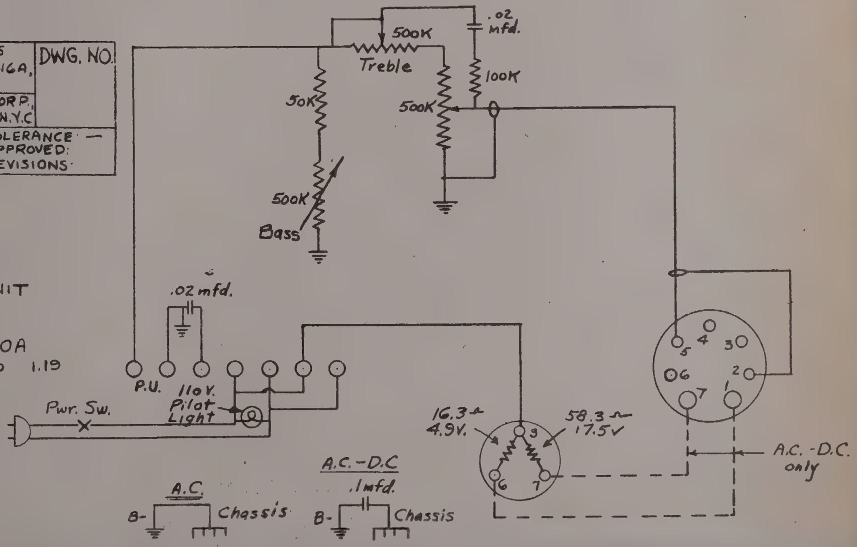


PART NO. 1.12
A.C. AUDIO AMPLIFIER
AND POWER SUPPLY



PART NO. 1.13
A.C.-D.C. AUDIO AMPLIFIER
AND POWER SUPPLY

CIRCUIT DIAGRAMS FOR MODELS D-16A, AND D-20 A	DWG. NO.
ANSLEY RADIO CORP, 4377 BRONX BLVD, N.Y.C	
DATE: 2-1-40 BY: A.M.S. CHECKED.	TOLERANCE — APPROVED: REVISIONS.

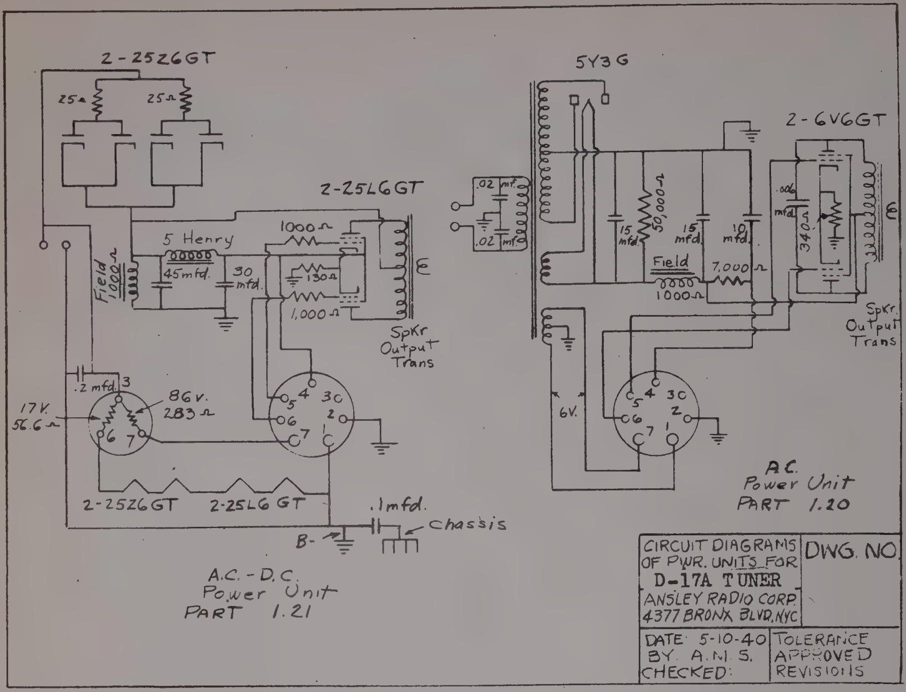


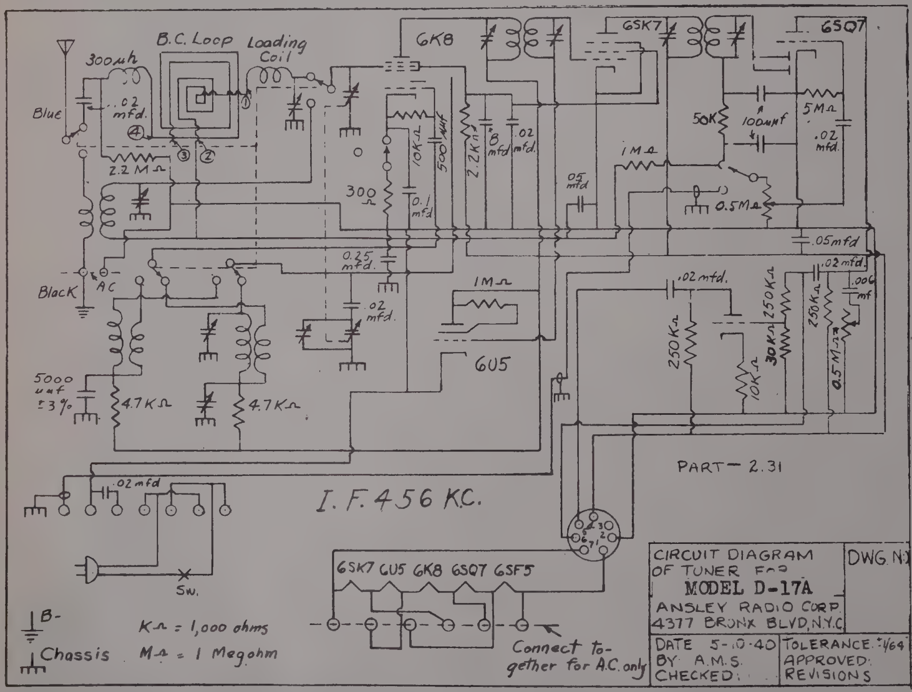
CONTROL UNIT

D-16A, D-20A
PART No 1.19

D17A (1940)

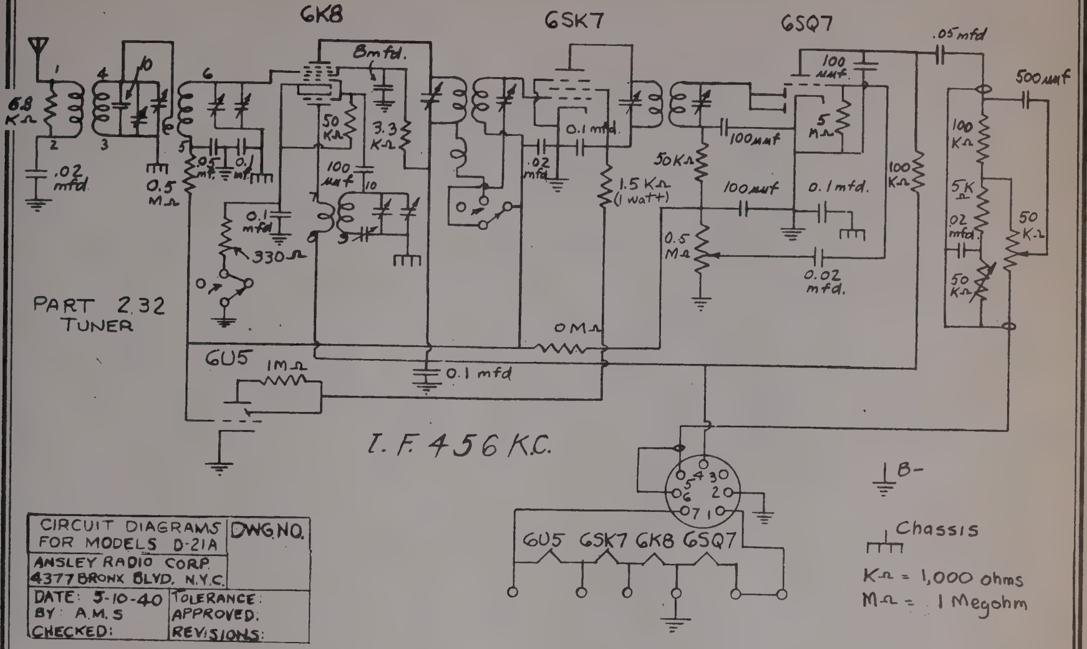
ANSLEY RADIO CORP.





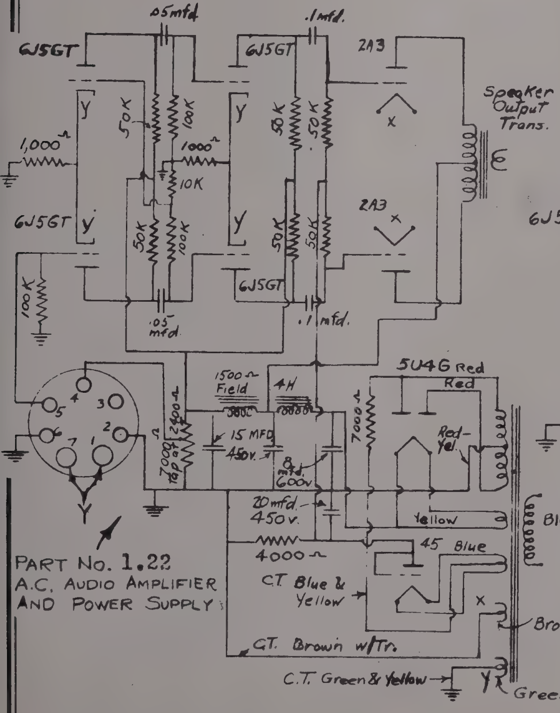
ANSLEY RADIO CORP.

D-21A (1940)

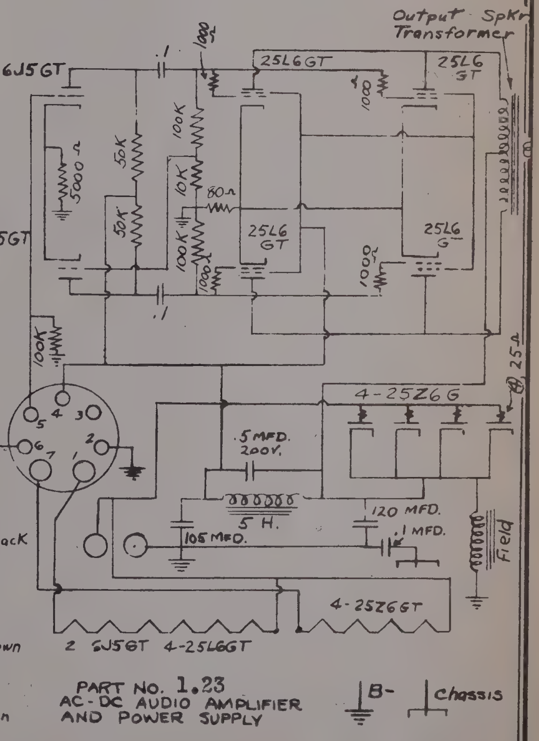


PART 2.32
TUNER

CIRCUIT DIAGRAMS FOR MODELS D-21A	DWG. NO.
ANSLEY RADIO CORP. 4377 BRONX BLVD. N.Y.C.	
DATE: 5-10-40 BY: A.M.S CHECKED:	TOLERANCE: APPROVED: REVISIONS:

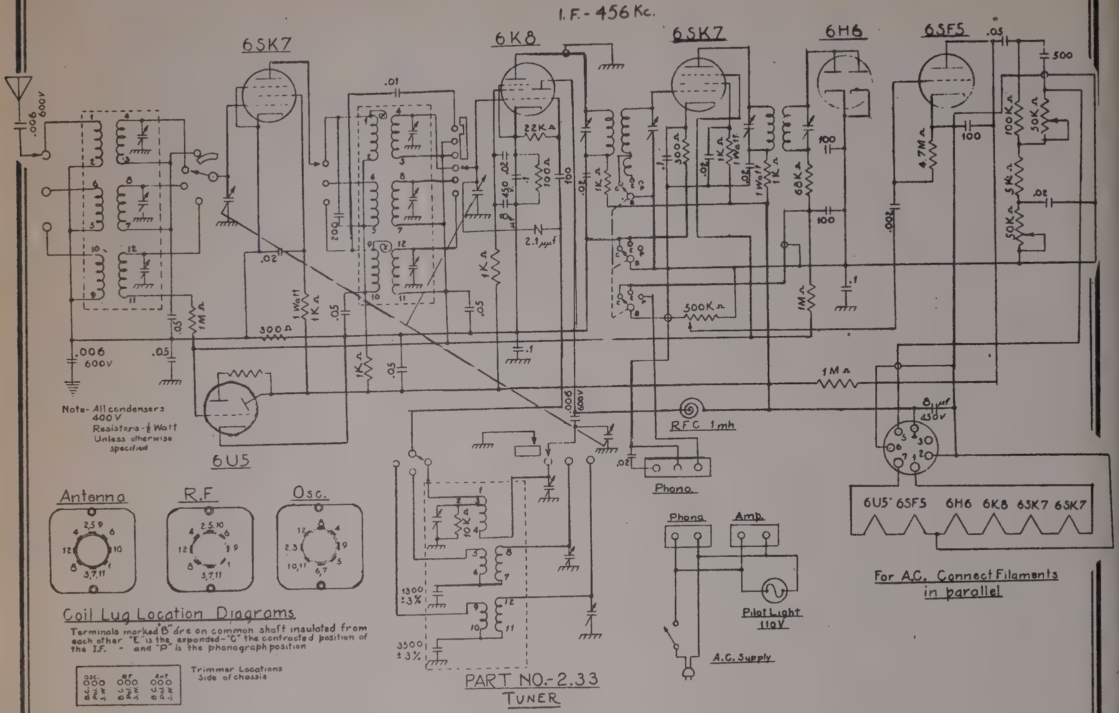


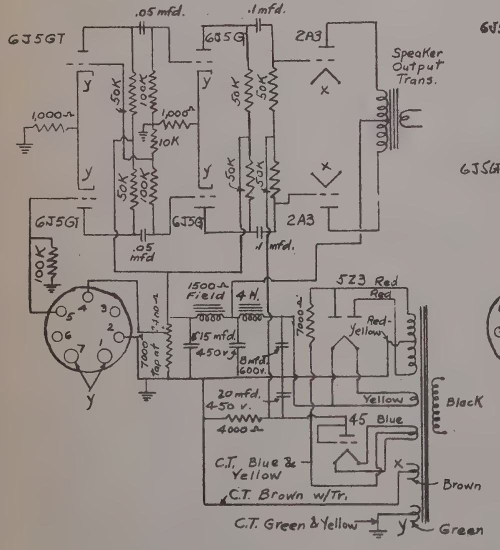
PART No. 1.22
A.C. AUDIO AMPLIFIER AND POWER SUPPLY



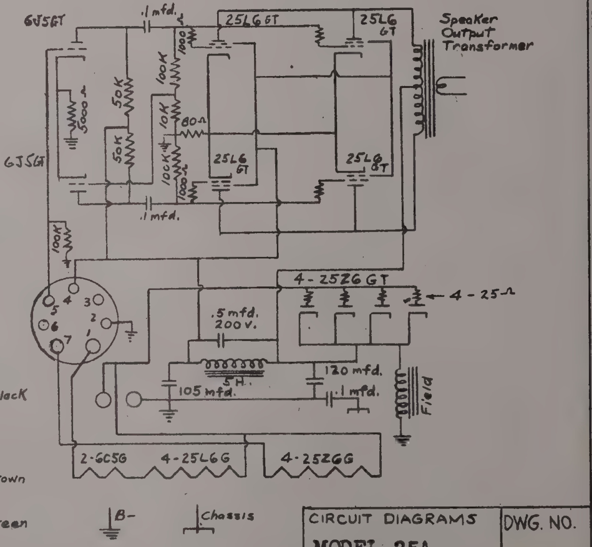
PART No. 1.23
AC-DC AUDIO AMPLIFIER AND POWER SUPPLY

ANSLEY RADIO CORP.


I.F.-456 Kc.
6SK7
6K8
6SK7
6H6
6SF5
6U5
.006 600V
.01
.02
.05
.1
300 Ω
1 Watt 1K Ω
1M Ω
22K Ω
100 Ω
430
2.1 μμf
1K Ω
300 Ω
1 Watt 1K Ω
68K Ω
100
4.7M Ω
100K Ω
50K Ω
5K Ω
50K Ω
.002
500
500K Ω
1M Ω
8 μf 450V
RFC 1mh
Phono
Note- All condensers 400 V Resistors - ½ Watt Unless otherwise specified
6U5· 6SF5 6H6 6K8 6SK7 6SK7
For A.C. Connect Filaments in parallel
Phono
Amp.
Pilot Light 110V
A.C. Supply
Antenna
R.F.
Osc.
Coil Lug Location Diagrams
Terminals marked "B" are on common shaft insulated from each other "E" is the expanded-"C" the contracted position of the I.F. - and "P" is the phonograph position
Trimmer Locations Side of chassis
1300 ±3%
3500 ±3%
PART NO.-2.33
TUNER



PART No. 1.22
A.C. AUDIO AMPLIFIER
AND POWER SUPPLY



PART No. 123
A.C-D.C. AUDIO AMPLIFIER
AND POWER SUPPLY

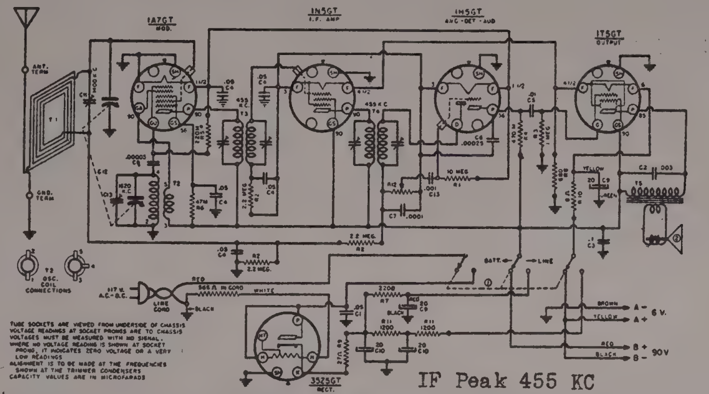
CIRCUIT DIAGRAMS
DWG. NO.

MODEL 25A
DYNAPHONE

DATE: 1-8-40
BY: A.M.S.
CHECKED:
TOLERANCE:
APPROVED:
REVISIONS:

AUTOCRAT RADIO COMPANY

Models 131, 531, 533
Model 431



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READINGS
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
CAPACITY VALUES ARE IN MICROFARADS

IF Peak 455 KC

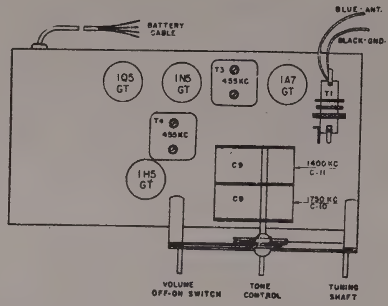
CODE	PART NO.	DESCRIPTION
C1	1607	05 MFD 400 V. TUBULAR COND.
C2	16-139	.003 - - - -
C3	16-115	.1 - 200 V - -
C4	1622	05 - - - -
C5	16-121	01 - - - -
C6	1304	00025 MFD. MICA CONDENSER
C7	1501	0001 - - -
C8	1503	.00005 - - -
C9	18-263	20 x 20 - 150 W.V ELECTROLYTIC
C10	18-262	20 x 20 - 150 W.V -
C11	20-129	TRIMMER ON LOOP
C12	19-167	2 GANG VARIABLE COND. ALSO C13
C13	16-124	.001 MFD 400 V TUBULAR COND.

CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 W. RESISTOR
R2	60-179	2.2 - - -
R3	60-195	1 - - -
R4	60-178	470 M OHM - -
R5	60-180	220 M - - -
R6	60-177	47 M - - -
R7	60-383	2200 - - -
R8	60-379	680 - - -
R9	60-220	27 - - -
R10	60-128	8 - 1/2 W. -
R11	60-642	1200 - 3 W. -
R12	24-130	1 MEGOHM VOLUME CONTROL

CODE	PART NO	DESCRIPTION 1-53
T1	02-25	LOOP ANTENNA
T2	10-310	OSCILLATOR COIL
T3	10-379	1 ST. I.F. TRANSFORMER
T4	10-343	2 ND. - -
T5	-------	OUTPUT TRANSFORMER
1	69-151	POWER SWITCH
2	79-314	5" P.M. SPEAKER

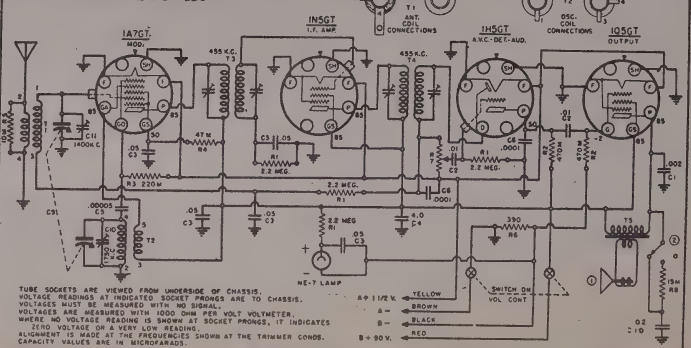
MODELS 131, 531, 533

MODEL 431



MODEL 431

IF Peak 455 KC

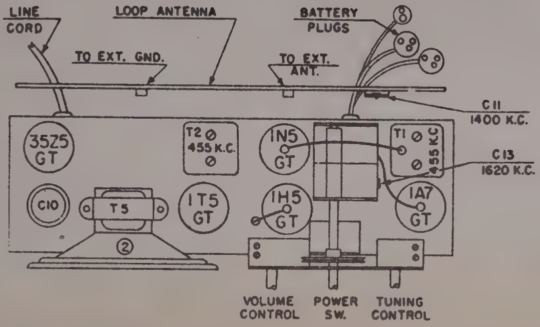


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION
R1	60-179	2.2 MEGOHM 1/4 W RESISTOR
R2	60-178	470M OHM - -
R3	60-130	220M - - -
R4	60-177	47M - - -
R5	60-215	10M - - -
R6	60-221	390 - - -
R7	24-149	1 MEGOHM VOLUME CONTROL
R8	60-202	15M OHM 1/4 W RESISTOR

CODE	PART NO	DESCRIPTION
C1	16-138	.002 MFD. 400V. TUBULAR COND.
C2	16-121	.01 - 200V. - -
C3	1622	.05 - - - -
C4	18-250	4.0 - 150W V. ELECTROLYTICS
C5	15-120	.00005 MFD. MICA CONDENSER
C6	1501	.0001 - - -
C9	19-163	2 GANG VAR. COND. ALSO C10 & C11
C10	1605	.02 MFD 200 V TUBULAR COND

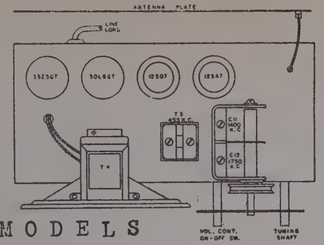
CODE	PART NO.	DESCRIPTION 1-43
T1	10-344	ANTENNA TRANSFORMER
T2	10-341	OSCILLATOR -
T3	10-342	1 ST I.F -
T4	10-343	2 ND. I.F -
T5	-- ---	OUTPUT TRANS. (ON SPKR)
1	79-310	6" P.M. SPEAKER
2	69-156	TONE CONTROL SW



MODELS 131, 531, 533

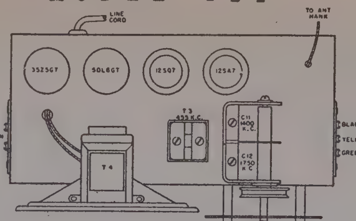
Models 401, 401V
Model 411
Model 422

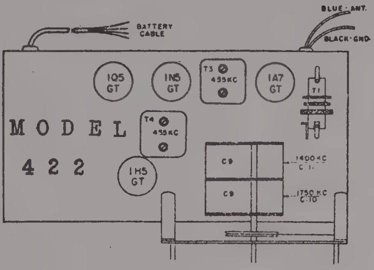
AUTOCRAT RADIO COMPANY



MODELS
401
401V

MODEL 411

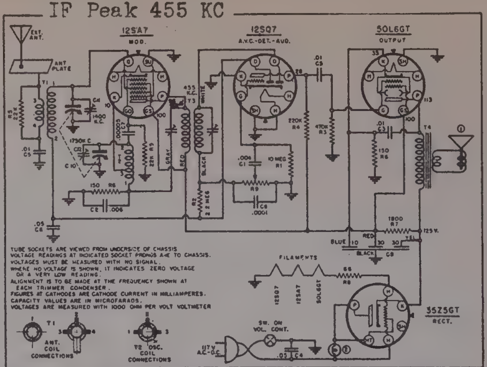




MODEL
422

MODELS
401
401V

IF Peak 455 KC



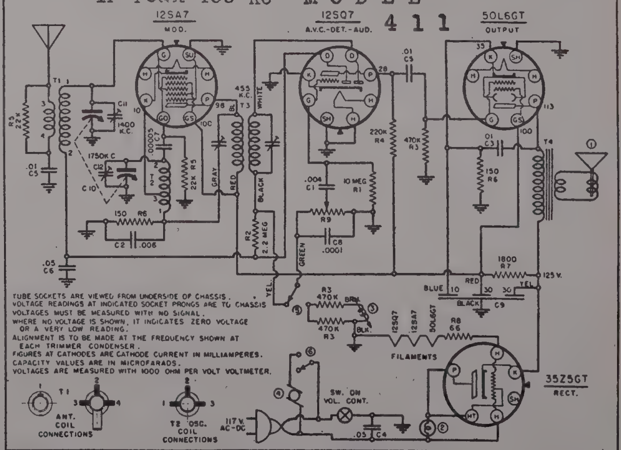
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER

CODE	PART NO	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W. RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K OHM " "
R 4	60-180	220K " " "
R 5	60-185	22K " " "
R 6	60-184	150 " " "
R 7	60-438	1800 " 1/2 W. "
R 8	60-647	66 " 1 1/2 W. "
R 9	24-152	500K " VOL. CONT. & SW.

CODE	PART NO.	DESCRIPTION
C 1	16-125	.004 MFD. 400V. TUBULAR COND.
C 2	16-148	.006 " " " "
C 3	16-119	.01 " " " "
C 4	1607	.05 " " " "
C 5	16-121	.01 " 200V. " "
C 6	1622	.05 " " " "
C 7	1503	.00005 MFD. MICA COND.
C 8	1501	.0001 " " "
C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.
C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12

CODE	PART NO.	DESCRIPTION 1-40
T 1	10-367	ANTENNA COIL
T 2	10-366	OSCILLATOR COIL
T 3	10-368	I. F. TRANSFORMER
T 4	80-205	OUTPUT TRANS. (ON SPKR)
①	79-305	5" P.M. SPEAKER
②	89-4	# 47 PILOT LIGHT

IF Peak 455 KC MODEL 411



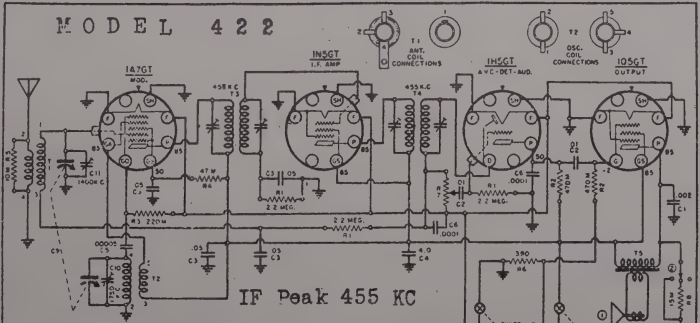
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K OHM " "
R 4	60-180	220K " " "
R 5	60-185	22K " " "
R 6	60-184	150 " " "
R 7	60-438	1800 " 1/2 W. "
R 8	60-647	66 " 1 1/2 W. "
R 9	24-152	1 MEG. " VOL. CONT & SW.
⑥	69-153	S.P.S.T. SWITCH

CODE	PART NO	DESCRIPTION
C 1	16-125	004 MFD 400V TUBULAR COND
C 2	16-148	.006 " " " "
C 3	16-119	.01 " " " "
C 4	1607	.05 " " " "
C 5	16-121	.01 " 200V. " "
C 6	1622	.05 " " " "
C 7	1503	.00005 MFD. MICA COND.
C 8	1501	.0001 " " "
C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.
C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12

CODE	PART NO	DESCRIPTION 1-41
T 1	10-367	ANTENNA COIL
T 2	10-366	OSCILLATOR COIL
T 3	10-368	I F. TRANSFORMER
T 4	80-205	OUTPUT TRANS (ON SPKR)
①	79-305	5" P M SPEAKER
②	89-4	# 47 PILOT LIGHT
③	83-216	PICKUP
④	59-4	PHONO MOTOR
⑤	69-154	SPDT SWITCH

MODEL 422



IF Peak 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.

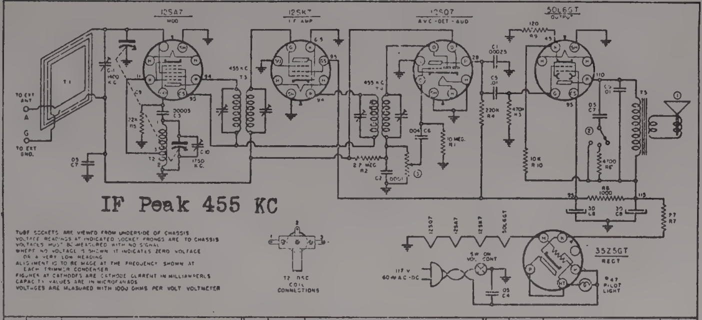
CODE	PART NO	DESCRIPTION
R 1	60 179	2.2 MEGOHM 1/4 W RESISTOR
R 2	60-170	470M OHM " "
R 3	60-180	220M " " "
R 4	60 177	47M " "
R 5	60-215	10M " " "
R 6	60 221	390 " " "
R 7	24-154	1 MEGOHM VOLUME CONTROL
R 8	60 202	15M OHM 1/4 W RESISTER

CODE	PART NO	DESCRIPTION
C 1	16-130	002 MFD. 400V TUBULAR COND.
C 2	16 121	.01 " 200V " "
C 3	1622	.05 " " " "
C 4	18-230	4 0 " 150W V ELECTROLYTICS
C 5	15 120	00005 MFD. MICA CONDENSER
C 6	1501	0001 " " "
C 9	19 165	2 GANG VAR COND ALSO C10 & C11
C 10	1605	02 MFD 400V TUBULAR COND

CODE	PART NO.	DESCRIPTION 1-42
T 1	10-344	ANTENNA TRANSFORMER
T 2	10 341	OSCILLATOR "
T 3	10-342	1 ST I F "
T 4	10-343	2 ND I F "
T 5		OUTPUT TRANS (ON SPKR)
1	79 297	5" P M SPEAKER
2	69-152	TONE CONTROL SWITCH

AUTOCRAT RADIO COMPANY

Models 501, 501U, 503
Model 521

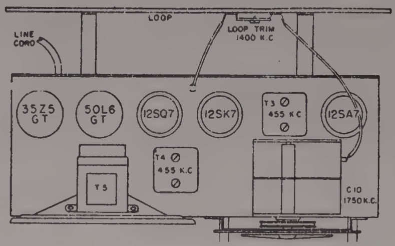


IF Peak 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

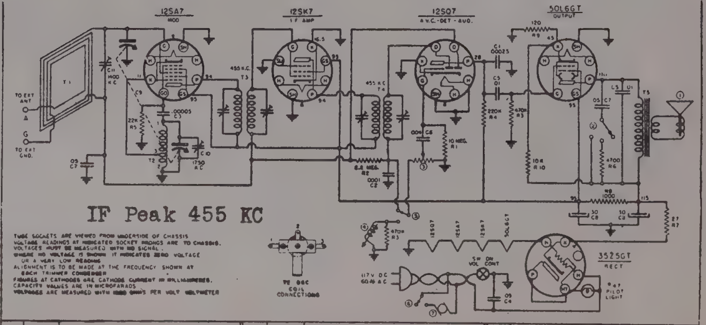
CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION 1-50
R1	60-193	10 MEGOHM 1/4 WATT RESISTOR	C1	1504	.00025 MFD MICA CONDENSER	T1	82-21	LOOP ANTENNA
R2	60-179	2.2 - - -	C2	1501	.0001 - - -	T2	10-371	OSCILLATOR COIL
R3	60-178	470K OHM - -	C3	1503	.00005 - - -	T3	10-369	1ST I.F. TRANSFORMER
R4	60-180	220K - - -	C4	1607	.05 MFD, 400 V TUBULAR CONDENSER	T4	10-370	2ND I.F. TRANSFORMER
R5	60-183	22K - - -	C5	16-119	.01 - - - -	T5	80-205	OUTPUT TRANSFORMER (ON SPKR.)
R6	60-169	4700 - - -	C6	16-125	.004 - - - -			
R7	60-220	27 - - -	C7	1622	.05 - 200 V. - -	1	78-305	5" P.M. SPEAKER
R8	60-198	1000 - 1/2 WATT -	C8	18-266	30 x 30 MFD 150 W.V. ELECTROLYTIC	2	60-152	TONE SWITCH
R9	60-648	120 - - -	C9	19-171	2 GANG VARIABLE CONDENSER (ALSO C10)	3	24-153	500K OHM VOLUME CONTROL (WITH SW.)
R10	60-547	10K 1 WATT -	C11	20-129	TRIMMER (ON LOOP)			

MODELS 501, 501U. 503



MODELS 501, 501U, 503

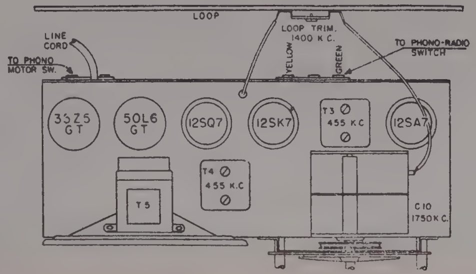
MODEL 521



IF Peak 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

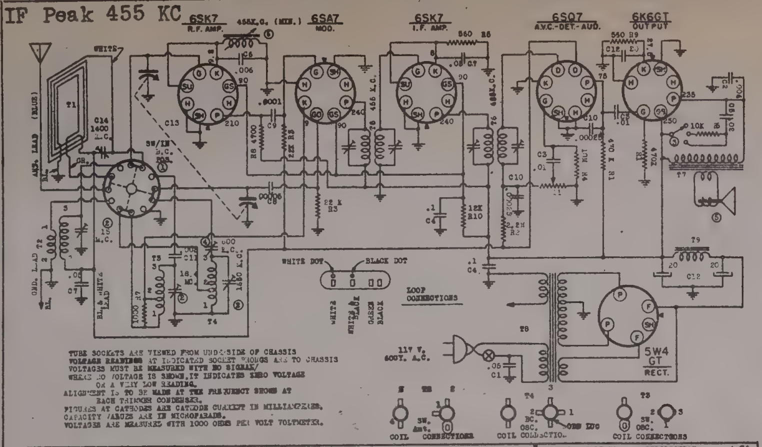
CODE	PART NO.	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION 1-52
R1	60-193	10 MEGOHM 1/4 WATT RESISTOR	C1	1504	.00025 MFD MICA CONDENSER	T1	82-73	LOOP ANTENNA
R2	60-179	2.2 - -	C2	1501	.0001 - - -	T2	10-371	OSCILLATOR COIL
R3	60-178	470K OHM -	C3	1503	.00005 - -	T3	10-369	1ST I.F. TRANSFORMER
R4	60-180	220K	C4	1607	.05 MFD 400 V TUBULAR CONDENSER	T4	10-370	2ND I.F. TRANSFORMER
R5	60-185	22K - -	C5	16-119	.01 - - - -	T5	80-205	OUTPUT TRANSFORMER (ON SPKR.)
R6	60-189	4700	C6	16-125	.004 - - - -			
R7	60-220	27 - - -	C7	1622	.05 - 200 V. - -	1	79-30	5" P.M. SPEAKER
R8	60-198	1000 1/2 WATT -	C8	18-266	30 x 30 MFD 150 W.V. ELECTROLYTIC	2	60-152	TONE SWITCH
R9	60-648	120 - -	C9	19-171	2 GANG VARIABLE CONDENSER (ALSO C10)	3	24-153	500K OHM VOLUME CONTROL (WITH SW.)
R10	60-547	10K 1 WATT -	C11	20-129	TRIMMER (ON LOOP)	4	83-216	PICKUP
7	59-4	PHONO MOTOR	6	69-153	S.P.S.T. SWITCH.	5	69-154	S.P.D.T. SWITCH



MODEL 521

Model 601
Model 611

AUTOCRAT RADIO COMPANY



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL/
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER.

CODE.	PART NO.	DESCRIPTION
R1	60-178	470 K OHM 1/4 WATT RES.
R2	60-179	2.2 MEG OHM 1/4 WATT RES.
R3	60-185	22 K OHM 1/4 WATT RES.
R4	60-193	10 MEG. OHM 1/4 WATT RES.
R5	60-201	560 OHM 1/4 WATT RES.
R6	60-216	10 K OHM 1/4 WATT RES.
R7	60-217	1000 OHM 1/4 WATT RES.
R8	60-282	4700 OHM 1/2 WATT RES.
R9	60-535	560 OHM 1 WATT RES.
R10	60-646	12 K OHM 2 WATT RES.
R11	24-146	VOLUME CONTROL
6	10-374	WAVE TRAP -

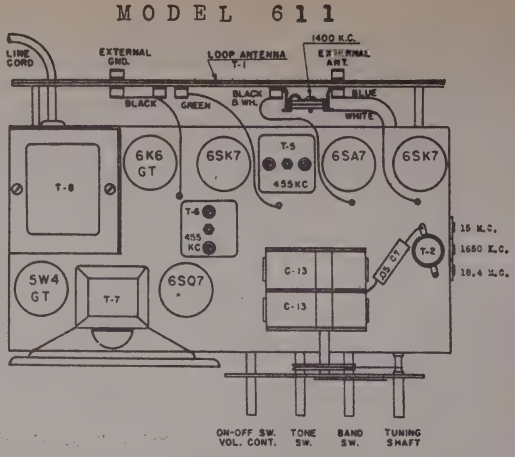
CODE.	PART NO.	DESCRIPTION
C1	1607	.05 MFD. 400 wv. TUB. COND.
C2	16-125	.004 " " " " "
C3	16-119	.01 " " " " "
C4	16-116	.1 " " " " "
C5	1606	.02 " " " " "
C6	16-148	.006 " " " " "
C7	1622	.05 " 200 " " "
C8	1603	.00005 MFD. MICA COND.
C9	1601	.0001 " " "
C10	1604	.00025 " " "
C11	16-118	.003 " " "
C12	18-267	ELEC. 20&20 AT 450 & 20 AT 25
C13	19-160	VARIABLE COND.
C14	20-129	TRIMMER (ON LOOP)

CODE.	PART NO.	DESCRIPTION
T1	82-19	LOOP ANTENNA
T2	10-357	S.W. ANTENNA COIL
T3	10-320	S.W. OSC. COIL
T4	10-326	B.C. OSC. COIL
T5	10-358	1 st. I.F. TRANS.
T6	10-312	2 nd. I.F. TRANS.
T7	------	OUTPUT TRANS.
T8	80-199	POWER TRANS.
T9	------	FIELD COIL
1	69-145	BAND SWITCH
2	20127	TRIMMER BLOCK
3	69-155	TONE CONTROL
4	20-130	PADDING CONDENSER
5	79-300	5" DYNAMIC SPEAKER

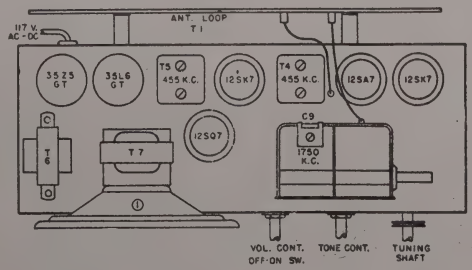
1-61

MODEL 611

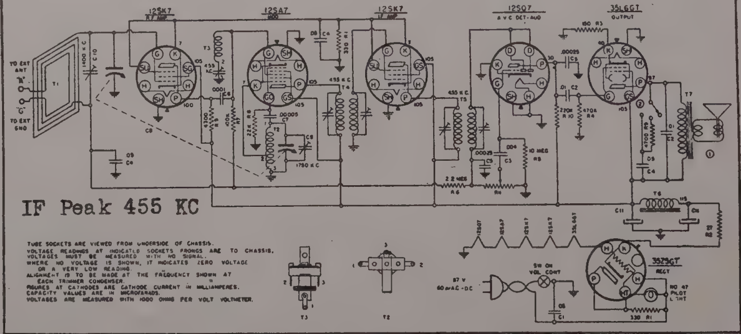
MODEL 611



MODEL 601



MODEL 601



IF Peak 455 KC

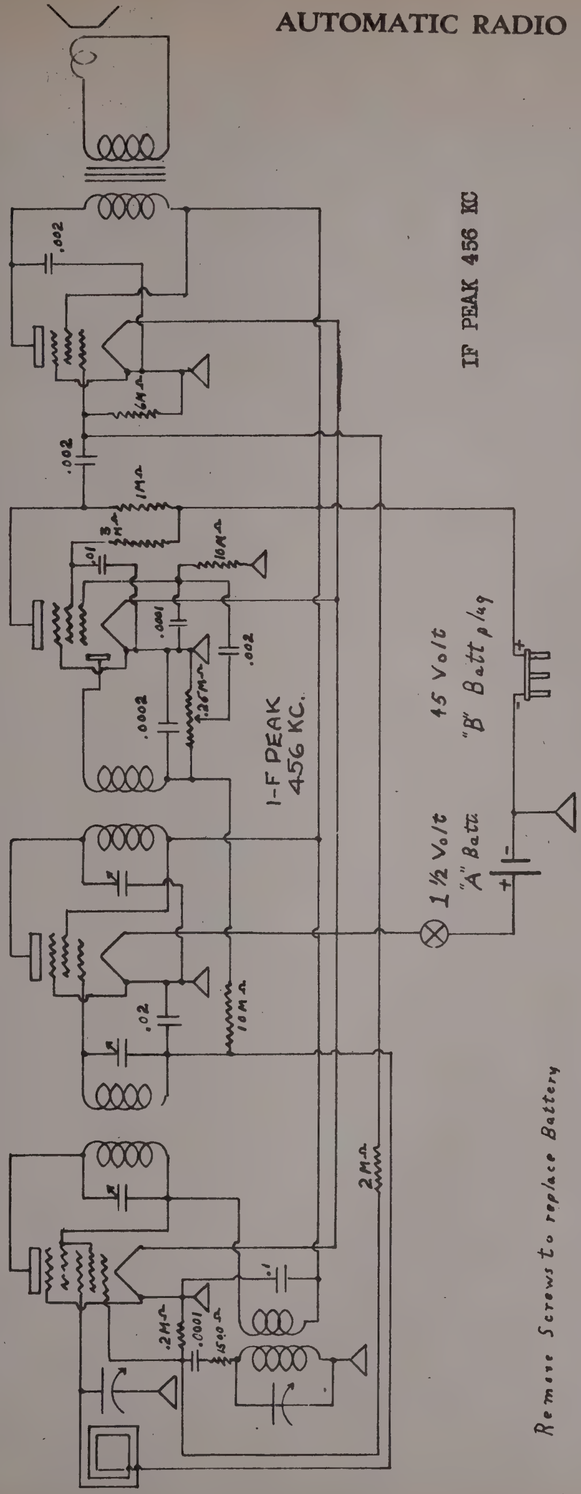
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKETS PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER.

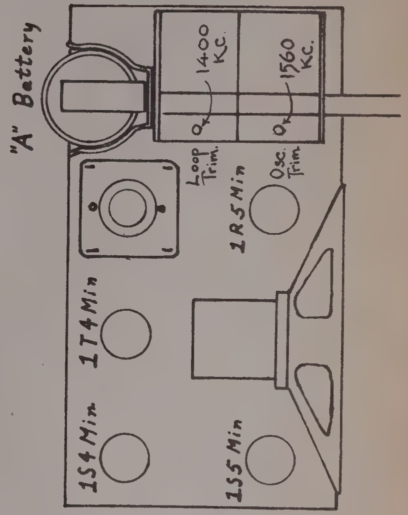
CODE	PART NO	DESCRIPTION
R 1	60-262	330 OHM 1/4 WATT RESISTOR
R 2	60-220	27 " " " "
R 3	60-184	150 " " " "
R 4	60-178	470K " " " "
R 5	60-193	10 MEG " " " "
R 6	60-179	2.2 MEG " " " "
R 7	60-186	100 K " " " "
R 8	60-185	22 K " " " "
R 9	60-189	4700 " " " "
R 10	60-180	220K " " " "
R 11	24-153	500K " VOLUME CONTROL (WITH SWITCH)

CODE	PART NO	DESCRIPTION
C 1	1607	.05 MFD 400 V TUBULAR CONDENSER
C 2	16-119	.01 " 400 V. " "
C 3	16-125	.004 400 V. " "
C 4	1622	.05 " 200 V. " "
C 5	1504	.00025 MFD. MICA "
C 6	1501	.0001 " " "
C 7	15-120	.00005 " " "
C 8	95-14	2 GANG VARIABLE CONDENSER & TUNER (ALSO C9)
C 10	20-129	TRIMMER (ON LOOP)
C 11	18-266	30 & 30 MFD ELECTROLYTIC

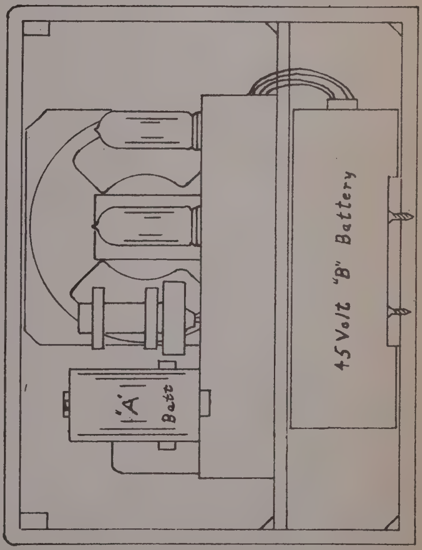
CODE	PART NO	1-60
T 1	82 21	LOOP ANTENNA
T 2	10-372	OSC COIL
T 3	10-373	WAVE TRAP
T 4	10-369	1 ST IF TRANS
T 5	10-370	2 ND IF TRANS.
T 6	33-222	FILTER CHOKE
T 7	————	OUTPUT TRANS. (ON SPEAKER)
1	79-300	SPEAKER
2	69-192	TONE CONTROL

AUTOMATIC RADIO MFG. CO.



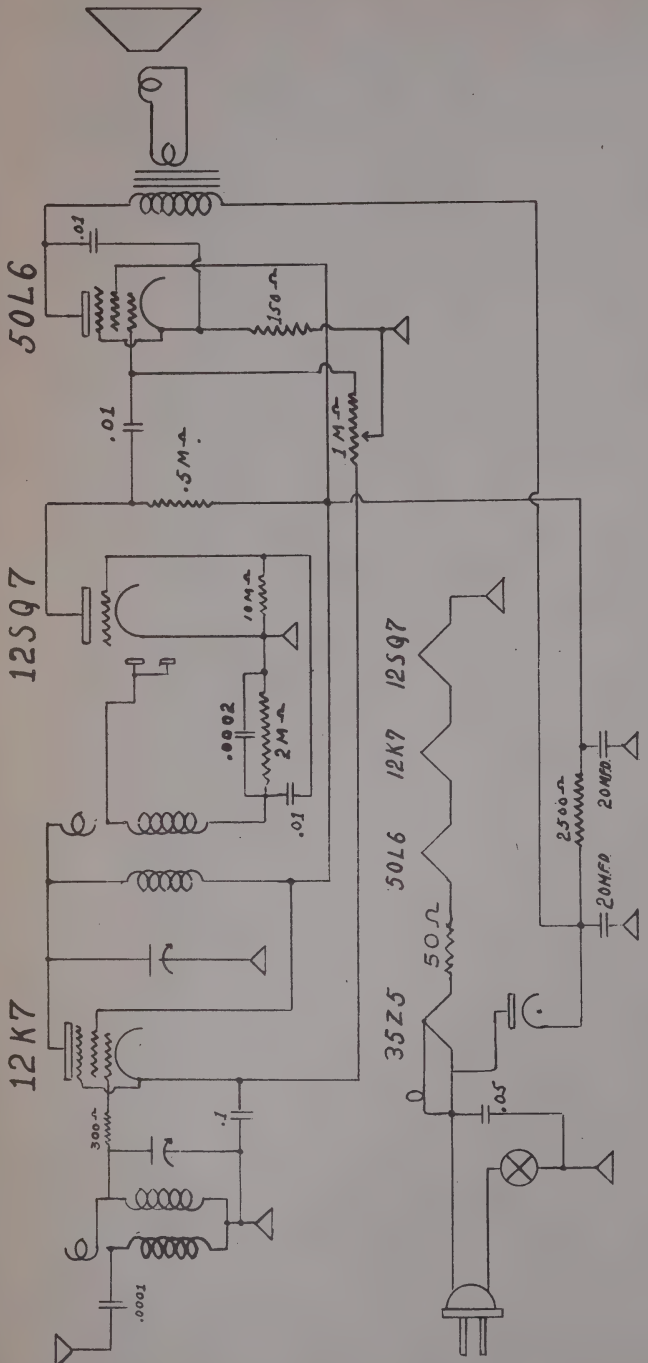


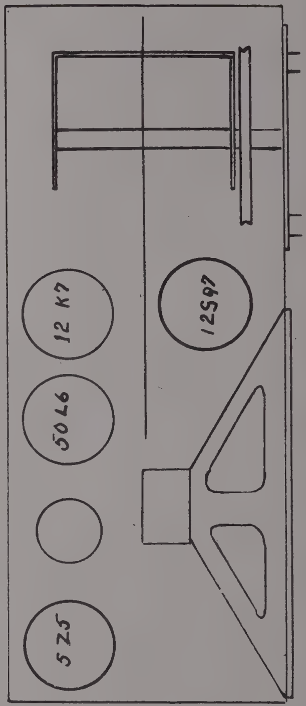
Remove Screws to replace Battery



Models 100, 101

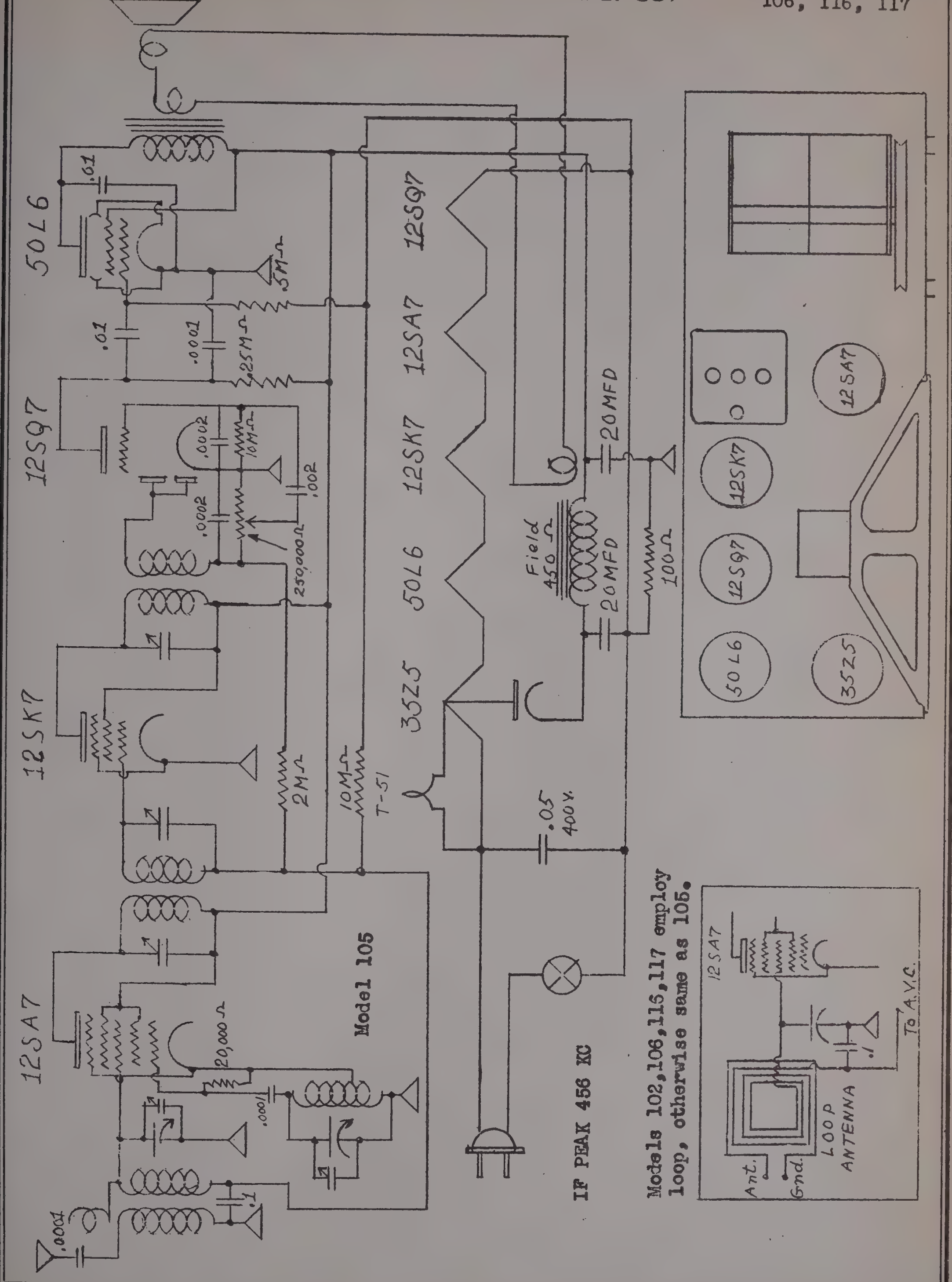
AUTOMATIC RADIO MFG. CO.





AUTOMATIC RADIO MFG. CO.

Models 102, 105, 106, 116, 117



Model 105

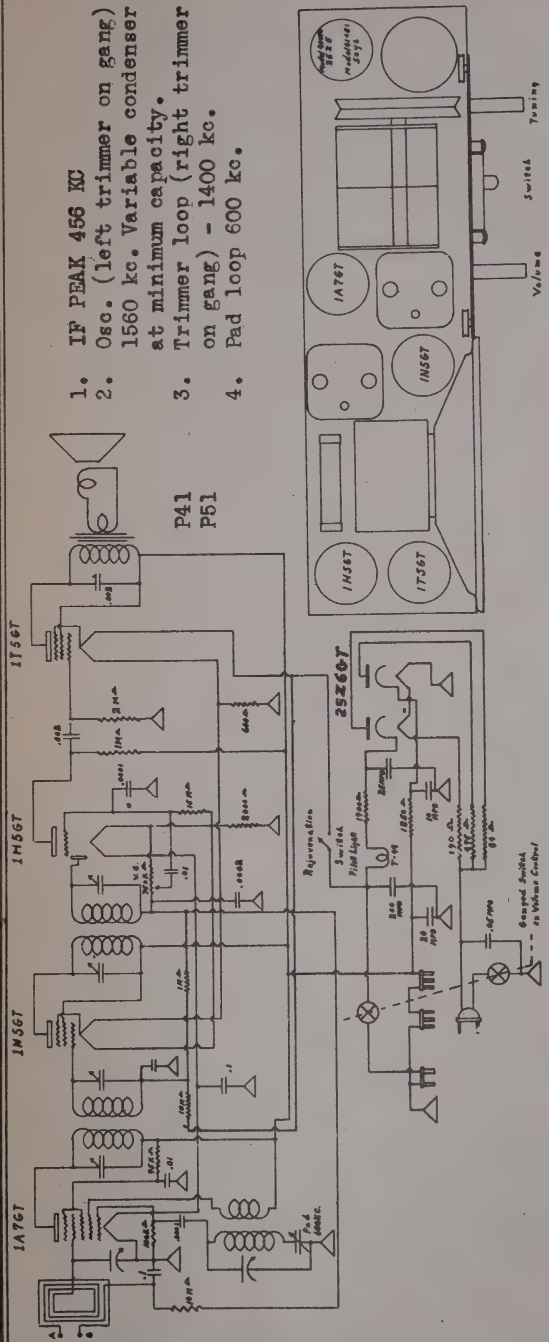
IF PEAK 456 KC

Models 102,106,115,117 employ loop, otherwise same as 105.

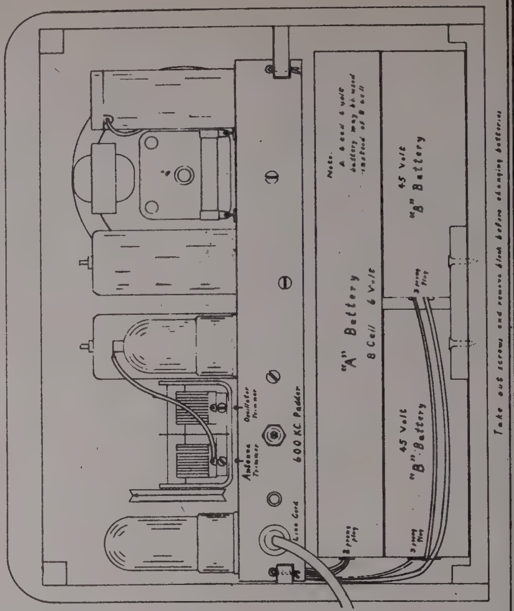
Models P40, P41,
P50, P51

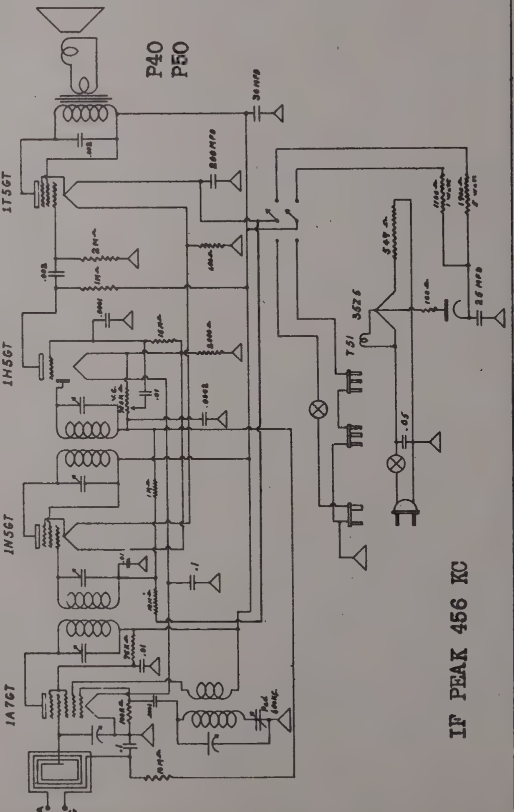
AUTOMATIC RADIO MFG. CO.

1. IF PEAK 456 KC
2. Osc. (left trimmer on gang) 1560 kc. Variable condenser at minimum capacity.
3. Trimmer loop (right trimmer on gang) - 1400 kc.
4. Pad loop 600 kc.



P41
P51



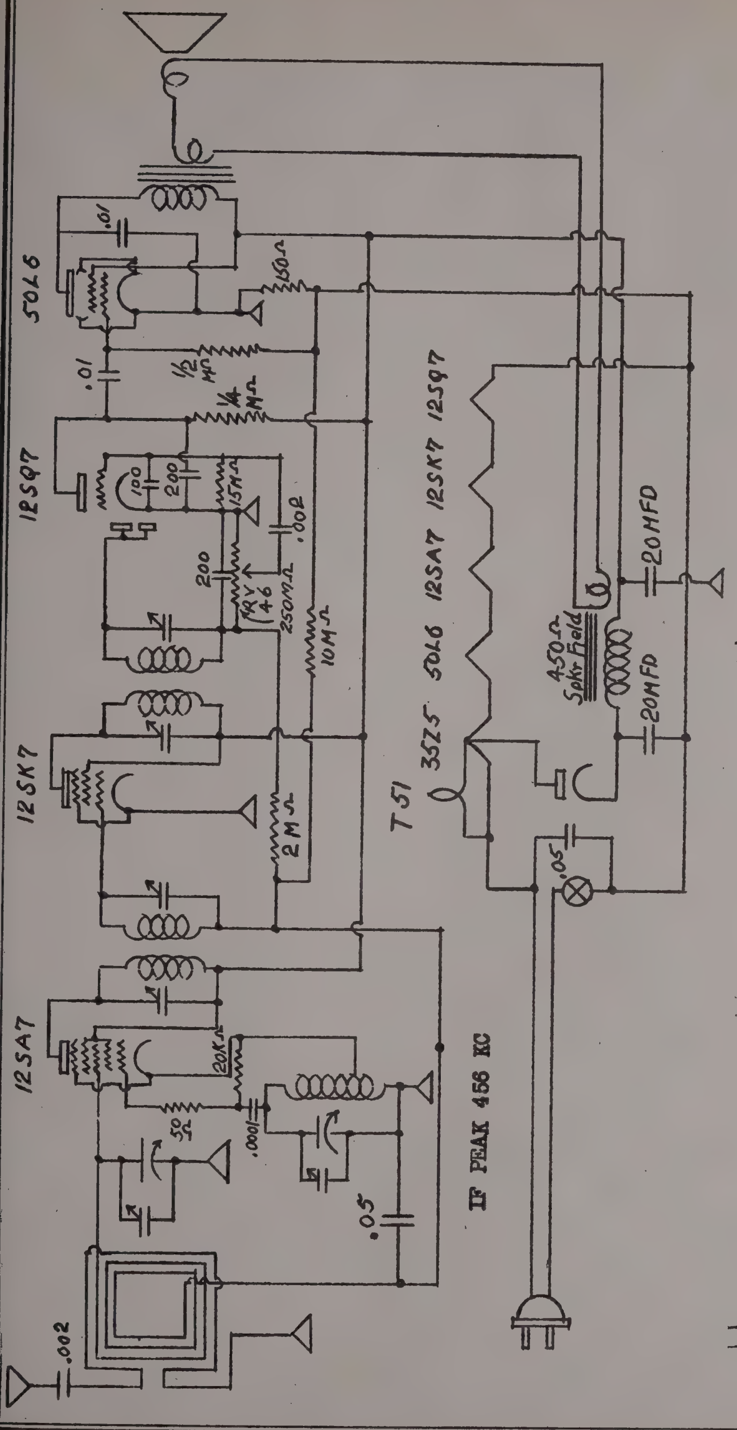


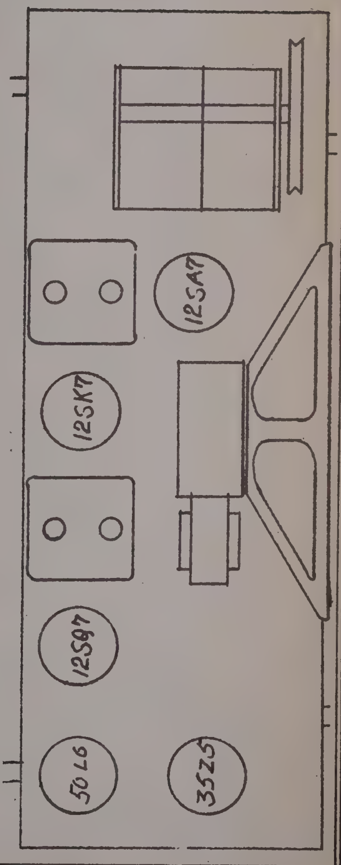
P40
P50

IF PEAK 456 KC

AUTOMATIC RADIO MFG. CO.

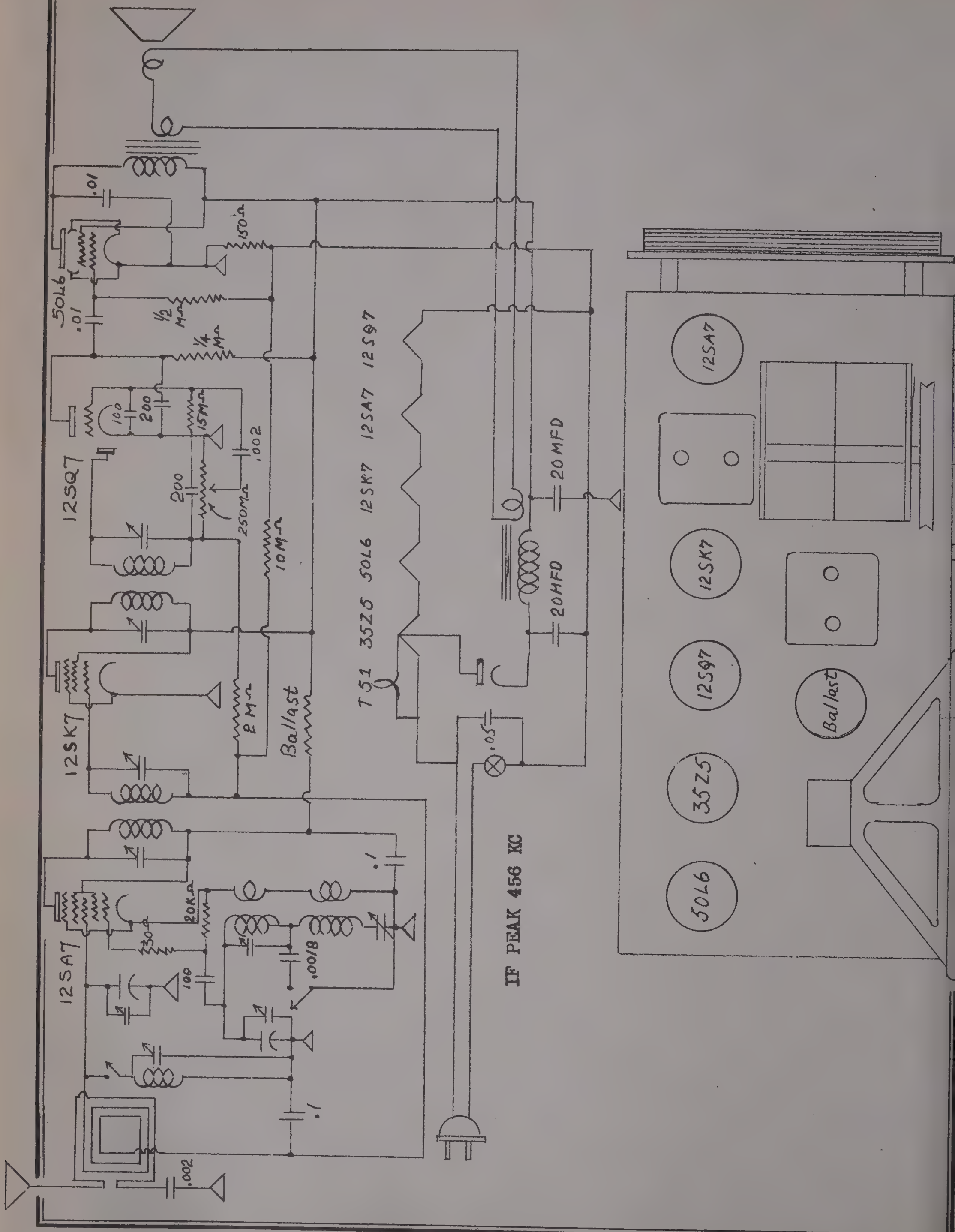
Models 110, 111





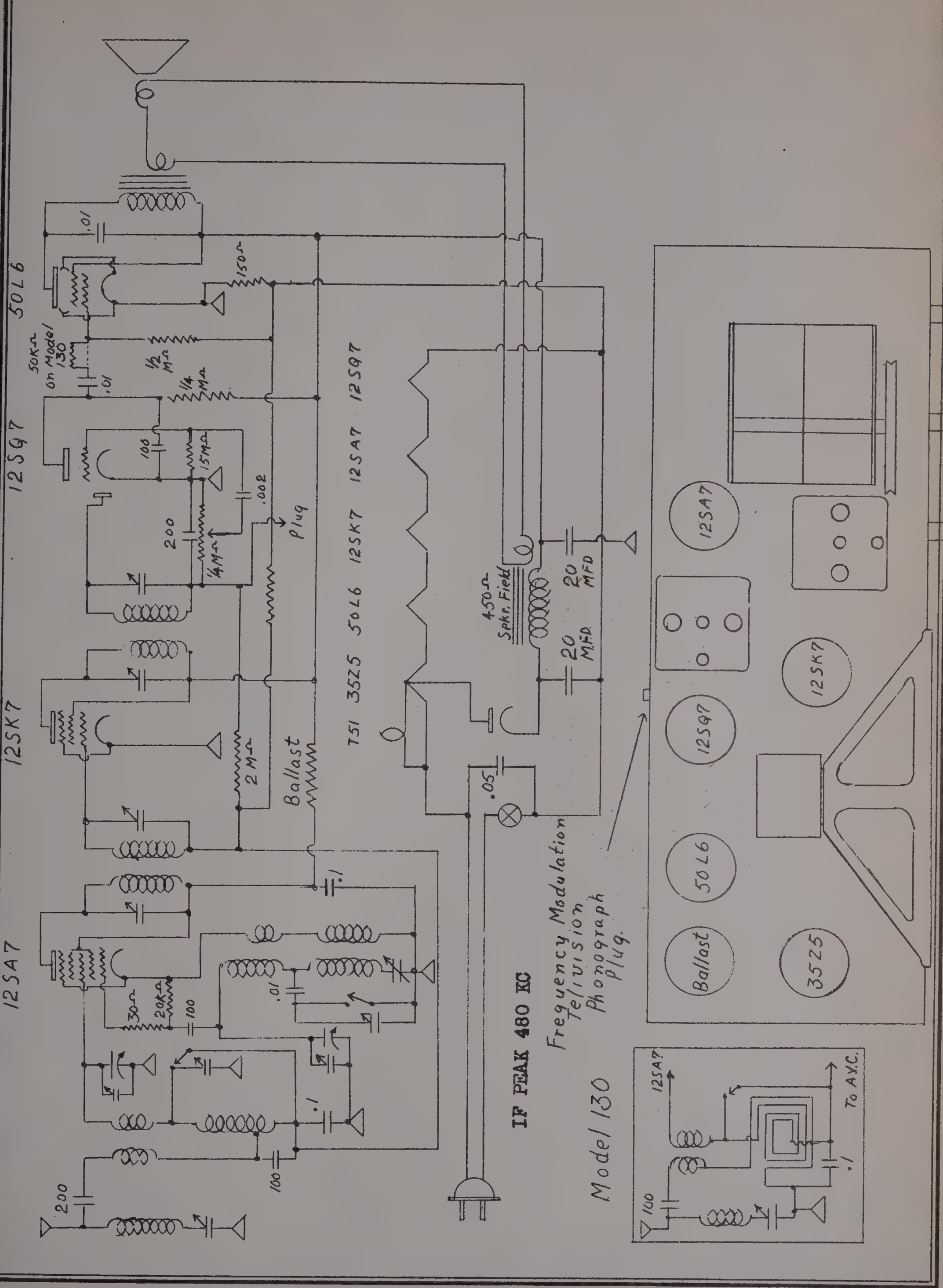
Model 115

AUTOMATIC RADIO MFG. CO.



IF PEAK 456 KC

AUTOMATIC RADIO MFG. CO. Models 120, 125, 130



IF PEAK 480 KC

Model 135

AUTOMATIC RADIO MFG. CO.

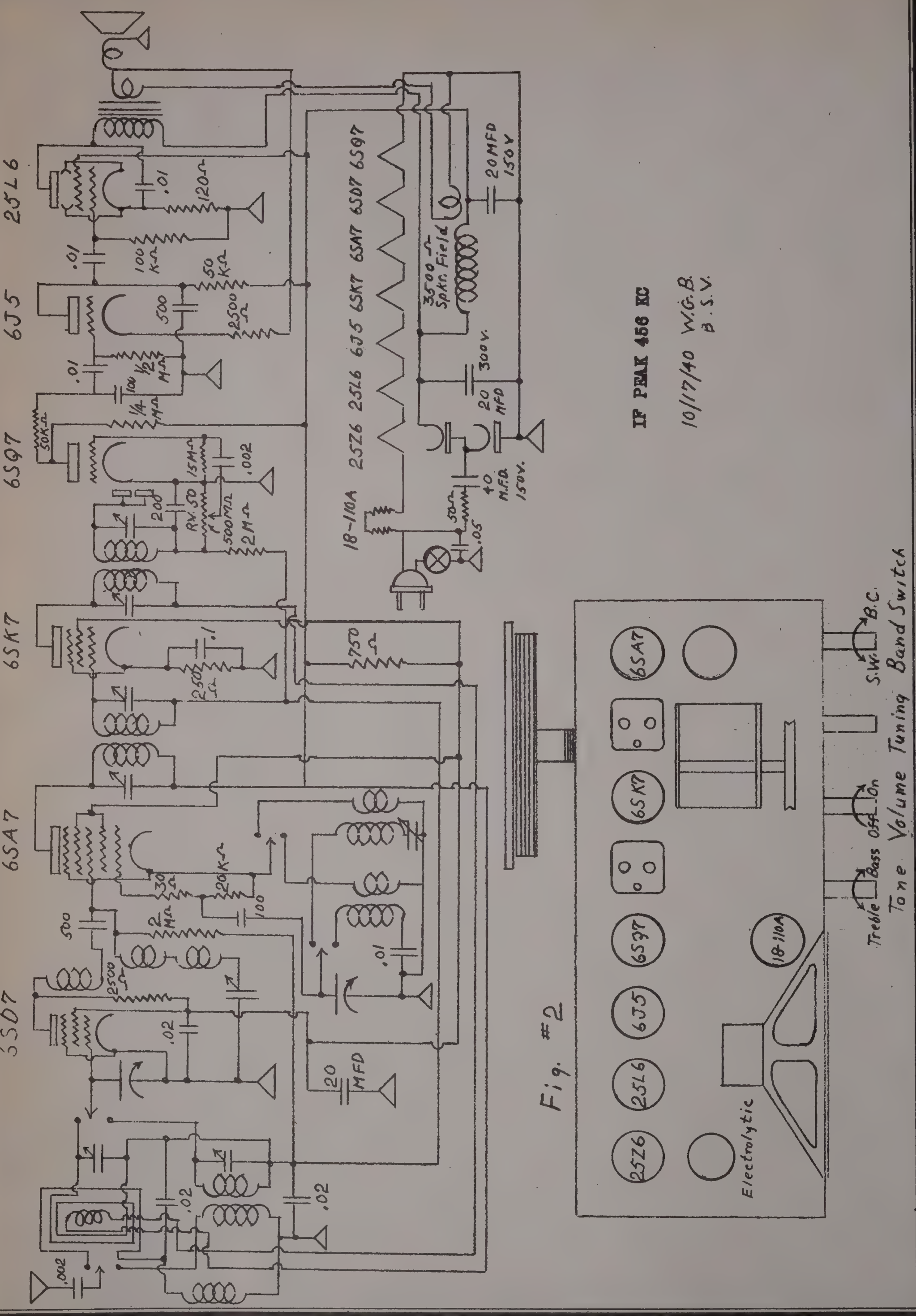


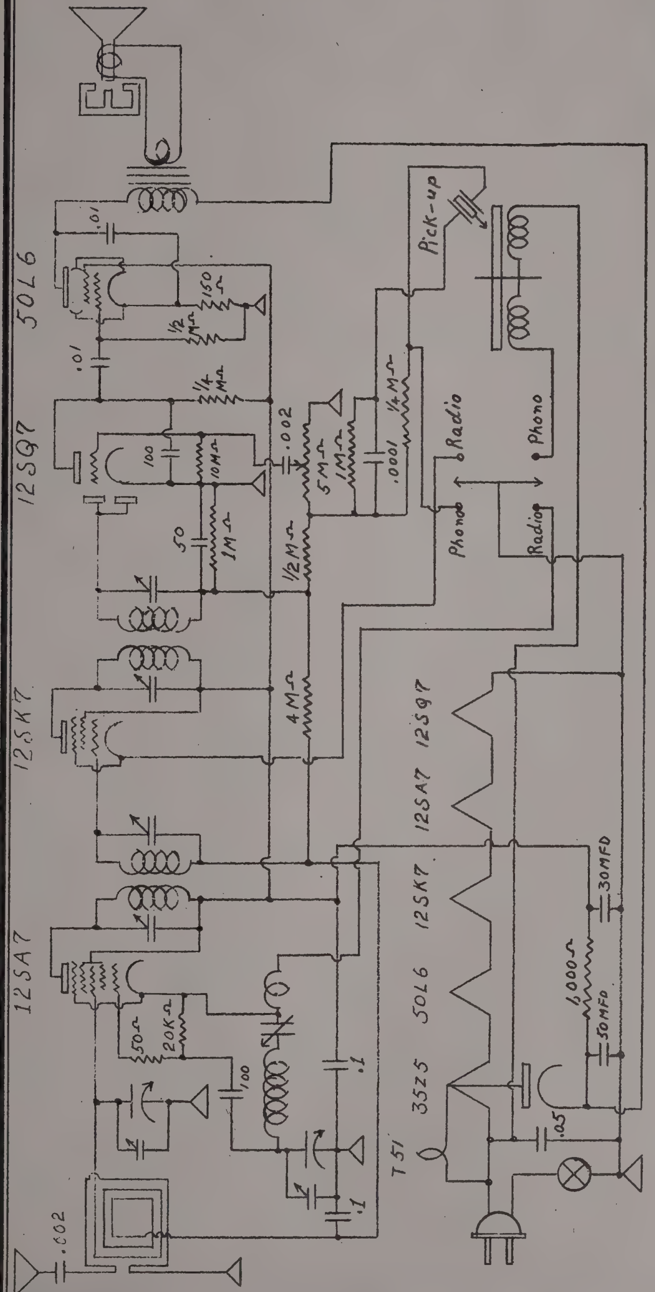
Fig. #2

IF PEAK 456 KC

10/17/40 W.G.B.
B.S.V.

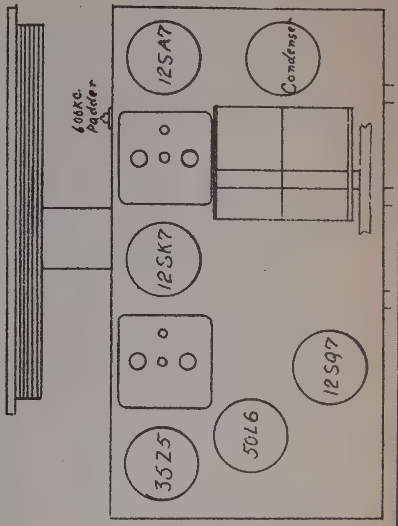
AUTOMATIC RADIO MFG. CO.

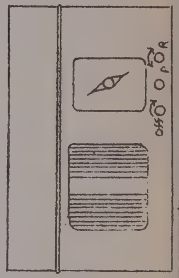
Model 140AC



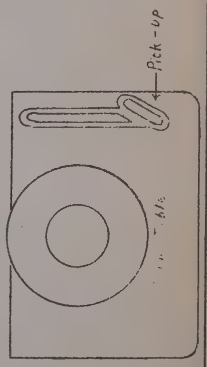
IF PEAK 456 KC

10/2/40 W.G.B.
B.S.V.





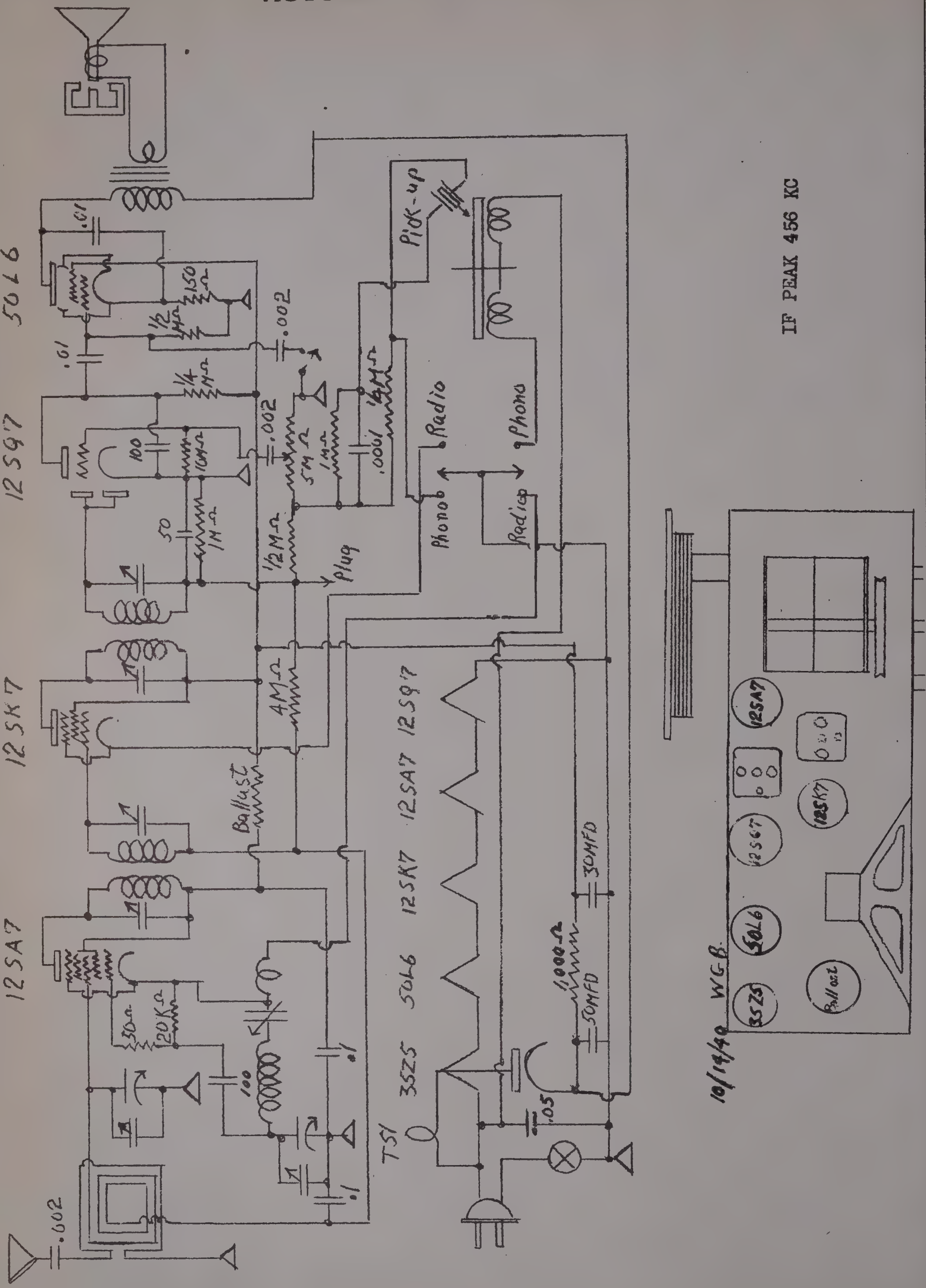
Front View



Top View

Model 145AC

AUTOMATIC RADIO MFG. CO.

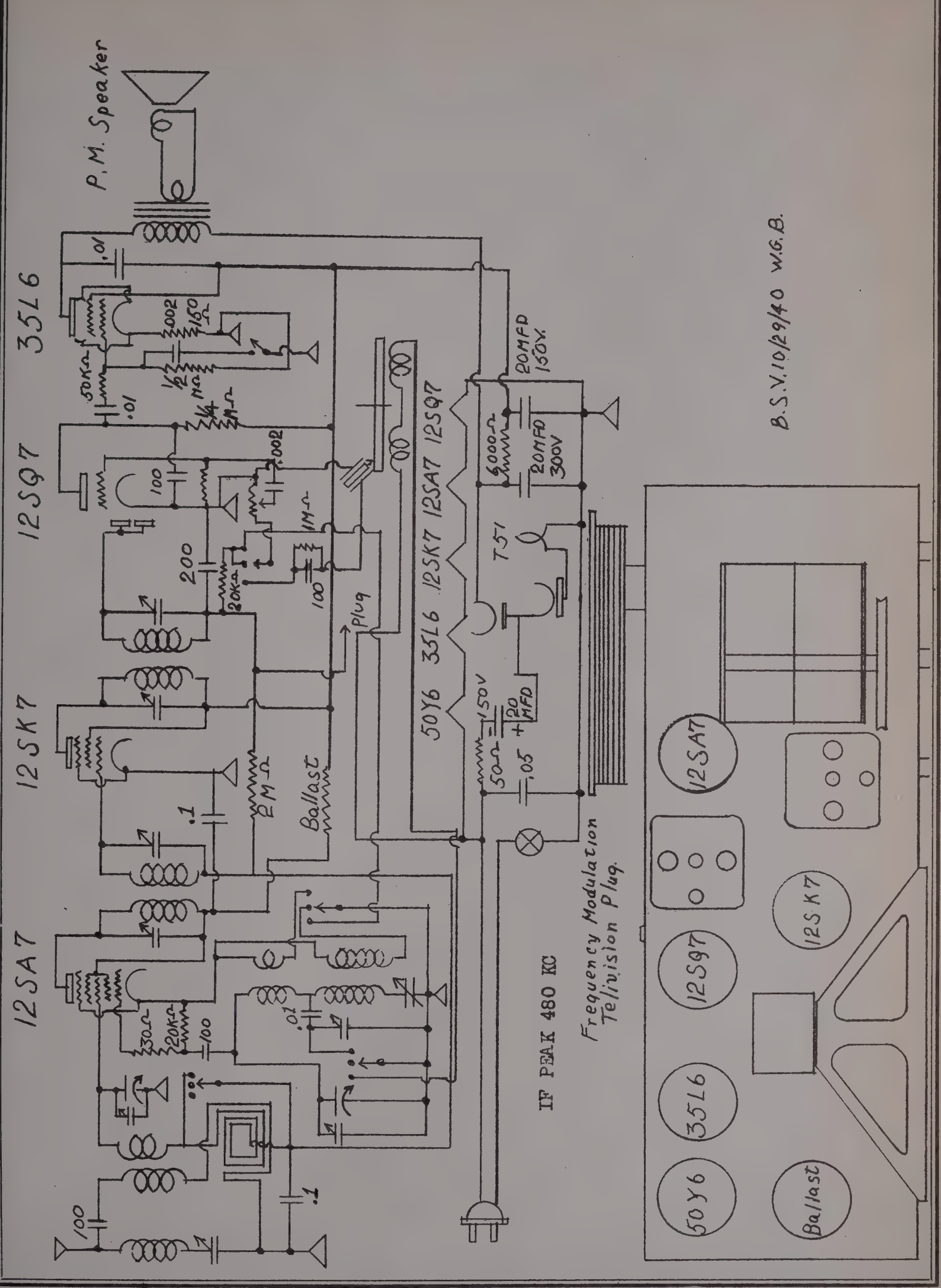


10/14/40 WGB

IF PEAK 456 KC

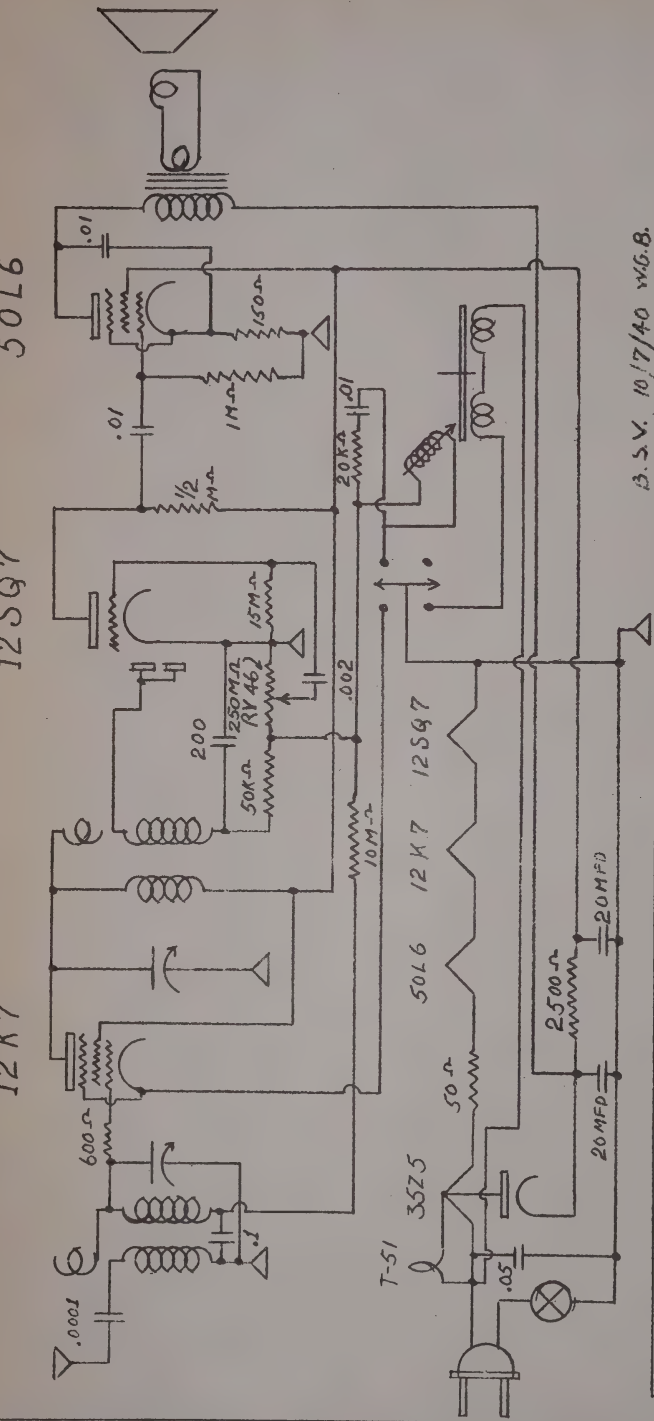
AUTOMATIC RADIO MFG. CO.

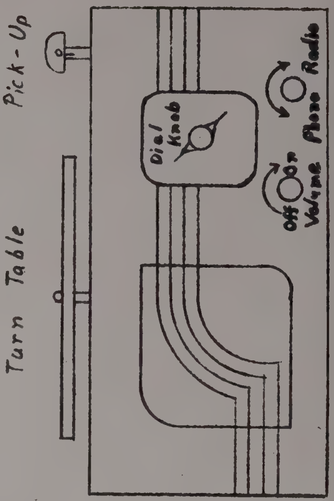
Model 148AC

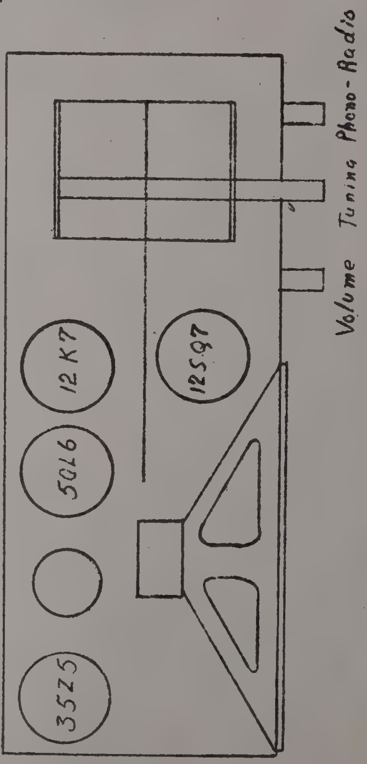


Models 152AC, 155

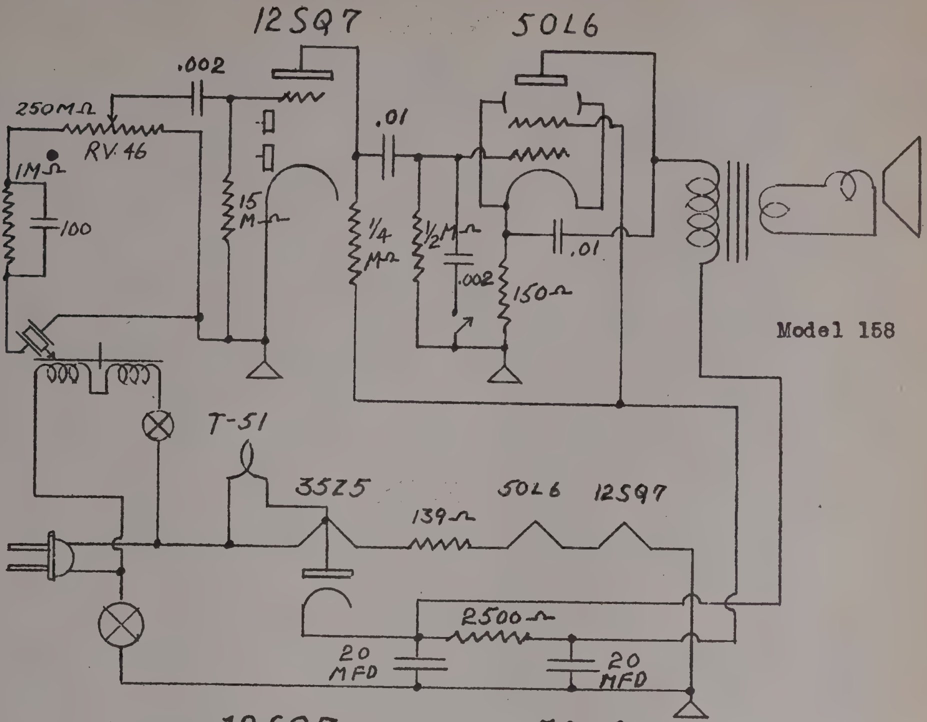
AUTOMATIC RADIO MFG. CO.



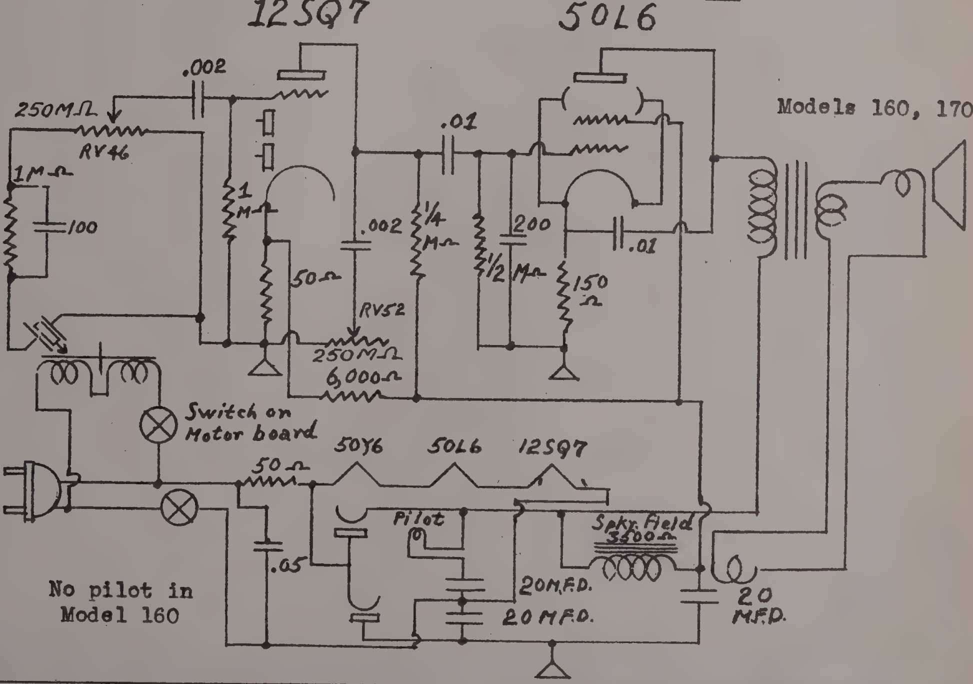




AUTOMATIC RADIO MFG. CO. Models 158, 160, 170



Model 158

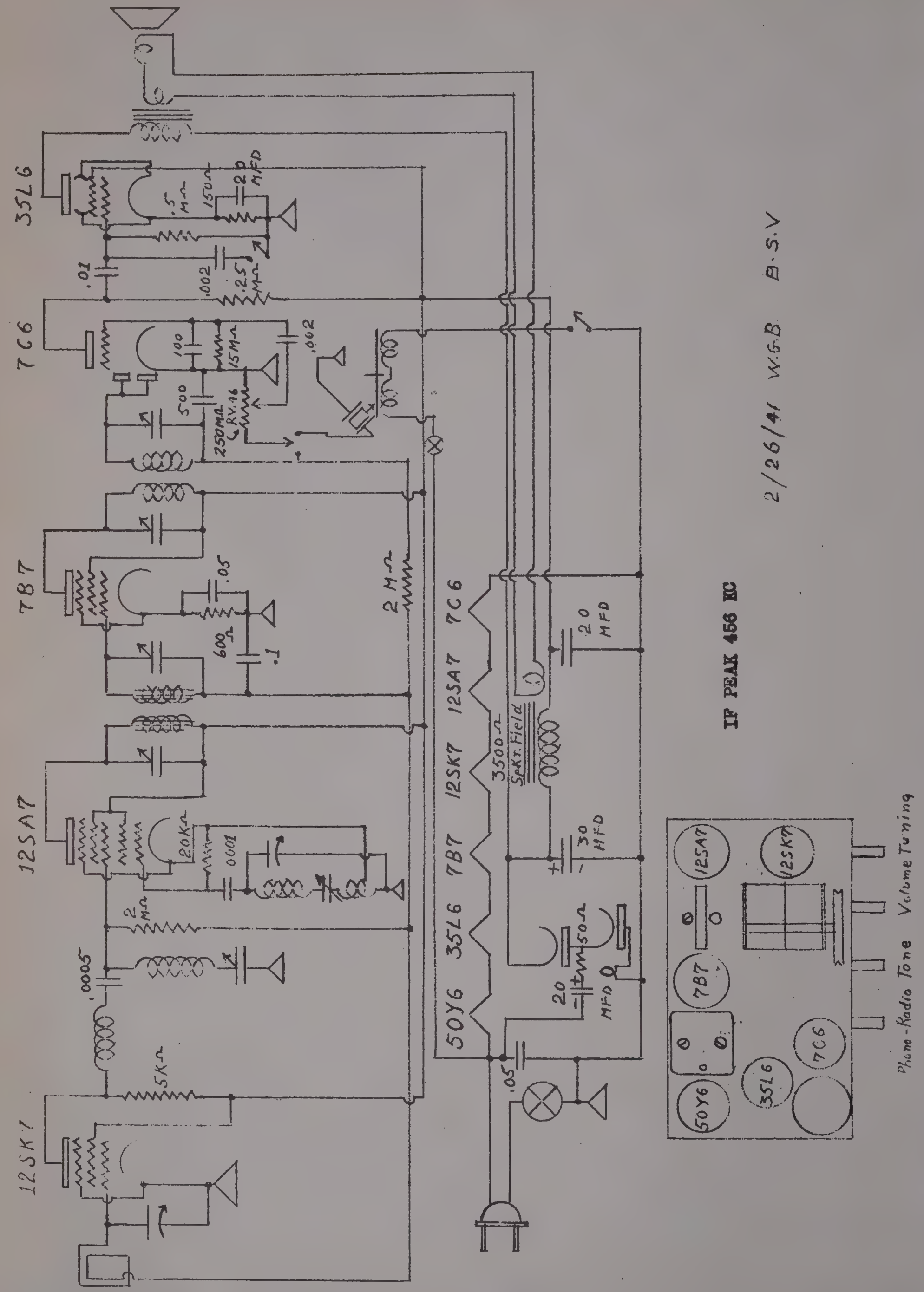


Models 160, 170

No pilot in
Model 160

Model 175AC

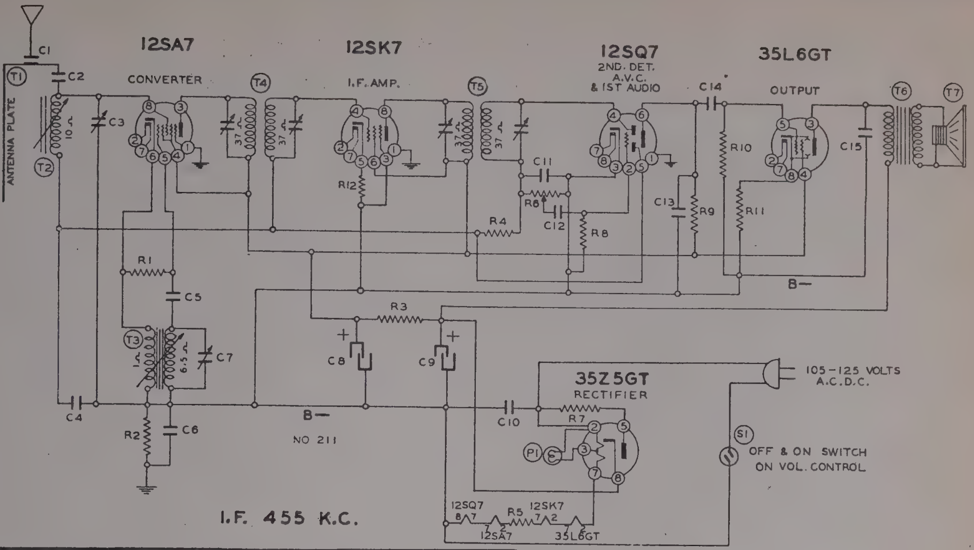
AUTOMATIC RADIO MFG. CO.

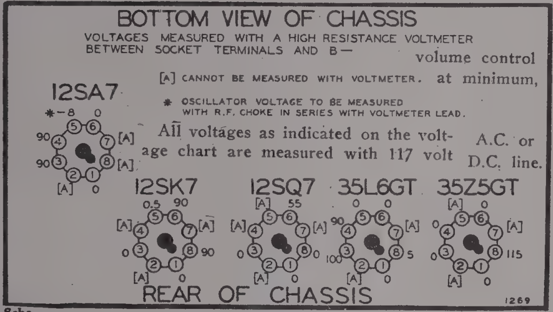


IF PEAK 456 KC

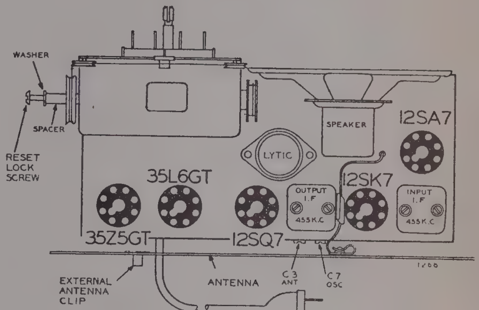
BELMONT RADIO CORP.

MODELS 151, 536

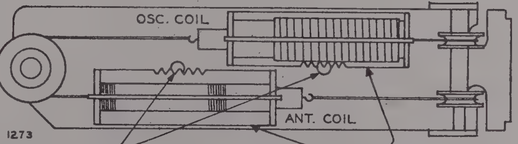



BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER
BETWEEN SOCKET TERMINALS AND B—
[A] CANNOT BE MEASURED WITH VOLTMETER.
volume control at minimum,
* OSCILLATOR VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.
All voltages as indicated on the voltage chart are measured with 117 volt A.C. or D.C. line.
12SA7
*-8
0
90
90
[A]
[A]
[A]
0
12SK7
0.5
90
[A]
[A]
0
90
[A]
0
12SQ7
[A]
55
[A]
[A]
0
0
[A]
0
35L6GT
0
0
90
[A]
100
5
[A]
0
35Z5GT
[A]
0
0
[A]
0
115
[A]
0
REAR OF CHASSIS
1269

Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—1/3 w.
R2	130100	150M ohm—1/3 w.
R3	130279	1M ohm—1 w.
R4	1304	3 megohm—1/3 w.
R5	130288	50 ohm—1.5 w.
R6	101238	500M ohm volume control and switch
R7	130240	30 ohm—1/3 w.
R8	130257	5 megohm—1/3 w.
R9	100100	150M ohm—1/3 w.
R10	13011	250M ohm—1/3 w.
R11	130166	150 ohm—1/3 w.
R12	130233	60 ohm—1/3 w.
		CONDENSERS
C1	131262	.00001 washer condenser (Antenna clip on back plate)
C2	129114	.0003 mica
C3	124151	Trimmer on antenna coil
C4	1009	.05 x 200 v.
C5	12939	.00005 mica
C6	10091	.15 x 400 v.
C7	124151	Trimmer on oscillator coil
C8	11992	20 mfd. lytic x 150 w. v.
C9	11992	40 mfd. lytic x 150 w. v.
C10	10013	.05 x 400 v.
C11	12912	.00025 mica
C12	10025	.002 x 600 v.
C13	1292	.0005 mica
C14	10011	.01 x 400 v.
C15	10011	.01 x 400 v.
		C3 and C7 are in same unit
		C8 and C9 are in same unit
		PARTS
T1	128586B	Back plate (walnut)
	128586	Back plate (ivory)
T2	112877	Antenna coil—Permeability tuning assembly complete
T3	112877	Oscillator coil—Permeability tuning assembly complete
T4	108157L	Input I. F. coil—455 Kc.
T5	108157N	Output I. F. coil—455 Kc.
T6	10595C	Output transformer
T7	114225	5" P. M. speaker
S1		Switch on volume control
P1	107249	Pilot light T47



VIEW LOOKING AT BOTTOM OF CHASSIS



NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.

TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

For Alignment data see Index

October 1940

Setting the Automatic Pushbuttons

Make a list of your favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

Press one of the buttons all the way down and hold it FIRMLY. Now tune in the station you want with the tuning knob. Tune back and forth until the station is clear, then release the button. NOTE: If the tuning knob turns quite hard when the button is held down firmly (loosen the reset lock screw several turns with a screwdriver or coin (quarter).

Continue, setting each of the remaining pushbuttons in the same way. Now turn the tuning knob all the way to the right and tighten the reset lock screw. This screw prevents the pushbuttons from slipping off the stations you have set. To change stations loosen lock screw and proceed as above.

BRC. Series A—5142—5750—10-40
Pro. 246

ALIGNMENT PROCEDURE

MODEL 642

IMPORTANT:—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer rear section of gang.	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer front section of gang	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

FREQUENCY RANGE
535 to 1600 K.C.

Power Consumption .... 35 Watts

Power Output .... 1 Watt Undistorted, 1.5 Watts Maximum

Intermediate Frequency .... 455 K.C.

MODELS 151 & 536

Power Consumption - - - - - - - - 35 Watts

Power Output - - - - - 800 Milliwatts Undistorted

Sensitivity (for .05 Watts Output) - 30 Microvolts Average

Selectivity - 85 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range - - - - 535 to 1720 KC

Intermediate Frequency - - - - - - - 455 KC

Speaker - - - - - - - - 5 in. P. M. Dynamic

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

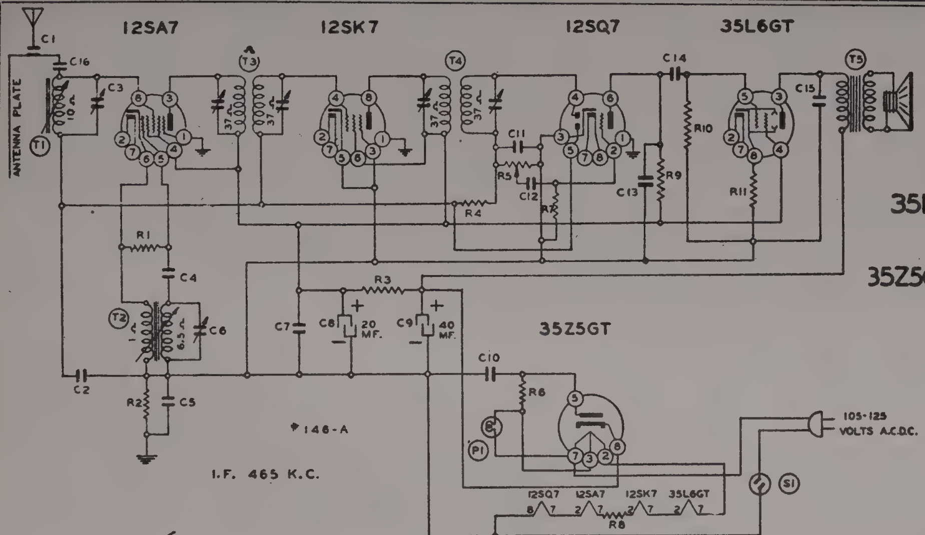
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

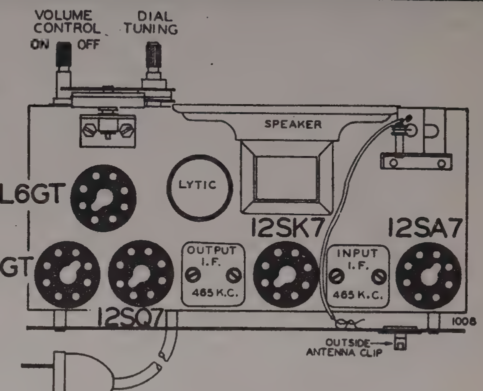
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Trimmer (C3) (See chassis view)	Antenna	Adjust to maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See chassis view)	Antenna	Check for tracking (See Note "B")

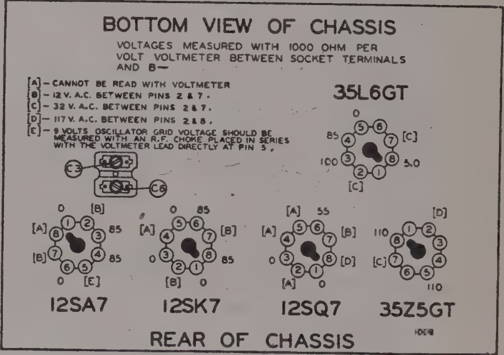
NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

BELMONT RADIO CORP.





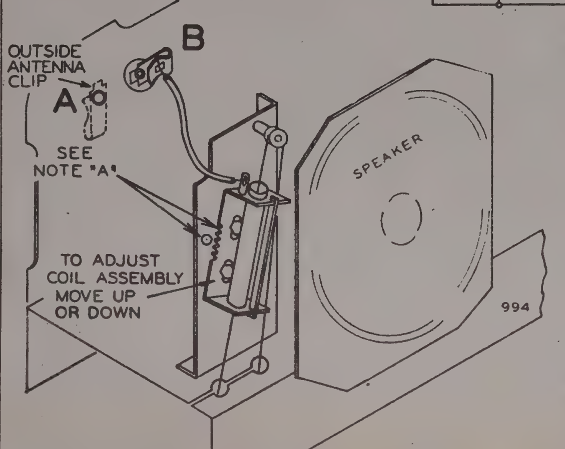


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

[A]—CANNOT BE READ WITH VOLTMETER
[B]—12 V. A.C. BETWEEN PINS 2 & 7.
[C]—32 V. A.C. BETWEEN PINS 2 & 7.
[D]—117 V. A.C. BETWEEN PINS 2 & 8.
[E]—9 VOLTS OSCILLATOR GRID VOLTAGE SHOULD BE MEASURED WITH AN R.F. CHOKE PLACED IN SERIES WITH THE VOLTMETER LEAD DIRECTLY AT PIN 5.

REAR OF CHASSIS



Circuit Diagram Ref.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—⅓ w.
R2	130100	150M ohm—⅓ w.
R3	130279	1M ohm—1 watt
R4	1304	3 megohm—⅓ w.
R5	101196	500M ohm volume control
R6	130293	30 ohm—1 watt
R7	130257	5 megohm—⅓ w.
R8	130288	50 ohm—1.5 watt
R9	1302	75M ohm—⅓ w.
R10	13011	250M ohm—⅓ w.
R11	130166	150 ohm—⅓ w.
		CONDENSERS
C1	131262	.00001 washer condenser (on Antenna plate)
C2	10022	.05 x 200 v.
C3	124100	Antenna Trimmer
C4	12930	.00005 Mica
C5	10091	.15 x 400 v.
C6	124100	Oscillator Trimmer
C7	10022	.05 x 200 v.
C8	11992	20 mfd. x 150 v. lytic
C9	11992	40 mfd. x 150 v. lytic
C10	10013	.05 x 400 v.
C11	12912	.00025 mica
C12	10025	.002 x 600 v.
C13	1292	.0005 mica
C14	10011	.01 x 400 v.
C15	10011	.01 x 400 v.
		C3 and C6 in one unit
		C8 and C9 in one unit
		PARTS
T1	111136B	Antenna Coil Complete
T2	110126B	Oscillator Coil
T3	108157C	Input I. F. Coil—465 kc.
T4	108157C	Output I. F. Coil—465 kc.
T5	114170	4" P. M. Speaker and Transformer
S1	101196	Off-on switch on volume control
P1	107249	6-8 v. pilot light T-47

(BRC. 518) Form No. 5144—3750—9-40
Pro. 235

MODEL 794, Series A,
Ser. No. OA297000 up
MODEL 518

BELMONT RADIO CORP.

Power Consumption.......35 Watts
Power Output.......800 Milliwatts Undistorted, 1.2 Watts Maximum
Intermediate Frequency.......465 K.C.

Model 518

FREQUENCY RANGE
540 to 1720 K.C.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Trimmer (C6) (See bottom of Radio, Fig. 3)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Trimmer (C3) (See bottom of Radio, Fig. 3)	Antenna	Adjust to maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil up or down (see Fig. 4)	Antenna Coil Adjustment	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See Fig. 3)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

Model 794
Series A

(Serial No. OA297000 and up)

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 12A8GT Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C3 (See Fig. 5)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C10 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1550 Kc.	200 mmf.	Grid of 12A8GT	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C4 (See Fig. 5)	Broadcast oscillator	Adjust to maximum output
	540 Kc.	200 mmf.	Grid of 12A8GT	Broadcast	Set Dial at 540 Kc.	Trimmer C8 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum output
LOOP-ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Fig. 5)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2 (See Fig. 5)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 12A8GT tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1550 and 540 K.C.).

The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal (See Fig. 1).

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

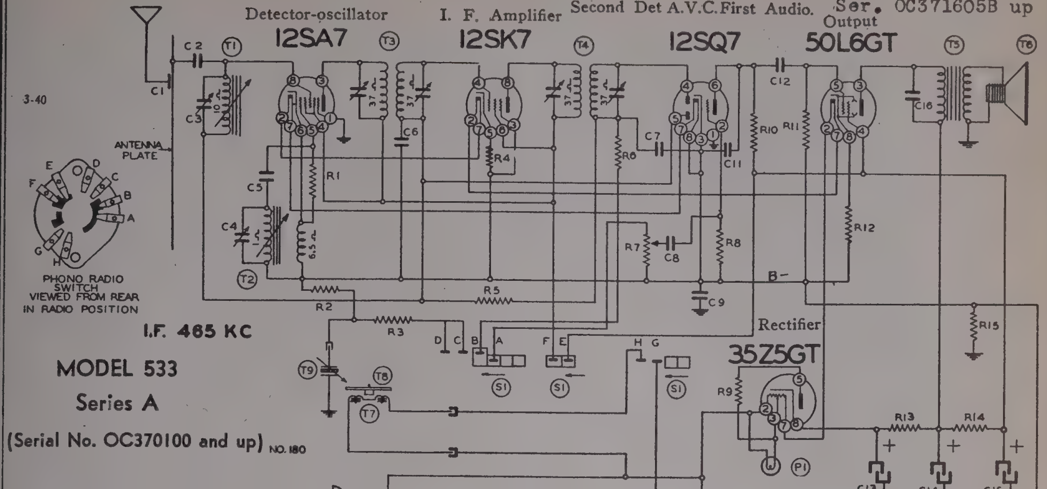
After each band is completed, repeat the procedure as a final check.

It is important during loop alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

FREQUENCY RANGE
5.7 to 18.3 MC.
540 to 1550 KC.

BELMONT RADIO CORP

MODEL 533, Series A
Ser. OC3710100 up
MODEL 533, Series B
Ser. OC371605B up

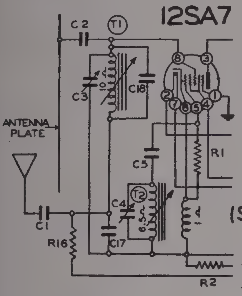


I.F. 465 KC

MODEL 533

Series A

(Serial No. OC370100 and up) NO. 180



TO LEFT-
PARTIAL
SCHEMATIC FOR
MODEL 533
Series B
(Serial No.
OC371605B and up)
ALL OTHER CONNEC.
ARE AS FOR SERIES
A ABOVE

Power Consumption..Radio Only 30 Watts
Power Output..............900 Milliwatts Undistorted, 1.7 Watts Maximum

FREQUENCY RANGE
535 to 1690 K.C.

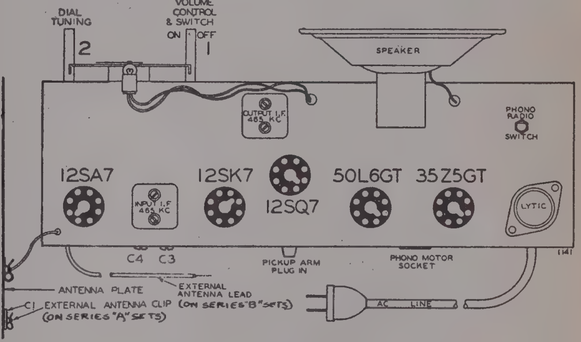
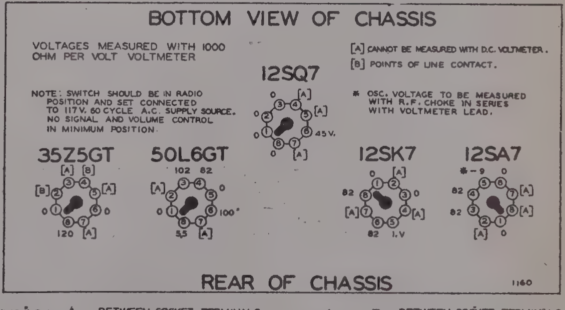


FIG. 1—TOP VIEW


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.
[B] POINTS OF LINE CONTACT.

NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117V. 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.

* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

REAR OF CHASSIS

Series A BETWEEN SOCKET TERMINALS AND CHASSIS.

Series B BETWEEN SOCKET TERMINALS AND B−

Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—1/3 w.
R2	130118	600M ohm—1/3 w.
R3	130118	600M ohm—1/3 w.
R4	13056	100 ohm—1/3 w.
R5	130170	3 megohm—1/3 w.
R6	13012	50M ohm—1/3 w.
R7	101217	1/2 megohm—volume control
R8	130257	5 megohm—1/3 w.
R9	130215	25 ohm—1/2 w.
R10	1309	200M ohm—1/3 w.
R11	13037	750M ohm—1/3 w.
R12	130166	150 ohm—1/3 w.
R13	13097	200 ohm—1/3 w.
R14	130287	1200 ohm—1 watt
R15	1309	200M ohm—1/3 w.
R16	1309	200M—1/3 w.
		CONDENSERS
C2	129114	.0003 mfd. mica
C5	1295	.0001 mica
C6	1009	.05 x 200 v.
C7	1295	.0001 mica
C8	10025	.002 x 600 v.
C9	100119	.1 x 400 v.
C10	1001	.1 x 400 v.
C11	12912	.00025 mica
C12	10019	.006 x 600 v.
C13	11994	40 mfd. lytic—150 w. v.
C14	11994	20 mfd. lytic—150 w. v.
C15	11994	20 mfd. lytic—150 w. v.
C16	10011	.01 x 400 v.
C17	129162	.0008 Mica Condenser
C18	129163	.000025 Ceramicon Condenser
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
T1	112767	Antenna Coil—Permeability tuning assembly complete
T2	112767	Oscillator Coil
T5	105108	Output Transformer
T6	114193	5" P.M. Speaker
T7	104206	Phono Motor
T8	12228	Turntable
T9	114194	Phono pick up arm
S1	125113	Phono Switch
S2		Switch on volume control
P1	107249	Pilot light T47
		T1 and T2 in same unit

Series A Only

C1	131262	.00001 washer condenser (clip on antenna plate)
C3	124135	Antenna Trimmer
C4	124135	Oscillator Trimmer
T3	108157F	Input I. F. Coil—465 kc.
T4	108157G	Output I. F. Coil—465 kc.

Series B Only

C1	1295	0001 Mica Condenser
C3	124136	Antenna Trimmer
C4	124136	Oscillator Trimmer
T3	108140F	Input I. F. Coil—465 kc.
T4	108145D	Output I. F. Coil—465 kc.

MODEL 533
Series A
Series B

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Trimmer (C4) (See Fig. 1)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Iron Cores All the way out	Trimmer (C3) (See Fig. 1)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Fig. 3)	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Fig. 1)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

SERVICE NOTES:

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.

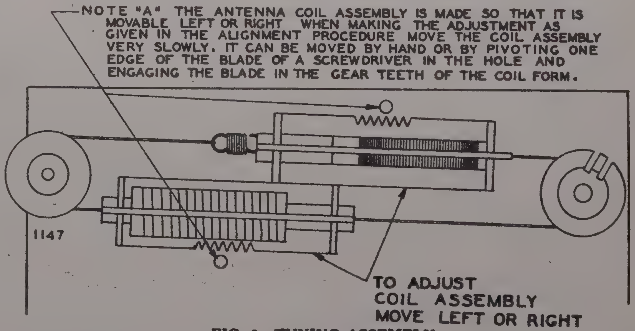
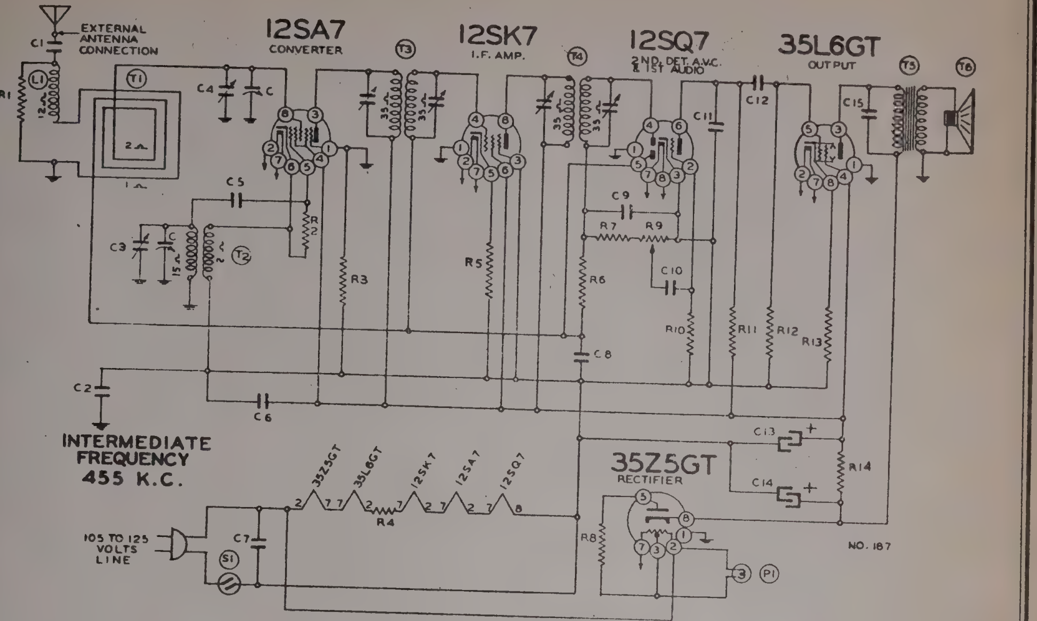
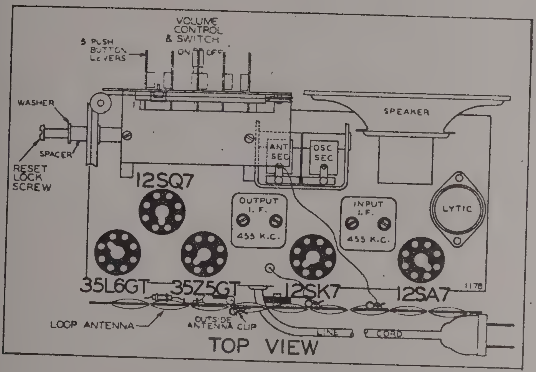
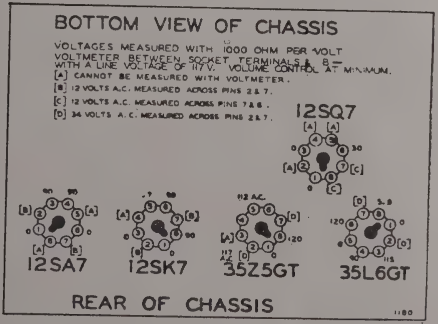

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.
1147
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

FIG. 3.—TUNING ASSEMBLY

BELMONT RADIO CORP.







BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B— WITH A LINE VOLTAGE OF 117 V. VOLUME CONTROL AT MINIMUM.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
[D] 34 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.

BRC Series A—Form No. 5125—4200-10-40
PRO. 259—1732

CONDENSERS

Schematic Diagram Ref. No.	Part No.	Description
C	102132	2 gang variable condenser
C1	10011	.01 x 400 v.
C2	10091	.15 x 400 v.
C3		Oscillator trimmer on gang
C4		Antenna trimmer on gang
C5	12921	.0002 mfd. mica
C6	1009	.05 x 200 v.
C7	1001	.1 x 400 v.
C8	1009	.05 x 200 v.
C9	1295	.0001 mfd. mica
C10	10025	.002 x 600 v.
C11	12912	.00025 mfd. mica
C12	100106	.004 x 600 v.
C13	11992	20 mfd. lytic x 150 w. v.
C14	11992	40 mfd. lytic x 150 w. v.
C15	10026	.02 x 400 v.

C13 and C14 are in same unit

RESISTORS

Schematic Diagram Ref. No.	Part No.	Description
R1	130314	2200 ohm—⅓ w.
R2	13094	50M ohm—⅓ w.
R3	1309	200M ohm—⅓ w.
R4	130315	75 ohm—1½ w.
R5	130203	40 ohm—⅓ w.
R6	1304	3 megohm—⅓ w.
R7	1301	25M ohm—⅓ w.
R8	130215	25 ohm—⅓ w.
R9	101198	1 megohm volume control
R10	130257	5 megohm—⅓ w.
R11	1303	500M ohm—⅓ w.
R12	1303	500M ohm—⅓ w.
R13	130166	150 ohm—⅓ w.
R14	130287	1200 ohm—1 w.
T1	111182	Loop antenna—complete assembly
T2	110145	Oscillator coil
T3	108140I	Input I. F.—455 kc.
T4	108141D	Output I. F.—455 kc.
T5	105104	Output Transformer
T6	114201	5" P. M. Speaker
L1	12311	Loading coil
S1		On-off switch on volume control
P1	107249	Pilot light bulb T47

FOR TUNER DATA, SEE INDEX

BELMONT RADIO CORP.

MODEL 534

Power Consumption - - - - - 35 Watts
Power Output - - - 800 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output:
20 Microvolts Average

Selectivity - 65 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - 535 to 1650 KC
Intermediate Frequency - - - - - - - 455 KC
Speaker - - - - - - - - 5 in. P.M. Dynamic

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Conection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer—Bottom of gang (See Top View)	Oscillator	Adjust to maximum output
	1400 Kc.		(See Note "A" and "B")	Set dial at 1400 Kc.	Trimmer—Bottom of gang (See Top View)	Antenna	(See Note "A") Adjust to maximum output

Loop aerial should be connected when aligning receiver.

NOTE "A"—Mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

NOTE "B"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

MODEL 695

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 12SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 17 Mc.	Trimmer C8	Short Wave oscillator	Adjust to signal
	17 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 6 Mc.	Trimmer C12	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C9	Broadcast oscillator	Adjust to signal
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 K. C.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 600 K. C.	Trimmer C11 (See Top View)	Broadcast Series Pad	Adjust to maximum output (See Note "A")

The loop antenna should be connected to the radio when making all adjustments—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected.

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

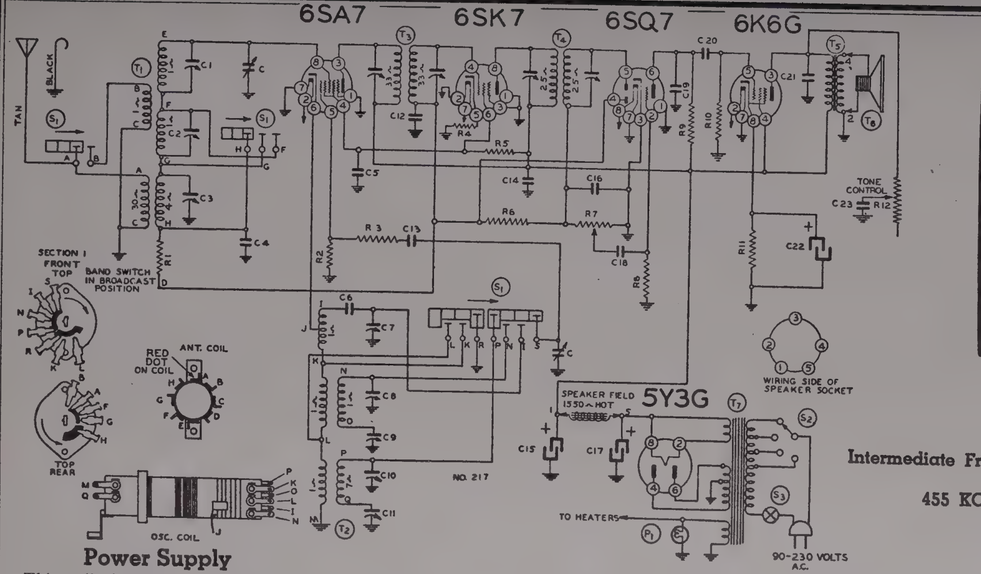
After each band is completed, repeat the procedure as a final check.

Power Consumption - - - - - 35 Watts
Power Output - - - 900 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output - 15 Microvolts Average
Selectivity - 46 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range
Broadcast - - - 540 to 1600 KC
Shortwave - - - 5.6 to 18.3 MC
Intermediate Frequency - - - - - - 455 KC
Speaker - - - - - - - 5 in. P.M. Dynamic

BELMONT RADIO CORP.

MODEL 542
Series A



Power Supply

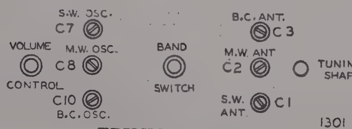
This radio is equipped with a universal transformer, 40 to 60 cycles which has the following taps: 90-110-130-150-230 volts.

A rotary switch mounted on top of the transformer selects the proper voltage tap.

Set the switch for various line voltages to conform with the following table:

90 mark for current of 85 to 105 volts
110 mark for current of 105 to 125 volts
130 mark for current of 125 to 145 volts
150 mark for current of 145 to 165 volts
230 mark for current of 210 to 250 volts

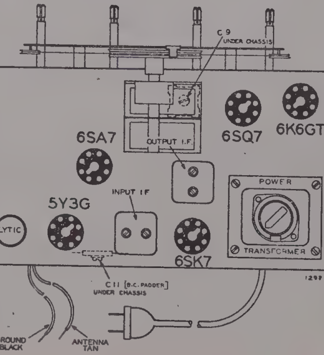
To set the switch, unloosen the set screw on the side of the switch and rotate the knob so that the mark desired shows up in the small framed window on the top of the switch. Tighten the set screw.



TRIMMER VIEW

MODEL 542 SERIES A

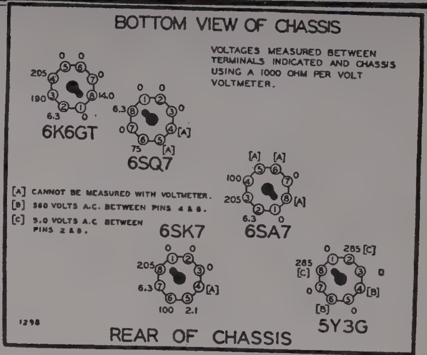
Power Consumption - - 55 Watts
Power Output - 1½ Watts Undistorted
Tuning Frequency Range
Broadcast Band - 540 to 1735 KC
Medium Band - - - 2.2 to 7 MC
Short Wave Band - - 6.6 to 23 MC



BRC.—Form No. 5152—1M—12-40
PRO. 280

Intermediate Frequency

455 KC



VOLTAGES MEASURED BETWEEN TERMINALS INDICATED AND CHASSIS USING A 1000 OHM PER VOLT VOLTMETER.

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 360 VOLTS A.C. BETWEEN PINS 4 & 6.
[C] 5.0 VOLTS A.C BETWEEN PINS 2 & 8.

Circuit Diagram Ref. No.	Part No.	
		RESISTORS
R1	13011	250M ohm—⅓ w.
R2	130194	35M ohm—⅓ w.
R3	130299	10 ohm—⅓ w.
R4	130239	250 ohm—⅓ w.
R5	130242	12M ohm —1 watt
R6	1304	3 megohm—⅓ w.
R7	101208	1 megohm volume control
R8	130223	10 megohm—⅓ w.
R9	13011	250M ohm—⅓ w.
R10	13019	1 megohm—⅓ w.
R11	13070	500 ohm—⅓ w.
R12	101237	Tone control
		CONDENSERS
C	102124	Two Gang Variable Condenser
C1	124124	S. W. Antenna Trimmer
C2	124124	M. W. Antenna Trimmer
C3	124124	B. C. Antenna Trimmer
C4	1009	.05 x 200 v.
C5	1001	.1 x 400 v.
C6	129153	006—S. W. Padder (Set at Factory)
C7	124123	S. W. Oscillator Trimmer
C8	124123	M. W. Oscillator Trimmer
C9	129154	.0025 M. W. Padder
C10	124123	B. C. Oscillator Trimmer
C11	129155	B. C. Padder
C12	10026	.02 x 400 v.
C13	1295	.0001 Mica
C14	1001	.1 x 400 v.
C15	119103	40 mfd. lytic
C16	1295	.0001 Mica
C17	119103	10 mfd. lytic
C18	10025	.002 x 600 v.
C19	1292	.0005 Mica
C20	10026	.02 x 400 v.
C21	10071	.004 x 600 v.
C22	119103	20 mfd. lytic x 25 w.v.
C23	10013	.05 x 400 v.
		C15, C17 and C22 in same unit
		PARTS
T1	111169	Antenna Coil
T2	110143	Oscillator Coil
T3	108169H	Input I. F.
T4	108170C	Output I. F.
T5	10575C	Output Transformer
T6	114176	6" Dynamic Speaker (1550 ohm field)
T7	104193B	Power Transformer 40-60 cycles 90-230 volts
S1	125105	Band Switch
S2		Voltage Switch on Power Transformer
S3		Volume Control—On-Off switch
P1	10794	Pilot Light Bulb T-44
	101237	Tone Control

MODEL 542, Series A
MODEL 681, Series A

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mf., 200 Mmf., 400 Ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 L. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Output L. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C7) (See Trimmer View)	Short wave oscillator	See Note "A" Adjust to maximum output
	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C1) (See Trimmer View)	Short wave antenna	Adjust to maximum output
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 MC	Trimmers (C8, C2) (See Trimmer View)	Medium wave oscillator and antenna	Adjust to maximum output
	2.3 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.3 MC	Trimmer (C9) (See Chassis View)	Medium wave osc. series pad	Adjust to maximum rock dial. (See note "B")
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Trimmer (C10) (See Trimmer View)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C3) (See Trimmer View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C11) (See Chassis View)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "B")

NOTE "A"—It is extremely necessary when making this adjustment that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental.

NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

MODEL 542—SERIES A

The loop antenna should be connected to the radio when making all R. F. adjustments.

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

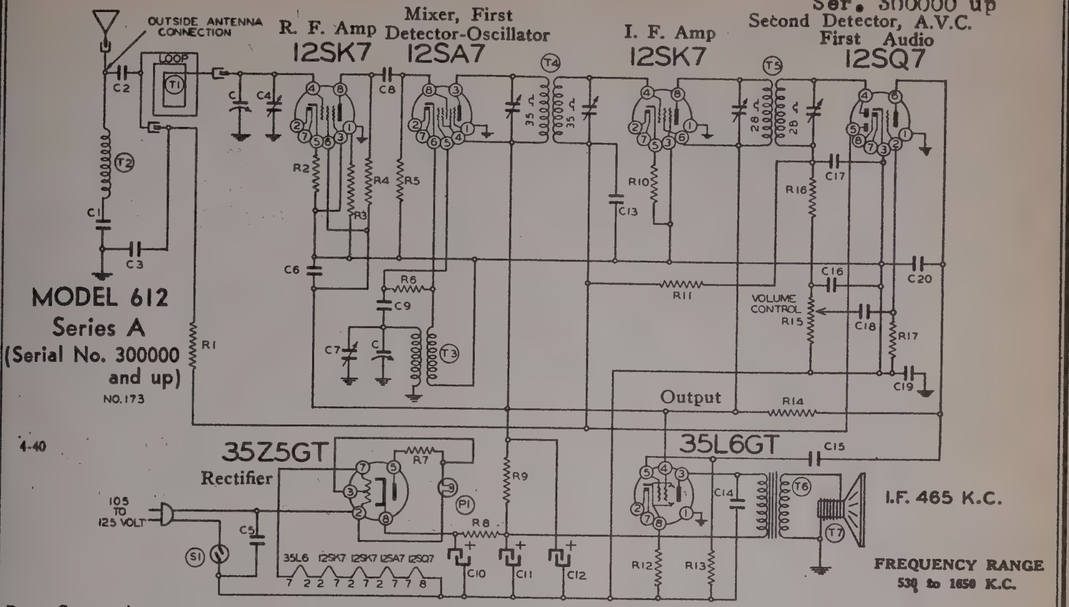
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
After each band is completed, repeat the procedure as a final check.

Model 681 –SERIES A

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Chassis View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROAD-CAST BAND	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Chassis View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Chassis View)	Broadcast oscillator series pad	Adjust to maximum output and rock dial (See note "A")

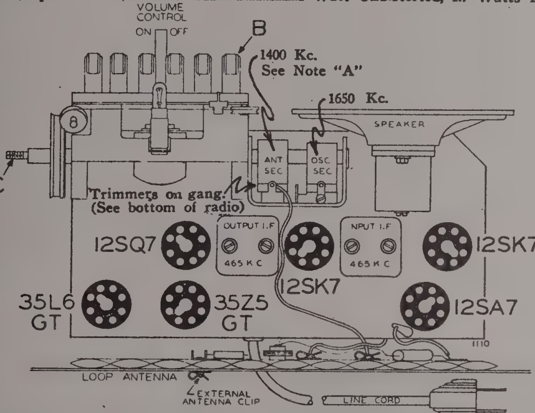
BELMONT RADIO CORP.

MODEL 612, Series A
Ser. 300000 up



Power Consumption.......35 Watts

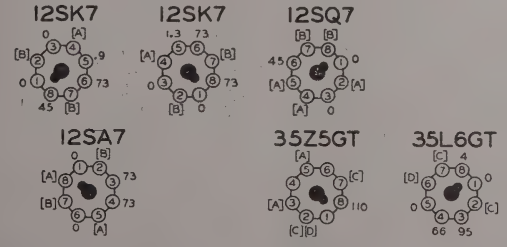
Power Output.......1 Watt Undistorted, 1.7 Watts Maximum



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS.

[A] CANNOT BE READ WITH VOLTMETER.
[B] 12 VOLTS A.C. BETWEEN PINS B & B.
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7.
[D] 117 VOLTS A.C BETWEEN PINS D & D.



For Tuner Data see Index

Diagram Ref.	Part No.	Description
		RESISTORS
R1	130100	150M ohms—⅓ w.
R2	130168	100 ohms—⅓ w.
R3	130100	150M ohms—⅓ w.
R4	130218	5M ohms—⅓ w.
R5	13020	100M ohms—⅓ w.
R6	13094	50M ohms—⅓ w.
R7	130215	25 ohms—½ w.
R8	130296	200 ohms—1 watt
R9	130287	1200 ohms—1 watt
R10	130166	150 ohm—⅓ w.
R11	1304	3 megohm—⅓ w.
R12	130166	150 ohm—⅓ w.
R13	1303	500M ohm—⅓ w.
R14	1309	200M ohm—⅓ w.
R15	101211	1 megohm—volume control and switch
R16	13012	50M ohm—⅓ w.
R17	130257	5 megohm—⅓ w.
		CONDENSERS
C	102116	Two gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	10026	.02 x 400 v.
C4		B.C. Antenna Trimmer
C5	1001	.1 x 400 v.
C6	1006	.25 x 200 v.
C7		B.C. Oscillator Trimmer
C8	1295	.0001 mica
C9	1295	.0001 mica
C10	11994	40 ufd.—150 w.v. lytic
C11	11994	20 ufd.—150 w.v. lytic
C12	11994	20 ufd.—150 w.v. lytic
C13	1009	.05 x 200 v.
C14	10026	.02 x 400 v.
C15	100106	.004 x 600 v.
C16	12939	.00005 mica
C17	1295	.0001 mica
C18	10025	.002 x 600 v.
C19	100110	.2 x 400 v.
C20	1295	.0001 mica
		C10, C11, C12 are in same unit
		PARTS
T1	111145	Loop Antenna Assembly
T2	1237	Loading Coil
T3	110128	Oscillator Coil
T4	108140G	Input I.F. Coil—465 kc.
T5	108145C	Output I.F. Coil—465 kc.
T6	10595B	Output Transformer
T7	114191	5" P.M. Speaker
S1		On-off switch
P1	107249	T-47 Pilot light

For Conv. Align. see Spec. Sec. Vol. VIII

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

PROCEDURE FOR SETTING THE AUTOMATIC TUNER PUSH BUTTONS

MODELS 612 ,638,794,796,797,642,534

1. Make a list of six stations you tune in regularly. There are six push buttons on the front of the radio by means of which six stations may be tuned automatically. (See "B," Fig. 2.)

2. Punch out the call letters of the stations you have selected from the set of station call letter tabs supplied.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner push buttons.

3. Stations may be set up in any sequence desired. Press any one of the automatic tuner push buttons down all the way.

4. Hold the push button down **firmly**, and tune set **very carefully** to station desired, until station is heard clearly and with maximum volume.

Release the push button.

5. Press down another automatic tuner push button. Hold it down FIRMLY and carefully tune in next station desired. Release this push button.

Follow this procedure until you have selected all of your favorite stations.

6. Now rotate the tuning knob to the right (clockwise) as far as it will turn, and with a screwdriver tighten the special locking screw ("C")

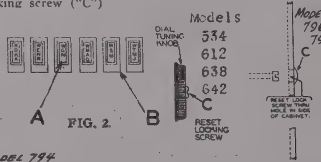


FIG. 2.

MODEL 794

Looking at the back of the cabinet note the **locking screw "C"** on the left hand side of the chassis.

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner push buttons. (Note: Locking screw "C" is loose when radio is shipped from factory.)

CHANGING STATIONS:

If you should desire to change any station you have selected to another, loosen the locking screw "C" one or two turns. Hold in push button on which the station is to be changed and tune in new station desired. Release the push button. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner buttons, it is due to the locking screw being too tight. **Loosen the locking screw "C" until the dial mechanism works freely with the tuner push button pressed in.**

Be sure to retighten the locking screw, otherwise the stations you have previously selected will not stay adjusted to the push buttons.

The set is now set up for automatic tuning.

MODEL 678C

PROCEDURE FOR SETTING THE AUTOMATIC PUSHBUTTONS:

There are six pushbuttons on the Remote Tuner Unit by means of which six stations may be set up for automatic tuning (see B, Fig. 2).

Make a list of local stations you tune in regularly; **any** number up to and including six.

Punch out from the set of station call letter tabs **supplied**, the call letters of the stations you have selected.

On the top of each pushbutton a slot is provided for inserting the call letter tabs, (see A, Fig. 2).

Insert the call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. Push the dial tuning knob **in** hard enough to make it **latch in.**
2. Rotate the dial tuning knob to the **left** (counter-clockwise), until the knob can not be turned any further **without forcing.**

   You will note that as the knob is rotated it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required to actually **start unlocking** the tuner mechanism. Beyond this point the knob will turn quite easily again until the tuner mechanism is **completely unlocked.** At this point do not force the knob any further. The tuner mechanism is now **unlocked.**

   (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)
3. Push in **all the way** any one of the pushbuttons and at the same time hold in **firmly** the dial tuning knob. **Both the dial tuning knob** and the **pushbutton** should **be pushed hard** enough to make them **stay latched in.** The reason for holding the dial tuning knob in **firmly** when the **pushbutton** is **pressed** in is due to the latching mechanism in the Remote Tuner unit which is so constructed to release the dial tuning knob entirely when **a** pushbutton is pressed in. When setting up stations for automatic tuning, however, it is necessary that **both** the dial **tuning knob** and the **pushbutton** be **latched** in **together.**
4. Press in on the **pushbutton which is latched in.** Holding it in **firmly,** tune in by means of the dial tuning knob the station indicated on the station call letter **tab** on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing in firmly on the pushbutton), until the station is **clearest.** The **station** will then be accurately tuned in.
5. Push in **all the way** another pushbutton, **at the same** time holding the dial tuning knob in so that **both the pushbutton and the dial tuning knob are latched in together.** Holding the pushbutton in **firmly,** tune in the station indicated on the **call letter tab on this pushbutton.**
6. Follow this procedure until you **have tuned** in all of your favorite stations.
7. When the last pushbutton has been properly set up, it is necessary to **release** it from the latched-in position before the tuner mechanism can be locked. To release this pushbutton, press the **pushbutton release pin** on the bottom of the tuner unit. This will trip the latching mechanism and all the **pushbuttons will be released** to **out position,** (See Fig. 2A).
8. Now, Press on the dial tuning knob hard enough to make it latch in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it.
   This will **lock the tuner mechanism** and all the stations that have been set up on the pushbuttons **will be locked** in place for automatic tuning.
9. Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

The **important** steps to remember when setting up stations on the pushbuttons for automatic tuning are:

1. **To unlock** the tuner mechanism press on the dial tuning knob hard enough to make it stay **latched in.** Rotate the dial tuning knob to the left (counterclockwise) until the knob cannot be turned any further without forcing it.
2. **To set a pushbutton,** Push in **all the way** and hold in **firmly both** the **pushbutton** and the **dial tuning knob** so that **both latch in.** Hold in **firmly** the pushbutton and tune in the station by means of the dial tuning knob. Set all the pushbuttons in the same manner.
3. **To release the last pushbutton press the pushbutton release pin** on the bottom of the tuner unit.
4. **To lock the tuner mechanism** push on the dial tuning knob hard enough to make it stay **latched in.** Rotate the dial tuning knob to the **right** (clockwise) until the knob can not be turned any further without forcing it. (NOTE: All the pushbuttons must be in **out position** when locking the tuner mechanism.)

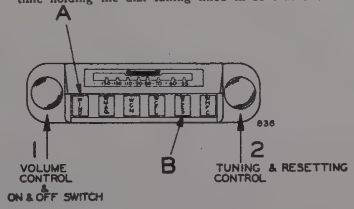


Fig. 2—Front View of Remote Tuner Unit

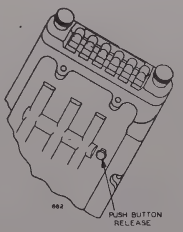


Fig. 2A—

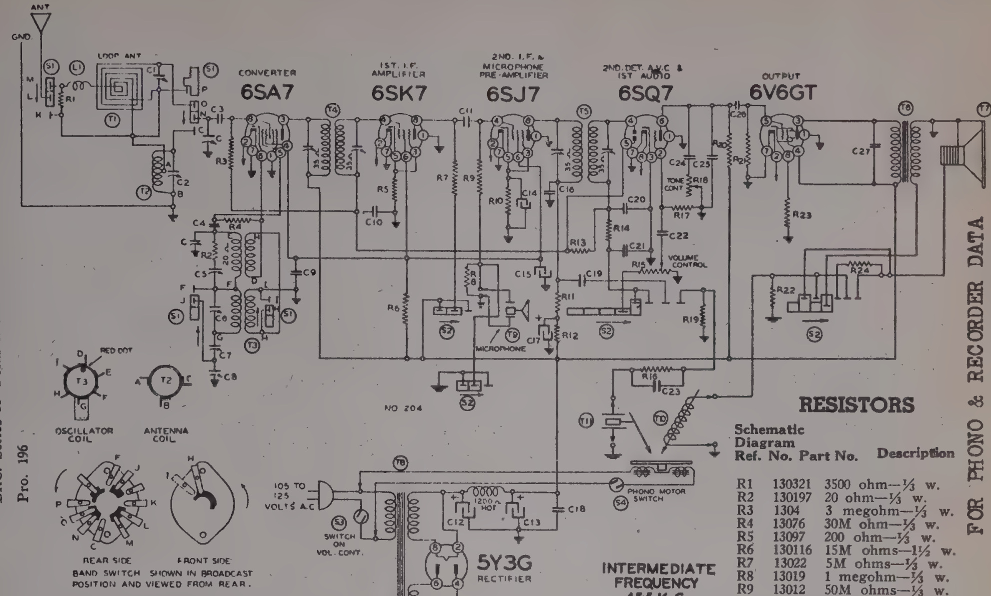
Bottom View of Remote Tuner Unit Showing Push Button Release Pin.

BELMONT RADIO CORP.

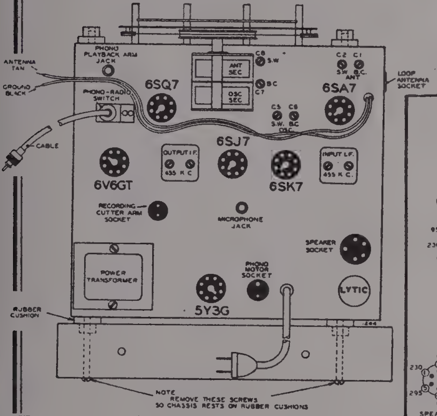
MODEL 616
Series A

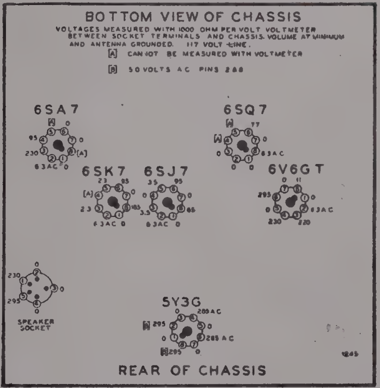
BRC. Series A—Form 6265—1M 8-40
Pro. 196

FOR PHONO & RECORDER DATA
SEE INDEX

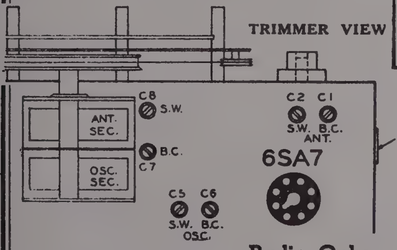


INTERMEDIATE FREQUENCY 455 K.C.




BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. VOLUME AT MINIMUM AND ANTENNA GROUNDED. 117 VOLT LINE.
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 50 VOLTS AC PINS 2 & 8
6SA7
6SQ7
6SK7
6SJ7
6V6GT
SPEAKER SOCKET
5Y3G
6.3 AC
285 AC
REAR OF CHASSIS

TRIMMER VIEW



C1 and C2 in one unit
C5 and C6 in one unit
C7 and C8 in one unit
C12, C13, C14 and C15 in one unit
C20 and C21 in one unit

S1	125126	Band Switch
S2	125134	Phono radio switch
S3		On-off switch on volume control
S4	12577	Phono motor switch
L1	12312	R.F. Choke Coil
P1	10794	2 Pilot light bulbs T44

Power Consumption Radio Only - - - - - - 70 Watts
Motor Only - - - - - - 40 Watts

Power Output - - - - - - - 2.1 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 15 Microvolts Average

Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 535 to 1600 KC

Shortwave Band - 5.46 to 18.3 MC

Speaker - - - - - - - - - 8 in. Electro Dynamic

RESISTORS

Schematic Diagram Ref. No.	Part No.	Description
R1	130321	3500 ohm—⅓ w.
R2	130197	20 ohm—⅓ w.
R3	1304	3 megohm—⅓ w.
R4	13076	30M ohm—⅓ w.
R5	13097	200 ohm—⅓ w.
R6	130116	15M ohms—1½ w.
R7	13022	5M ohms—⅓ w.
R8	13019	1 megohm—⅓ w.
R9	13012	50M ohms—⅓ w.
R10	130192	2M ohms—⅓ w.
R11	1302	75M ohms—⅓ w.
R12	1301	25M ohms—⅓ w.
R13	1304	3 megohm—⅓ w.
R14	13012	50M ohms—⅓ w.
R15	101142	1 megohm volume control
R16	13028	750M ohm—⅓ w.
R17	130257	5 megohm—⅓ w.
R18	101143	Tone control
R19	13019	1 megohm—⅓ w.
R20	13011	250M ohm—⅓ w.
R21	1303	500M ohm—⅓ w.
R22	130322	10 ohm—1 w.
R23	130323	270 ohm—1 w.
R24	130203	40 ohm—⅓ w.

CONDENSERS

C	102135	2 gang variable condenser
C1	124127	B.C. Antenna trimmer
C2	124127	S.W. Antenna trimmer.
C3	1292	.0005 mica
C4	12960	.00015 mica
C5	124112	S.W. Oscillator trimmer
C6	124112	B.C. Oscillator trimmer
C7	124146	B.C. Oscillator series padder
C8	124146	S.W. Oscillator series padder
C9	10013	.05 x 400 v. condenser
C10	1009	.05 x 200 v. condenser
C11	12921	.0002 mica
C12	119114	15 mfd. x 400 v. lytic
C13	119114	15 mfd. x 400 v. lytic
C14	119114	20 mfd. x 25 volt lytic
C15	119114	10 mfd. x 300 v. lytic
C16	1292	.0005 mica
C17	11967	8 mfd. x 450 v. lytic
C18	1001	.1 x 400 v. condenser
C19	10011	.01 x 400 v. condenser
C20	129161	.0001 mica
C21	129161	.0001 mica
C22	10012	.003 x 600 v. condenser
C23	1292	.0005 mica
C24	10089	.008 x 800 v.
C25	12912	.00025 mica
C26	10026	.02 x 400 v.
C27	10011	.01 x 400 v.

PARTS

T1	111211	Loop Antenna Assembly
T2	111184	S.W. Antenna Coil
T3	110163	B.C. S.W. Oscillator Coil
T4	108169D	Input I.F. Coil complete—455 kc.
T5	108106T	Output I.F. Coil complete—455 kc.
T6	105118	Output Transformer
T7	114218	8 in. dynamic speaker
T8	104225	Power Transformer
T9	114214	Microphone and Cable
T10	104230B	Recording and playback unit complete 60 cycle
T11	104235B	Recording and playback unit complete 50 cycle
		Phono Pickup arm

BELMONT RADIO CORP.

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1—mf., 200 mmf., 400 ohms.

MODEL 671

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Top View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Top View)	Broadcast oscillator series pad	Adjust to maximum output

SEE NOTES BELOW

MODEL 616

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	455 Kc.	.1 MFD.	Grid of 6SJ7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Chassis View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External tenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C5	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C8	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C6	Broadcast oscillator	Adjust to maximum output
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C7	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Chassis View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C7 (See Chassis View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 535 K. C.). ← 530 KC ON MODEL 671

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals.

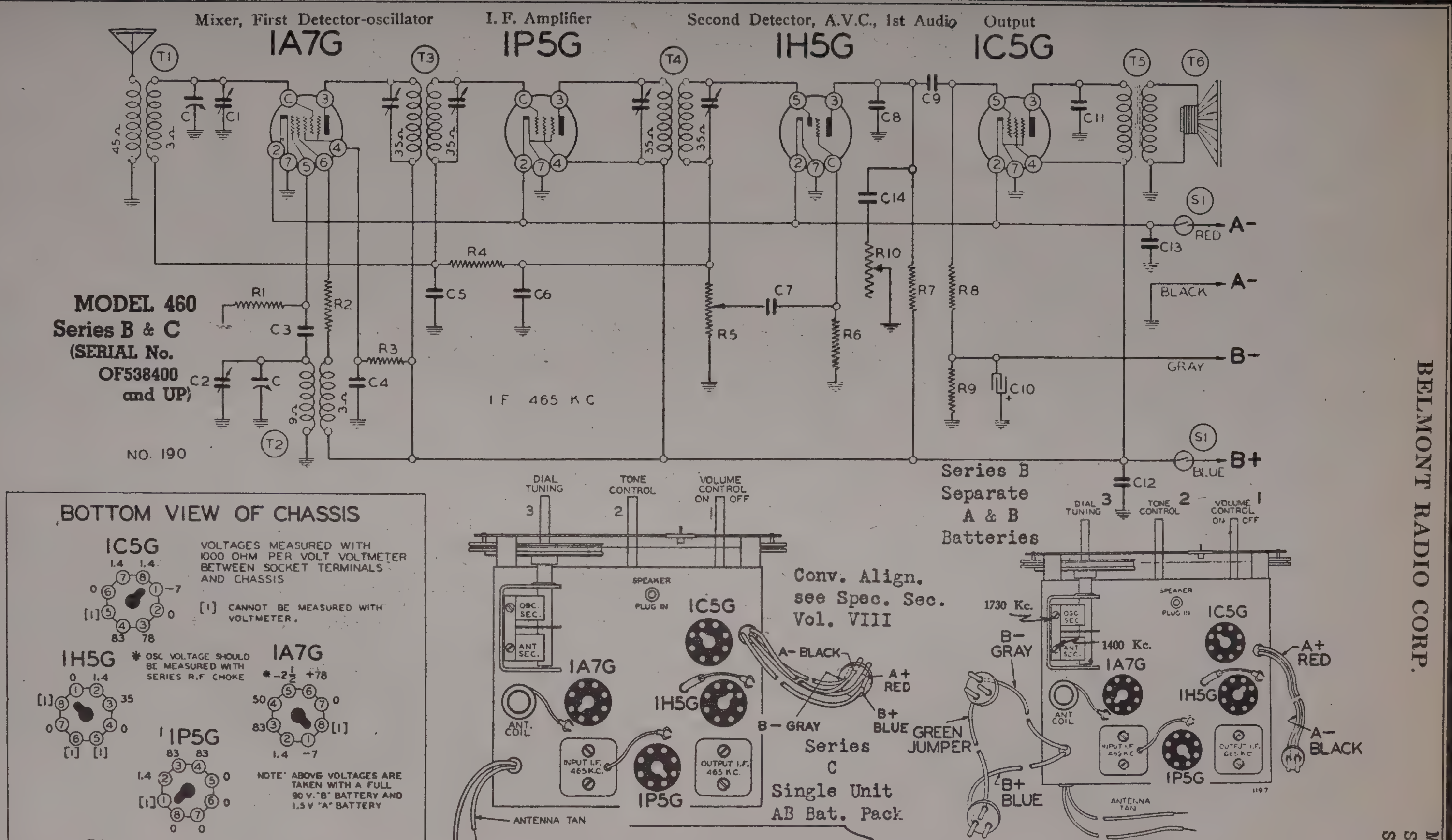
NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

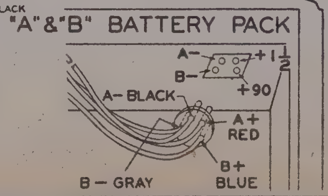
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

BELMONT RADIO CORP.

MODEL 460
Series B and C
Ser. No. OF538400





Ref. No.	Part No.	RESISTORS
R1	130266	200M ohm—⅓ w.
R2	13018	4M ohm—⅓ w.
R3	1307	40M ohm—⅓ w.
R4	1304	3 megohm—⅓ w.
R5	101175	1 megohm volume control
R6	130257	5 megohm—⅓ w.
R7	1303	500M ohm—⅓ w.
R8	13019	1 megohm—⅓ w.
R9	130200	700 ohm—⅓ w.
R10	101119	Tone Control (1 Megohm)

		CONDENSERS
C	102110	2 gang variable condenser
C1		Antenna Trimmer on gang
C2		Oscillator trimmer on gang
C3	12912	.00025 mica
C4	1009	.05 x 200 v.
C5	1009	.05 x 200 v.
C6	1295	.0001 mica
C7	10012	.003 x 600 v.
C8	1295	.0001 mica
C9	10011	.01 x 400 v.

		PARTS
T1	111132	Antenna Coil
T2	110122	Oscillator Coil
T3	108151B	Input I. F. - 465 kc.
T4	108153	Output I. F. - 465 kc.
T5	10591	Output Transformer
T6	114166	5 in. P. M. Speaker
S1		Off-on switch on Volume control
C10	11975	10 mfd. x 25 w. v.
C11	10012	.003 x 600 v.
C12	10064	.25 x 200 v.
C13	10020	.1 x 200 v.
C14	10025	.002 x 600 v.

Power Output——

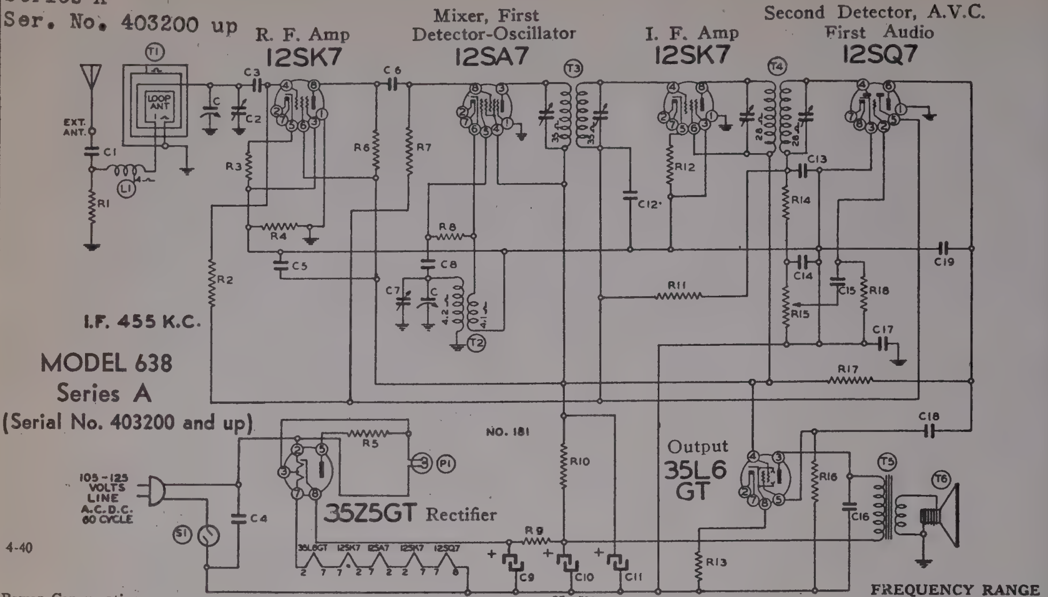
150 Milliwatts Undistorted,
270 Milliwatts Maximum

AUGUST 1940

FREQUENCY RANGE
535 to 1730KC.

MODEL 638
Series A
Ser. No. 403200 up

BELMONT RADIO CORP.



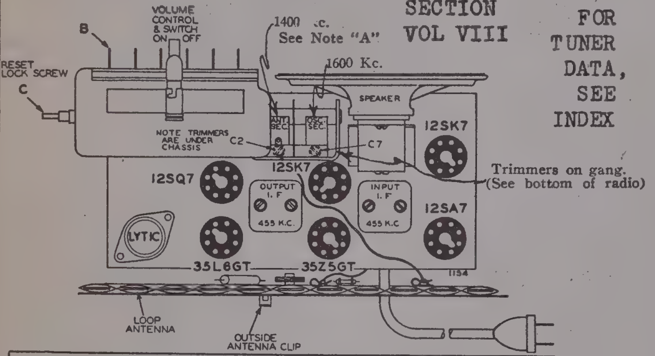
FREQUENCY RANGE
540 to 1600 K.C.

Power Consumption..35 Watts

Power Output..1 Watt Undistorted, 1.5 Watts Maximum

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL VIII

FOR TUNER DATA, SEE INDEX

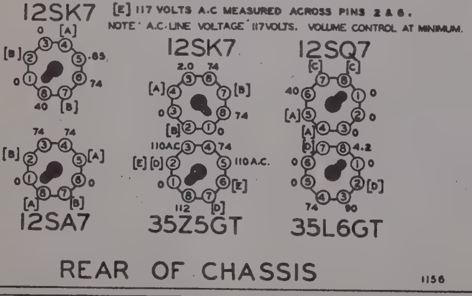


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C MEASURED ACROSS PINS 7 & 8.
[D] 30 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[E] 117 VOLTS A.C MEASURED ACROSS PINS 2 & 8.

NOTE: A.C. LINE VOLTAGE 117 VOLTS. VOLUME CONTROL AT MINIMUM.



Code No.	Part No.	Description
		RESISTORS
R1	13018	4M ohm—⅓ w.
R2	13019	1 megohm—⅓ w.
R3	130168	100 ohm—⅓ w.
R4	130100	150M ohm—⅓ w.
R5	130215	25 ohm—½ w.
R6	130218	5M ohm—⅓ w.
R7	13020	100M ohm—⅓ w.
R8	13012	50M ohm—⅓ w.
R9	130296	200 ohm—1 w.
R10	130287	1200 ohm—1 w.
R11	130170	3 megohm—⅓ w.
R12	13024	400 ohm—⅓ w.
R13	130166	150 ohm—⅓ w.
R14	13012	50M ohm—⅓ w.
R15	101218	1 megohm volume control
R16	1303	500M ohm—⅓ w.
R17	1309	200M ohm—⅓ w.
R18	130257	5 megohm—⅓ w.
		CONDENSERS
C	102116	2 gang variable condenser
C1	10025	.002 x 600 v.
C2		B. C. Antenna Trimmer on Gang Con.
C3	1292	.0005 Mica
C4	1001	.1 x 400 v.
C5	1006	.25 x 200 v.
C6	1295	.0001 mica
C7		B. C. Oscillator Trimmer on Gang Con.
C8	1295	.0001 mica
C9	11994	40 mfd. lytic x 150 w. v.
C10	11994	20 mfd. lytic x 150 w. v.
C11	11994	20 mfd. lytic x 150 w. v.
C12	1009	.05 x 200 v.
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10025	.002 x 600 v.
C16	10026	.02 x 400 v.
C17	100110	.2 x 400 v.
C18	100106	.004 x 600 v.
C19	1295	.0001 mica
		C9, C10, C11 are in same unit
		C13, C14 are in same unit
		PARTS
T1	111180	Loop Antenna complete
T2	110152	Oscillator Coil
T3	108140H	Input I. F. Coil—455 Kc.
T4	108145	Output I. F. Coil—455 Kc.
T5	105104	Output Transformer
T6	114197	5" P. M. Speaker
L1	12310	Loading Coil
S1		On-off switch on volume control
P1	107249	T47 Pilot light bulb

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

MODEL 642

BELMONT RADIO CORP.

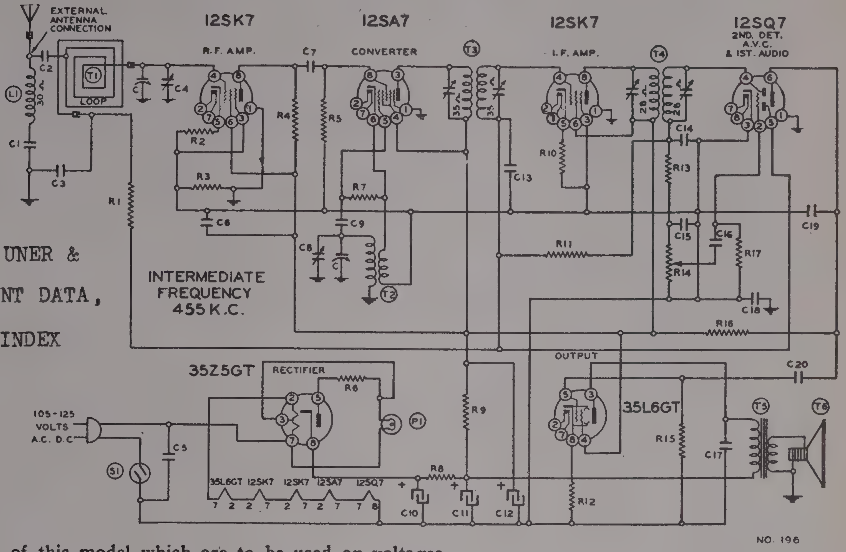
Six-Tube A.C.-D.C. Superheterodyne Receiver with Automatic Tuning and Self-Contained Loop Antenna

JUNE 1940

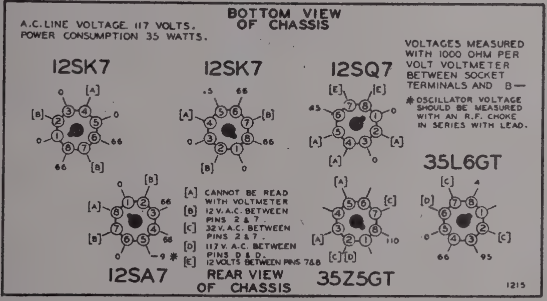
Frequency Range—535 - 1600 Kilocycles

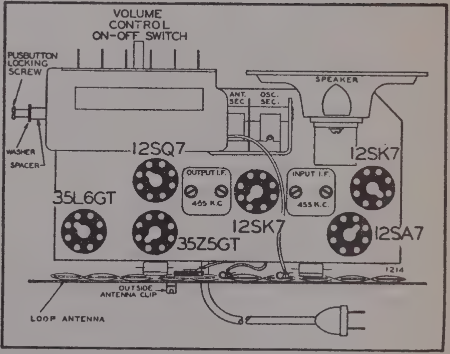
I. F. Frequency 455 Kc.

FOR TUNER & ALIGNMENT DATA, SEE INDEX



Receivers of this model which are to be used on voltages other than 105-125 volts A. C. (50/60 cycle), or 105-125 volts D. C. are so marked. The power consumption of this receiver is 35 watts.


BOTTOM VIEW OF CHASSIS
A.C. LINE VOLTAGE 117 VOLTS.
POWER CONSUMPTION 35 WATTS.
12SK7
12SK7
12SQ7
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—
✱OSCILLATOR VOLTAGE SHOULD BE MEASURED WITH AN R.F. CHOKE IN SERIES WITH LEAD.
35L6GT
[A] CANNOT BE READ WITH VOLTMETER
[B] 12 V. A.C. BETWEEN PINS 2 & 7
[C] 32 V. A.C. BETWEEN PINS 2 & 7
[D] 117 V. A.C. BETWEEN PINS D & D.
[E] 12 VOLTS BETWEEN PINS 7 & 8
12SA7
REAR VIEW OF CHASSIS
35Z5GT
1215



RESISTORS

Code No.	Part No.	Description
R1	130100	150M ohm—⅓ w.
R2	130168	100 ohm—⅓ w.
R3	130100	150M ohm—⅓ w.
R4	130218	5M ohm—⅓ w.
R5	13020	100M ohm—⅓ w.
R6	130215	25 ohm—½ w.
R7	13094	50M ohm—⅓ w.
R8	130296	200 ohm—1 w.
R9	130287	1200 ohm—1 w.
R10	130248	40 ohm—⅓ w.
R11	1304	3 megohm—⅓ w.
R12	130166	150 ohm—⅓ w.
R13	13012	50M ohm—⅓ w.
R14	101193	1 megohm volume control
R15	1303	500M ohm—⅓ w.
R16	1309	200M ohm—⅓ w.
R17	130257	5 megohm—⅓ w.

CONDENSERS

Code No.	Part No.	Description
C	102116	2 gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	10026	.02 x 400 v.
C4		B.C. Antenna Trimmer
C5	1001	.1 x 400 v.
C6	1006	.25 x 200 v.
C7	1295	.0001 mica
C8		B.C. Oscillator Trimmer
C9	1295	.0001 mica
C10	11994	40 mfd.—150 w.v. lytic
C11	11994	20 mfd.—150 w.v. lytic
C12	11994	20 mfd.—150 w.v. lytic
C13	1009	.05 x 200 v.
C14	1295	.0001 mica
C15	12939	.00005 mica
C16	10025	.002 x 600 v.
C17	10026	.02 x 400 v.
C18	100110	.2 x 400 v.
C19	1295	.0001 mica
C20	100106	.004 x 600 v.

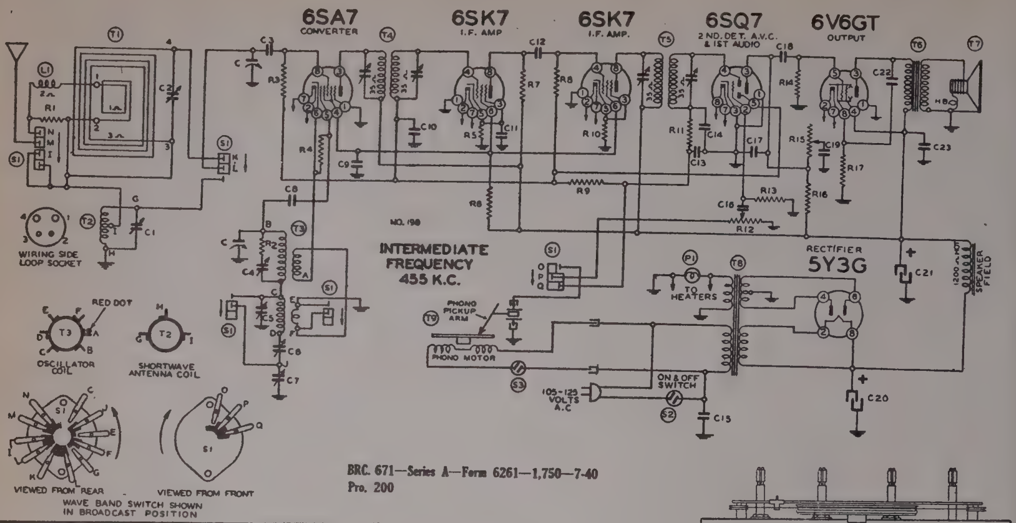
C10, C11 and C12 are in same unit

PARTS

Code No.	Part No.	Description
T1	111145	Loop Antenna Assembly
T2	110128	Oscillator Coil
T3	108140G	Input I.F. Coil—465 kc.
T4	108145C	Output I.F. Coil—465 kc.
T5	10595B	Output Transformer
T6	114174	5" P.M. Speaker
L1	1237	Loading Coil
S1		On-off switch on volume control
P1	107249	Pilot light T47

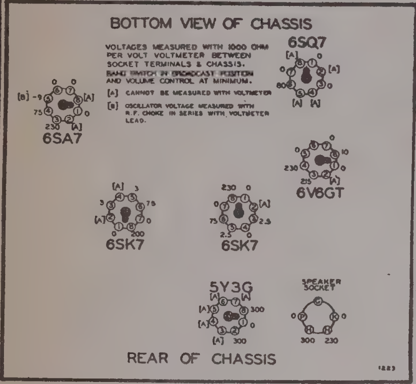
MODEL 671
Series A

BELMONT RADIO CORP.



BRC. 671—Series A—Form 6261—1,750—7-40
Pro. 200

BOTTOM VIEW OF CHASSIS

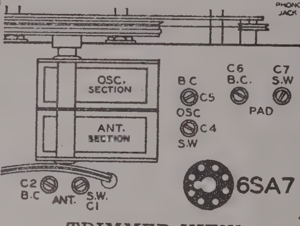


VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS. BAND SWITCH IN BROADCAST POSITION AND VOLUME CONTROL AT MINIMUM.

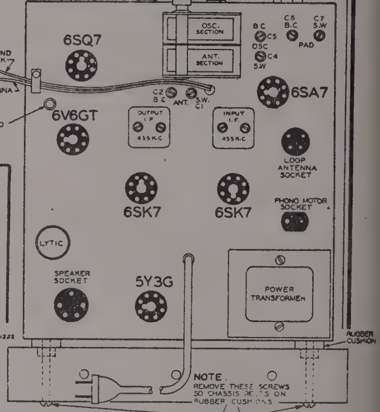
[A] CANNOT BE MEASURED WITH VOLTMETER

[B] OSCILLATOR VOLTAGE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

FOR AUTOMATIC
RECORD-CHANGER
DATA, SEE INDEX



TRIMMER VIEW



Code No.	Part No.	Description
		RESISTORS
R1	13071	4000 ohm—1/3 w.
R2	130128	20 ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130236	30M ohm—1/3 w.
R5	130283	750 ohm—1/3 w.
R6	130324	18M ohm—1 watt
R7	130218	5M ohm—1/3 w.
R8	13020	100M ohm—1/3 w.
R9	130170	3 megohm—1/3 w.
R10	130222	350 ohm—1/3 w.
R11	13012	50M ohm—1/3 w.
R12	101232	1 megohm volume control
R13	130223	10 megohm—1/3 w.
R14	1303	500M ohm—1/3 w.
R15	101231	1 megohm tone control
R16	130172	250M ohm—1/3 w.
R17	130323	270 ohm—1 watt
		CONDENSERS
C	102137	Two gang variable cond
C1	124149	S. W. Antenna trimmer
C2	124149	B. C. Antenna trimmer
C3	1292	.0005 mica
C4	124142	S. W. Oscillator trimmer
C5	124142	B. C. Oscillator trimmer
C6	124146	B. C. Padding Condenser
C7	124146	S. W. Padding Condenser
C8	12960	150 mmfd. mica
C9	10013	.05 x 400 v.
C10	10022	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1292	.0005 mica
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10061	.02 x 600 v.
C16	10025	.002 x 600 v.
C17	12912	.00025 mica
C18	10026	.02 x 400 v.
C19	10071	.004 x 600 v.
C20	119115	16 mfd. x 400 w. v. lytic
C21	119115	16 mfd. x 400 w. v. lytic
C22	10019	.006 x 600 v.
C23	1001	.1 x 400 v.

C1 and C2 are in same unit C4 and C5 in same unit
C6 and C7 are in same unit C13 and C14 in same unit
C20 and C21 are in same unit

Power Consumption	Radio Only	70 Watts
	Motor Only	20 Watts
Power Output		2.1 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 15 Microvolts Average

Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC

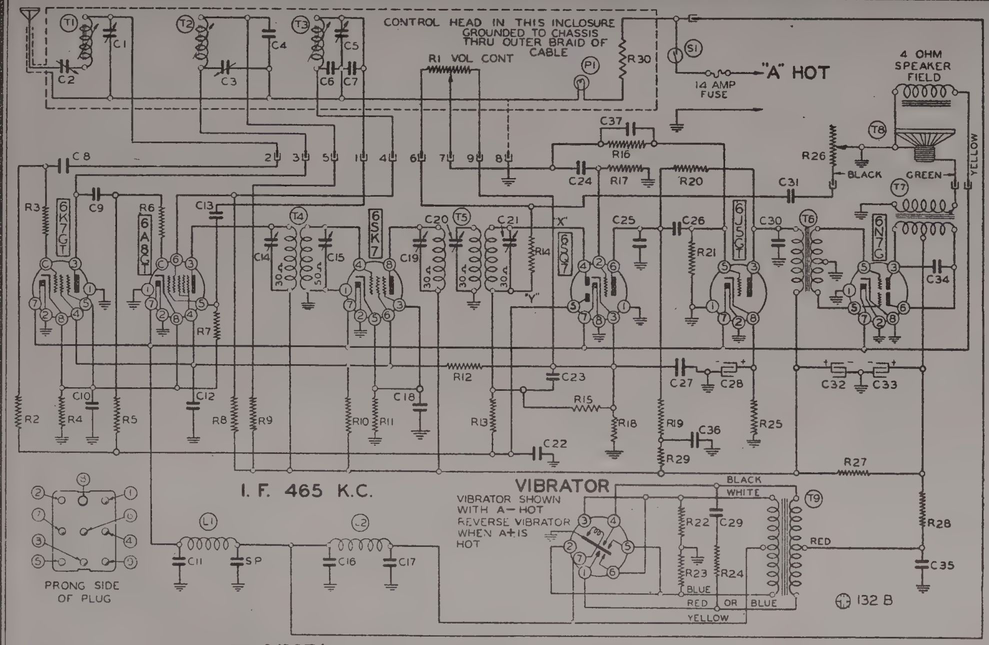
Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC

Intermediate Frequency - - - - - - - - - 455 KC

Speaker - - - - - - - - - - 8 in. Electro Dynamic

		PARTS
T1	111208	Loop antenna assembly
T2	111184	S. W. Antenna Coil
T3	110154	B. C. and S. W. Oscillator Coil
T4	108169E	Input I. F. Coil—455 kc.
T5	108106U	Output I.F. Coil—455 kc.
T6	105118	Output Transformer
T7	114216	8″ Electro Dynamic Speaker
T8	104225B	60 cycle power transformer
and	104238B	25 cycle power transformer
T9	104228	60 cycle Seeburg Record Changer and Phono Assembly
and	104229	25 cycle Seeburg Record Changer and Phono Assembly
S1	125132	Phono-band switch
S2		Switch on volume control
S3		Switch on record changer
L1	12312	R. F. Choke coil
P1	10794	Pilot light bulb No. T-44

BELMONT RADIO CORP.



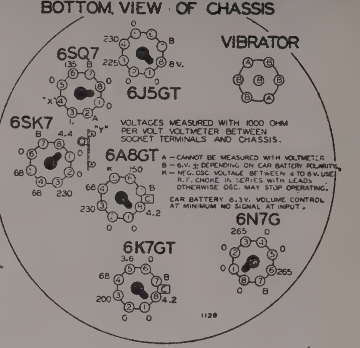

BOTTOM VIEW OF CHASSIS
VIBRATOR
6SQ7
6J5GT
6SK7
6A8GT
6K7GT
6N7G
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A — CANNOT BE MEASURED WITH VOLTMETER
B — 6.V. ± DEPENDING ON CAR BATTERY POLARITY.
K — NEG. OSC VOLTAGE BETWEEN 4 TO 8 V. USE R.F. CHOKE IN SERIES WITH LEADS OTHERWISE OSC. MAY STOP OPERATING.
CAR BATTERY 6.3 V. VOLUME CONTROL AT MINIMUM NO SIGNAL AT INPUT.
1128

FIG. 5

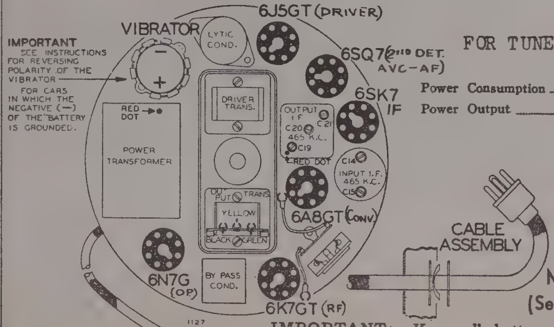


Fig. 3—Top View of Chassis

FOR TUNER DATA, SEE INDEX

Power Consumption ....7.7 Amperes at 6.3 Volts

Power Output ....7 Watts Undistorted,
9 Watts Maximum

FREQUENCY RANGE
535 to 1565 Kc.

MARCH 1940

MODEL 678, Issue C
(Serial No. 14302 and up)

IMPORTANT: Keep all battery connecting wires and cables such as cables 107313 and 107315 as far away from the R.F. connector cable (107231) as possible. This will reduce any interference which may be present in these battery wires from being radiated back into the R.F. connector cable 107231.

RESISTORS

R1	101161	1.2 megohm volume control
R2	13019	1 megohm—⅓ w.
R3	130275	500 ohm—⅓ w.
R4	13079	400 ohm—⅓ w.
R5	13019	1 megohm—⅓ w.
R6	130275	500 ohm—⅓ w.
R7	13012	50M ohm—⅓ w.
R8	13012	50M ohm—⅓ w.
R9	13021	20M ohm—⅓ w.
R10	130196	30M ohm—1 watt
R11	130235	1500 ohm—⅓ w.
R12	1307	40M ohm—⅓ w.
R13	13019	1 megohm—⅓ w.
R14	13020	100M ohm—⅓ w.
R15	130118	600M ohm—⅓ w.
R16	130257	5 megohm—⅓ w.
R17	13019	1 megohm—⅓ w.
R18	130101	600 ohm—⅓ w.
R19	13011	250M ohm—⅓ w.
R20	13038	2 megohm—⅓ w.
R21	1303	500M ohm—⅓ w.
R22	130269	100 ohm—⅓ w.
R23	130269	100 ohm—⅓ w.
R24	13071	4M ohm—⅓ w.
R25	13092	1M ohm—⅓ w.
R26	101162	1 megohm tone control
R27	130199	1500 ohm Resistor—1 watt
R28	130231	75 ohm—⅓ w.
R29	13020	100M ohm—⅓ w.
R30	130299	10 ohm—⅓ w.

CONDENSERS

C1	12483	Antenna Shunt Trimmer
C2	12481	Antenna Series Trimmer
C3	12480	R. F. Shunt Trimmer
C4	100102	.15 x 400 v.
C5	12480	Oscillator Shunt Trimmer
C6	129137	.0005 Mica
C7	129136	.00017 Mica
C8	12997	.00005 Ceramicon—5%
C9	1292	.0005 Mica
C10	11625	.05 x 200 v.
C11	1296	.002 Mica
C12	11625	.25 x 400 v.
C13	12912	.00025 Mica
C14		Plate Trimmer on Input I.F. Trans.
C15		Grid Trimmer on Input I.F. Trans.
C16	10031	.5 x 120 v.
C17	10031	.5 x 120 v.
C18	1009	.05 x 200 v.
C19		Plate Trimmer on Output I.F. Trans.
C20		Tertiary Trimmer on Output I.F. Trans.
C21		Grid Trimmer on Output I.F. Trans.
C22	11625	.05 x 200 v.
C23	1295	.0001 Mica
C24	10011	.01 x 400 v.
C25	1295	.0001 Mica
C26	10011	.01 x 400 v.
C27	10026	.02 x 400 v.
C28	11988	20 mfd.—25 w. v. lytic
C29	100101	.0055 x 1600
C30	129114	.0003 Mica
C31	10047	.002 x 600 v.
C32	11988	15 mfd.—450 w. v. lytic
C33	11988	15 mfd.—450 w. v. lytic
C34	100103	.004 x 800 v.
C35	1001	.1 x 400 volt
C36	10013	.05 x 400 v.
C37	12967	.00004 Mica

PARTS

T1	111118	P. B. Antenna Coil Assembly Complete
T2	10949	P. B. R. F. Coil Assembly Complete
T3	110109	P.B. Oscillator Coil
T4	108120B	Input I.F. Coil—465 kc.
T5	108115B	Output I.F. Coil—465 kc.
T6	10584	Audio Driver Transformer
T7	10583	Output Transformer
T8	114155	8" Dynamic Speaker
T9	104158	Power Transformer
L1	10566	"A" Choke
L2	10519	"A' Choke
P1	10797	6-8 v. Pilot Light T51
S1		Off-on Switch on volume control
	1269	Vibrator (130 cycle synchronous)

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 125 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	Trimmers C19, C20 (See Fig. 3)	Output I. F.	See note "A" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SK7	Set dial at 1400 Kc.	Trimmer C21 (See Fig. 3)	Output I. F.	See note "B" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6A8GT	Set dial at 1400 Kc.	Trimmers C14, C15 (See Fig. 3)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1565 Kc.	125 mmf.	Antenna lead	Set dial at 1565 Kc.	Trimmer C5 (See Fig. 4)	Oscillator	Adjust to maximum output
	1400 Kc.	125 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmers C1, C3 (See Fig. 4)	Antenna and R. F.	Adjust to maximum output
	600 Kc.	125 mmf.	Antenna lead	Set dial at 600 Kc.	Trimmer C2 (See Fig. 4)	Antenna series adj.	See note "C"

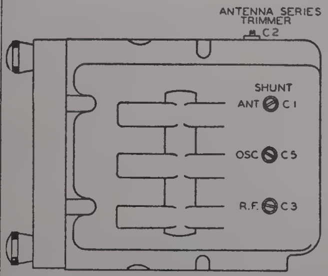


Fig. 4.—Bottom View of Remote Tuner

IMPORTANT—ADJUSTING ANTENNA TRIMMER:

Tune in any weak station between 600 and 800 kc.

Make sure that the antenna shunt trimmer on the **Bottom of the Remote Tuner** is turned all the way out (counter clockwise), (see adjustment "C1," Fig. 4.)

Adjust antenna series trimmer **on the side of the remote Tuner Unit.** For maximum output. (See adjustment "C2," Fig. 4.)

NOTE: If resonance (maximum output) cannot be obtained within the range of the antenna series trimmer "C2," turn the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer "C1" on the **bottom of the remote tuner unit** for a peak of maximum output.

The above arrangement will cover any antenna capacity that is now in use.

NOTE "A" IMPORTANT: To align the output I. F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the diode tuned circuit. Connect the resistor as indicated by points "X" and "Y" on the circuit diagram and the bottom view of the radio chassis Fig. 5. A red dot on top of output I. F. can designates location of trimmer "C19."

NOTE "B" Before adjusting trimmer C21 disconnect the 10M ohm resistor. Under no circumstances re-adjust trimmers C19 or C20 after the 10M ohm resistor has been removed.

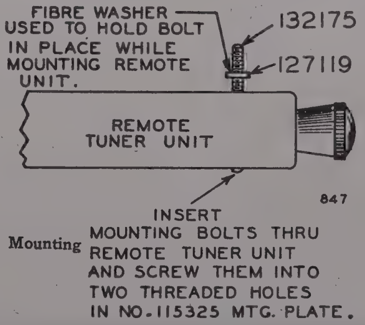
For alignment of the output I. F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used.

NOTE "C" Maximum gain for this adjustment depends on the capacity of the antenna system of the car in which the radio is installed. For the proper alignment of this adjustment see "Adjusting Antenna Trimmer."

ALIGNMENT OF THE IRON CORES

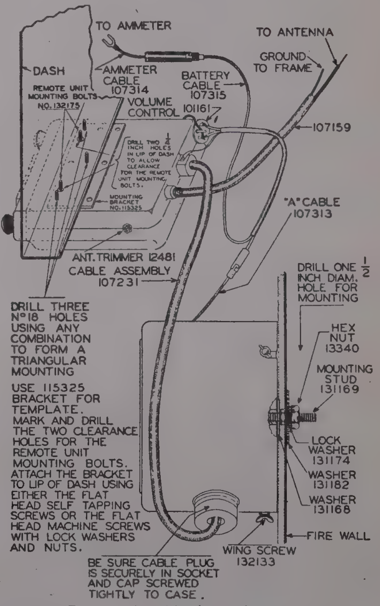
The iron cores for the antenna, R. F. and oscillator permeability coils have been very carefully adjusted at the factory and require no further adjustment, unless it becomes necessary to replace a coil, or if the adjustments have been tampered with.

The procedure for aligning the iron cores will be supplied with replacement coils when ordered.


FIBRE WASHER USED TO HOLD BOLT IN PLACE WHILE MOUNTING REMOTE UNIT.
132175
127119
REMOTE TUNER UNIT
847

INSERT MOUNTING BOLTS THRU REMOTE TUNER UNIT AND SCREW THEM INTO TWO THREADED HOLES IN NO. 115325 MTG. PLATE.

Remote Mounting



DRILL THREE Nº18 HOLES USING ANY COMBINATION TO FORM A TRIANGULAR MOUNTING

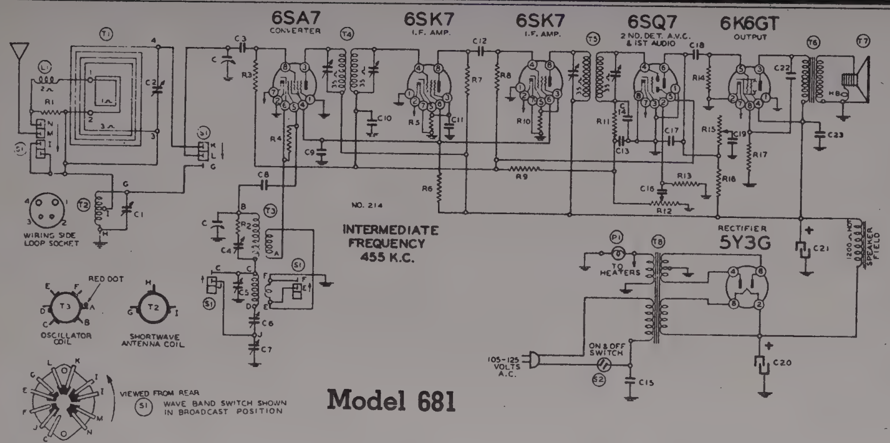
USE 115325 BRACKET FOR TEMPLATE. MARK AND DRILL THE TWO CLEARANCE HOLES FOR THE REMOTE UNIT MOUNTING BOLTS. ATTACH THE BRACKET TO LIP OF DASH USING EITHER THE FLAT HEAD SELF TAPPING SCREWS OR THE FLAT HEAD MACHINE SCREWS WITH LOCK WASHERS AND NUTS.

BE SURE CABLE PLUG IS SECURELY IN SOCKET AND CAP SCREWED TIGHTLY TO CASE.

General Installation View

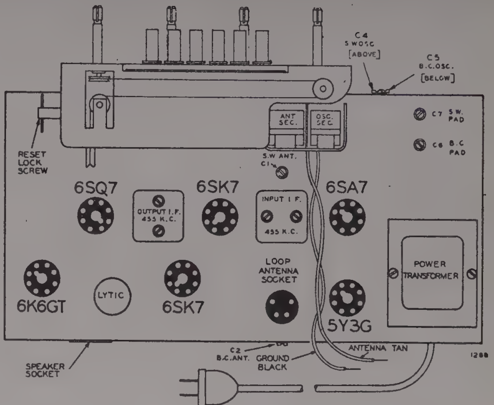
BELMONT RADIO CORP.

MODEL 681
Series A



Model 681

Series A



CONDENSERS

Code No.	Part No.	
C	102128	2 gang variable condenser
C1	124116	S.W. antenna trimmer
C2	124141	B.C. antenna trimmer
C3	1292	.0005 mica
C4	124142	S.W. oscillator trimmer
C5	124142	B.C. oscillator trimmer
C6	124146	B.C. padding condenser
C7	124146	S.W. padding condenser
C8	12960	150 mfd. mica
C9	10013	.05 x 400 v.
C10	1009	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1292	.0005 mica
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10061	.02 x 600 v.
C16	10025	.002 x 600 v.
C17	12912	.00025 mica
C18	10026	.02 x 400 v.
C19	10071	.004 x 600 v.
C20	119115	16 mfd. x 400 w.v. lytic
C21	119115	16 mfd. x 400 w.v. lytic
C22	10019	.006 x 600 v.
C23	1001	.1 x 400 v.

C4 and C5 are in same unit
C13 and C14 are in same unit
C6 and C7 are in same unit
C20 and C21 are in same unit

RESISTORS

R1	13071	4M ohm—1/3 w.
R2	130197	20 ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130236	30M ohm—1/3 w.
R5	130283	750 ohm—1/3 w.
R6	130298	19M ohm—1½ w.
R7	130218	5M ohm—1/3 w.
R8	13020	100M ohm—1/3 w.
R9	1304	3 megohm—1/3 w.
R10	130222	350 ohm—1/3 w.
R11	13012	50M ohm—1/3 w.
R12	101240	1 megohm volume control
R13	130223	10 megohm—1/3 w.
R14	1303	500M ohm—1/3 w.
R15	101241	1 megohm tone control
R16	13011	250M ohm—1/3 w.
R17	130255	500 ohm—1 w.

PARTS

T1	111228	Loop antenna assembly
T2	111184	S.W. antenna coil
T3	110154	B.C. & S.W. oscillator coil
T4	108169G	Input I.F. coil—455 kc.
T5	108106L	Output I.F. coil—455 kc.
T6	10590B	Output Transformer
T7	114229	8" electro dynamic speaker
T8	104225C	60 cycle power transformer
	104238C	25 cycle power transformer
S1	125141	Band switch
S2		Switch on volume control
L1	12312	R.F. choke coil
P1	10794	Pilot light bulb T-44

Power Consumption - - - - - - 55 Watts

Power Output - - - - - 2.2 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 15 Microvolts Average

Selectivity - 47 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 535 to 1600 KC

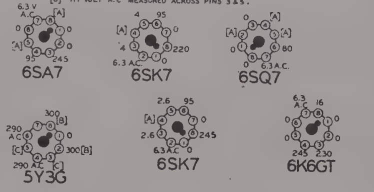
Shortwave Band - 5.43 to 18.3 MC

Intermediate Frequency - - - - - - - 455 KC

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. VOLUME CONTROL AT MINIMUM. 117 VOLT LINE

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 5 VOLTS A.C. MEASURED ACROSS PINS 2 & 8.
[C] 117 VOLT A.C MEASURED ACROSS PINS 3 & 5.



REAR OF CHASSIS

1289

Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

Next push one of the pushbuttons all the way in as far as it will go and hold it there. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct, then release the button. Continue setting each pushbutton in the same way. Now rotate the tuning knob to the right (clockwise) as far as it will turn.

Looking at the back of the cabinet note the **reset lock screw** on the left hand side of the chassis, (see chassis view).

Rotate the **reset lock screw** to the **right** (clockwise) by means of the pin thru the shaft.

It is **very important** that this locking screw is **turned** until it is **absolutely tight.**

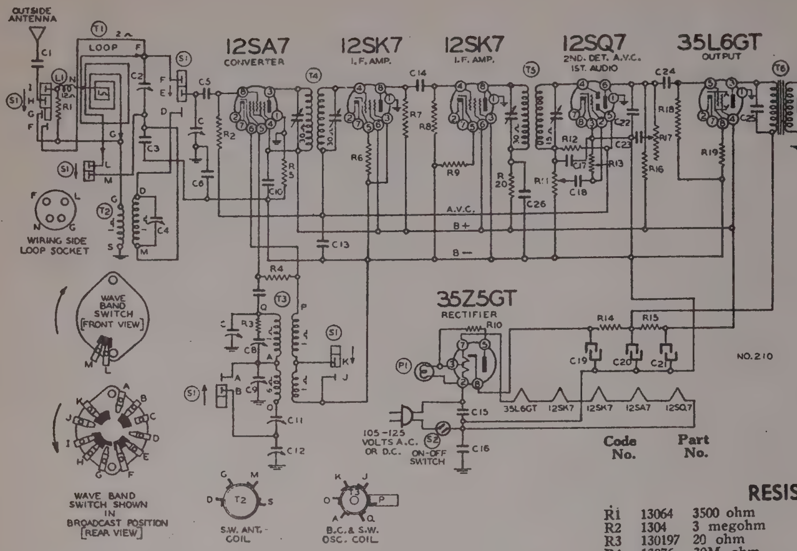
This screw will lock in place all the stations you have selected on the automatic tuner pushbuttons. Pressing the proper button will now tune the station you want. (NOTE: Locking screw is loose when radio is shipped from factory).

To change stations simply loosen the reset lock screw and repeat the procedure above.

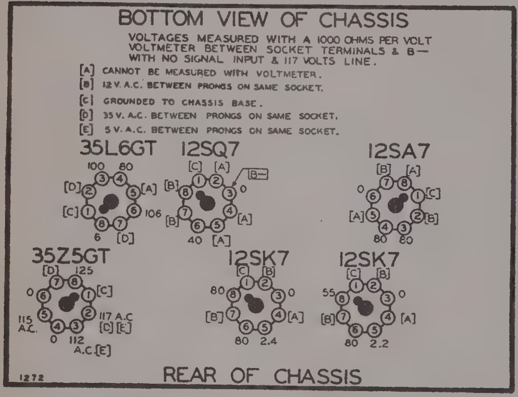
BRC. 681—Series A Form No. 6273—1000—11-40
Pro. 260

MODEL 695

BELMONT RADIO CORP.



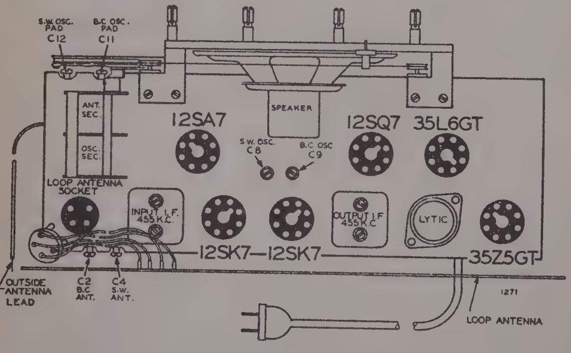
INTERMEDIATE FREQUENCY 455 K.C.



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B— WITH NO SIGNAL INPUT & 117 VOLTS LINE.

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 V. A.C. BETWEEN PRONGS ON SAME SOCKET.
[C] GROUNDED TO CHASSIS BASE.
[D] 35 V. A.C. BETWEEN PRONGS ON SAME SOCKET.
[E] 5 V. A.C. BETWEEN PRONGS ON SAME SOCKET.



BRC.(695) Form No. 6271—2750—10-40
PRO. 242

RESISTORS

Code No.	Part No.	Description
R1	13064	3500 ohm
R2	1304	3 megohm
R3	130197	20 ohm
R4	13076	30M ohm
R5	130100	150M ohm
R6	13097	200 ohm—⅓ w.
R7	13082	10M ohm—⅓ w.
R8	13019	1 megohm
R9	13083	300 ohm
R10	130215	25 ohm
R11	101215	1 megohm volume control
R12	1304	3 megohm
R13	130257	5 megohm
R14	130296	200 ohm—1 w.
R15	130287	1200 ohm—1 w.
R16	13011	250M ohm
R17	101216	1 megohm tone control
R18	1303	500M ohm
R19	130166	150 ohm
R20	13022	5M ohm—⅓ w.

CONDENSERS

C	102139	2 gang variable condenser
C1	10092	.001 x 600 v.
C2	124152	B.C. Antenna Trimmer
C3	1009	.05 x 200 v.
C4	124152	S.W. Antenna Trimmer
C5	1292	.0005 mica
C6	1001	.1 x 400 v.
C7	12960	.00015 mica
C8	124142	S.W. Oscillator trimmer
C9	124142	B.C. Oscillator trimmer
C10	1001	.1 x 400 v.
C11	124153	B.C. Oscillator pad
C12	124153	S.W. Oscillator pad
C13	1009	.05 x 200 v.
C14	1292	.0005 mica
C15	1001	.1 x 400 v.
C16	1001	.1 x 400 v.
C17	129158	.0002 mica
C18	10012	.003 x 600 v.
C19	11994	40 mfd. x 150 v. lytic
C20	11994	20 mfd. x 150 v. lytic
C21	11994	20 mfd. x 150 v. lytic
C22	1295	.0001 mica
C23	1007	.005 x 600 v.
C24	10011	.01 x 400 v.
C25	10026	.02 x 400 v.
C26	10013	.05 x 400 v.

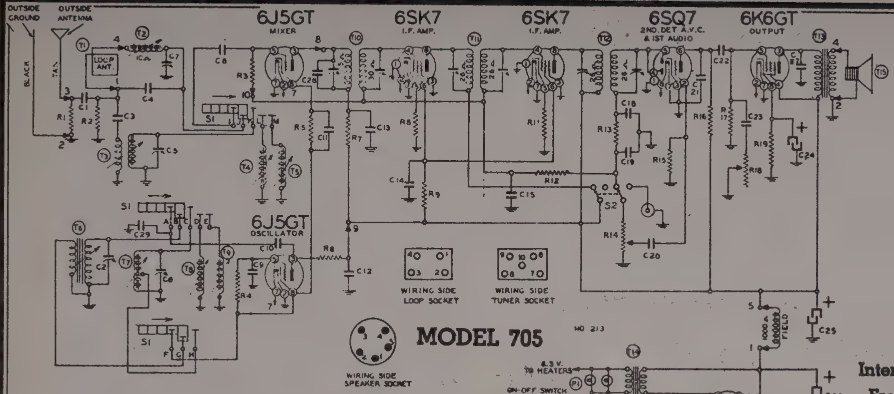
C2 and C4 are in same unit C8 and C9 in same unit
C11 and C12 in same unit
C19, C20 and C21 in same unit

PARTS

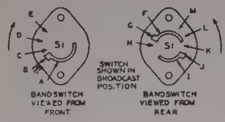
T1	111217	Loop Antenna Assembly
T2	111219	S.W. Antenna coil
T3	110169	B.C. S.W. Oscillator Coil
T4	108169F	Input I.F. Coil—455 kc.
T5	108130F	Output I.F. Coil—455 kc.
T6	105104C	Output Transformer
T7	114224	5" P.M. Speaker
L1	1239	R.F. Choke coil
S1	125139	Wave band switch
S2		Switch on volume control
P1	107249	Pilot light

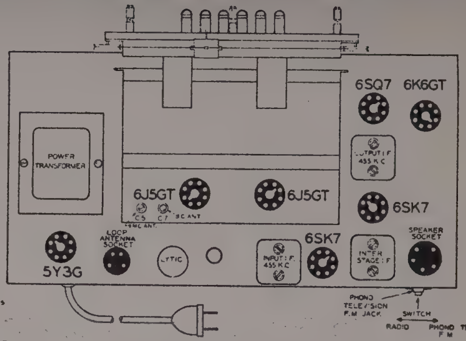
BELMONT RADIO CORP.

MODEL 705

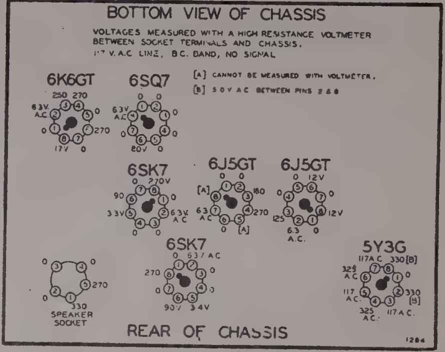


MODEL 705


BANDSWITCH VIEWED FROM FRONT
SWITCH SHOWN IN BROADCAST POSITION
BANDSWITCH VIEWED FROM REAR



Intermediate Frequency 455 KC


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
117 V.A.C LINE, B.C. BAND, NO SIGNAL
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 5 0 V A C BETWEEN PINS 2 & 8
6K6GT
6SQ7
6SK7
6J5GT
6J5GT
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS

CONDENSERS

Code No.	Part No.	
C1	1292	.0005 mica
C2	124144	B.C. oscillator trimmer
C3	100112	.001 tubular
C4	129102	.00002 ceramicon
C5	124154	9 mc. ant. trimmer
C6	124145	9 mc. osc. trimmer
C7	124154	B.C. antenna trimmer
C8	1292	.0005 mica
C9	1292	.0005 mica
C10	129158	.0002 mica
C11	10022	.05 x 200 v.
C12	10074	.1 x 400 v.
C13	10026	.02 x 400 v.
C14	10024	.25 x 400 v.
C15	10026	.02 x 400 v.
C16	10061	.02 x 600 v.
C17	10061	.02 x 600 v.
C18	129161	.0001 mica
C19	129161	.0001 mica
C20	10078	.01 x 200 v.
C21	12912	.00025 mica
C22	10026	.02 x 400 v.
C23	10019	.006 x 600 v.
C24	11997	40.0 x 25 w.v. lytic
C25	11997	15.0 x 400 w.v. lytic
C26	11997	15.0 x 450 w.v. lytic
C27	10019	.006 x 600 v.
C28	129171	.0022 mica in coil 108186
C29	129167	.0002 silver mica

RESISTORS

R1	130232	25M ohm—⅓ w.
R2	130232	25M ohm—⅓ w.
R3	13038	2 megohm—⅓ w.
R4	13094	50M ohm—⅓ w.
R5	130157	12M ohm—⅓ w.
R6	130219	20M ohm—1 w.
R7	130103	100M ohm—⅓ w.
R8	13079	400 ohm—⅓ w.
R9	130291	50M ohm—1 w.
R11	13083	300 ohm—⅓ w.
R12	13019	1 megohm—⅓ w.
R13	13012	50M ohm—⅓ w.
R14	101239	500M ohm volume control
R15	130257	5 megohm—⅓ w.
R16	13011	250M ohm—⅓ w.
R17	13019	1 megohm—⅓ w.
R18	125140	1 megohm tone control
R19	13093	450 ohm—⅓ w.

PARTS

T1	111227	Loop antenna assembly
T2	111222	B.C. antenna coil
T3	111223	9 mc. antenna coil
T4	111224	12 mc. antenna coil
T5	111225	15 mc. antenna coil
T6	110170	B.C. oscillator coil
T7	110171	9 mc. oscillator coil
T8	110158	12 mc. oscillator coil
T9	110172	15 mc. oscillator coil
T10	108186	Input I.F. coil—455 kc.
T11	108187	Interstage I.F. coil—455 kc.
T12	108188	Output I.F coil—455 kc.
T13	105120	Output transformer
T14	104246	Power transformer 50-60 cycle
T14	104247	Power transformer—25 cycle
T15	114228	10" dynamic speaker
S1	125140	Wave band switch
S2	125133	Radio phono switch
P1	10794	(2) Pilot lights—type T44

Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

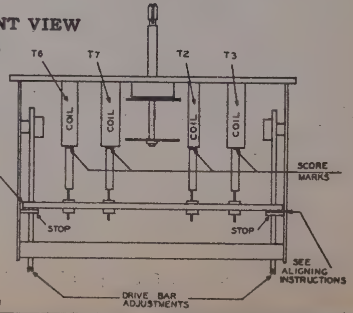
Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure.

Power Consumption - - - - - - - 80 Watts
Power Output - - - - - - 2½ Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 540 to 1600 KC
31M Band - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC

BRC (705) Series A Form No. 7919-
PRO. 247 —1M—10-40

ADJUSTMENT VIEW IRON CORE



BELMONT RADIO CORP.

MODEL 705

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (2nd I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SK7 (1st I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Interstage I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6J5 (Mixer)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C6 (See Trimmer on Top) C5	Osc. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T8 (See Trimmer View) T4	Osc. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T9 (See Trimmer View) T5	Osc. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C2 (See Trimmer on Top) C7	Osc. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T2 (See Iron Core Adjustment View)	Ant.	Adjust to maximum output

Power Consumption - - - - - - **100 Watts**

Power Output - - - - - **5 Watts Undistorted**

Sensitivity for 500 Milliwatt Output: 10 Microvolts Average

Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 540 to 1600 KC

MODEL 902

49M Band - - - 5.9 to 6.1 MC

31M Band - - - 9.1 to 10 MC

25M Band - - 11.4 to 12.1 MC

19M Band - - 14.9 to 15.4 MC

Setting the Pushbuttons

MODEL 902

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton. (Except the two end ones).

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure

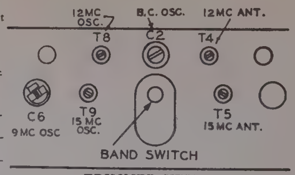
MODEL 902

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output



TRIMMER VIEW
MODEL 705

MODELS 705 & 902

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

MODEL 902

Pushbutton Tone Control

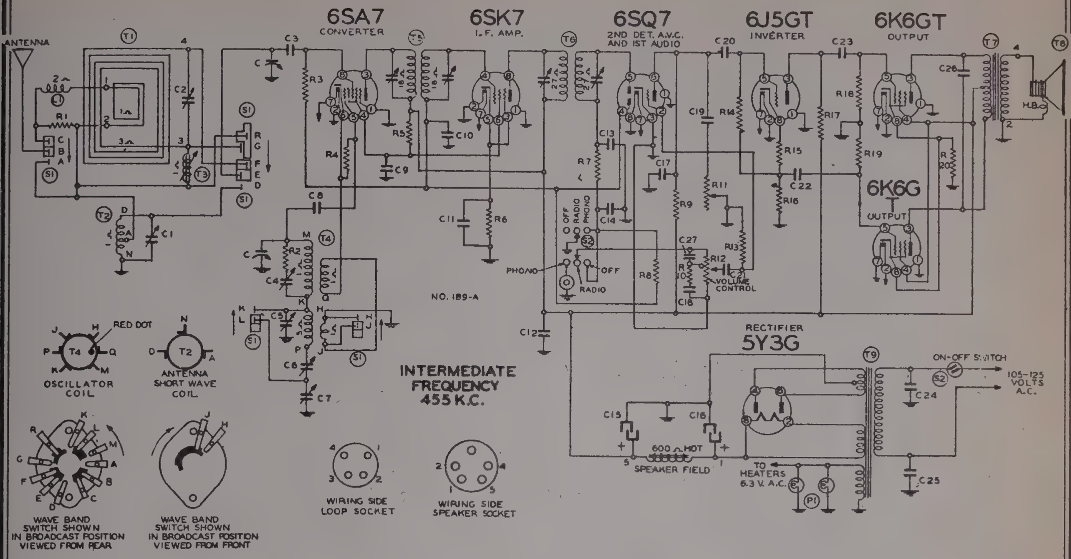
This button has three tone positions Bass—Medium—Treble. Each time you push the button it will change the tone to one of these positions—Change it any time to the tone you like best.

Radio-Phono Pushbutton Switch

This pushbutton switches from the radio to the phono position. It should be level with the other buttons for radio operation—or pulled out to use a phonograph. A phono jack is provided on the chassis should you wish to connect an external Phonograph to your Radio. (Phono jack is shown in the chassis view).

BELMONT RADIO CORP.

MODEL 729
Series A



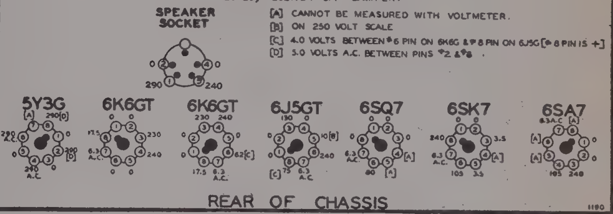
Schematic Diagram Ref. No.	Part No.	Description
RESISTORS		
R1	13064	3500 ohm—⅓ w.
R2	130276	10 ohm—⅓ w.
R3	1304	3 megohm—⅓ w.
R4	130236	30M ohm—⅓ w.
R5	130307	15M ohm—1 w.
R6	13083	300 ohm—⅓ w.
R7	13012	50M ohm—⅓ w.
R8	13038	2 megohm—⅓ w.
R9	13011	250M ohm—⅓ w.
R10	130149	15M ohm—⅓ w.
R11	101223	Tone control—1 megohm
R12	101224	Volume Control—½ megohm
R13	130257	5 megohm—⅓ w.
R14	1303	500M ohm—⅓ w.
R15	130218	5M ohm—⅓ w.
R16	130103	100M ohm—⅓ w.
R17	130103	100M ohm—⅓ w.
R18	1303	500M ohm—⅓ w.
R19	1303	500M ohm—⅓ w.
R20	130320	320 ohm—1 watt
CONDENSERS		
C	102133	2 gang variable condenser
C1	124116	Short wave antenna trimmer
C2	124141	B.C. antenna trimmer
C3	1292	.0005 mica
C4	124142	Dual adj. trimmer—S.W. osc. trimmer
C5	124142	Dual adj. trimmer—B.C. osc. trimmer
C6	124140	Dual adj. condenser—B.C. pad
C7	124140	Dual adj. condenser—S.W. pad
C8	12960	.00015 mica
C9	10013	.05 x 400 v.
C10	1009	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1001	.1 x 400 v.
C13	129161	Dual—.0001 mica
C14	129161	Dual—.0001 mica
C15	119108	16 mfd. x 450 w.v. lytic condenser
C16	119108	16 mfd. x 450 w.v. lytic condenser
C17	1295	.0001 mica
C18	100120	.035 x 200 v.
C19	10019	.006 x 600 v.
C20	10026	.02 x 400 v.
C21	10019	.006 x 600 v.
C22	10013	.05 x 400 v.
C23	10013	.05 x 400 v.
C24	10061	.02 x 600 v.
C25	10061	.02 x 600 v.
C26	10019	.006 x 600 v.
C27	129169	.00025 mica

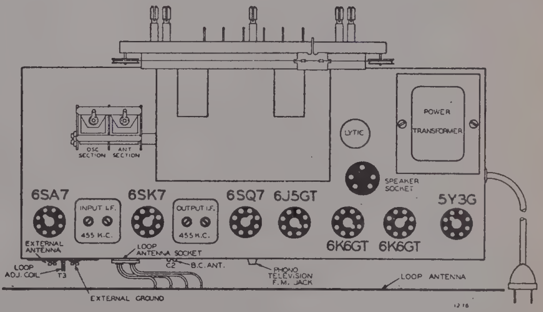
C4 and C5, C6 and C7, and C13 and C14 are in the same units

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. LOOP CONNECTED, RECEIVER OFF CARRIER.

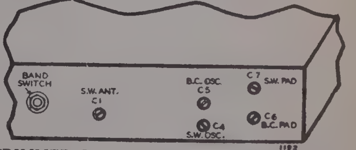
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] ON 250 VOLT SCALE
[C] 4.0 VOLTS BETWEEN #6 PIN ON 6K6G & #8 PIN ON 6J5G [#8 PIN IS +]
[D] 5.0 VOLTS A.C. BETWEEN PINS #2 & #8 .





PARTS

T1	111220	Loop antenna assembly
T2	111184	Short wave antenna coil
T3	111183	Loop adjustable coil
T4	110154	B.C.—S.W. oscillator coil
T5	108178	Input I.F. coil—455 kc.
T6	108179	Output I.F. coil—455 kc.
T7	105112	Output transformer
T8	114226	6" Dynamic Speaker
T9	104212	Power transformer
L1	12312	R.F. Choke coil
S1	125119	Wave band switch
S2	125120	Radio-phono On-off switch
P1	10794	(2) Pilot light bulbs T-44



TRIMMER VIEW FRONT CHASSIS FLANGE

BRC. (729) Form No. 7917—1750—10-40
PRO. 254

MODEL 729
Series A

BELMONT RADIO CORP.

Phonograph-Television or FM. Jack

Should you wish to use an external phonograph it should be plugged into the phono-jack shown in the top view—The on-off radio-phono knob on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phono or a television or FM converter.

Power Consumption	75 Watts
Power Output	3 Watts Undistorted
Sensitivity for 500 Milliwatt Output:	20 Microvolts Average
Selectivity	45 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast	535 to 1600 KC
Tuning Frequency Range Shortwave	5.4 to 18.4 MC
Intermediate Frequency	455 KC
Speaker	6 in. Electro Dynamic

Pushbutton Tuning

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 535 Kc.	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T3 (See Top View)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 535 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

MODEL 796 Series A
Serial No.
OC362500 up

BELMONT RADIO CORP.

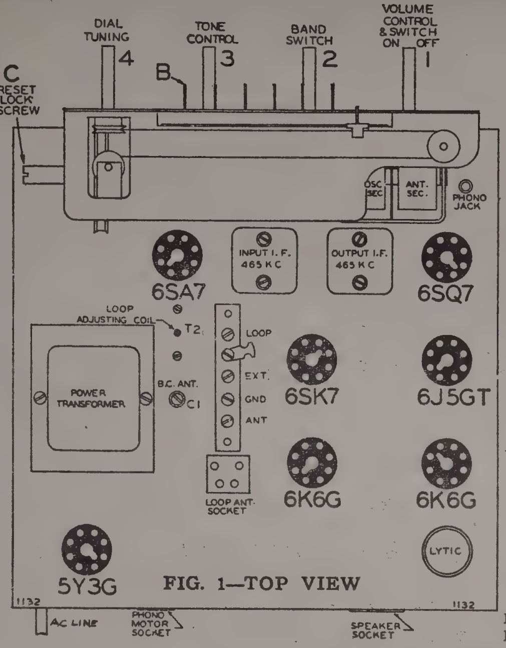
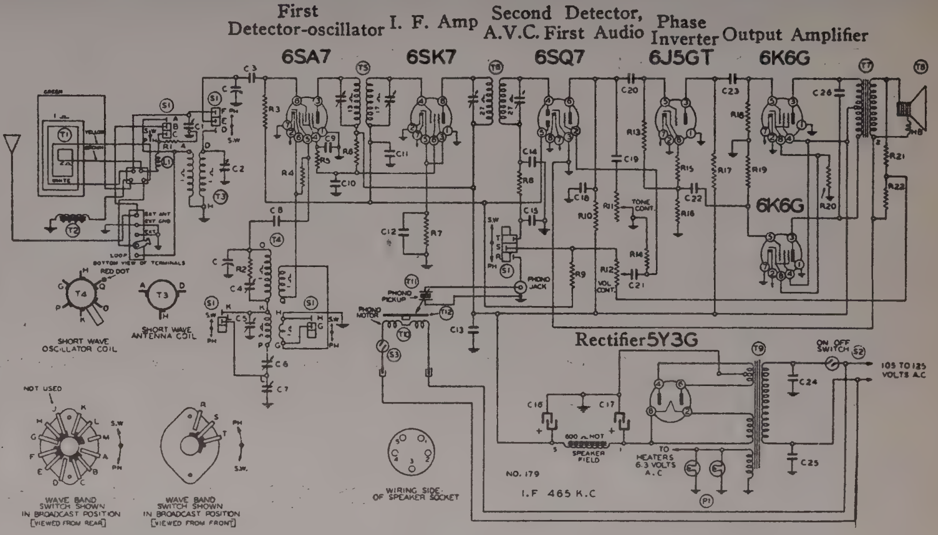


FIG. 1—TOP VIEW



3-40

FOR TUNER DATA, SEE INDEX

I.F. 465 K.C.

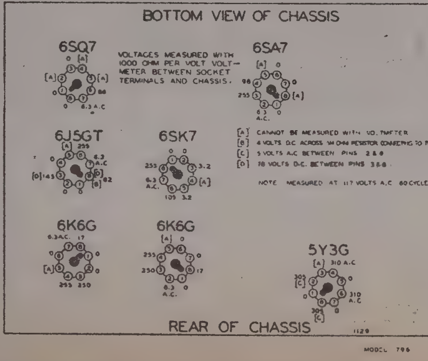
FREQUENCY RANGE
5.4 to 18.3 MC.
532 to 1570 KC.

Power Consumption (Radio Chassis only, less Phono Motor)..........85 Watts
Power Output..........4.5 Watts Undistorted, 6 Watts Maximum

Model 796

Series A

(Serial No. OC362500 and up)



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 4 VOLTS D.C ACROSS 1M OHM RESISTOR CONNECTING TO THIS PIN.
[C] 5 VOLTS A.C BETWEEN PINS 2 & 8
[D] 78 VOLTS D.C. BETWEEN PINS 3 & 8

NOTE MEASURED AT 117 VOLTS A.C 60 CYCLES

RESISTORS

Circuit Diagram Ref. No.	Part No.	Description
R1	13018	4M ohm—1/3 w.
R2	130197	20 ohm—1/3 w.
R3	1304	3 megohm—1/3 w.
R4	130236	30M ohm—1/3 w.
R5	13092	1000 ohm—1/3 w.
R6	130116	15M ohm—1½ watt
R7	13083	300 ohm—1/3 w.
R8	130103	100M ohm—1/3 w.
R9	1304	3 megohm—1/3 w.
R10	13011	250M ohm—1/3 w.
R11	101216	1 megohm—tone control
R12	101215	1 megohm volume control
R13	1303	500M ohm—1/3 w.
R14	130257	5 megohm—1/3 w.
R15	130218	5M ohm—1/3 w.
R16	130103	100M ohm—1/3 w.
R17	130103	100M ohm—1/3 w.
R18	1303	500M ohm—1/3 w.
R19	1303	500M ohm—1/3 w.
R20	130227	250 ohm—1 watt
R21	130168	100 ohm—1/3 w.
R22	130197	20 ohm—1/3 w.

CONDENSERS

C	102131	2 gang variable condenser
C1	124117	B.C. Antenna Trimmer
C2	124116	S.W. Antenna Trimmer
C3	1292	.0005 Mica
C4	124112	S.W. Oscillator Trimmer
C5	124112	B.C. Oscillator Trimmer
C6	124134	B.C. Series Pad
C7	124134	S.W. Series Pad
C8	12991	.00015 Mica
C9	10013	.05 x 400 v.
C10	1001	.1 x 400 v.
C11	1009	.05 x 200 v.
C12	1009	.05 x 200 v.
C13	1001	.1 x 400 v.
C14	129161	.0001 mica
C15	129161	.0001 mica
C16	119108	Lytic—16 mfd. 450 w.v.
C17	119108	Lytic—16 mfd. 450 w.v.
C18	12940	.0001 Mica
C19	100118	.008 x 600 v.
C20	10026	.02 x 400 v.
C21	10025	.002 x 600 v.
C22	10013	.05 x 400 v.
C23	10013	.05 x 400 v.
C24	10061	.02 x 600 v.
C25	10061	.02 x 600 v.
C26	10019	.006 x 600 v.

C4 and C5 are in same unit
C6 and C7 are in same unit
C14 and C15 are in same unit
C16 and C17 are in same unit

PARTS

T1	111165E	Loop Antenna Assembly
T2	111153	Loop Adjustable Coil
T3	111163	Short Wave Antenna Coil
T4	110150	B.C. S.W. Oscillator Coil
T5	108162B	Input I.F. Coil—465 kc.
T6	108132D	Output I.F. Coil—465 kc.
T7	10554E	Output Transformer
T8	114192	10" Electrodynamic speaker
T9	104170B	Power Transformer
S1	125112	Band Switch
S2		On-off Switch on Volume Control
P1	10794	(2) Pilot light Bulbs T44
L1	1239	R. F. Choke Coil
S3		Phono Motor Switch
T10 T11	104174	Phono Motor; Phono Pickup Arm Record Changer Complete
T12		Phono Turntable

MODEL 796, Series A
Ser. No. 0C32500 up
MODEL 797, Series A
Ser. No. 0D428100 up

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

IMPORTANT: See Aligning Instructions.

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all-wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., 400 ohms.

	SIGNAL GENERATOR								
BAND	MODEL 796 Frequency Setting	MODEL 797 Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Output I. F.	Adjust to maximum output
	465 Kc.	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1570 Kc.	1570 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	532 Kc.	532 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 532 K. C.	Trimmer C6 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Fig. 5)	Broadcast antenna	Adjust to maximum output
	600 Kc.	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2 (See Fig. 5)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1570 and 532 K. C.).

The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

It is important during loop alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

To remove the chassis from the cabinet, pull off the knobs and take out the 4 bolts holding the chassis flange to the control panel.

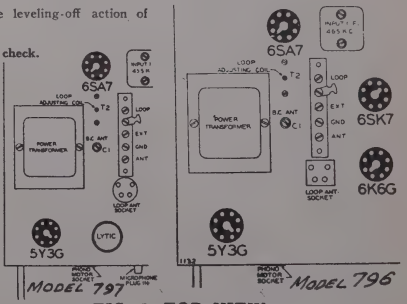


FIG. 5—TOP VIEW

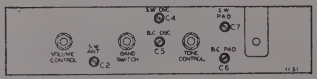
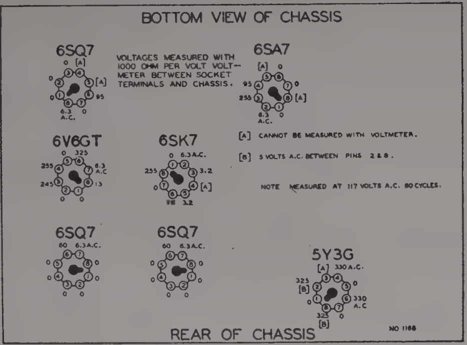


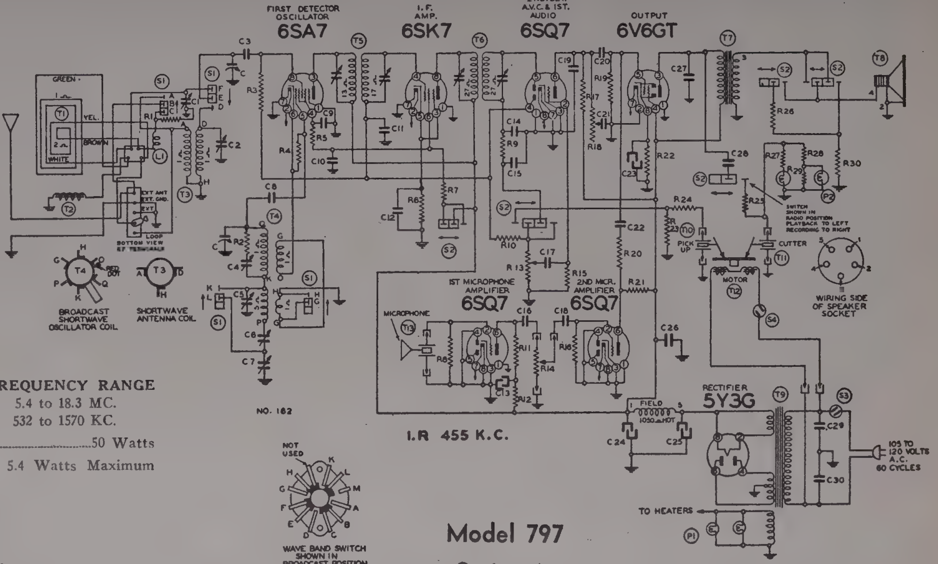
FIG. 4

BELMONT RADIO CORP.

MODEL 797, Series A
Ser. No. OD428100 up


BOTTOM VIEW OF CHASSIS
6SQ7
6SA7
6V6GT
6SK7
6SQ7
6SQ7
5Y3G
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 5 VOLTS A.C. BETWEEN PINS 2 & 8.
NOTE MEASURED AT 117 VOLTS A.C. 60 CYCLES.
REAR OF CHASSIS
NO 1168

MODEL 797


FIRST DETECTOR OSCILLATOR 6SA7
I.F. AMP. 6SK7
2ND. DET. A.V.C. & IST. AUDIO 6SQ7
OUTPUT 6V6GT
IST MICROPHONE AMPLIFIER 6SQ7
2ND MICR. AMPLIFIER 6SQ7
RECTIFIER 5Y3G
MICROPHONE
PICK UP
CUTTER
MOTOR
SWITCH SHOWN IN RADIO POSITION PLAYBACK TO LEFT RECORDING TO RIGHT
WIRING SIDE OF SPEAKER SOCKET
FIELD 1050 Ω HOT
105 TO 120 VOLTS A.C. 60 CYCLES
TO HEATERS
GREEN
YEL.
BROWN
WHITE
BOTTOM VIEW RF TERMINALS
LOOP
EXT ANT
EXT. GND.
BROADCAST SHORTWAVE OSCILLATOR COIL
SHORTWAVE ANTENNA COIL
NO. 182
I.R 455 K.C.
NOT USED
WAVE BAND SWITCH SHOWN IN BROADCAST POSITION [VIEWED FROM REAR]

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.4 to 18.3 MC.
Center Position	Broadcast	532 to 1570 KC.

Power Consumption (Radio Chassis only, less Phono Motor)..........50 Watts
Power Output..........3.6 Watts Undistorted, 5.4 Watts Maximum

Model 797
Series A
(Serial No. OD428100 and up)

FOR TUNER DATA
SEE INDEX

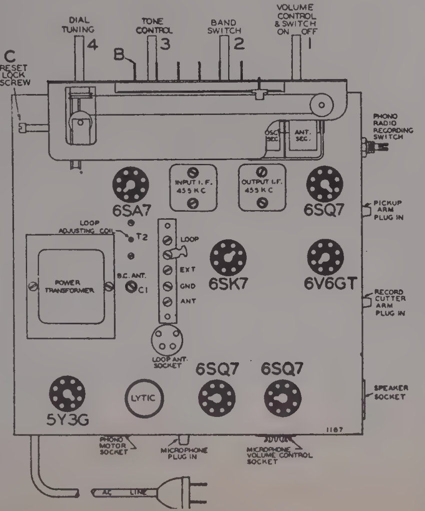


FIG. 3—TOP VIEW

RESISTORS

Circuit Diagram Ref. No.	Part No.	Description
R1	13018	4M ohm—⅓ w.
R2	130197	20 ohm—⅓ w.
R3	1304	3 megohm—⅓ w.
R4	130236	30M ohm—⅓ w.
R5	13092	1M ohm—⅓ w.
R6	13083	300 ohm—⅓ w.
R7	130313	20M ohm—1½ watt
R8	130257	5 megohm—⅓ w.
R9	13012	50M ohm—⅓ w.
R10	1304	3 megohm—⅓ w.
R11	1303	500M ohm—⅓ w.
R12	13012	50M ohm—⅓ w.
R13	101215	1 megohm volume control
R14	101219	1 megohm microphone control
R15	130223	10 megohm—⅓ w.
R16	130223	10 megohm—⅓ w.
R17	13011	250M ohm—⅓ w.
R18	101216	1 megohm tone control
R19	1303	500M ohm—⅓ w.
R20	13020	100M ohm—⅓ w.
R21	1303	500M ohm—⅓ w.
R22	130227	250 ohm—1 watt
R23	13019	1 megohm—⅓ w.
R24	1303	500M ohm—⅓ w.
R25	130194	35M ohm—⅓ w.
R26	130166	150 ohm—⅓ w.
R27	1309	200M ohm—⅓ w.
R28	1309	200M ohm—⅓ w.
R29	1309	200M ohm—⅓ w.
R30	10661	6 ohm—5 watt

CONDENSERS

Circuit Diagram Ref. No.	Part No.	Description
C	102131	2 gang variable condenser
C1	124117	B.C. Antenna Trimmer
C2	124116	S.W. Antenna Trimmer
C3	1292	.0005 mica
C4	124112	S.W. Oscillator Trimmer
C5	124112	B.C. Oscillator Trimmer
C6	124134	B.C. Series Pad
C7	124134	S.W. Series Pad
C8	12991	.00015 mica
C9	10013	.05 x 400 v.
C10	1001	.1 x 400 v.
C11	1009	.05 x 200 v.
C12	1009	.05 x 200 v.
C13	11967	8 mfd. lytic
C14	129161	.0001 mica
C15	129161	.0001 mica
C16	10026	.02 x 400 volts
C17	10071	.004 x 600 v.
C18	10025	.002 x 600 v.
C19	1292	.0005 mica
C20	10013	.05 x 400 v.
C21	10019	.006 x 600 v.
C22	10013	.05 x 400 v.
C23	119110	40 mfd. lytic
C24	119110	20 mfd. lytic
C25	119110	20 mfd. lytic
C26	1001	.1 x 400 v.
C27	10019	.006 x 600 v.
C28	10024	.25 x 400 v.
C29	10061	.02 x 600 v.
C30	10061	.02 x 600 v.

C4 and C5 in same unit—C6 and C7 in same unit
C14 and C15 are in same unit
C23, C24 and C25 are in same unit

PARTS

Circuit Diagram Ref. No.	Part No.	Description
T1	111165E	Loop Antenna Assembly
T2	111153	Loop Adjustable Coil
T3	111163	S.W. Antenna Coil
T4	110150	B.C. & S.W. Oscillator Coil
T5	108162B	Input I.F. Coil—455 kc.
T6	108132D	Output I.F. Coil—455 kc.
T7	105109	Output Transformer
T8	114195	10" Dynamic Speaker
T9	104209	Power Transformer
T10	104210	Pickup arm
T11	104210	Record cutter arm
T12	104210	Phono Motor
T13	114196	Microphone Complete
L1	1239	R.F. Choke coil
S1	125114	Wave Band Switch
S2	125115	Radio Recording Switch
S3		On-off switch on Volume Control
S4		Phono Motor Switch
P1	10794	(2) Pilot light bulbs T44
P2	107326	(2) Neon Light Bulbs Type (T2)

MODEL 797, Series A
Ser. No. 0D428100 up

BELMONT RADIO CORP.

THE RECORDER AND PHONOGRAPH

Model 797 Series A

Unpack the microphone and plug it into the chassis. The microphone socket is shown in Fig. 3.

Insert a playback needle in the phone playback arm.

Insert a special cutting stylus (needle) in the cutter arm as shown in Fig. 2. Handle this needle with care.

Be sure the needle is tight after each recording. Should it loosen during the recording, it will chatter and ruin your record.

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the console until the machine is reasonably level.

HOWLING:

If the microphone is held too close to the loud speaker, it will feed back and start a loud "howl". Keep the microphone well away from the recording cabinet with its back toward the cabinet.

If the recording switch is in radio position and the microphone volume control is turned on, feedback will occur and a very loud howl will start. Be sure to turn the microphone volume control to zero when playing radio.

SHAVINGS:

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

Just before lowering the cutting arm on the record, hold one finger on the center of the record for a moment. This will create a static charge that will pull the shavings toward the center pin.

While cutting, gently brush the shavings from the left side of the record in, toward the center pin, allowing them to collect there until the recording is completed.

CUTTING ARM ADJUSTMENTS:

The cutting arm is adjusted at the factory for proper operation, however,, with various types of blanks this adjustment may sometimes have to be altered. With a blank record on the table, the height adjustment shown in Fig. 2. should be adjusted so that the bottom of the cutting arm is ¼" from the top of the record blank. Make this measurement carefully at the front end beside the stylus screw.

The screw adjustment can be turned to raise or lower the arm.

Several blank grooves should now be cut to see if the groove is the proper depth. The depth adjustment screw shown in Fig. 2 will increase the depth of the groove if turned to the right and will decrease the groove if turned to the left.

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

A properly cut groove will leave a shaving just a little heavier than a human hair.

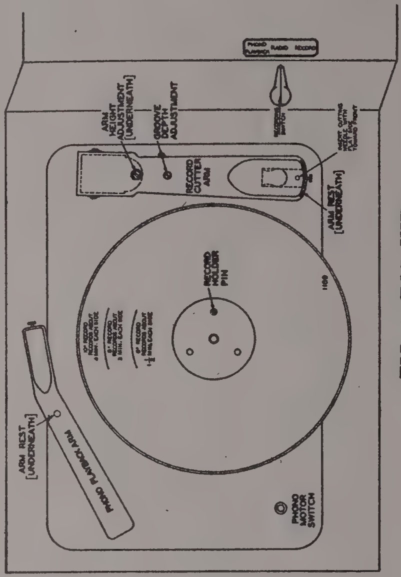
RECORDING RADIO PROGRAMS:

Turn the radio on and tune in the pogram you wish to record. Turn microphone volume control to zero (left). Put recording switch in record position. The volume will drop. Start motor and then gently lower cutting needle onto blank record, about ¼" from outer edge.

OPERATING THE PHONOGRAPH:

Turn microphone volume control left, to zero. Turn recording switch to Phono Playback position.

Put your record on turntable and start motor. Place playback arm on record and contol tone and volume with radio volume and tone control knobs.



ARM HEIGHT ADJUSTMENT [UNDERNEATH]
GROOVE DEPTH ADJUSTMENT
PHONO PLAYBACK RADIO RECORD
RECORD CUTTER ARM
INSERT CUTTING NEEDLE WITH FLAT SIDE TOWARD FRONT
ARM REST [UNDERNEATH]
RECORD HOLDER PIN
10" RECORD RECORDS ABOUT 4 MIN. EACH SIDE
8" RECORD RECORDS ABOUT 3 MIN. EACH SIDE
6" RECORD RECORDS ABOUT 1½ MIN. EACH SIDE
ARM REST [UNDERNEATH]
PHONO PLAYBACK ARM
PHONO MOTOR SWITCH

FIG. 2—TOP VIEW

RECORDING VOICE:

Turn the radio volume control to zero volume but do not turn the radio completely off. Turn microphone volume control to the right, full on. Recording switch should be in record position. Talk into the microphone. Watch the lights and, if volume is too great, reduce it by turning microphone volume control to the left. Start motor, and set cutting needle gently on start of record.

RECORDING VOICE WITH RADIO MUSIC BACKGROUND:

Proceed the same as for recording voice, after having first tuned in the radio music you want as a background.

By tuning the radio volume control up or down you can make the radio background music as loud or soft as you wish.

VOLUME OVERLOAD LIGHTS:

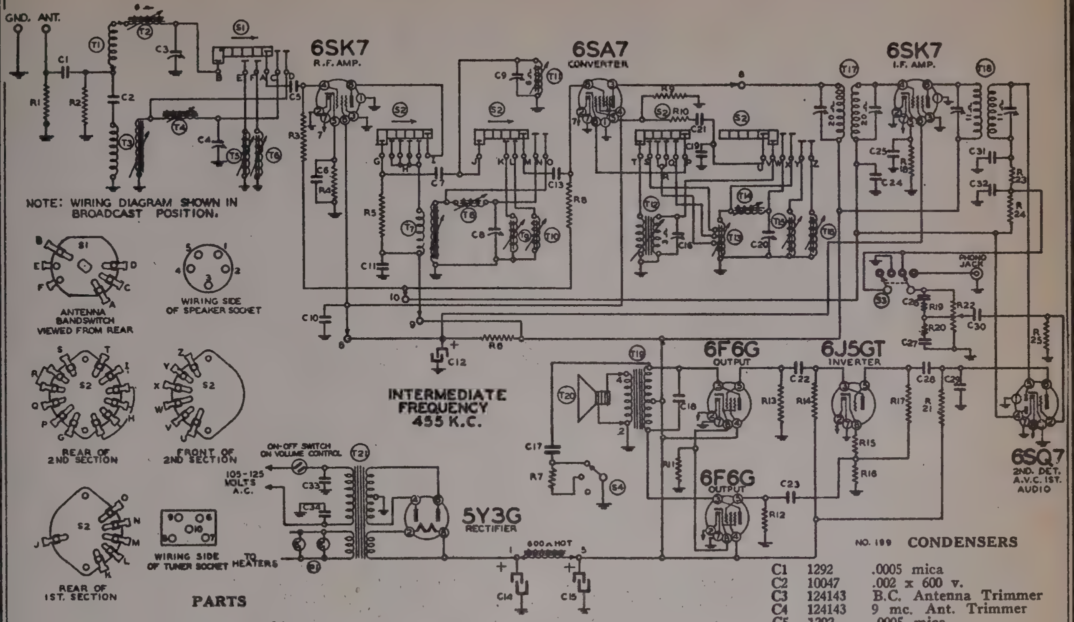
There are two small lights set into the dial marked "Normal Level" and "Overload Level".

If you do not use enough volume on either radio or voice for a satisfactory recording, both lights will remain out. If you use too much volume, both lights will glow.

Before cutting a record, speak into the microphone and set the microphone volume control so that the "Normal Level" light is on and the "Overload Level" is out. This is the proper recording level for all types of recordings.

BELMONT RADIO CORP.

MODEL 800


GND. ANT.
6SK7 R.F. AMP.
6SA7 CONVERTER
6SK7 I.F. AMP.
NOTE: WIRING DIAGRAM SHOWN IN BROADCAST POSITION.
ANTENNA BANDSWITCH VIEWED FROM REAR
WIRING SIDE OF SPEAKER SOCKET
REAR OF 2ND SECTION
FRONT OF 2ND SECTION
REAR OF 1ST. SECTION
WIRING SIDE OF TUNER SOCKET
INTERMEDIATE FREQUENCY 455 K.C.
6F6G OUTPUT
6J5GT INVERTER
6F6G OUTPUT
6SQ7 2ND. DET. A.V.C. 1ST. AUDIO
5Y3G RECTIFIER
ON-OFF SWITCH ON VOLUME CONTROL
105-125 VOLTS A.C.
TO HEATERS
600 Ω HOT
PHONO JACK

NO. 199

PARTS

T1	111206	Loop antenna assembly
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Oscillator Coil
T13	110157	9 mc. Oscillator Coil
T14	110156	6 mc. Oscillator Coil
T15	110158	12 mc. Oscillator Coil
T16	110159	15 mc. Oscillator Coil
T17	108177	Input I.F. Coil—455 kc.
T18	108176	Output I.F. Coil—455 kc.
T19	105111	Output Transformer
T20	114221	12" Dynamic Speaker
T21	104202B	Power Transformer—For 50-60 Cycle
or	104203B	Power Transformer—For 25 Cycle
S1	125118	Antenna Bandswitch
S2	125117	R.F. & Osc. Bandswitch
S3	125129	Radio-Phono Switch
S4	125130	Tone Control Switch
P1	10794	(2) 6-8 Volt Pilot Lights—T44

Code No.	Part No.	RESISTORS
R1	1301	25M ohm—1/3 w.
R2	1301	25M ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130239	250 ohm—1/3 w.
R5	130218	5M ohm—1/3 w.
R6	10662	12,500 ohm—3 w.
R7	13064	3500 ohm—1/3 w.
R8	13019	1 megohm—1/3 w.
R9	130232	25M ohm—1/3 w.
R10	130174	50 ohm—1/3 w.
R11	130220	300 ohm—1 w.
R12	1303	500M ohm—1/3 w.
R13	1303	500M ohm—1/3 w.
R14	130103	100M ohm—1/3 w.
R15	130218	5M ohm—1/3 w.
R16	130103	100M ohm—1/3 w.
R17	13019	1 megohm—1/3 w.
R18	13070	500 ohm—1/3 w.
R19	13011	250M ohm—1/3 w.
R20	130149	15M ohm—1/3 w.
R21	13011	250M ohm—1/3 w.
R22	101233	Volume Control & On-off switch
R23	13012	50M ohm—1/3 w.
R24	1304	3 megohm—1/3 w.
R25	130257	5 megohm—1/3 w.

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. Ant. Trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 mfd. x 350 w.v. lytic
C13	1292	.0005 mica
C14	119109	15.0 mfd. x 450 w.v. lytic
C15	119109	15.0 mfd. x 450 w.v. lytic
C16	124144	B.C. Oscillator Trimmer
C17	10013	.05 x 400 v.
C18	10071	.004 x 600 v.
C19	129167	.0002 silver mica
C20	124145	9 mc. Oscillator Trimmer
C21	12938	.00005 mica
C22	10013	.05 x 400 v.
C23	1009	.05 x 200 v.
C24	10026	.02 x 400 v.
C25	10020	.1 x 200 v.
C26	129114	.0003 mica
C27	100122	.03 x 200 v.
C28	10026	.02 x 400 v.
C29	12921	.0002 mica
C30	10019	.006 x 600 v.
C31	129165	.00005 mica
C32	129165	.00005 mica
C33	10061	.02 x 600 v.
C34	10061	.02 x 600 v.

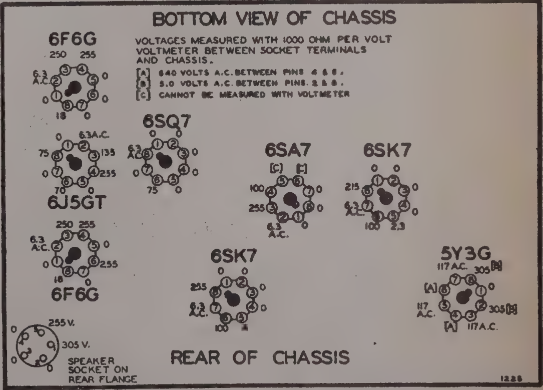
C12 and C14 and C15 in same unit
C31 and C32 in same unit

Setting the Pushbuttons

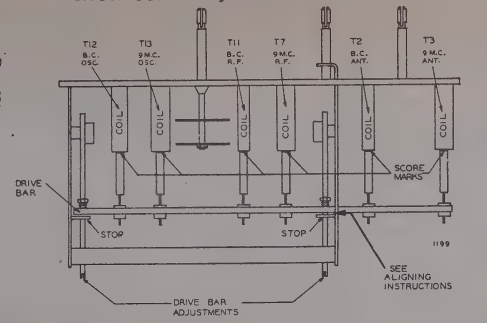
Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton. (Except the two end ones).

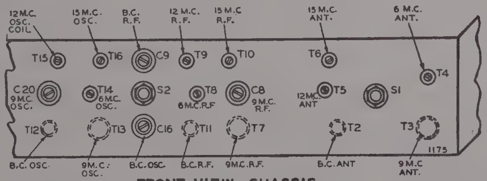
Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

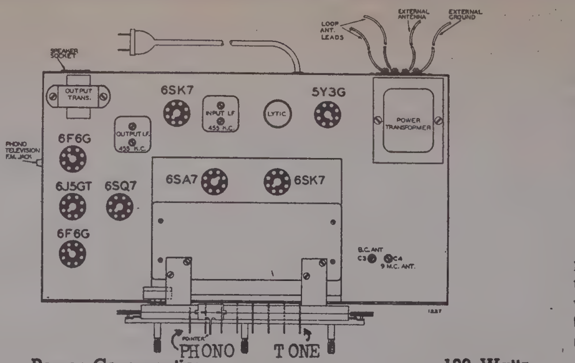

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] 640 VOLTS A.C. BETWEEN PINS 4 & 6.
[B] 5.0 VOLTS A.C. BETWEEN PINS 2 & 8.
[C] CANNOT BE MEASURED WITH VOLTMETER
6F6G
250
255
6.3 A.C.
18
6SQ7
6J5GT
75
135
255
70
6.3 A.C.
6SA7
[C]
100
255
6SK7
215
100
2.3
6F6G
250
255
6SK7
255
6.3 A.C.
5Y3G
117 A.C.
305 [B]
[A]
117 A.C.
255 V.
305 V.
SPEAKER SOCKET ON REAR FLANGE
REAR OF CHASSIS
1228

IRON CORE ADJUSTMENT VIEW





FRONT VIEW CHASSIS



Power Consumption - - - - - - 100 Watts
Power Output - - - - 5 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range
Broadcast Band - 540 to 1600 KC
49M Band - - - 5.9 to 6.1 MC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
Intermediate Frequency 455 KC
Speaker 12 in. Electro Dynamic

Phonograph-Television and Fm. Jack

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view—The radio-phono button on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phono or a television or FM converter.

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a guage). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

BELMONT RADIO CORP.

MODEL 794, Series A
Ser. No. 0A297000 up

Power Consumption ....55 Watts
Power Output........................3 Watts Undistorted, 3.6 Watts Maximum

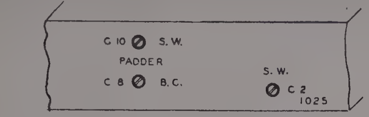
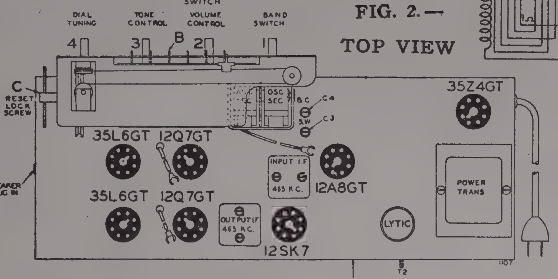
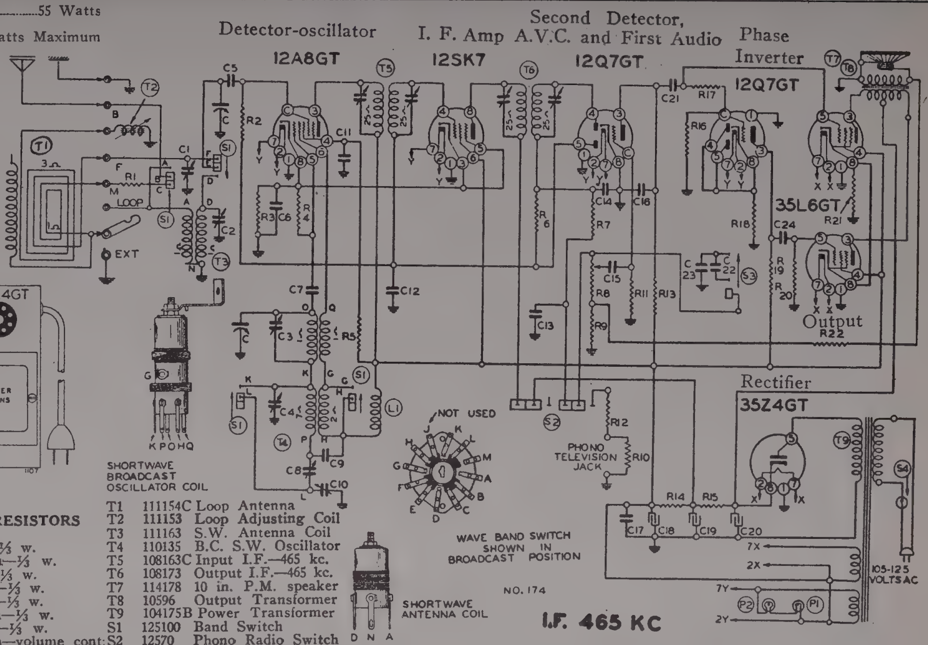


FIG. 4.—FRONT OF CHASSIS

FIG. 2.—
TOP VIEW





SHORTWAVE
BROADCAST
OSCILLATOR COIL

C	102128	2 gang variable condenser
C1	124117	B.C. Adj. Trimmer (Antenna)
C2	124116	S.W. Adj. Trimmer (Antenna)
C3	124112	S.W. Adj. Trimmer (Oscillator)
C4	124112	B.C. Adj. Trimmer (Oscillator)
C5	1292	.0005 mica
C6	100104	.5 x 100 v.
C7	12939	.00005 mica
C8	124113	B.C. Series pad
C9	1009	.05 x 200 v.
C10	124113	S.W. Series pad
C11	10020	.1 x 200 v.
C12	1009	.05 x 200 v.
C13	1295	.0001 mica
C14	1295	.0001 mica
C15	10025	.002 x 600 v.
C16	1292	.0005 mica
C17	10020	.1 x 200 v.
C18	119101	20 mfd. lytic
C19	119101	20 mfd. lytic
C20	119101	40 mfd. lytic
C21	10026	.02 x 400 v.
C22	1298	.0006 mica
C23	100112	.001 x 200 v.
C24	10026	.02 x 400 v.

C3 and C4 in same unit
C8 and C10 in same unit
C18, C19, C20 in same unit

FOR
TUNER
&
ALIGNMENT
DATA,
SEE INDEX

RESISTORS

R1	13079	400 ohm—⅓ w.
R2	13019	1 megohm—⅓ w.
R3	130168	100 ohm—⅓ w.
R4	13012	50M ohm—⅓ w.
R5	130149	15M ohm—⅓ w.
R6	130170	3 megohm—⅓ w.
R7	13012	50M ohm—⅓ w.
R8	101195	1 megohm—volume cont:
R9	130276	10 ohm—⅓ w.
R10	1305	300M ohm—⅓ w.
R11	130257	5 megohm—⅓ w.
R12	1304	3 megohm—⅓ w.
R13	1309	200M ohm—⅓ w.
R14	130294	1200 ohm—½ w.
R15	130294	1200 ohm ½ w.
R16	130236	30M ohm—⅓ w.
R17	130102	500M ohm—⅓ w.
R18	13022	5M ohm—⅓ w.
R19	1309	200M ohm—⅓ w.
R20	130102	500M ohm—⅓ w.
R21	130296	200 ohm—1 w.
R22	130168	100 ohm—⅓ w.

T1	111154C	Loop Antenna
T2	111153	Loop Adjusting Coil
T3	111163	S.W. Antenna Coil
T4	110135	B.C. S.W. Oscillator
T5	108163C	Input I.F.—465 kc.
T6	108173	Output I.F.—465 kc.
T7	114178	10 in. P.M. speaker
T8	10596	Output Transformer
T9	104175B	Power Transformer
S1	125100	Band Switch
S2	12570	Phono Radio Switch
S3	12599	Tone Switch
S4		Off-on Switch on volume control
L1	1233	R.F. Choke
P1 & 2	10794	6-8 v. pilot light

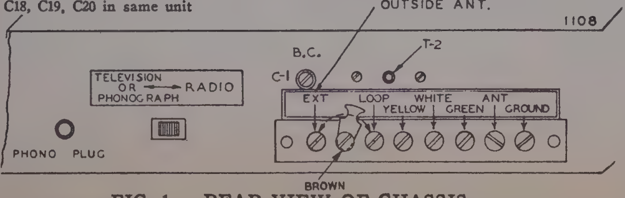


FIG. 1.— REAR VIEW OF CHASSIS

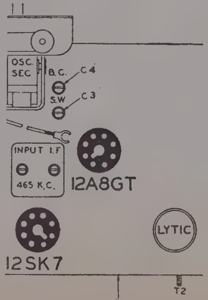
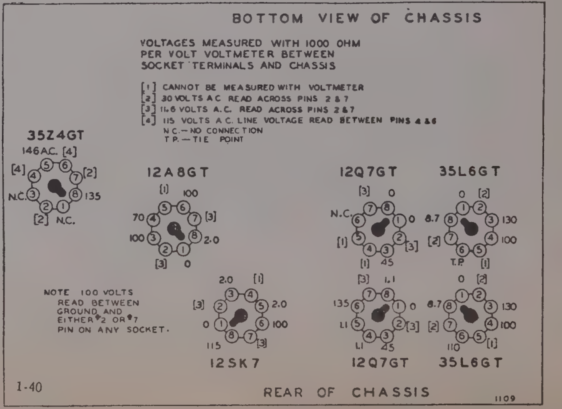


FIG. 5.—TOP VIEW



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM
PER VOLT VOLTMETER BETWEEN
SOCKET TERMINALS AND CHASSIS

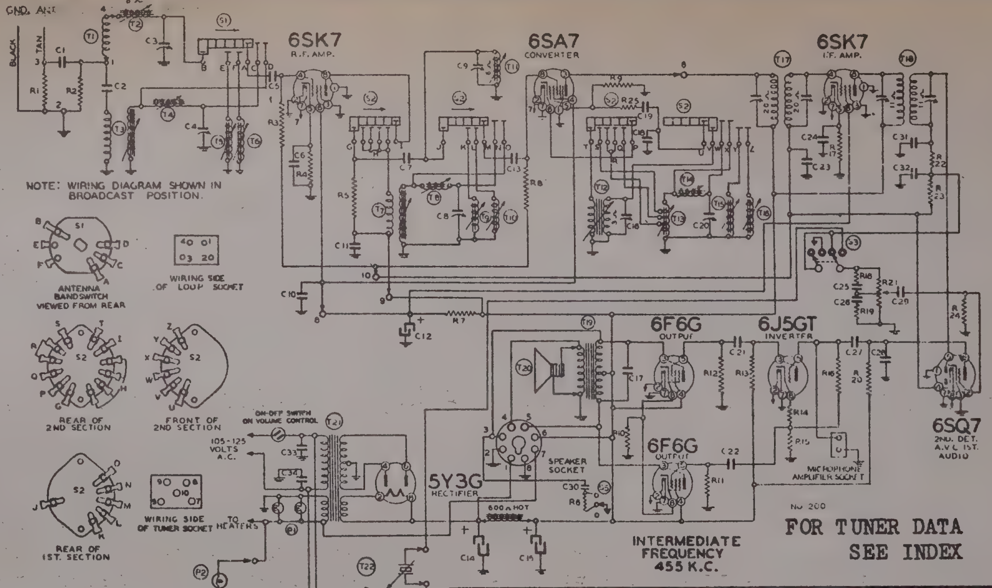
[1] CANNOT BE MEASURED WITH VOLTMETER
[2] 30 VOLTS A C READ ACROSS PINS 2 & 7
[3] 11.6 VOLTS A.C. READ ACROSS PINS 2 & 7
[4] 115 VOLTS A C. LINE VOLTAGE READ BETWEEN PINS 4 & 6
N C.—NO CONNECTION
T P.—TIE POINT

NOTE 100 VOLTS
READ BETWEEN
GROUND AND
EITHER #2 OR #7
PIN ON ANY SOCKET.

MODEL 801

BELMONT RADIO CORP.

Radio Set Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	1301	25M ohm—⅓ w.
R2	1301	25M ohm—⅓ w.
R3	13019	1 megohm—⅓ w.
R4	130239	250 ohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	13064	3500 ohm—⅓ w.
R7	10662	12,500 ohm—3 watts
R8	13019	1 megohm—⅓ w.
R9	130232	25M ohm—⅓ w.
R10	130220	300 ohm—1 watt
R11	1303	500M ohm—⅓ w.
R12	1303	500M ohm—⅓ w.
R13	130103	100M ohm—⅓ w.
R14	130218	5M ohm—⅓ w.
R15	130103	100M ohm—⅓ w.
R16	13019	1 megohm—⅓ w.
R17	13070	500 ohm—⅓ w.
R18	13011	250M ohm—⅓ w.
R19	130149	15M ohm—⅓ w.
R20	13011	250M ohm—⅓ w.
R21	101233	½ megohm volume control and on-off switch
R22	13012	50M ohm—⅓ w.
R23	1304	3 megohm—⅓ w.
R24	130257	5 megohm—⅓ w.
R25	130174	50 ohm—⅓ w.
		CONDENSERS
C1	1292	.0005 mica
C2	10047	.002 x 600 v. -10%
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 x 350 w.v.
C13	1292	.0005 mica
C14	119109	15.0 x 450 w.v.
C15	119109	15.0 x 450 w.v.
C16	124144	B.C. Oscillator trimmer
C17	10071	.004 x 600 v.
C18	129167	.0002 silver mica
C19	12938	.00005 mica
C20	124145	9 mc. osc. trimmer
C21	10013	.05 x 400 v.
C22	1009	.05 x 200 v.
C23	10026	.02 x 400 v.
C24	10020	.1 x 200 v.
C25	129114	.0003 mica
C26	100122	.03 x 200 v.
C27	10026	.02 x 400 v.
C28	12921	.0002 mica
C29	10019	.006 x 600 v.
C30	10013	.05 x 400 v.
C31	129165	.00005 mica
C32	129165	.00005 mica
C33	10061	.02 x 600 v. bakelite
C34	10061	.02 x 600 v. bakelite
		C12, C14 and C15 in same unit
		C31 and C32 in same unit
T1	111209	Loop antenna assembly
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Osc. Coil
T13	110157	9 mc. Osc. Coil
T14	110156	6 mc. Osc. Coil
T15	110158	12 mc. Osc. Coil
T16	110159	15 mc. Osc. Coil
T17	108177	Input I.F. Coil—455 kc.
T18	108176	Output I.F. Coil—455 kc.
T19	105111	Output Transformer
T20	114217	12 in. speaker—dynamic
T21	104202B	Power Transformer—50-60 cycle
	104203B	Power Transformer—25 cycle
T22	104234	Automatic Record Changer—Complete Seeburg 60 cycle
	104232	Automatic Record Changer—Complete Seeburg 25 cycle
	104233	Automatic Record Changer—Complete Seeburg 50 cycle
S1	125118	Antenna Bandswitch
S2	125117	R.F. & Osc. Bandswitch
S3	125129	Radio-phono switch
S4		Switch on record changer
S5	125130	Tone control switch
P1	10794	(2) 6-8 Volt Pilot Lights T44
P2	10794	Indicator Light T44

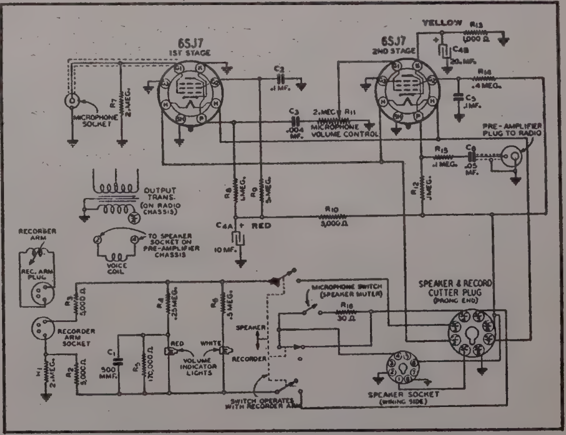


GND. ANT
BLACK
TAN
6SK7 R.F. AMP.
6SA7 CONVERTER
6SK7 I.F. AMP.
6SQ7 2ND. DET. A.V.C. 1ST. AUDIO
6F6G OUTPUT
6J5GT INVERTER
6F6G OUTPUT
5Y3G RECTIFIER
SPEAKER SOCKET
MICROPHONE AMPLIFIER SOCKET
NOTE: WIRING DIAGRAM SHOWN IN BROADCAST POSITION.
ANTENNA BANDSWITCH VIEWED FROM REAR
WIRING SIDE OF LOOP SOCKET
REAR OF 2ND SECTION
FRONT OF 2ND SECTION
REAR OF 1ST. SECTION
WIRING SIDE OF TUNER SOCKET
ON-OFF SWITCH ON VOLUME CONTROL
105-125 VOLTS A.C.
TO HEATERS
600 Ω HOT
No 200

INTERMEDIATE FREQUENCY 455 K.C.

FOR TUNER DATA SEE INDEX

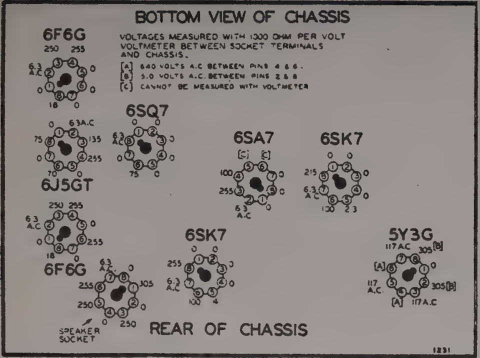
Aug. 1940

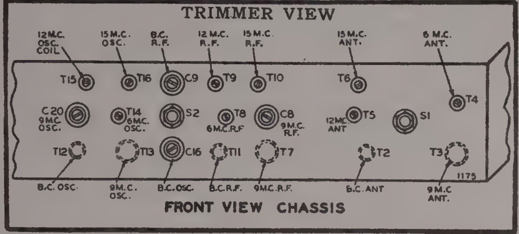


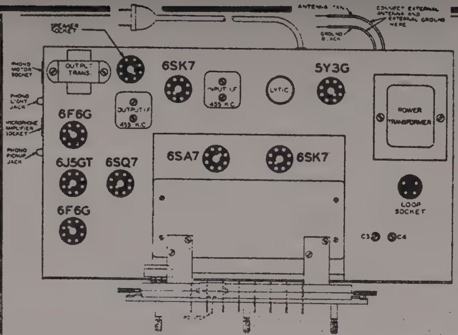
6SJ7 1ST STAGE
6SJ7 2ND STAGE
MICROPHONE SOCKET
YELLOW
MICROPHONE VOLUME CONTROL
PRE-AMPLIFIER PLUG TO RADIO
OUTPUT TRANS. (ON RADIO CHASSIS)
TO SPEAKER SOCKET ON PRE-AMPLIFIER CHASSIS
VOICE COIL
RECORDER ARM
REC. ARM PLUG
RECORDER ARM SOCKET
RED
WHITE
VOLUME INDICATOR LIGHTS
MICROPHONE SWITCH (SPEAKER MUTER)
SPEAKER
RECORDER
SWITCH OPERATES WITH RECORDER ARM
SPEAKER & RECORD CUTTER PLUG (PRONG END)
SPEAKER SOCKET (WIRING SIDE)

CIRCUIT DIAGRAM OF MICROPHONE AMPLIFIER

BELMONT RADIO CORP.


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] 640 VOLTS A.C BETWEEN PINS 4 & 6.
[B] 5.0 VOLTS A.C. BETWEEN PINS 2 & 8
[C] CANNOT BE MEASURED WITH VOLTMETER
6F6G
6SQ7
6J5GT
6SA7
6SK7
6F6G
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS
1231

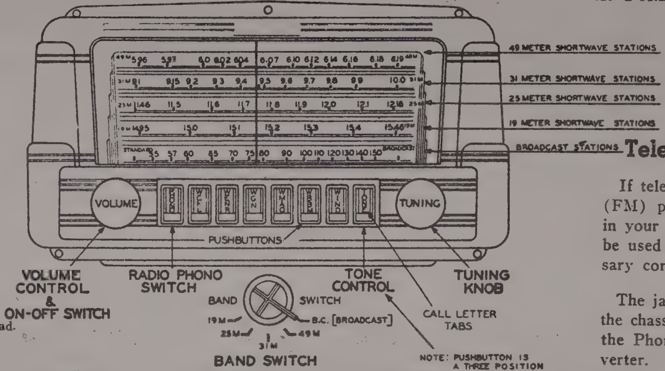




Power Consumption, Radio only	100 Watts
Power Output	5 Watts Undistorted
Sensitivity for 500 Milliwatt Output:	10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC	
Tuning Frequency Range Broadcast Band	540 to 1600 KC
49M Band	5.9 to 6.1 MC
31M Band	9.1 to 10 MC
25M Band	11.4 to 12.1 MC
19M Band	14.9 to 15.4 MC
Intermediate Frequency	455 KC
Speaker	12 in. Electro Dynamic

FOR TUNER DATA, SEE INDEX

FOR IRON-CORE
ADJUSTMENT DATA
(SW BAND SPREAD)
SEE INDEX


49 METER SHORTWAVE STATIONS
31 METER SHORTWAVE STATIONS
25 METER SHORTWAVE STATIONS
19 METER SHORTWAVE STATIONS
BROADCAST STATIONS
VOLUME
TUNING
PUSHBUTTONS
VOLUME CONTROL & ON-OFF SWITCH
RADIO PHONO SWITCH
TONE CONTROL
TUNING KNOB
CALL LETTER TABS
BAND SWITCH
BAND
19M
25M
31M
49M
B.C. [BROADCAST]
BAND SWITCH
NOTE: PUSHBUTTON IS A THREE POSITION TONE CONTROL.

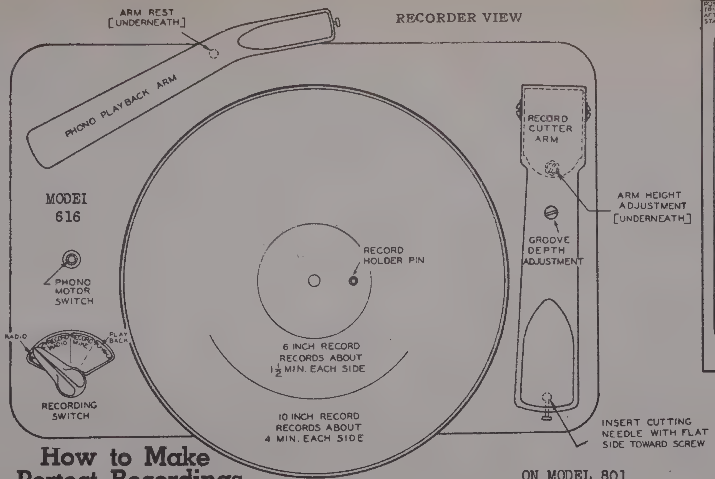
Television and Fm. Jack

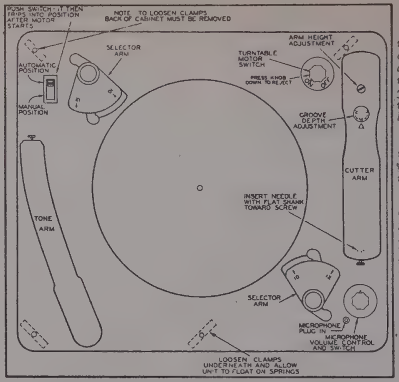
If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-pickup jack in the chassis view will accommodate either the Phono or a television or FM converter.

- Dummy antennas—.1 mf., 200 mmf., and 400 ohms
- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output




PUSH SWITCH - IT THEN TRIPS INTO POSITION AFTER MOTOR STARTS
NOTE TO LOOSEN CLAMPS BACK OF CABINET MUST BE REMOVED
SELECTOR ARM
AUTOMATIC POSITION
MANUAL POSITION
ARM HEIGHT ADJUSTMENT
TURNTABLE MOTOR SWITCH
PRESS KNOB DOWN TO REJECT
GROOVE DEPTH ADJUSTMENT
CUTTER ARM
TONE ARM
INSERT NEEDLE WITH FLAT SHANK TOWARD SCREW
SELECTOR ARM
10
12
MICROPHONE PLUG IN
MICROPHONE VOLUME CONTROL AND SWITCH
LOOSEN CLAMPS UNDERNEATH AND ALLOW UNIT TO FLOAT ON SPRINGS

MODEL 801

NOTE—Some radios of this model are equipped with a recording arm on the record changer with which you can make your own records. If your radio has the recording unit follow the instructions below for making records.

The Mike volume control must be turned off (all the way left) except when recording with the microphone.

The two volume indicator lights along side the microphone volume control are used for setting the proper recording level. When recording radio programs the radio volume control should be adjusted so that the red indicator light remains off while the white continues to flicker. When recording with the microphone the lights should be adjusted in the same manner but using the microphone volume control.

How to Make Perfect Recordings

The microphone must be connected to the chassis at all times.

Insert a playback needle in the playback arm.

Insert a special cutting stylus (needle) in the cutter arm. Handle this needle with care.

Be sure the needle is tight after each recording. Should it loosen during the recording, it will chatter and ruin your record.

Cutting Needle

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the cabinet until the machine is reasonably level.

Shavings

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

While cutting, gently brush the shavings from the left side of the record in, toward the center pin, allowing them to collect there until the recording is completed.

Do Not Use Too Much Volume

The most frequent cause of poor recordings is too much volume or overloading. If some passages of your recording are smooth and clear while others are raspy, rough and distorted, you are probably using too much volume. Overloading occurs most often on strong passages. The remedy is to reduce the volume slightly and watch the volume indicator lights—and study the different effects of microphone technique.

Too little volume will show up when you play the record back. The volume control on playbacks will have to be turned up quite high and needle scratch will be excessive.

Cutting Arm Adjustments

The cutting arm is adjusted at the factory for proper operation, however, with various types of blanks this adjustment may sometimes have to be altered.

ON MODEL 801

With a blank record on the table, the height adjustment on the cutter arm should be adjusted so that the needle screw is centered in the slot when the needle rests on a blank record.

on Model 616

With a blank record on the table, the height adjustment under the cutter arm should be adjusted so that the bottom of the cutting arm is ¼" from the top of the record blank. Make this measurement carefully at the front end beside the stylus screw.

The screw adjustment can be turned to raise or lower the arm.

Several blank grooves should now be cut to see if the groove is the proper depth.

on Model 616

The depth adjustment screw on the cutter arm will increase the depth of the groove if turned to the right and will decrease the groove if turned to the left.

on Model 801

The depth adjustment screw on the cutter arm will increase the depth of the groove if turned to the letter "H" and will decrease the groove if turned to the letter "L"—For a medium groove turn to "M".

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

A properly cut groove will leave a shaving just a little heavier than a human hair.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

Recording Radio Programs MODEL 616

Turn the radio on and tune in the program you wish to record. Put recording switch in "Record Radio" position. The volume will drop. Start motor and then gently lower cutting needle onto blank record, about ¼" from outer edge.

Recording Radio Programs MODEL 801

Turn the radio on and tune in the program you wish to record. Put manual switch in manual position. Start motor and then gently lower cutting needle onto blank record. about ¼" from outer edge. Radio Volume will drop—Adjust volume control so red volume indicator light is off and white indicator light continues to flicker.

Recording Voice MODEL 616

Turn the radio volume control nearly full on. Recording switch should be in Record "Mike" position. Start motor, and set cutting needle gently on start of record. Turn mike switch on and talk.

Microphone Recording MODEL 801

Turn the mike volume control well up. Phono pushbutton should be in "Phono" position. Put manual switch in manual position. Start motor, and set cutting needle gently on start of record. Adjust volume indicator lights the same as in recording radio programs.

NOTE: The cutting arm must be raised about three inches to move it freely across the record.

Operating the Phonograph

Turn radio on. Put phono switch in "Phono" position. **on 801**

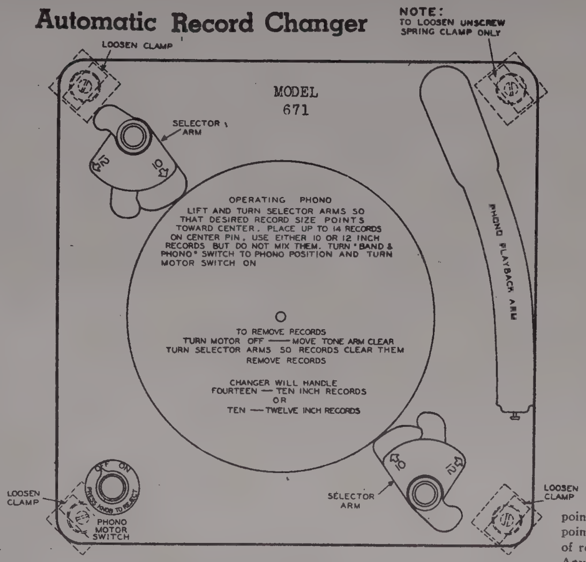
Turn recording switch to Playback position. **on 616**

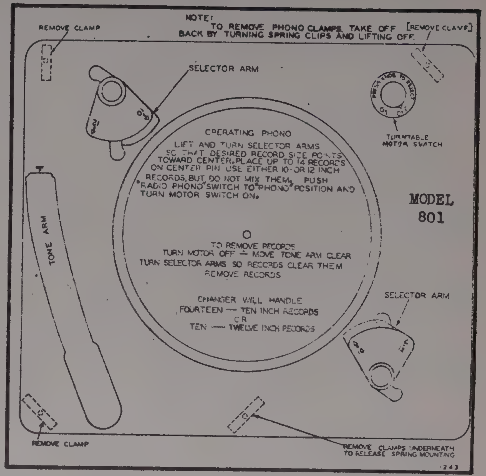
Push manual switch toward manual side to play home recordings. **on 801**

Put your record on turntable and start motor. Place playback arm on record and control tone and volume with the radio volume and tone control knobs.

Be sure mike control is turned off when playing records.

Automatic Record Changer


NOTE:
TO LOOSEN UNSCREW SPRING CLAMP ONLY
LOOSEN CLAMP
MODEL 671
SELECTOR ARM
12
10
PHONO PLAYBACK ARM
OPERATING PHONO
LIFT AND TURN SELECTOR ARMS SO THAT DESIRED RECORD SIZE POINTS TOWARD CENTER. PLACE UP TO 14 RECORDS ON CENTER PIN. USE EITHER 10 OR 12 INCH RECORDS BUT DO NOT MIX THEM. TURN "BAND & PHONO" SWITCH TO PHONO POSITION AND TURN MOTOR SWITCH ON
TO REMOVE RECORDS
TURN MOTOR OFF —— MOVE TONE ARM CLEAR
TURN SELECTOR ARMS SO RECORDS CLEAR THEM
REMOVE RECORDS
CHANGER WILL HANDLE
FOURTEEN — TEN INCH RECORDS
OR
TEN — TWELVE INCH RECORDS
OFF ON
PRESS KNOB TO REJECT
PHONO MOTOR SWITCH
LOOSEN CLAMP
SELECTOR ARM
LOOSEN CLAMP


NOTE:
TO REMOVE PHONO CLAMPS TAKE OFF BACK BY TURNING SPRING CLIPS AND LIFTING OFF
[REMOVE CLAMP]
REMOVE CLAMP
SELECTOR ARM
TURNTABLE MOTOR SWITCH
OPERATING PHONO
LIFT AND TURN SELECTOR ARMS SO THAT DESIRED RECORD SIZE POINTS TOWARD CENTER. PLACE UP TO 14 RECORDS ON CENTER PIN. USE EITHER 10 OR 12 INCH RECORDS, BUT DO NOT MIX THEM. PUSH "RADIO PHONO" SWITCH TO "PHONO" POSITION AND TURN MOTOR SWITCH ON.
MODEL 801
TONE ARM
TO REMOVE RECORDS
TURN MOTOR OFF — MOVE TONE ARM CLEAR
TURN SELECTOR ARMS SO RECORDS CLEAR THEM
REMOVE RECORDS
CHANGER WILL HANDLE
FOURTEEN — TEN INCH RECORDS
OR
TEN — TWELVE INCH RECORDS
SELECTOR ARM
REMOVE CLAMP
REMOVE CLAMPS UNDERNEATH TO RELEASE SPRING MOUNTING
243

Setting for Size of Record

The Changer plays up to fourteen 10" or ten 12" records at one loading. **All records must be the same size for each loading.**

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Loading

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

Starting the Changer

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph-radio knob, to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

How to Reject a Record

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

Playing Individual Records

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading", and set the machine in operation by means of the switch knob described under "Starting the Changer." In other words, play an individual record in the same manner as you would play a stack of that size.

Unloading

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

Turning Off Changer

Throw Changer switch knob to "OFF" position.

Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

If Changer is Left Running

No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

Phonograph Needles

Various types and kinds of needles are available for use in phonograph tone arms. All have their virtues, as well as their faults, **for use in ordinary** phonographs, where needles can be changed after each record. For playing ten or more records at one set-up, as with this Changer, no attempt should be made to use ordinary **steel** or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the tone arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so that the records are not damaged and the quality of the music is not impaired.

In general there are two types of needles which can be satisfactorily used on an Automatic Record Changer: those which require changing after approximately 12 records, and the so-called permanent type needles which are rated in terms of "hours of service." In no case should the manufacturers' claims for these needles be exceeded, since in all probability the needles are rated in terms of their maximum life. If at any time short of the rated life, particularly in the case of the semi-permanent type needles, there is any reason to suspect that the needle has become unduly worn, it would probably be advisable to replace it with a new one. **Never under any conditions should a needle be removed from the tone arm head and then replaced—needle manufacturers' claims notwithstanding.**

For convenience, the tone arm on your changer may be raised to a nearly vertical position, so that the needle may be easily inserted; the needle screw should be tightened firmly.

Radio-Phono Pushbutton Switch MODEL 801

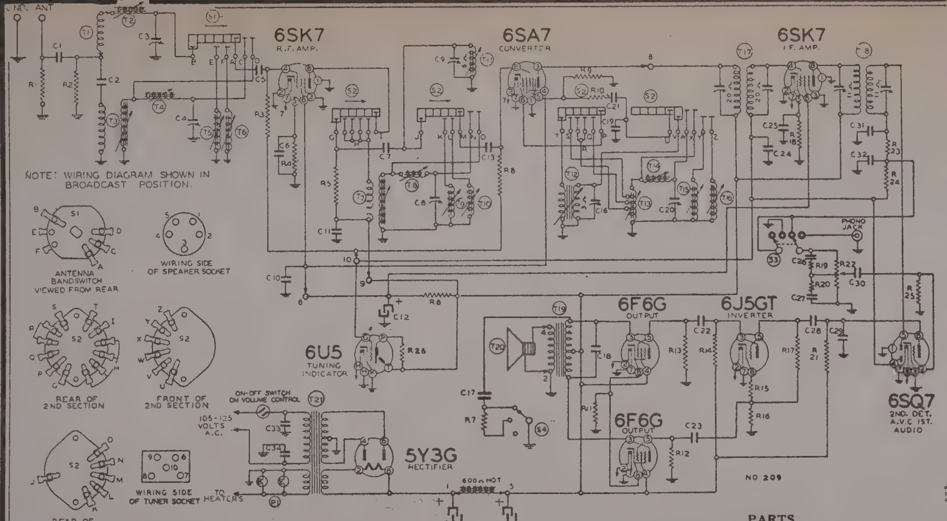
This pushbutton switches from the radio to the phono position. It should be level with the other buttons for radio operation—or pulled out to use the phonograph.

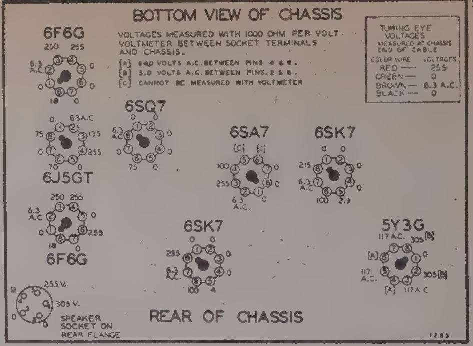
The volume and tone controls also operate when playing records.

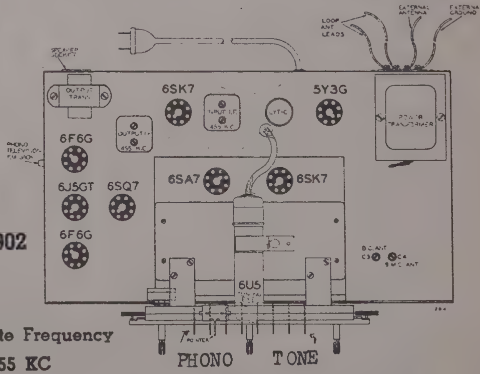
Pushbutton Tone Control

This button has three tone positions Bass—Medium—Treble. Each time you push the button it will change the tone to one of these positions—Change it any time to the tone you like best.

BELMONT RADIO CORP.



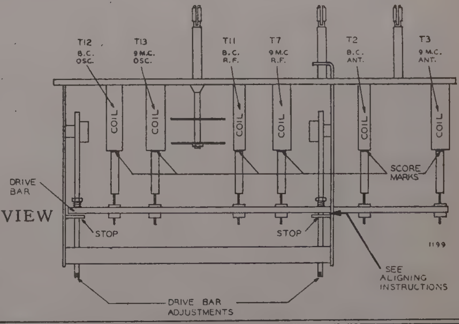

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] 640 VOLTS A.C. BETWEEN PINS 4 & 6.
[B] 5.0 VOLTS A.C. BETWEEN PINS. 2 & 8.
[C] CANNOT BE MEASURED WITH VOLTMETER
TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE
COLOR WIRE — VOLTAGES
RED — 255
GREEN — 0
BROWN — 6.3 A.C.
BLACK — 0
6F6G
6SQ7
6J5GT
6SA7
6SK7
6SK7
5Y3G
6F6G
SPEAKER SOCKET ON REAR FLANGE
REAR OF CHASSIS



Model 902

Intermediate Frequency

455 KC



IRON CORE ADJUSTMENT VIEW

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. Ant. Trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 mfd. x 350 w.v. lytic
C13	1292	.0005 mica
C14	119109	15.0 mfd. x 450 w.v. lytic
C15	119109	15.0 mfd. x 450 w.v. lytic
C16	124144	B.C. Oscillator Trimmer
C17	10013	.05 x 400 v.
C18	10071	.004 x 600 v.
C19	129167	.0002 silver mica
C20	124145	9 mc. Oscillator Trimmer
C21	12938	.00005 mica
C22	10013	.05 x 400 v.
C23	1009	.05 x 200 v.
C24	10026	.02 x 400 v.
C25	10020	.1 x 200 v.
C26	129114	.0003 mica
C27	100122	.03 x 200 v.
C28	10026	.02 x 400 v.
C29	12921	.0002 mica
C30	10019	.006 x 600 v.
C31	129165	.00005 mica
C32	129165	.00005 mica
C33	10061	.02 x 600 v.
C34	10061	.02 x 600 v.

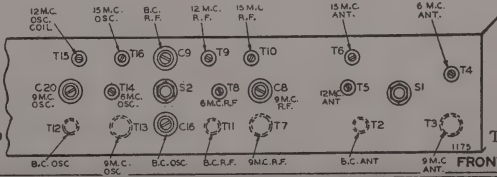
C12 and C14 and C15 in same unit
C31 and C32 in same unit

RESISTORS

R1	1301	25M ohm—⅓ w.
R2	1301	25M ohm—⅓ w.
R3	13019	1 megohm—⅓ w.
R4	130239	250 ohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	10662	12,500 ohm—3 w.
R7	13064	3500 ohm—⅓ w.
R8	13019	1 megohm—⅓ w.
R9	130232	25M ohm—⅓ w.
R10	130174	50 ohm—⅓ w.
R11	130220	300 ohm—1 w.
R12	1303	500M ohm—⅓ w.
R13	1303	500M ohm—⅓ w.
R14	130103	100M ohm—⅓ w.
R15	130218	5M ohm—⅓ w.
R16	130103	100M ohm—⅓ w.
R17	13019	1 megohm—⅓ w.
R18	13070	500 ohm—⅓ w.
R19	13011	250M ohm—⅓ w.
R20	130149	15M ohm—⅓ w.
R21	13011	250M ohm—⅓ w.
R22	101233	Volume Control & On-off switch
R23	13012	50M ohm—⅓ w.
R24	1304	3 megohm—⅓ w.
R25	130257	5 megohm—⅓ w.
R26		1 megohm tuning indicator cable

PARTS

T1	111206	Loop antenna assembly
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Oscillator Coil
T13	110157	9 mc. Oscillator Coil
T14	110156	6 mc. Oscillator Coil
T15	110158	12 mc. Oscillator Coil
T16	110159	15 mc. Oscillator Coil
T17	108177	Input I.F. Coil—455 kc.
T18	108176	Output I.F. Coil—455 kc.
T19	105111	Output Transformer
T20	114221	12" Dynamic Speaker
T21	104202B	Power Transformer—For 50-60 Cycle
or	104203B	Power Transformer—For 25 Cycle
S1	125118	Antenna Bandswitch
S2	125117	R.F. & Osc. Bandswitch
S3	125129	Radio-Phono Switch
S4	125130	Tone Control Switch
P1	10794	(2) 6-8 Volt Pilot Lights—T44



TRIMMER VIEW

FRONT VIEW CHASSIS

BRC(C800) Series A Form No. 9030—1M—9-40

PRO. 236

BELMONT RADIO CORP.

MODEL 1100
Series A

FOR TUNER DATA, SEE INDEX

RESISTORS

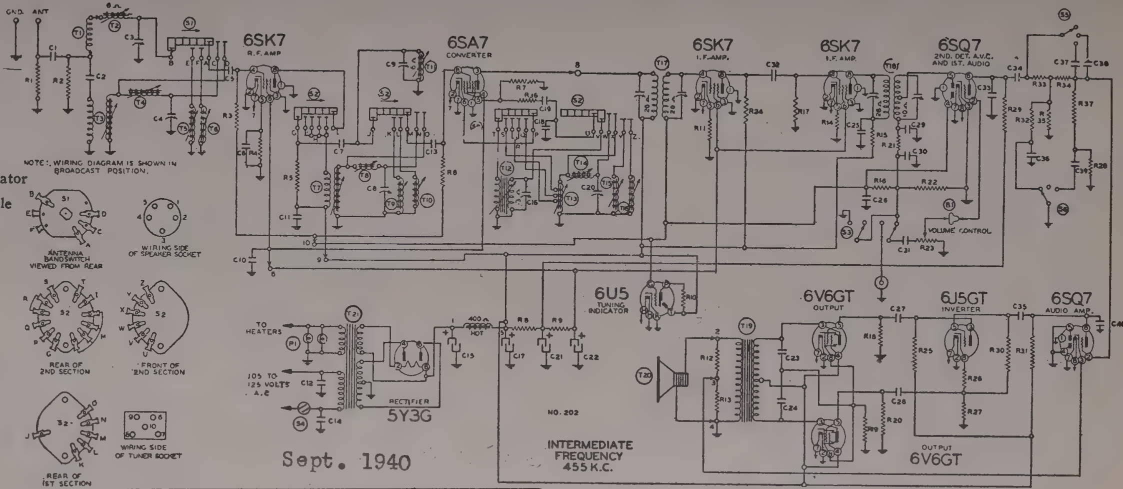
Code No.	Part No.	Description
R1	130232	25M ohm—⅓ w.
R2	130232	25M ohm—⅓ w.
R3	13019	1 megohm—⅓ w.
R4	130239	250 ohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	13019	1 megohm—⅓ w.
R7	130232	25M ohm—⅓ w.
R8	130318	6M ohm—2 watt
R9	130319	10M—2 watt
R10		1 megohm in tuning indicator cable
R11	130200	700 ohm—⅓ w.
R12	13082	10M ohm—⅓ w.
R13	130235	1500 ohm—⅓ w.
R14	130235	1500 ohm—⅓ w.
R15	130192	2M ohm—⅓ w.
R16	13019	1 megohm—⅓ w.
R17	13020	100M ohm—⅓ w.
R18	1303	500M ohm—⅓ w.
R19	130317	250 ohm—2 watt
R20	1303	500M ohm—⅓ w.
R21	13020	100M ohm—⅓ w.
R22	130238	400M ohm—⅓ w.
R23	101234	500M ohm volume control and line switch (S4)
R24	13073	15M ohm—⅓ w.
R25	13094	50M ohm—⅓ w.
R26	130218	5M ohm—⅓ w.
R27	13094	50M ohm—⅓ w.
R28	1303	500M ohm—⅓ w.
R29	130172	250M ohm—⅓ w.
R30	1303	500M ohm—⅓ w.
R31	130172	250M ohm—⅓ w.
R32	1307	40M ohm—⅓ w.
R33	13080	150M ohm—⅓ w.
R34	130309	350M ohm—⅓ w.
R35	130172	250M ohm—⅓ w.
R36	130174	50 ohm—⅓ w.
R37	13080	150M ohm—⅓ w.

CONDENSERS

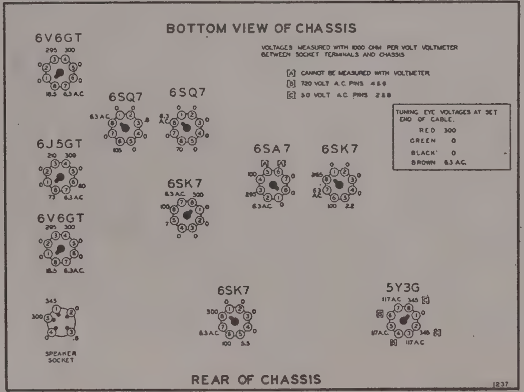
Code No.	Part No.	Description
C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. Antenna Trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. Tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mfd. lytic
C16	124144	B.C. Oscillator Trimmer
C17	119112	30.0 mfd. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	12938	.00005 mica
C20	124145	9 mc. Oscillator Trimmer
C21	119112	10.0 mfd. lytic
C22	11969	16 mfd. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.
C26	10022	.05 x 200 v.
C27	10013	.05 x 400 v.
C28	1009	.05 x 200 v.
C29	129161	.0001 mica
C30	129161	.0001 mica
C31	10020	.1 x 200 v.
C32	1292	.0005 mica
C33	12912	.00025 mica
C34	1001	.1 x 400 v.
C35	10013	.05 x 400 v.
C36	100118	.008 x 600 v.
C37	12936	.0003 mica
C38	129166	.000125 mica
C39	10037	.003 x 600 v.
C40	12912	.00025 mica

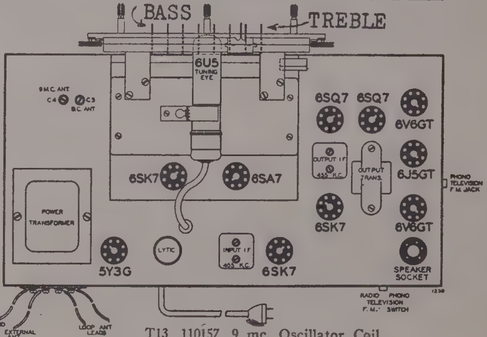
C3 and C4 in same unit
C15, C17 and C21 in same unit
C29 and C30 in same unit

Code No.	Part No.	Description
T1	111207	Loop Antenna Assembly
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Oscillator Coil
T13	110157	9 mc. Oscillator Coil
T14	110156	6 mc. Oscillator Coil
T15	110158	12 mc. Oscillator Coil
T16	110159	15 mc. Oscillator Coil
T17	108177B	Input I.F. Coil—455 Kc.
T18	108130E	Output I.F. Coil—455 Kc.
T19	105115	Output Transformer
T20	114207	12" Dynamic Speaker
T21	104217	Power Transformer—50-60 cycles
S1	125118	Antenna Bandswitch
S2	125117	R.F. Oscillator Bandswitch
S3	125133	Radio-phono Switch
S4		On-off Switch on volume control
S5	125130	Treble Switch
S6	125131	Bass Switch
P1	10794	2 6-8 Volts Pilot Lights T44
B1	11622	1.25 Volt Bias Cell



Sept. 1940


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 720 VOLT A.C. PINS 4 & 6
[C] 50 VOLT A.C. PINS 2 & 8
TUNING EYE VOLTAGES AT SET END OF CABLE.
RED 300
GREEN 0
BLACK 0
BROWN 6.3 AC
6V6GT
6SQ7
6SQ7
6J5GT
6SA7
6SK7
6SK7
6V6GT
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS



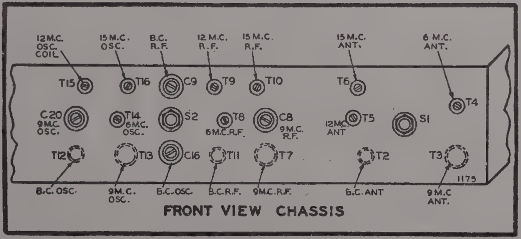
MODEL 1100

BELMONT RADIO CORP.

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output



TRIMMER VIEW

Power Consumption - - - - - - 120 Watts
Power Output - - - - - 10 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 540 to 1600 KC
49M Band - - - 5.9 to 6.1 MC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
Intermediate Frequency - - - - - - 455 KC
Speaker - - - - - 12 in. Electro Dynamic

Phonograph-Television and Fm. Jack

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view—The radio-phono switch on the chassis will then switch from radio to phono operation.

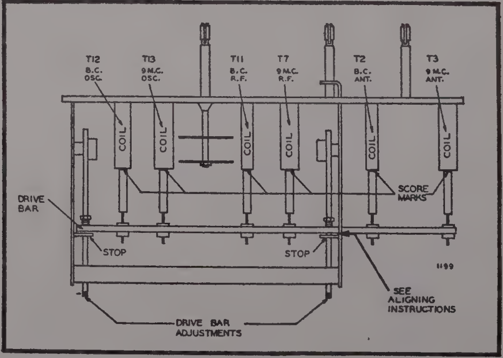
If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the chassis view will accommodate either the Phono or a television or FM converter.

Service Notes

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a guage). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.



IRON CORE ADJUSTMENT VIEW

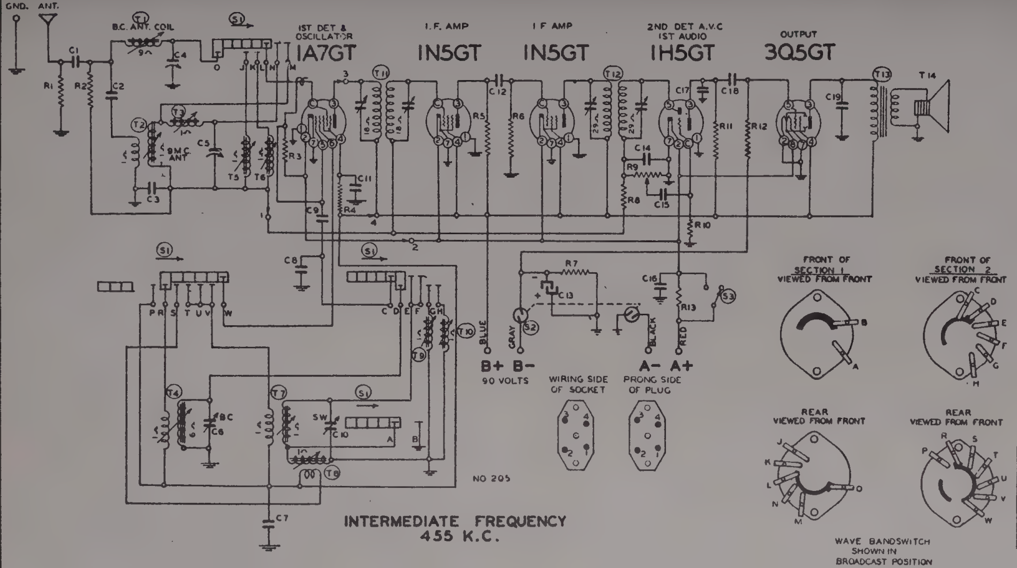
Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

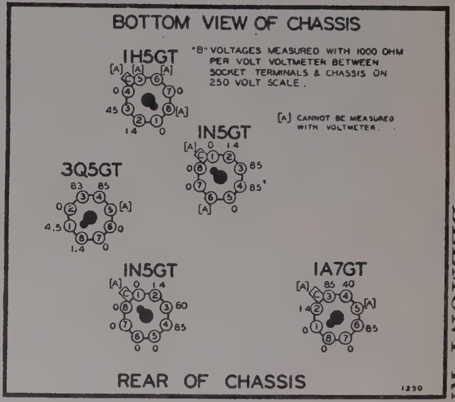
©John F. Rider, Publisher

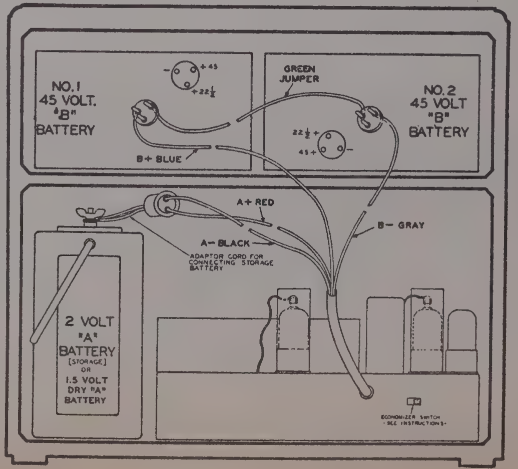
BELMONT RADIO CORP.

BRC(509) Series A Form No. 5129—1,500—9-40
PRO. 220



WAVE BANDSWITCH SHOWN IN BROADCAST POSITION

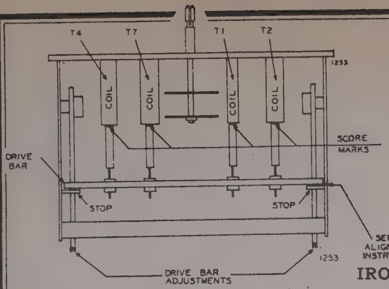

BOTTOM VIEW OF CHASSIS
"B" VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS ON 250 VOLT SCALE.
[A] CANNOT BE MEASURED WITH VOLTMETER.
1H5GT
1N5GT
3Q5GT
1N5GT
1A7GT
REAR OF CHASSIS
1250


NO.1 45 VOLT. "B" BATTERY
NO.2 45 VOLT "B" BATTERY
GREEN JUMPER
B+ BLUE
A+ RED
B− GRAY
A− BLACK
ADAPTOR CORD FOR CONNECTING STORAGE BATTERY
2 VOLT "A" BATTERY [STORAGE] OR 1.5 VOLT DRY "A" BATTERY
ECONOMIZER SWITCH - SEE INSTRUCTIONS -

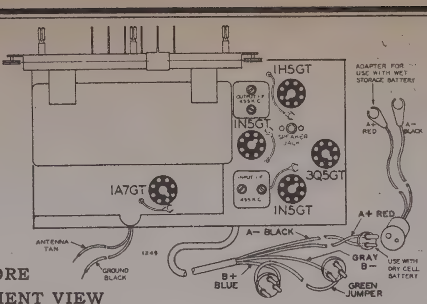
Code No.	Part No.	Description
		RESISTORS
R1	13012	50M ohm—⅓ w. 20%
R2	13020	100M ohm—⅓ w. 20%
R3	1309	200M ohm—⅓ w. 20%
R4	13094	50M ohm—⅓ w. 10%
R5	130176	20M ohm—⅓ w. 10%
R6	13019	1 megohm—⅓ w. 20%
R7	13079	400 ohm—⅓ w. 10%
R8	13038	2 megohm—⅓ w. 20%
R9	101236	Volume Control
R10	130223	10 megohm—⅓ w. 20%
R11	13011	250M ohm—⅓ w. 20%
R12	13019	1 megohm—⅓ w. 20%
R13	130325	1 ohm—⅓ w. 10%
	130326	2.3 ohm—1½ Watt 10% in "A" Cable Adapter
		CONDENSERS
C1	129158	.0002 mica 10%
C2	100112	.001 x 200 volt
C3	1009	.05 x 200 volt
C4	124138	B.C. ant. trimmer
C5	124138	9 mc. ant. trimmer
C6	124139	B.C. osc. trimmer
C7	10064	.25 x 200 volt
C8	129170	.00009 mica 3%
C9	1295	.0001 mica 20%
C10	124145	9 mc. osc. trimmer
C11	100124	.1 x 200 volt
C12	100112	.001 x 200 volt
C13	119116	20 mfd. x 25 volt lytic
C14	12912	.00025 mica 20%
C15	10025	.002 x 600 volt
C16	100104	.5 x 100 volt
C17	1295	.0001 mica 20%
C18	10026	.02 x 400 volt
C19	10012	.003 x 600 volt
		MISCELLANEOUS
T1	111216	B.C. ant. coil
T2	111213	9 mc. ant. coil
T3	111212	6 mc. ant. coil
T4	110168	B.C. osc. coil
T5	111214	12 mc. ant. coil
T6	111215	15 mc. ant. coil
T7	110165	9 mc. osc. coil
T8	110164	6 mc. osc. coil
T9	110166	12 mc. osc. coil
T10	110167	15 mc. osc. coil
T11	108177C	Input I.F. complete
T12	108185B	Output I.F. complete
T13	105119	Output transformer
T14	114220	P.M. speaker
S1	125138	Band switch
S2		On-off switch on volume control
S3	12588B	Battery switch

MODEL 509

BELMONT RADIO CORP.



IRON CORE ADJUSTMENT VIEW



Power Consumption

A Battery	**300 MA**
B Battery	**13.5 MA**
Power Output	**210 MW Undistorted**
Sensitivity for 50 Milliwatt Output:	**10 Microvolts Average**
Selectivity	**38 KC Broad at 1000 Times Signal at 1000 KC**
Tuning Frequency Range Broadcast Band	**535 to 1730 KC**
49M Band	**5.9 to 6.1 MC**
31M Band	**9.1 to 10 MC**
25M Band	**11.4 to 12.1 MC**
19M Band	**14.9 to 15.4 MC**
Intermediate Frequency	**455 KC**
Speaker	**6 in. PM Dynamic**

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

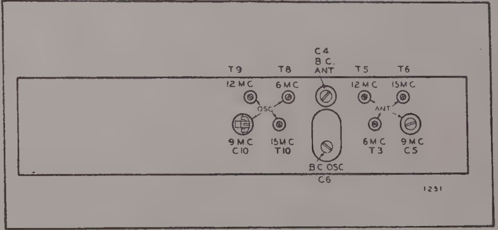
Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.



TRIMMER VIEW

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 1N5 (I.F.)	Broadcast	Set Dial at 1730 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 1A7	Broadcast	Set Dial at 1730 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C10 (See Trimmer on Top) C5	Osc. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T8 (See Trimmer View) T3	Osc. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T9 (See Trimmer View) T5	Osc. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T10 (See Trimmer View) T6	Osc. Ant.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1730 Kc.	(See Trimmer View) C6 ((See Trimmer View) C4	Osc. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Tune to Generator Sig.	Rotate Core T1 (See Iron Core Adjustment View)	Ant.	Adjust to maximum output

BUICK MOTOR

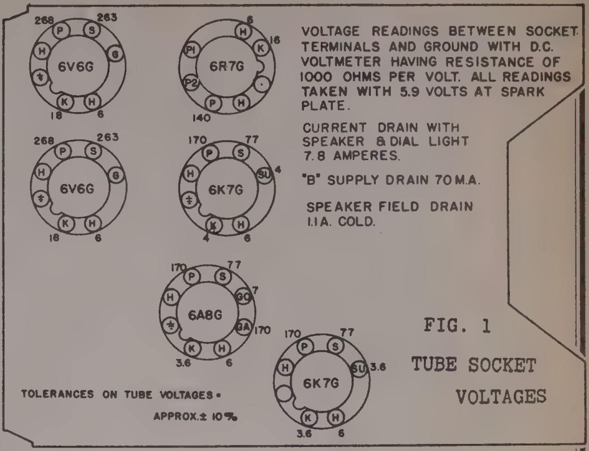
The 1939 Buick Sonomatic radio is a six tube single unit, superheterodyne receiver with an 8" dynamic speaker.

BUICK MODEL 1308221
(980598) AUTO RADIO

6 D-916

Date: 10-17-38

IF PEAK 260 KC



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 5.9 VOLTS AT SPARK PLATE.

CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 7.8 AMPERES.

"B" SUPPLY DRAIN 70 M.A.

SPEAKER FIELD DRAIN 1.1 A. COLD.

TOLERANCES ON TUBE VOLTAGES - APPROX. ± 10%

FIG. 1

TUBE SOCKET VOLTAGES

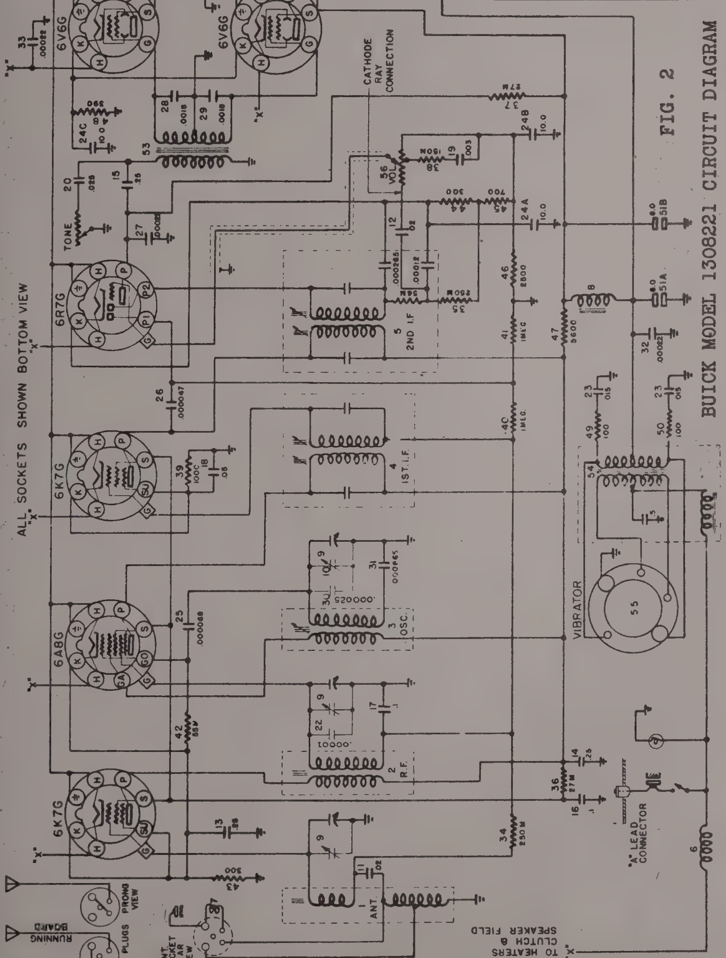


FIG. 2

BUICK MODEL 1308221 CIRCUIT DIAGRAM

TUNING CONTROLS: Tuning is accomplished by means of the conventional manual tuning control, or by means of five push buttons which mechanically rotate the variable condenser gang to preselected frequencies. An electric clutch is provided which automatically disconnects the manual tuning mechanism when a button is pressed.

NOTE: Do not attempt to operate the push button tuning unless the set is connected to a 6 volt battery and the switch turned "on".

Setting up the push buttons for any desired station may be done as follows:

1. Remove the button by depressing the spring located on the bottom of each button, and pulling straight out.
2. Loosen the screw with a coin or a screw driver.
3. Carefully tune in the desired station by means of the manual control.
4. Push the loosened screw in as far as possible and tighten.

MODEL 1308221

BUICK MOTOR

1. Aligning I-F Stages at 260 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube through a .25 mfd. condenser, leaving the grid clip in place.

(c) Connect the output meter across the speaker voice coil.

(d) Set the signal generator accurately to 260 kilocycles and turn volume control on full.

(e) Set the condenser gang to a point at about 600 kilocycles where no station is received.

(f) Adjust the four screws of the two I-F transformers, one on top and one on the bottom of each transformer in the following order ABA and CDC (Illus. 4 & 5 of Figs. 3 & 4) until maximum output is obtained. Repeat these adjustments the second time for greater accuracy using the minimum output from the signal generator which will give a readable indication on the output meter.

(g) CHECKING SELECTIVITY CURVE

The cathode ray oscillograph should be used to check the shape of the I-F curve after completing the "Alignment Procedure". The best tone quality is obtained when both sides of the I-F curve are alike. Slight readjustment of the I-F transformers may be necessary to accomplish this.

2. Aligning at 1560 Kilocycles

The antenna and R-F coils contain iron cores which have been very carefully adjusted at the factory. These cores are sealed, and no further adjustments in service are necessary. The Service Replacement coils are also adjusted and sealed at the factory.

(a) Turn tuning condenser plates all the way out and against the high frequency stop.

(b) Set signal generator accurately to 1560 kilocycles and adjust oscillator trimmer (Illus. E, Fig. 3) for maximum output. This trimmer is made accessible by removing plug button at side of case. Using trimmer alignment wrench, Part No. 7236513, loosen the hex nut with one end and adjust for maximum output by sliding plunger either in or out with the "hook" end of the wrench.

3. Aligning at 1400 Kilocycles

(a) Remove the .25 mfd. condenser and connect the signal lead of the signal generator through a .0005 mfd. condenser to the Test Plug Part No. 7236514 which is then inserted into the receiver antenna receptacle.

(b) Set the signal generator to approximately 1400 kilocycles.

(c) Rotate the variable plates of the condenser gang until the signal is tuned in with maximum output.

(d) Adjust the R-F and antenna parallel trimmers (Illus. F & G, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

(a) Set the signal generator to approximately 600 kilocycles.

(b) Rotate the variable plates of the condenser gang until the signal is tuned in.

(c) Adjust the oscillator coil iron core aligning screw (Illus. H, Fig. 3) while rocking the condenser gang back and forth through the signal until maximum output is obtained. This screw is made accessible by removing plug button at side of case.

(d) Repeat adjustments made under "Aligning at 1400 Kilocycles".

SERVICING AUTOMATIC TUNER

1. LUBRICATION

The mechanical parts of the push button tuner should be carefully lubricated as a part of every service job, using a special lubricant which is supplied under Part No. 7236515.
NOTE: Do not use ordinary oils or greases on the automatic tuner.
Grease the following points:
- (a) Dial pulleys and pins.
- (b) Plunger guides and pinions.
- (c) Pinion rack.
- (d) Manual tuning shaft bearing.
- (e) All gears and worms.
- (f) Pointer guide.
- (g) Clutch shaft bearings.

Do not grease the parkerized cam or brake shoe.

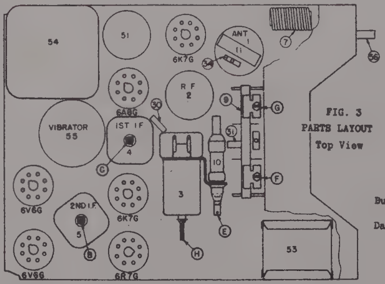


FIG. 3
PARTS LAYOUT
Top View

The capacity of the running board antenna is approximately 550 micro-microfarads or .00055 microfarads.

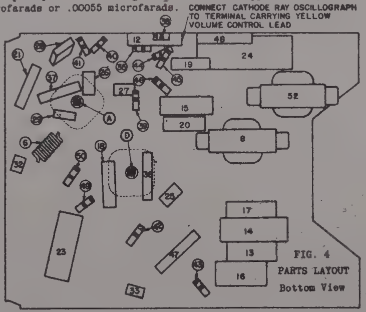

CONNECT CATHODE RAY OSCILLOGRAPH TO TERMINAL CARRYING YELLOW VOLUME CONTROL LEAD

FIG. 4
PARTS LAYOUT
Bottom View

2. SERVICE HINTS

(a) Improper operation--single button.
Sticking cams. Remove knob; loosen screw, force in and rotate the manual tuner knob to grind in. Do not lubricate.

(b) Improper operation--all buttons.
Back lash between condenser drive gears.
Remove automatic tuner assembly by removing the three fastening screws on the under side of case. Loosen the four tuner mechanism to condenser gang mounting screws and adjust the mesh between the two large drive gears, to be as tight as possible without binding.

(c) Replacing button re-set screw hold-on spring.
In cases where it does not seem advisable to replace the complete tuner mechanism, the hold-on spring may be replaced as follows:
The spring can be removed from the pusher arm by prying off with a screw driver. This operation straightens out the staking, and does not destroy the metal of the pin. Carefully file the burrs off the stake end of the pin. New springs (Part No. 7235845) can be placed over the pins and restaked in place.

(d) Clutch.
Do not attempt to disassemble the clutch. If trouble is encountered with this unit, replace with Part No. 7236984.

The antenna circuit in the receiver is designed to operate either with the running board antenna or with a low capacity antenna such as the side cowl type, the selection being controlled by the internal wiring of the antenna lead plug

6 D-916
Buick 1308221
Date: 10-17-38

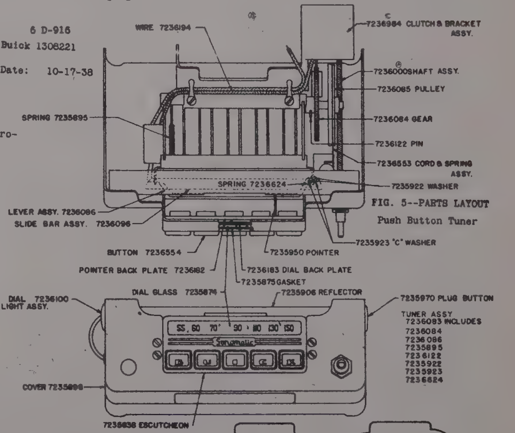


FIG. 5--PARTS LAYOUT
Push Button Tuner

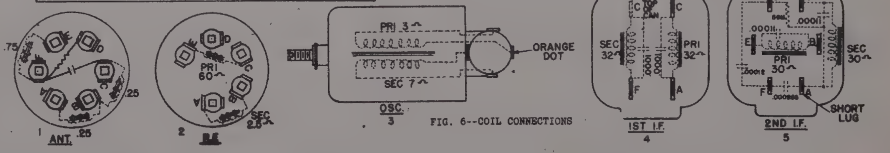
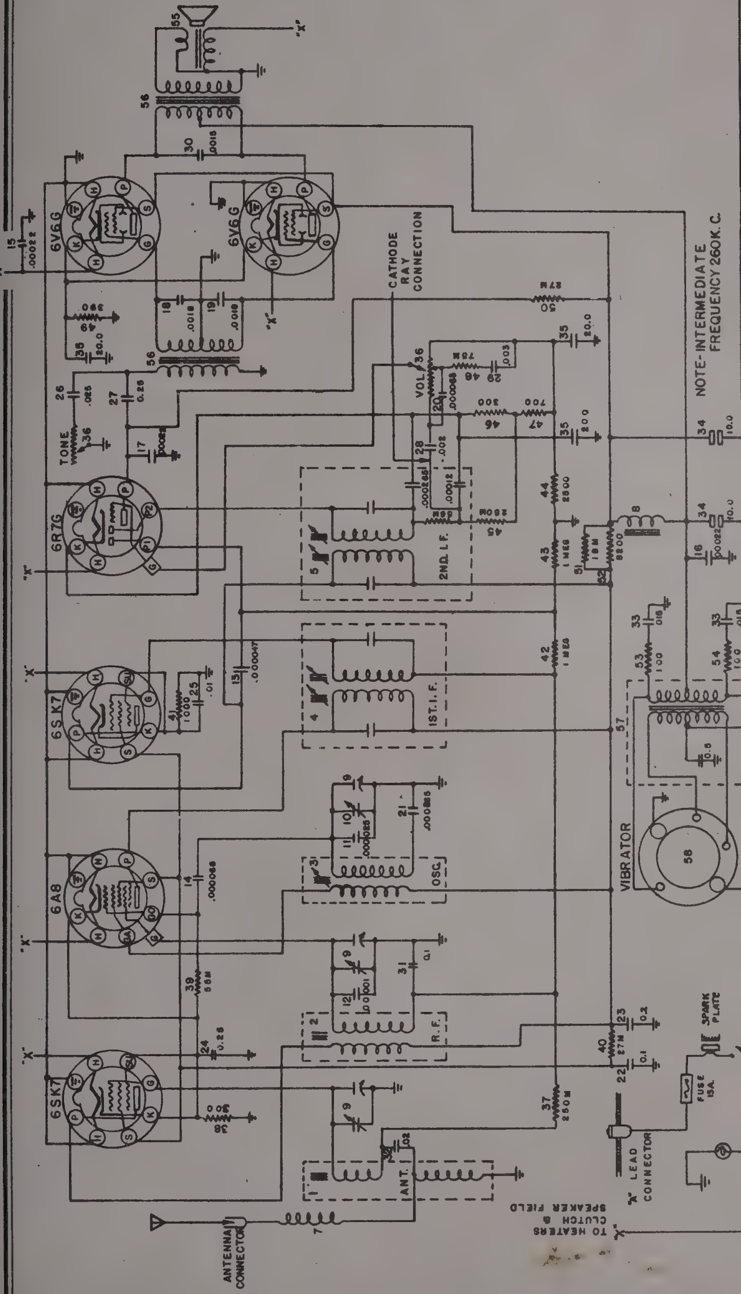


FIG. 6--COIL CONNECTIONS

BUICK MOTOR

MODEL 1314523



NOTE-INTERMEDIATE FREQUENCY 260K.C.

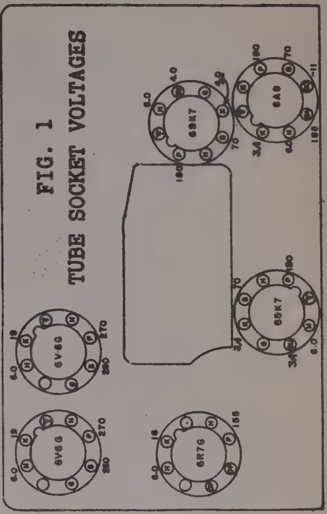


FIG. 1
TUBE SOCKET VOLTAGES

CIRCUIT DIAGRAM
FIG. 2--BUICK MODEL 1314523 (980620)

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT.

ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS.

CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 8.0 AMPERES.

"B" SUPPLY DRAIN 70 M.A. TOLERANCES ON VOLTAGES ±10%.

IF PEAK 260 KC

Date: 10-12-39

1. Aligning I.F. Stages at 260 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis.

(b) Connect the signal lead of the signal generator to the grid cap of the 6A8 tube through a .25 mfd. condenser leaving the grid cap in place.

(c) Connect the output meter from the plate prong of one 6V6G tube to the plate prong of the other 6V6G tube.

(d) Set the signal generator to 260 kilocycles and turn volume control on full.

(e) Set the condenser gang to a point around 600 kilocycles where no station is received.

(f) Adjust the four screws of the two I.F. transformers, one on top and one on the bottom of each transformer, in the order ABA and CDC (Illus. 4 & 5, Figs. 3 & 4) until maximum output is obtained. Repeat these adjustments with as low an output from the signal generator as possible for a readable indication on the output meter.

(g) Checking Selectivity Curves: The Cathode Ray Oscillograph should be used to check the shape of the I.F. curve after completing the alignment procedure. Slight readjustments of the I.F. transformers may be necessary to obtain a symmetrical curve. Connect the Cathode Ray Oscillograph from the point as shown on the schematic circuit diagram or from "D" lug on the second I.F. Coil (Fig. 7).

2. Aligning at 1560 Kilocycles

(a) Turn tuning condenser plates all the way out and against the high frequency stop.

(b) Set the signal generator to 1560 kilocycles and adjust the oscillator trimmer (Illus. E, Fig. 3) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Remove the .25 mfd. condenser and connect the signal lead of the signal generator to the antenna connection of the set through a .00005 condenser.

(b) Set the signal generator to 1400 kilocycles.

(c) Rotate the variable plates of the gang condenser until the signal is tuned for maximum output.

(d) Adjust the R.F. and antenna parallel trimmers (Illus. F & G, Fig. 6) for maximum output.

4. Alignment at 600 Kilocycles

(a) Set the signal generator to 600 kilocycles.

(b) Tune this signal in on the set.

(c) Adjust the oscillator coil iron core aligning screw (Illus. H, Fig. 3) while rocking the condenser gang back and forth through the signal until maximum output is obtained.

(d) Repeat adjustment made under "Alignment at 1400 Kilocycles."

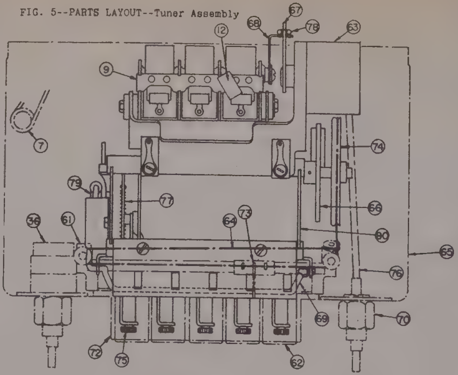
5. Adjustment of Radio to Car Antenna

The radio should be adjusted to the car antenna after mounting in the car. The following adjustment should be made:

(a) Tune in a weak station near the high frequency end of the dial (approximately 1400 K.C.).

(b) Adjust the Antenna Trimmer (Illus. G, Fig. 6) for maximum volume. DO NOT DISTURB THE OSCILLATOR OR R.F. TRIMMERS WHILE MAKING THIS ADJUSTMENT.

FIG. 5--PARTS LAYOUT--Tuner Assembly



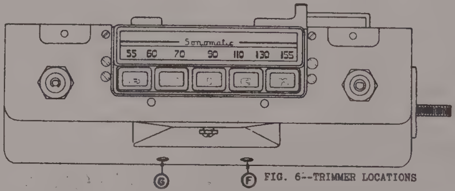


FIG. 6--TRIMMER LOCATIONS

61	7238400	Bar	Pointer slide bar assy.
62	7239107	Button	Push button assy.
63	7238712	Clutch assy.	Includes bracket
64	7239108	Cord	Drive cord and spring assy.
65	7238420	Cover	Bottom cover assy.
66	7236084	Gear	Tuner gear assy.
67	7238493	Leaf	Female joint leaf assy.
68	7236018	Leaf	Male joint leaf assy.
69	7238885	Lever	Switch lever assy.
70	7238510	Nut	Spacer nut
71	7238647	Pin	Taper pin for tuner gear
72	7238349	Plate	Escutcheon
73	7233348	Pointer	Dial
74	7239038	Pulley	Pointer drive pulley assy.
75	7238213	Screw	Reset screw
76	7238516	Shaft	Manual tuning shaft assy.
77	7235895	Spring	Plunger return
78	7237174	Spring	Universal joint spring
79	1213511	Switch	Declutching switch assy.
80	7238706	Tuner	Tuner assy.--Includes racks, pinions, plungers, reset screws and tuner gear

ANTENNA SYSTEM: The 1940 Buick uses a roof peak antenna as standard equipment. Optional equipment is a vacuum operated whip antenna. The roof peak antenna has a capacity of .000055 mfd. and the vacuum operated of .000067 mfd. The 1940 Buick Sonomatic Radio is designed to operate satisfactorily with either type of antenna.

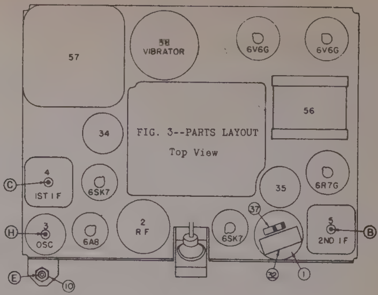


FIG. 3--PARTS LAYOUT Top View

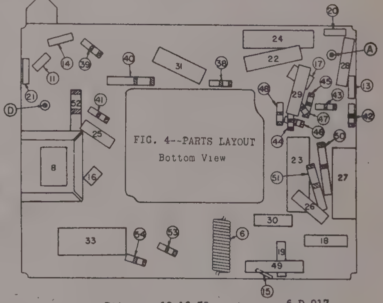
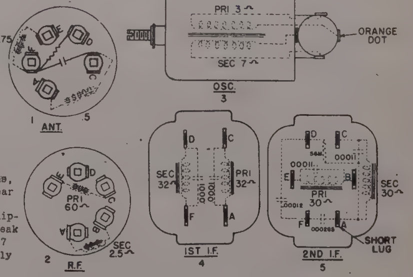


FIG. 4--PARTS LAYOUT Bottom View

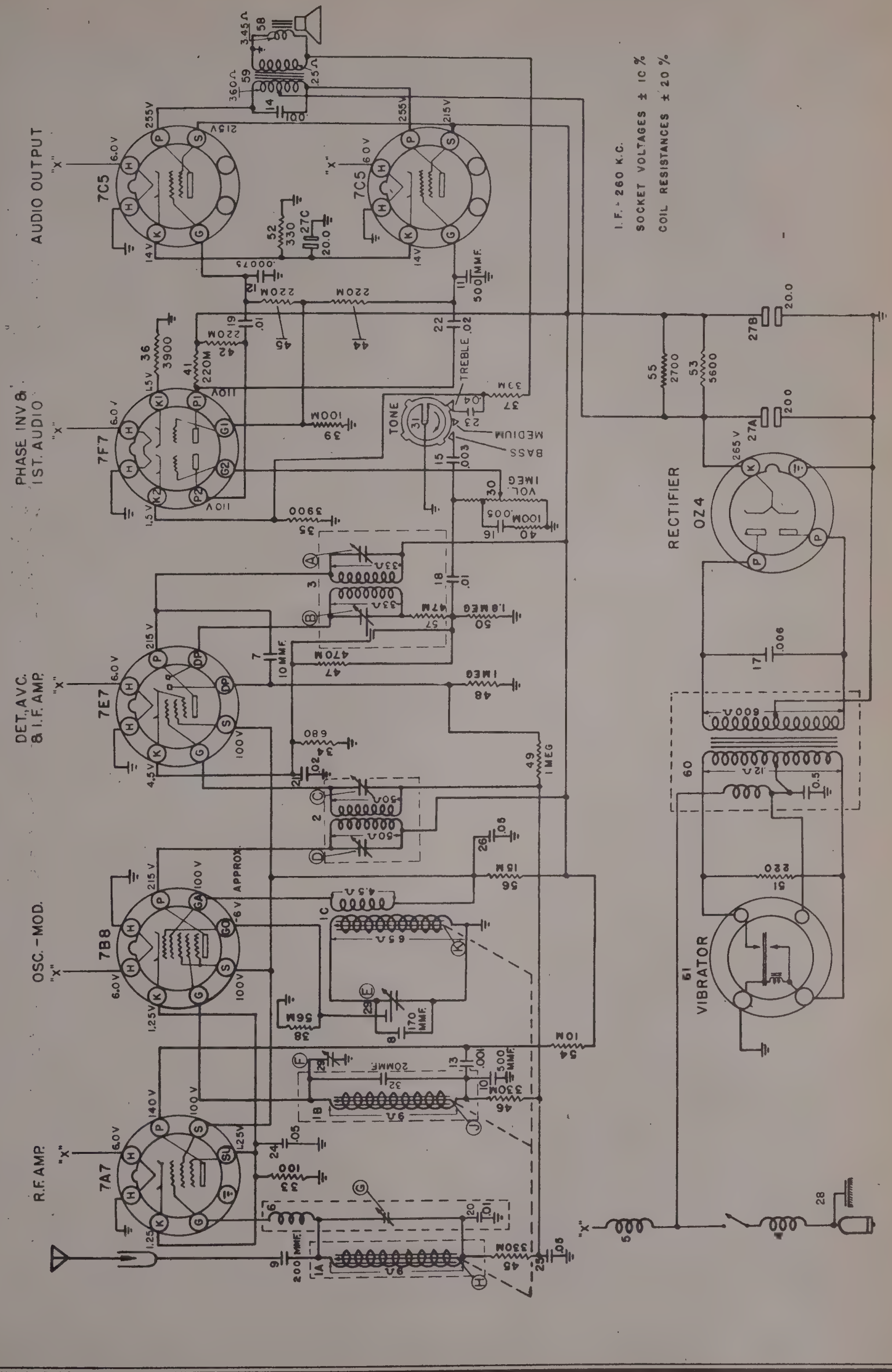
Date: 10-12-39 6 D-917
Buick 1314523 (980620)

FIG. 7--COIL CONNECTIONS



CADILLAC DIV.—GEN. MOTORS

MODEL 7240371



MODEL 7240371

CADILLAC DIV.—GEN. MOTORS

Due to the fact that the iron cores have been sealed in place at the factory, only the trimmer adjustments as outlined under capacity alignment should be made unless the coils of the iron cored tuning unit are changed.

CAPACITY ALIGNMENT

1. I.F. Alignment at 260 K.C.
   - (a) Connect an output meter across the test terminals on the left side of speaker cover, leaving the speaker connected.
   - (b) Connect the ground lead of the signal generator to the chassis frame.
   - (c) Connect the signal lead of the signal generator to the grid of the 7B8 tube through the 0.1 mfd condenser.
   - (d) Turn set volume control on full and tone control to the extreme treble end. Set the signal generator at 260 KC. Tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved in narrow limits no appreciable change in output may be noted.
   - (e) Adjust the I.F. trimmers A, B, C, & D for maximum output, beginning with trimmer A.
2. Alignment at 1560 KC.
   - (a) Connect the signal lead of the signal generator to the receiver antenna connection through a 70 mmfd. condenser or 7241619 alignment dummy.
   - (b) Turn the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.
   - (c) Set the signal generator to 1560 KC.
   - (d) Adjust the oscillator trimmer E for maximum output.
3. Alignment at 1400 KC.
   - (a) Set the signal generator to 1400 KC.
   - (b) Tune the receiver to the signal and adjust the trimmers F and G for maximum output. Signal generator signal should be as low as possible and still give a satisfactory meter reading.

   This type of tuning circuit does not require alignment at 600 KC.
4. Alignment with Car Antenna

   Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal between 1000 and 1500 KC. The antenna should be fully extended when making this adjustment.

CAPACITY AND INDUCTANCE ALIGNMENT

To be used only when there is definite evidence of iron cores being out of adjustment.

1. I.F. Alignment at 260 KC.

   Follow the procedure as outlined under I.F. Alignment at 260 KC Capacity Alignment.
2. Alignment at 1560 KC.
   - (a) Connect the signal lead of the signal generator to the antenna connection of the set through a 70 mmfd condenser.
   - (b) Set signal generator to 1560 Kilocycles.
   - (c) Rotate the manual tuning mechanism until the high frequency stop is reached. Mechanically align the iron cores K, H, & J by setting the oscillator core K so that its front edge projects out 1 - 1/16" from the end of the coil form and the antenna and R.F. cores H & J project 1 - 13/32" from the end of the respective coil windings. Note that one of the above measurements is from the coil form while the others are from the windings.
   - (d) Adjust the oscillator trimmer E, R.F. trimmer F, and antenna trimmer G for maximum output.
3. Alignment at 1400 KC
   - (a) Set signal generator to 1400 K.C. and tune set to this signal.
   - (b) Adjust the R.F. core J for maximum output.
   - (c) Adjust the antenna core H for maximum output.
4. Realignment at 1560 and 1400 KC
   - (a) Repeat alignment of trimmer E and trimmers F and G at 1560 KC.
   - (b) Repeat alignment of cores H and J at 1400 KC. Apply shellac to the core screws to seal the adjustment.
5. Alignment with car antenna

   Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal between 1000 and 1500 KC. The antenna should be fully extended when making this adjustment.

AUTOMATIC PERMEABILITY TUNING

The automatic push button tuning unit has been made compact by combining the manual and automatic tuning units so that they both use the same three iron cores which are "ganged" together in one reciprocating unit actuated by a small mechanical motor. This highly efficient three-circuit tuning system pushes the iron cores back and forth like pistons in the tuning coils, which varies the inductance of the coils by changing the permeability of the magnetic circuit.

For manual tuning, this is accomplished by first depressing and then rotating the manual station selector knob. For automatic tuning, pressing an automatic tuning button causes the cores to be moved to a pre-set position and locked in place by the button latch mechanism, which prevents the cores from shifting position until released by the use of another of the automatic push buttons or by use of the manual control.

Changing the stations selected by the buttons is a simple operation. The button to be set to a new station is depressed until it locks in. Then the button is rotated exactly like a manual tuning knob until the desired station is tuned in. Pressing any tuning button will release the depressed button.

The call letters of the stations to which the automatic tuner is pre-set are inserted above the chrome plated selector buttons. Whenever the instrument panel lights are turned on, the call letters are illuminated. Identification of the station to which the radio is tuned is facilitated by three indications: the selector button is latched into its depressed position, the corresponding call letters are more brightly illuminated than the call letters of the other four stations, and, finally, the dial pointer indicates the station frequency.

Note: Do not turn any button at any time unless a new station setting is desired, as the tuning position of a button is changed whenever it is turned regardless of whether it is depressed or not.

CADILLAC 1941 AUTOMATIC RADIO (Front Compt.) PART NO. 7240371

Power Output	5 Watts Undistorted at 6.0 volts.
Power Consumption	7.0 Amperes at 6.0 volts.
Sensitivity	2.5 Microvolts at 1 Watt output
Selectivity at 1000 times signal	35 KC
Tuning Range	
Manual Tuning	545 to 1560 KC
Automatic Tuning (All buttons)	545 to 1560 KC
Speaker	8" Permanent Magnet Dynamic
Intermediate Frequency Peak	260 KC
Antenna Trimmer Range	45 to 90 mfd

CADILLAC DIV.—GEN. MOTORS

MODEL 7240371

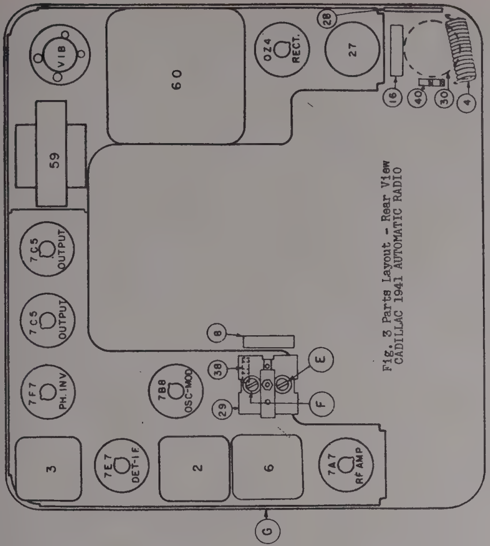


Fig. 3 Parts Layout - Rear View CADILLAC 1941 AUTOMATIC RADIO

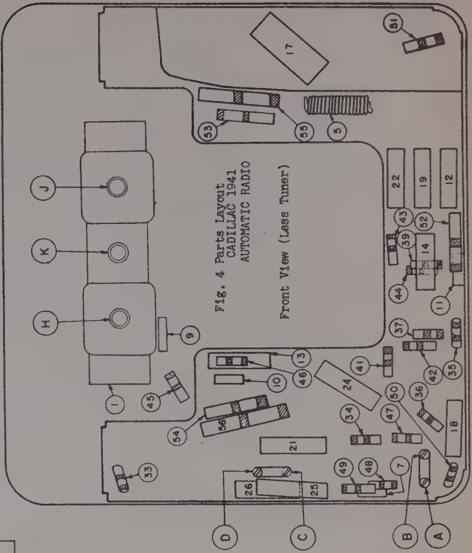


Fig. 4 Parts Layout CADILLAC 1941 AUTOMATIC RADIO Front View (Less Tuner)

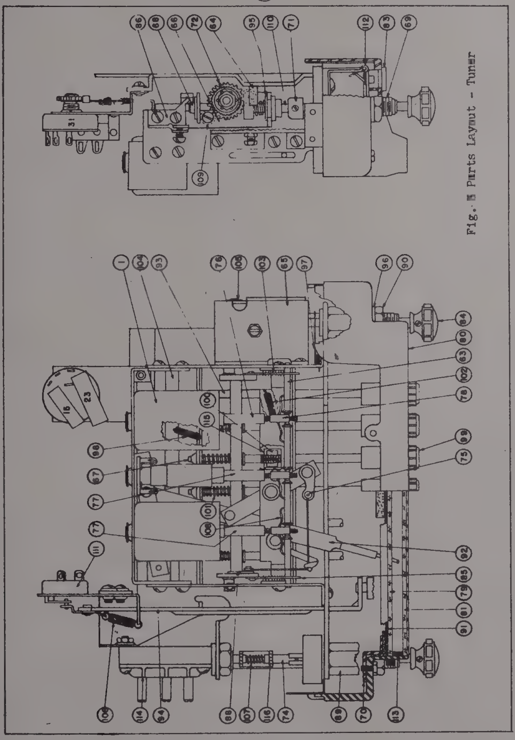
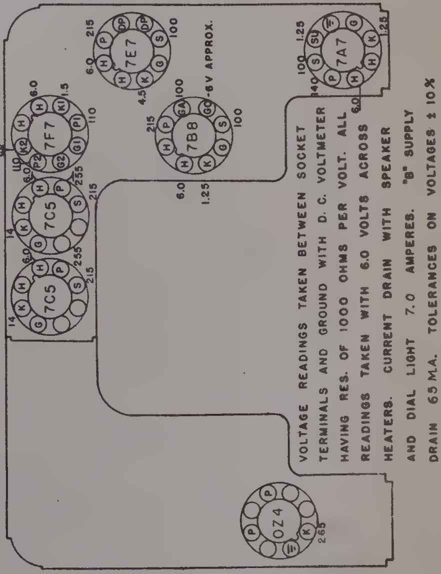


Fig. 5 Parts Layout - Tuner



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D. C. VOLTMETER HAVING RES. OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.0 AMPERES. "B" SUPPLY DRAIN 65 M.A. TOLERANCES ± 10%

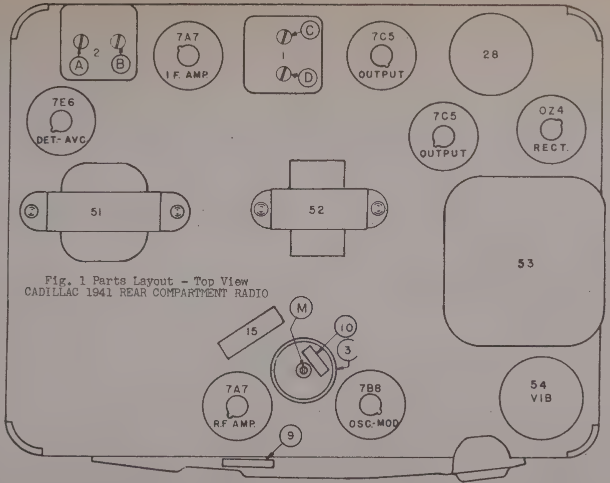
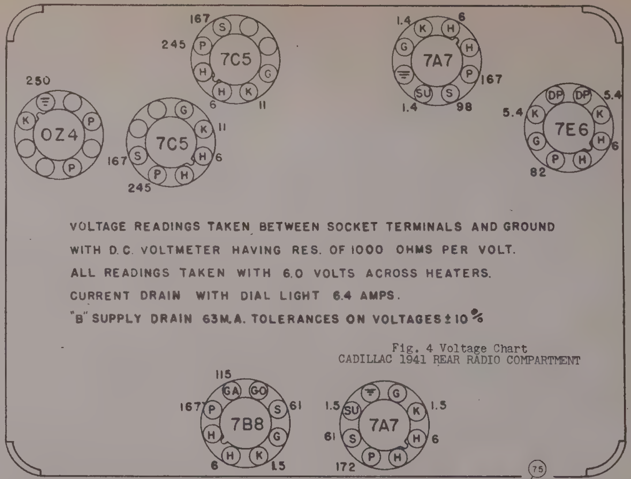


Fig. 1 Parts Layout - Top View
CADILLAC 1941 REAR COMPARTMENT RADIO



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RES. OF 1000 OHMS PER VOLT.
ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS.
CURRENT DRAIN WITH DIAL LIGHT 6.4 AMPS.
"B" SUPPLY DRAIN 63M.A. TOLERANCES ON VOLTAGES ± 10%

Fig. 4 Voltage Chart
CADILLAC 1941 REAR RADIO COMPARTMENT

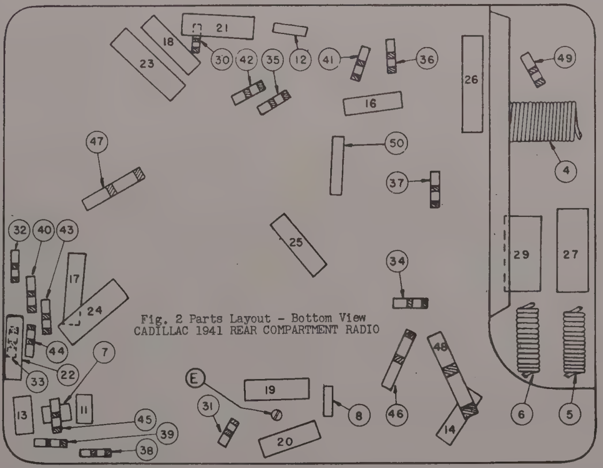


Fig. 2 Parts Layout - Bottom View
CADILLAC 1941 REAR COMPARTMENT RADIO

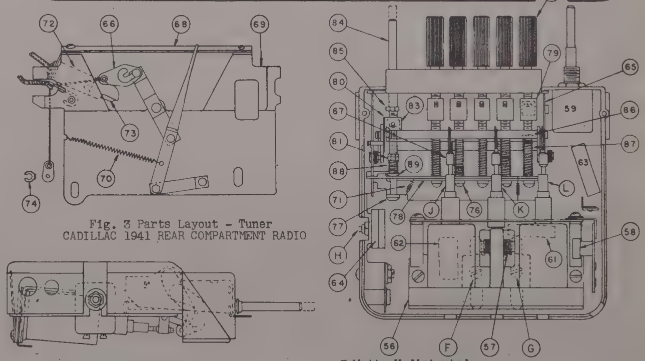


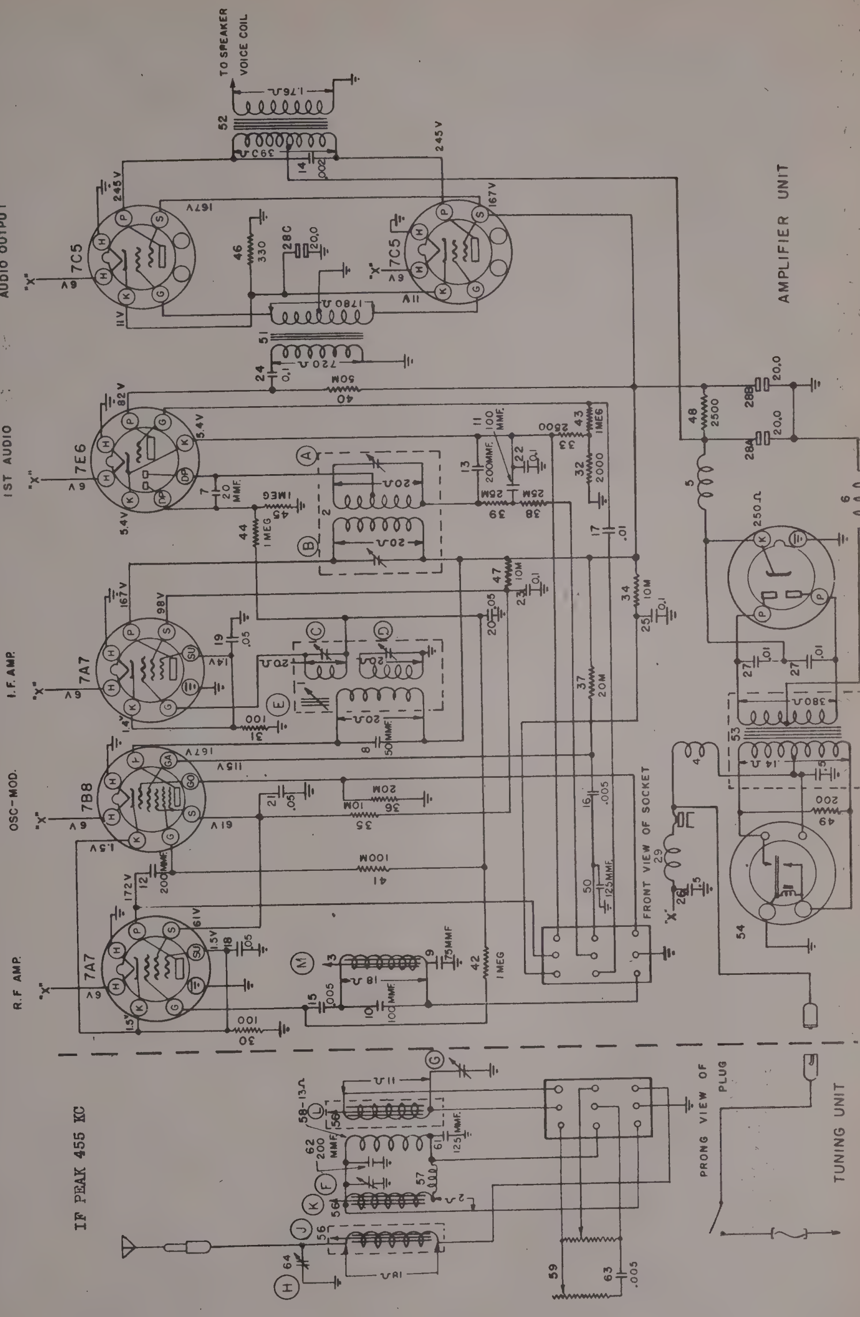
Fig. 3 Parts Layout - Tuner
CADILLAC 1941 REAR COMPARTMENT RADIO

Power Output	5 Watts Undistorted
Power Consumption	7.5 Amperes at 6 volts
Sensitivity	4 Microvolts at 1 Watt output
Selectivity at 1000 times signal	35 KC
Tuning Range	545 to 1560 KC
Manual Tuning	545 to 1560 KC
Automatic Tuning (all 5 buttons)	545 to 1560 KC
Speaker	21 oz. Permanent Magnet, Elliptical Cone
Intermediate Frequency Peak	455

Antenna Trimmer - Designed for 80 mmf. vacuum trunk Antenna

CADILLAC DIV.—GEN. MOTORS

MODEL 7240427



TO CONTROL THE VACUUM AERIAL

To the left of the volume control rod is the knob which controls the vacuum aerial. Pulling this button upward will raise the aerial and pushing it downward will lower the aerial. The vacuum aerial has two rods, one sliding within the other. For maximum reception both rods should be extended to their full height, the inner rod being extended manually.

MODEL 7240427

CADILLAC DIV.—GEN. MOTORS

TO CHANGE STATION SETTING OF PUSH BUTTONS

The five push buttons should be set up for five stations which are received favorably in your vicinity. The procedure for setting up the push buttons is as follows:

1. Turn on the radio and allow it to warm up from ten to fifteen minutes.
2. Depress button to be set up until it latches and remains depressed.
3. Without pressing or holding the button down, turn it, as in manual tuning, until the desired station is tuned in. This should be done very carefully until the station comes in sharp and clear, free from background noise.
4. Repeat this process for any other buttons which you wish to change.

The setting of any button may be changed at any time by following this procedure.

CAUTION: TURNING ANY OF THE PUSH BUTTONS CHANGES ITS STATION SETTING. DO NOT TURN ANY BUTTON UNLESS YOU WISH TO CHANGE THE SETTING.

CAPACITY ALIGNMENT

1. Aligning I.F. stages at 455 KC.
   - (a) Connect the ground lead of the signal generator to the chassis frame.
   - (b) Connect the signal lead of the signal generator to the grid of the 7B8. (Grid side of condenser 12) through a 0.1 mfd. condenser.
   - (c) Connect an output meter across the speaker voice coil. (If speaker is disconnected a 4 ohm load may be used instead).
   - (d) Set signal generator to 455 KC.
   - (e) Turn the set volume control on full and tune the set to a position where no squeals or beat notes may be heard, and so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output. The tone control should be rotated to its extreme high position (clockwise).
   - (f) Adjust the I.F. trimmers A, B, C, and D, and the I.F. core adjustment E until maximum output is obtained.
   - (g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.
   - (h) Connect the signal generator to the antenna connection of the set through a 70 mmfd. condenser.
   - (i) Adjust the I.F. trap adjustment M for minimum output.
2. Alignment at 1560 KC.
   - (a) Leave signal generator connected the same as for the I.F. trap adjustment.
   - (b) Tune the set to the extreme high frequency position against the stop.
   - (c) Set the signal generator to 1560 KC.
   - (d) Adjust the oscillator trimmer F for maximum output.
3. Alignment at 600 K.C.
   - (a) Set the signal generator to 600 KC and tune the set to this signal.
   - (b) Adjust the R.F. trimmer G and the antenna trimmer H for maximum output.

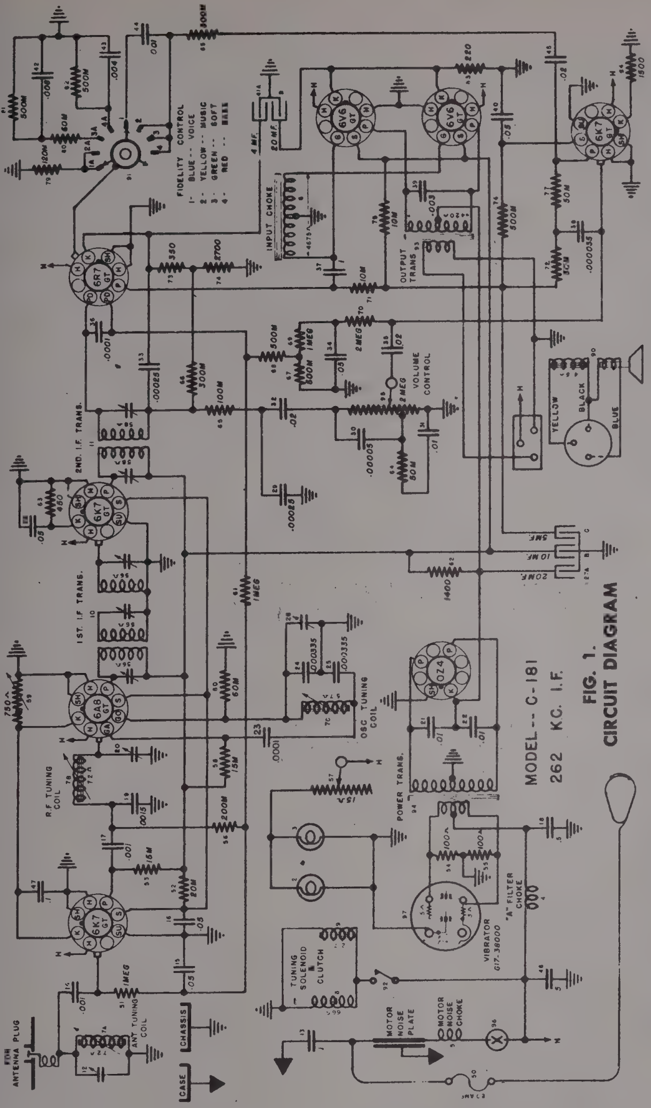
CAPACITY AND INDUCTANCE ALIGNMENT

1. Aligning I.F. stages at 455 K.C.

   Align the I.F. stages as outlined under paragraph 1 under "Capacity Alignment".
2. Mechanical Alignment of cores
   - (a) Turn the manual control of the set to the high frequency end, against stop.
   - (b) Remove the pointer plate (note insulating washers under mounting screws) without disturbing the tuning mechanism.
   - (c) Using a spare core as a gauge, adjust the oscillator core K so that its rear surface is exactly flush with the front end of the oscillator coil winding.
   - (d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fiber mounting bushing.
   - (e) Adjust the antenna and R.F. cores J and L so that the front surfaces of these cores are flush with the front ends of the coil fiber mounting bushing. Mechanically align the cores so that all three are just at the point of entering their respective windings when the tuning mechanism is against the high frequency stop.
   - (f) Replace the pointer plate assembly.
3. Aligning at 1560 KC.
   - (a) Connect the signal lead of the signal generator to the antenna connection of the receiver through a 70 mmfd. condenser.
   - (b) Turn the manual control of the set to the high frequency end against stop.
   - (c) Set signal generator to 1560 KC.
   - (d) Adjust the oscillator trimmer "F" for maximum output.
4. Aligning at 600 KC.
   - (a) Leave the signal generator connected the same as before and set frequency to 600 KC.
   - (b) Tune in this frequency on the set.
   - (c) Adjust the R.F. trimmer G for maximum output.
   - (d) Adjust the antenna trimmer H for maximum output.
5. Aligning at 1400 KC.
   - (a) Set the signal generator to 1400 KC and tune set to this signal.
   - (b) Adjust the antenna core J and the R.F. core L for maximum output.
6. Realigning at 600 and 1400 KC.
   - (a) Repeat the alignment outlined under paragraphs 4 and 5 with as low an output from the signal generator as possible.
   - (b) Apply cement to the core screws to prevent their changing alignment.
7. Adjusting receiver to car antenna

   After the receiver is installed in the car, readjust the antenna trimmer H on a weak station near 1400 KC.

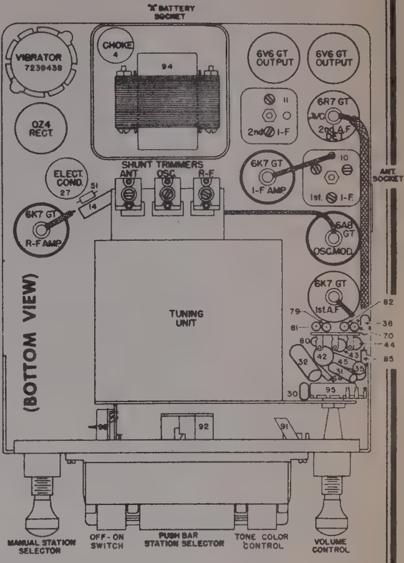
CHEVROLET DIV.—GEN. MOTORS



MODEL -- C-181

262 KC. I.F.

FIG. 1.
CIRCUIT DIAGRAM



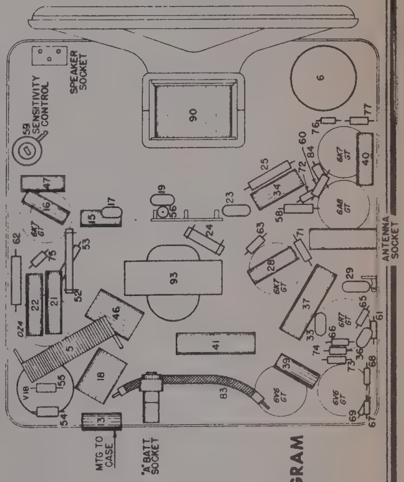


FIG. 2.

PARTS LOCATING DIAGRAM

(TOP VIEW)

3-33 . 985694
Date 10-1-40

This auto radio is an eight-tube self contained receiver, built expressly for installation in 1941 Chevrolet automobiles. Special features incorporated are: Automatic station selection; permeability tuning; sensitivity control; automatic noise control; temperature control condenser; four-position tone control; A.V.C. applied to R.F., I.F., and A.F. circuits; a dimmer control for dial lights; automatic bass compensation; push-pull beam power output; elliptical low resonance speaker; OZ4 rectifier; and a special full-wave primary type vibrator.

ANTENNA SYSTEM:

There are two antenna systems available for use with this receiver; the telescopic cowl antenna, and the telescopic reel-type antenna. Either of these antennas will operate very efficiently when used with this Chevrolet radio. A motor noise filter is built into the set end of the antenna system.

Solenoid Relief Valve

This valve is of the ball type and will operate only when the receiver is setting in normal operating position.

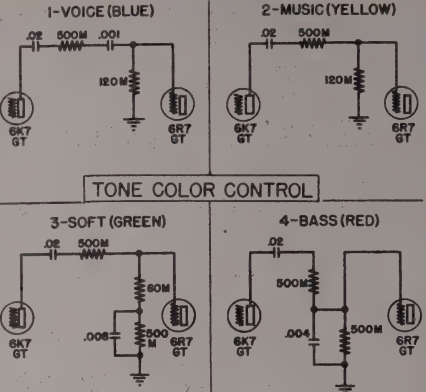
The automatic station selection tuning system is operated by a single bar. The system can be pre-set for five stations, each station having a corresponding number which is visible in small window to the right of tuning dial as that station is tuned in. To set the automatic tuning system to the five stations, proceed as follows:

1. Turn the receiver on and allow a sufficient length of time to permit the tubes to reach their normal operating condition.
2. Depress the automatic station selector until No. 5 is visible in the small window to the right of the dial.
3. Depress the large push-bar and hold in depressed position while carefully tuning in manually, the station which is to be represented by the figure 1 in the small window. Release bar and the first station has been set. Depress the push-bar and hold in that position then tune in manually the second station, and so on, until the five station positions have been set.

   To tune the receiver with the automatic station selector bar, merely keep depressing the bar until the program you wish to hear is tuned in. The numbers 1 to 5 which appear in the small window to the right of the dial, will indicate the station.

   NOTE: The accuracy of the automatic station selector depends upon how accurately the station is tuned in manually when setting it up. Always tune to a point where the clearest reception is obtained.

FIG. 5. TONE CONTROL WIRING



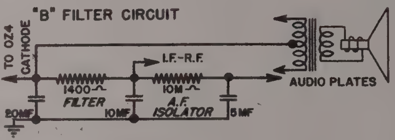
Tube Complement

Type	Function	Type	Function
6K7GT	R.F. Amplifier	6K7GT	1st Audio (A.V.C. Control)
6A8GT	Osc.-Modl.	6V6GT	Output (Push-pull)
6K7GT	I.F. Amplifier	OZ4	Rectifier
6R7GT	2nd Det. A.V.C. Driver		

Circuit Description

The circuit used in this receiver is the conventional superheterodyne type and does not use any regeneration. The eight tubes employed are an R.F. amplifier; combination oscillator-modulator tube; 262.5 k.c. I.F. amplifier, the first transformer of which is triple tuned; push-pull output, and power supply. The 6R7GT tube supplies A.V.C. voltage to the grids of the 6K7GT R.F. amplifier; the 6A8GT and the 6K7GT 1st A.F. tube. Bias for the 6K7GT R.F. amplifier and the 6A8GT is developed across a 750 ohm variable resistor (sensitivity control, item 59) which has a fixed minimum of approximately 140 ohms. The bias for the 6K7GT I.F. amplifier is developed across a 450 ohm resistor (item 63). The bias for the 6K7GT 1st audio tube is developed across a 1500 ohm resistor (item 84). The bias for the 6R7GT tube is developed across two resistors, one of 350 ohms (item 73), the other of 2400 ohms (item 74). These two resistors form a voltage divider, feeding a portion of the bias voltage through the 300,000 ohm R.F.-A.V.C. load resistor (item 66) to the grid of the 6R7GT providing approximately one volt (q). Bias for the 6V6GT output tubes is developed across a 220 ohm resistor (item 83), between the 6K7GT 1st audio plate and the 6R7GT (driver) grid for the resistor capacity network comprising the tone color control. The 6R7GT plate is coupled through a .1 mfd. condenser to one side of the center tapped audio input choke.

"B" FILTER CIRCUIT



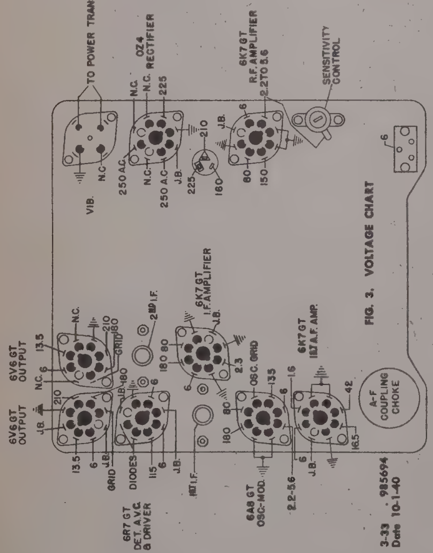


FIG. 3. VOLTAGE CHART

ALL MEASUREMENTS TAKEN WITH A 1000 OHMS PER VOLT 250 VOLTRANGE VOLTMETER.
ALL MEASUREMENTS TAKEN FROM SOCKET

CONNECTIONS TO CHASSIS.
J.B.= JUNCTION BLOCK.
N.C.=LUGS WITH NO CONNECTION

MODEL 985694

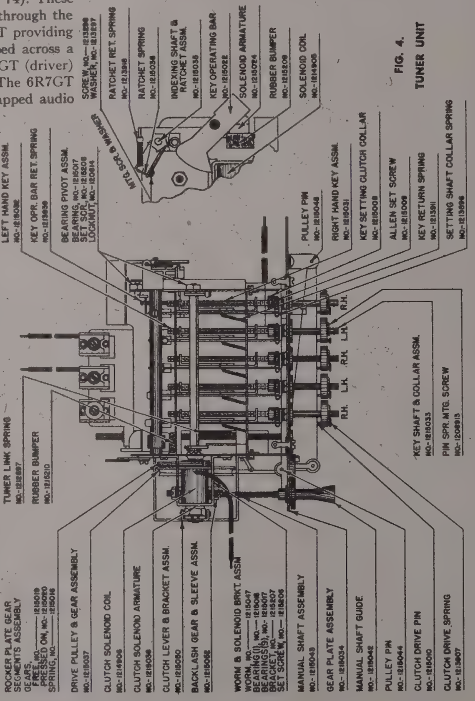

SCREW, NO.—1213298
WASHER, NO.—1213297
RATCHET RET. SPRING NO.-1213916
RATCHET SPRING NO.-1215036
INDEXING SHAFT & RATCHET ASSM. NO.-1215035
KEY OPERATING BAR NO.-1215022
SOLENOID ARMATURE NO.-1215024
RUBBER BUMPER NO.-1215209
SOLENOID COIL NO.-1214906
MTG. SCR. & WASHER
LEFT HAND KEY ASSM. NO.-1215032
KEY OPR. BAR RET. SPRING NO.-1213939
BEARING PIVOT ASSM.
BEARING, NO.-1215017
SET SCR., NO.-1215206
LOCKNUT, NO.-120614
PULLEY PIN NO.-1215046
RIGHT HAND KEY ASSM. NO.-1215031
KEY SETTING CLUTCH COLLAR NO.-1215008
ALLEN SET SCREW NO.-1215009
KEY RETURN SPRING NO.-1213911
SETTING SHAFT COLLAR SPRING NO.-1213896
R.H.
L.H.
R.H.
L.H.
R.H.
KEY SHAFT & COLLAR ASSM. NO.-1215033
PIN SPR. MTG. SCREW NO.-1206915
TUNER LINK SPRING NO.-1212697
RUBBER BUMPER NO.-1215210
ROCKER PLATE GEAR SEGMENTS ASSEMBLY
GEARS,
FREE, NO.—1215019
PRESSED ON, NO.-1215020
SPRING, NO.—1215016
DRIVE PULLEY & GEAR ASSEMBLY NO.-1215037
CLUTCH SOLENOID COIL NO.-1214906
CLUTCH SOLENOID ARMATURE NO.-1215038
CLUTCH LEVER & BRACKET ASSM. NO.-1215050
BACKLASH GEAR & SLEEVE ASSM. NO.-1215052
WORM & SOLENOID BRKT. ASSM
WORM, NO.—1215047
BEARING(1), NO.—1215006
BEARINGS(3), NO.-1215017
BRACKET, NO.—1215207
SET SCREW, NO.—1215206
MANUAL SHAFT ASSEMBLY NO.-1215043
GEAR PLATE ASSEMBLY NO.-1215034
MANUAL SHAFT GUIDE NO.-1215042
PULLEY PIN NO.-1215044
CLUTCH DRIVE PIN NO.-1215010
CLUTCH DRIVE SPRING NO.-1213907

FIG. 4. TUNER UNIT

CHEVROLET DIV.—GEN. MOTORS

MODEL 985694

Circuit Alignment

The adjustable condensers in this receiver have been very carefully adjusted at the factory and will require no further adjustment (excepting antenna trimmer) unless tampered with or a defective I.F. coil has been replaced. If realignment is found necessary the circuits can be adjusted only with the use of a signal generator and an output meter.

1. Aligning I.F. Stages at 262.5 Kilocycles

The I.F. amplifier may best be aligned by first using a modulated signal generator and an output meter in the conventional manner, and then making the final adjustment with a radio frequency modulated signal generator and oscillograph. The accuracy of the automatic tuning system partially depends upon the symmetry of the I.F. wave form. In most cases the symmetry is only approximate without the aid of the oscillograph equipment.

(a) Connect one terminal of the output meter to the plate of one of the 6V6GT output tubes, and connect the other terminal through a .1 mfd. condenser (not electrolytic) to the plate of the other 6V6GT output tube.

(b) Connect the ground lead from the signal generator to the frame of the receiver chassis. Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7GT I.F. amplifier tube leaving the tube's grid clip in place.

(c) Turn the volume control on full. Adjust station selector to low frequency (55) end of dial and press the tone control button to the "music" position.

(d) Adjust the signal generator to 262.5 kilocycles.

(e) Adjust the trimmer condensers located on the 2nd I.F. transformer for maximum reading on the output meter. NOTE: Use the lowest signal generator output that will give a reasonable reading on the output meter.

(f) Connect the output of the signal generator to the grid of the 6A8GT tube leaving the tube's grid clip in place.

(g) Open the middle trimmer (front) on the 1st I.F. transformer two or three turns of the adjusting screw. Care should be taken that the adjustment screw does not become dislodged from the nut.

(h) Adjust the other two trimmers (rear) on the 1st I.F. transformer for maximum reading on the output meter.

(i) Adjust the middle trimmer (front) on the I.F. transformer for maximum reading on the output meter. NOTE: Do not readjust the trimmers on the 2nd I.F. transformer.

2. Oscillograph Alignment

For more accurate adjustment of the I.F. amplifier a cathode ray oscillograph, in conjunction with a radio frequency modulated signal generator, may be used to obtain visual alignment. It will also allow adjusting for a more symmetrical wave form.

(a) Disconnect the conventional signal generator from the receiver.

(b) Connect the vertical plates of the oscillograph to the receiver connecting the (HI) terminal through a .02 mfd. condenser to the grid cap of the 6K7GT audio amplifier tube, leaving the tube's grid clip in place. Connect the ground terminal to the frame of the receiver chassis.

(c) Connect the output of the R.F. modulated signal generator also through a .02 mfd. condenser to the grid cap of the 6A8GT tube leaving the tube's grid clip in place. Connect the ground lead to the frame of the receiver chassis.

(d) Adjust the signal generator to 260.5 kilocycles.

(e) With the modulator switch of the signal generator turned off a horizontal line will appear on the window of the oscillograph. By means of the amplitude control on the oscillograph adjust the length of the line so that it is equal to the width of the celluloid scale supplied with the oscillograph.

(f) Turn the frequency modulator switch of the signal generator on.

(g) Adjust the vertical control of the oscillograph so that the image is just within the top and bottom lines of the oscillograph scale. NOTE: Use the lowest signal generator output that will give a stable image on the oscillator window. If too much signal input is used the humps desired on the wave form will not be visible even at perfect alignment.

(h) Readjust the middle trimmer condenser on the 1st I.F. transformer for maximum symmetry above the vertical resonance line in the center of the celluloid scale. The hump or shoulder appearing on each side of the wave form will be equal distance from the numbers of the curve when maximum symmetry is reached.

3. Aligning the R.F. Amplifier

NOTE: The tuning of this receiver is not accomplished in the conventional manner. Tuning is accomplished by specially designed iron cores which are moved in and out of the coils to vary the inductance. There are three matched cores mounted to a carriage and which move as a single unit. The adjustment (tracking alignment) of the iron cores is very critical, therefore they should not be tampered with. The permeability tuning unit is precision tested and aligned, then sealed at the factory, and should need no further adjustment.

NOTE: Do not touch iron core adjustments. See instructions under permeability tuning unit replacement procedure.

TO ALIGN THE R.F. AMPLIFIER

(a) Connect the output of the signal generator through a 40 mmfd. condenser and use the regular Chevrolet shielded lead-in to the antenna connection of the receiver.

(b) Connect the generator ground lead to the frame of the receiver chassis.

(c) Adjust the signal generator to 1610 kilocycles.

(d) Adjust the station selector knob until the high frequency (1610) stop is reached. The dial pointer should be at the indexing mark on dial (below 155).

(e) Adjust the shunt trimmer condensers for maximum output. The adjustment should be made in the following order: Oscillator—Antenna—R.F. NOTE: After the radio is installed in the car the antenna trimmer should again be adjusted. Using a very weak signal around 1550 kilocycles, which is just audible with volume control on full, the antenna trimmer should be peaked for maximum output.

4. Permeability Unit Replacement Procedure

Each unit is made of matched parts. The iron cores in any one unit must be of the same group. There are four groups or classifications graded according to permeability and coded with a dot of paint on the screw end of the core. The code and value is as follows:

Code	Value
Red	2% to minus 1%
Blue	Minus 1% to mean value
Yellow	Mean value to plus 1%
Purple	Plus 1% to plus 2%

3-33 985694
Date 10-1-40

A. To Replace Iron Core Only:

(a) Remove speaker from case. This will give access to permeability tuning unit mounted to key assembly.

(b) Remove the two screws holding the bakelite core support strip to the carriage. Carefully remove assembly from carriage.

(c) Note the physical location of core to be replaced, then carefully remove defective core.

(d) Clean the cement from core fastener and then insert the new core (be sure new core is coded similar to cores used in set) in fastener so it is approximately in the same position as the one removed. Replace core assembly on carriage being very careful to insert cores in coil forms so as not to damage either.

(e) If either or both the antenna or R.F. cores have been changed, align them as follows:

1. Set the signal generator to 1610 kilocycles.
2. Turn control until carriage is all the way out. Pointer on dial should be at indexing mark (below 155).
3. Adjust the antenna and R.F. cores for maximum output.
4. Adjust the signal generator to 1400 kilocycles.
5. Readjust the antenna and R.F. cores to peak at 1400 kilocycles.
6. Adjust the signal generator to 1610 kilocycles.
7. Adjust the shunt trimmer condensers for maximum output.

(f) The alignment procedure after changing the oscillator iron core, is as follows:

1. Insert core (same code) into core retainer to approximately the same physical position as one removed.
2. Adjust the signal generator to exactly 1610 kilocycles.
3. Move carriage (with manual tuning knob) to minimum position (pointer at 1610 kilocycles).
4. Adjust the oscillator trimmer condenser for maximum output, then adjust antenna and R.F. trimmer for maximum output.
5. Move carriage in approximately 3/16 of an inch.
6. Adjust the signal generator to 1400 kilocycles.
7. Adjust the oscillator core, the antenna and R.F. cores for maximum output.
8. Adjust the signal generator to exactly 1610 kilocycles and touch up the shunt trimmer condenser.

B. Replacing Complete Permeability Unit:

To facilitate this work, remove chassis from case.

(a) Remove the top and bottom covers from the case, then remove the speaker.

(b) Unsolder the "a" connection and motor noise choke from log on spark plate (mounted to case).

(c) Remove p.k. screws holding chassis in case and remove the chassis and front panel from case.

(d) To remove tuning unit (key assembly, etc.):

1. Remove the dial pointer from drive string.
2. Unsolder the two ground bonds, antenna connection, its shield, the blue, green, and black leads of the tuning unit, and also the A.V.C. resistor attached to the junction block.
3. Unsolder the clutch coil and the solenoid coil leads from the push-bar switch.
4. Loosen the set screw in the indexing shaft and remove long flexible shaft.
5. Loosen the unit on the volume control.
6. Remove the four screws which attach the whole tuning unit to the chassis.
7. Unsolder the .001 mfd. grid coupling condenser from antenna trimmer on unit. Unhook the spring and connecting link connecting the rocker arm and tuning carriage.
8. Remove permeability assembly by removing three screws accessible through keys on tuning unit and replace with new assembly.
9. The adjustments necessary on new units are the same as outlined under paragraph headed "Aligning the R.F. Amplifier".

   IMPORTANT: The permeability unit must not present any load or drag to the rest of the tuning unit. The method of determining whether or not there is too much friction is to hold the unit (permeability only) so that the iron cores will move in and out of the coils of their own weight. If they do not, too much friction is present. The total linear motion of the iron cores rack is 1.375 inches. Always seal iron core screws after an adjustment.

5 Automatic Tuning Unit

When the push-button bar is depressed, the following action takes place. The lower rear side of the bar pushes in lever on the solenoid. When the solenoid switch makes contact it closes the "A" circuit to both the magnetic clutch solenoid coil and the key operating bar solenoid. The clutch solenoid disconnects the manual drive mechanism. While this is occurring the large solenoid is pulling down the key operating bar. This bar has an arm on the right side which is cam shaped on the end which moves lever on indexing shaft ratchet. This movement causes the indexing shaft to pull on key back far enough to permit the key operating bar to engage lower hook of key. The key is then drawn back by the key operating bar until the key rocker bar is lined up by the key toggle fingers. The movement of the key rocker bar is transmitted through a link which moves the permeability tuning rack (iron core assembly) tuning in station for which that position was set. The indexing shaft has five studs so spaced that while one stud is pushing a key back so the key operating bar will engage the lower hook on the key, the next stud on the shaft is indexed ready to push the next key back. This follows in sequence. In the end of the indexing shaft is a flexible drive cable which operates the station indicator drum. This entire action takes place instantaneously when the push button is depressed.

Adjustments

The solenoid clutch face gap should be approximately .026 inches. This is adjusted by bending the clutch operating bar just above the pivot. The backlash gears on both the clutch and the rocker bar are adjusted on tooth.

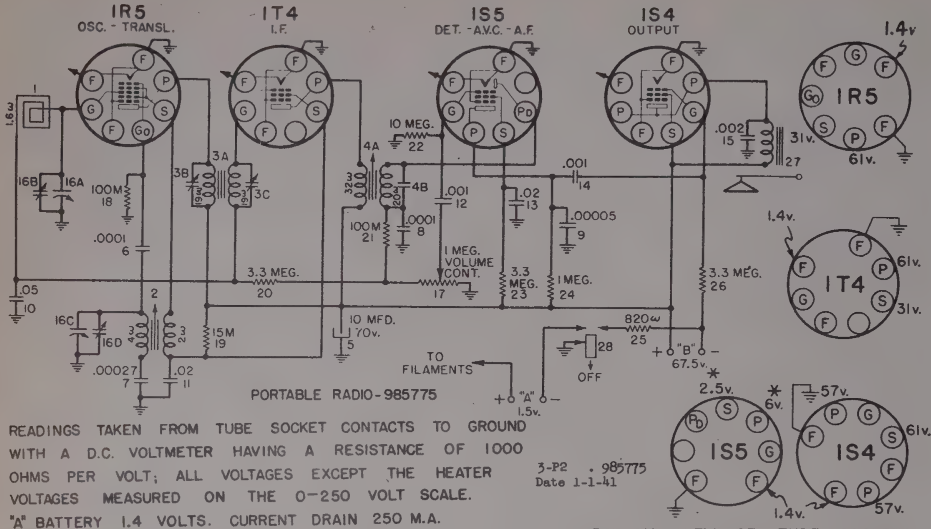
Key Adjustment

To adjust a key the two fingers should be parallel (straight up and down). Turn the rocker bar until it is exactly vertical. Push key in until both fingers are against the rocker bar. With the key in this position the key setting clutch shaft (1215033) should have its "C" washer bearing against the end of key and the clutch shaft locking collar should also be bearing against key. The shaft must turn freely and not bind or be rough. With the key in the above position adjust the gap against the key setting clutch to approximately .010 clearance between the clutch and gear face. With the setup as stated above, the correct distance between the inside edge of the hook on key (which engages the key operating bar) and the outside face of the rear key guide bar, should be 54/64 of an inch. Adjust and tighten set screw in key clutch shaft locking collar.

IMPORTANT: Do not put oil on solenoid armature or on the clutch solenoid armature.

MODEL 985775

CHEVROLET DIV.—GEN. MOTORS



READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0–250 VOLT SCALE.

"A" BATTERY 1.4 VOLTS. CURRENT DRAIN 250 M.A.

"B" SUPPLY DRAIN APPROXIMATELY 10 M.A.

✳ READINGS MUCH LOWER THAN ACTUAL VOLTAGE BECAUSE OF HIGH SERIES RESISTANCE.

3-P2 . 985775
Date 1-1-41

BOTTOM VIEW OF TUBE SOCKETS LOOKING FROM BACK OF SET

"A" BATTERY CURRENT	–	250 M.A.
"B" BATTERY CURRENT	–	10 M.A.
B+ TO B–	–	67.5 VOLTS
I.F. K.C.	–	455
R.F. K.C.	–	1600 TO 540

IMPORTANT: Batteries must be in their proper positions before making any adjustments.

ALIGNING I-F STAGES AT 455 KILOCYCLES

Connect the signal lead of the test oscillator through a .1 mfd. condenser, to terminal "X" on variable condenser 16A (see Parts Layout), which is the grid lead of the 1R5 tube.

Connect the ground lead of the test oscillator to the chassis frame.

Connect the output meter through a .5 mfd. condenser from the plate prong of the 1S4 output tube to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages, and to prevent short circuit of "B" battery

Turn volume control to maximum.

Adjust the trimmers 3B, 3C and 4A on the I-F Transformers for maximum output. (See Parts Layout.) These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

ALIGNING AT 1600 KILOCYCLES

Leave the test oscillator leads connected the same as for aligning the I-F circuits.

Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

Adjust the condenser 16D (see Parts Layout) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

ALIGNING THE ANTENNA STAGE 1400 K.C.

Remove the signal lead of the test oscillator from the grid of the 1R5 tube. Run a wire from the output terminal of the test oscillator, having it come near the receiver. NOTE: No metallic connection is made between the test oscillator and the receiver.

Turn the condenser rotor plates until this frequency is tuned in with maximum output.

Adjust the Antenna Trimmer "16B" (see Parts Layout) for maximum output.

ALIGNING AT 600 KILOCYCLES

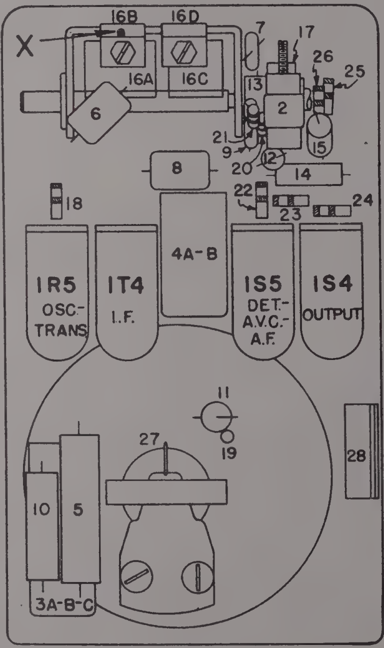
Turn the condenser rotor plates until the radiated signal from the test oscillator is tuned in with maximum output.

Maintain a low output signal from the test oscillator and adjust the oscillator padding adjustment on item 2 (see Parts Layout) while rocking the variable condenser gang tuning shaft back and forth through the signal.

This operation should be continued until no further increase in output can be obtained.

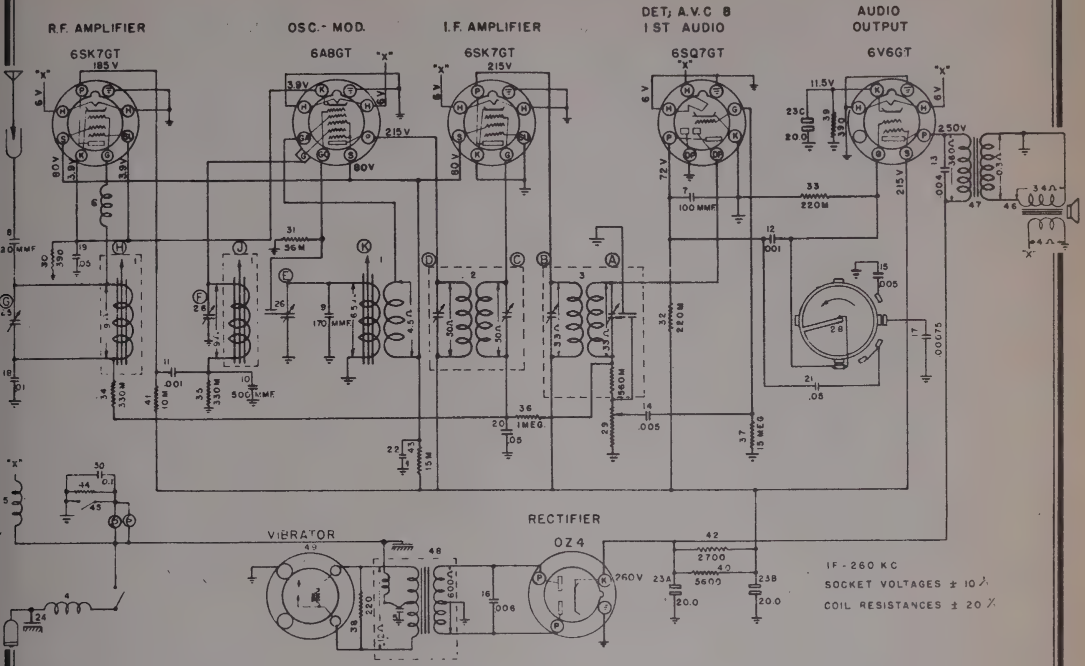
After the above operation turn the condenser rotor plates to the high frequency stop position. Check the 1600 K.C. setting and if necessary readjust trimmer "16D". Then return to 1400 K.C. for final antenna trimmer adjustment.

If the entire alignment procedure has been accomplished correctly, the receiver should be uniformly sensitive over the entire frequency range.



CHEVROLET DIV.—GEN. MOTORS

MODEL 985695



IF - 260 KC
SOCKET VOLTAGES ± 10 %
COIL RESISTANCES ± 20 %

3-34 . 985695
Date 10-1-40

FIG. 1. CIRCUIT DIAGRAM

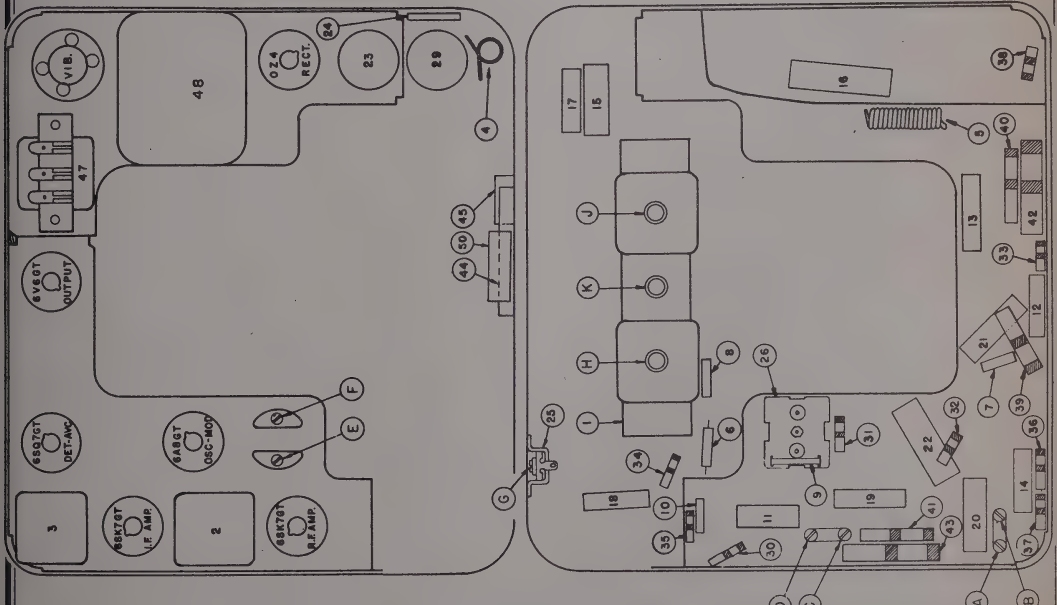


FIG. 2. PARTS LOCATING DIAGRAMS (TOP AND BOTTOM VIEWS)

MODEL 985695

CHEVROLET DIV.—GEN. MOTORS

Circuit Description

The circuit used in this receiver is the conventional superheterodyne type and does not use any regeneration. A special tone control circuit is employed to give the desired tone without distortion. The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coils by means of iron cores which slide in and out of the coils like pistons. The alignment of the cores has been sealed at the factory and they should not require readjustment unless the coils have been changed.

Circuit Alignment

The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a coil has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that alignment is necessary. Due to the fact that the iron cores are sealed in place at the factory, only the trimmer adjustment as outlined under "Capacity Alignment" should be made, unless the coils of the iron core tuning unit are changed. A signal generator and an output meter must be used to align the receiver circuit correctly. To make all alignment adjustments the front and back covers must be removed. All trimmer condensers are readily accessible.

Capacity Alignment

1. I.F. Alignment at 260 Kilocycles

(a) Connect a .1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter. Connect the second terminal of the output meter to ground. This will protect the meter from DC voltages.

(b) Connect the ground lead of the signal generator to the chassis frame.

(c) Connect the signal lead of the signal generator to the grid cap of the 6A8GT tube through a .1 mfd. condenser. Leave the grid connection on the tube in place.

(d) Turn the set volume control on full and put tone control on "music" position. Adjust the signal generator to 260 kilocycles. Tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved through narrow limits no appreciable change in output may be noted.

(e) Adjust the I.F. trimmers (a), (b), (c), and (d) for maximum output.

2. Aligning at 1560 Kilocycles

Set the signal generator to 1560 kilocycles.

(a) Connect the signal lead of the signal generator to the receiver antenna connection through a 70 mmfd. condenser.

(b) Turn the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.

(c) Adjust the signal generator to 1560 kilocycles.

(d) Adjust the oscillator trimmer (e) for maximum output.

(e) Adjust the R.F. trimmer (f) for maximum output.

(f) Adjust the antenna trimmer (g) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles.

(b) Tune the receiver to the signal and readjust the trimmers (f) and (g) for maximum output. The signal generator output should be as low as possible and still give a satisfactory meter reading. NOTE: This type of tuning does not require alignment at 600 k.c.

4. Alignment with Car Antenna

Antenna trimmer (g) must be adjusted to match car antenna when the receiver is installed. Use a weak station signal near 1400 kilocycles. When a weak signal has been tuned in turn volume control on full and adjust antenna trimmer for maximum output. NOTE: When making this adjustment the antenna should be fully extended.

Capacity and Inductance Alignment

This should be used only when there is definite evidence of the iron cores being out of adjustment.

1. I.F. Alignment at 260 Kilocycles

The same procedure as previously outlined should be followed.

2. Aligning at 1560 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna connection of the set through a 70 mmfd. condenser.

(b) Adjust the signal generator to 1560 kilocycles.

(c) Rotate the manual tuning mechanism until the high frequency stop is reached. Mechanically align the iron cores (k), (h) and (j), by setting the oscillator core (k) so that its front edge sticks out 1⅛" from the end of the coil form, and the antenna and R.F. cores (h) and (j) stick out 1¹³⁄₃₂" from the end of the respective coil windings.

(d) Adjust the oscillator trimmer (e), the R.F. trimmer (f) and the antenna trimmer (g) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles and tune the set to this signal.

(b) Adjust the R.F. core (j) for maximum output.

(c) Adjust the antenna core (h) for maximum output. NOTE: When checking maximum output remove hand from vicinity of the cores as body capacity will affect readings.

4. Realignment at 1560 and 1400 Kilocycles

(a) Repeat alignment of trimmer (e) and trimmers (f) and (g) at 1560 kilocycles.

(b) Repeat alignment of cores (k) and (j) at 1400 kilocycles. When this adjustment has been made seal the core screws with cement.

5. Alignment with Car Antenna

Antenna trimmer (g) must be adjusted to match car antenna when receiver is installed. Use a weak station signal near 1400 kilocycles that is audible with volume control on full. Adjust antenna trimmer for maximum output. NOTE: The antenna should be fully extended when making this adjustment.

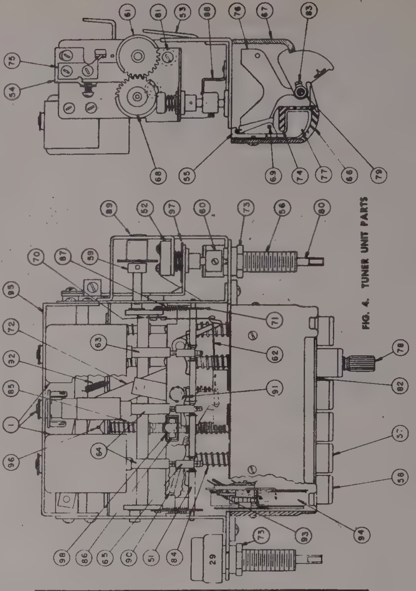


FIG. 4. TUNER UNIT PARTS

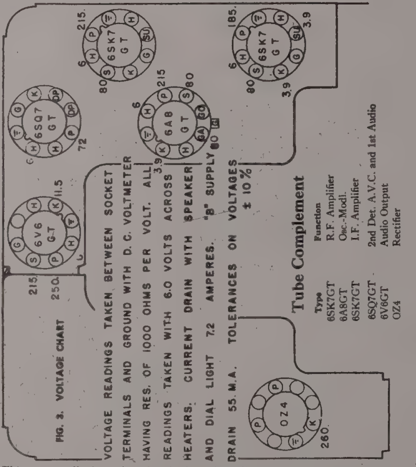


FIG. 3. VOLTAGE CHART

VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D. C. VOLTMETER HAVING RES. OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.2 AMPERES. "B" SUPPLY DRAIN 55 M.A. TOLERANCES ON VOLTAGES ± 10%

Tube Complement

Type	Function
6SK7GT	R.F. Amplifier
6A8GT	Osc.-Modl.
6SK7GT	I.F. Amplifier
6SQ7GT	2nd Det. A.V.C. and 1st Audio
6V6GT	Audio Output
OZ4	Rectifier

This auto radio is a six-tube single unit radio designed especially for 1941 Chevrolet automobiles. The complete radio mounts behind the instrument panel, and has six push-buttons (five for tuning and one for tone control). The manual tuning control, volume control knob and the dial extend through the instrument panel, blending with the design of the car interior. An elliptical speaker is used and is mounted in front of the receiver and projects its tone through the ornamental grille of the 1941 Chevrolet instrument panel. The tuning is accomplished by a mechanical unit of rugged construction assuring accuracy. A special compensating condenser is employed in the oscillator circuit to minimize tuning circuit changes due to normal variations in car voltages and temperature ranges. The power supply consists of an OZ4 rectifier tube used in conjunction with a full wave primary type vibrator.

ANTENNA CIRCUIT

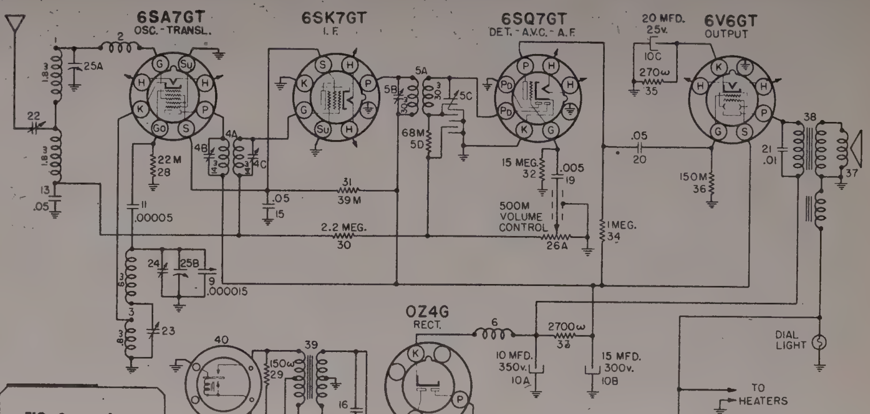
The antenna circuit is directly coupled to the antenna. The antenna coil is tuned by means of an iron core and the circuit is adjusted for slight variations in antenna capacity by means of an antenna trimmer located on the bottom of the receiver case.

ANTENNA SYSTEM

There are two antenna systems available for use with this receiver: the telescopic cowl antenna, and the telescopic reel-type antenna. Either of these antennas will operate very efficiently when used with this Chevrolet radio.

CHEVROLET DIV.—GEN. MOTORS

MODEL 985696



I.F = 455 K.C.

FIG. 1. CIRCUIT DIAGRAM

3-35 . 985696
Date 10-1-40

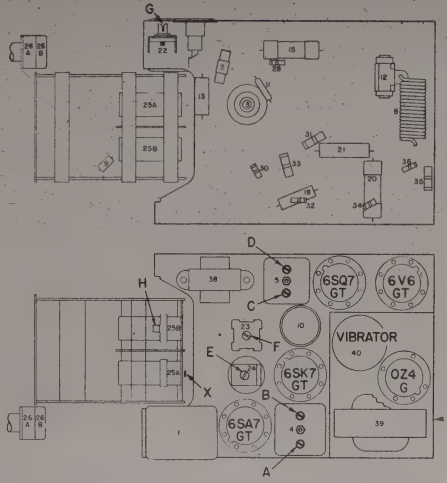
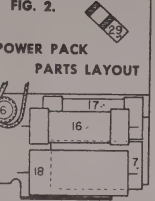


FIG. 2. PARTS LOCATING DIAGRAM (TOP AND BOTTOM VIEWS)

FIG. 2.

POWER PACK
PARTS LAYOUT



MODEL NUMBER -- 985696

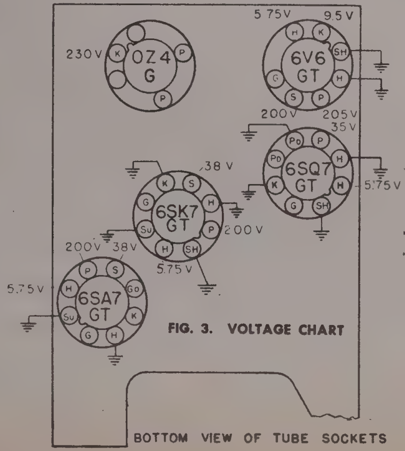


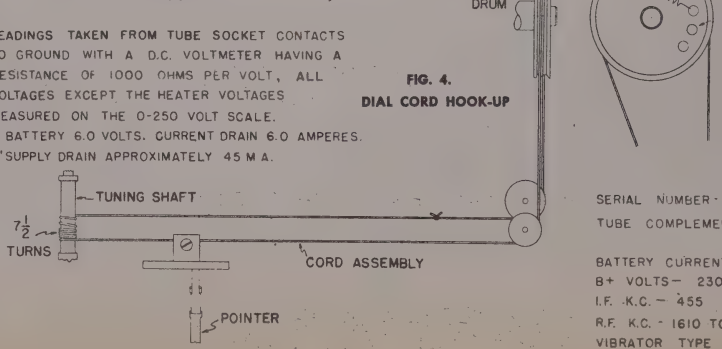
FIG. 3. VOLTAGE CHART

BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT, ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0-250 VOLT SCALE.

"A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.0 AMPERES.

"B" SUPPLY DRAIN APPROXIMATELY 45 M A.



ADJUSTMENT HOLES FOR CORD TENSION

POSITION OF DRUM ASSEMBLY WITH COIL CORES FULLY IN.

FIG. 4.
DIAL CORD HOOK-UP

SERIAL NUMBER -- B41-085001 & UP

TUBE COMPLEMENT – 6SA7GT, 6SK7GT, 6SQ7GT, 6V6GT, 0Z4G

BATTERY CURRENT – 6.0 AMPERES

B+ VOLTS – 230 VOLTS

I.F. K.C. – 455

R.F. K.C. - 1610 TO 540

VIBRATOR TYPE - NON SYNCHRONOUS

1. Aligning I.F. Stages at 455 Kilocycles

(a) Connect the signal lead of the test oscillator to terminal "X" on variable condenser 25A (see parts layout) which is the grid lead of the 6SA7GT tube through a .1 mfd. condenser.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect a .1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter. Connect the second terminal of the output meter to ground. This will protect the meter from d.c. voltages.

(d) Set the signal generator at 455 kilocycles.

(e) Turn volume control on full.

(f) Adjust the trimmer condensers (a), (b), (c), and (d), on the I.F. transformers for maximum output.

These adjustments should be repeated several times, and during alignment the signal generator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the signal generator leads connected the same as for aligning the I.F. circuit.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop (h).

(c) Set the signal generator at 1560 kilocycles.

(d) Adjust condenser (e), (see parts layout) for maximum output.

NOTE: It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning the Antenna Stage

(a) Remove the signal lead of the signal generator from the grid of the 6SA7GT tube and connect to the antenna terminal of the receiver through a .000075 mfd. mica condenser connected in place of the .1 mfd. condenser previously used. NOTE: It is very important that a .000075 mfd. mica condenser be used when aligning the antenna stage of the receiver in order that this circuit can be made to track properly.

(b) Adjust the signal generator to 1400 kilocycles.

(c) Turn the condenser rotor plates until the 1400 k.c. signal is tuned in with maximum output.

(d) Adjust antenna trimmer (g), (see parts layout) for maximum output.

4. Aligning at 600 Kilocycles

(a) Adjust the signal generator to 600 kilocycles.

(b) Turn the condenser rotor plates until the signal from the generator is tuned in with maximum output.

(c) Maintain a low output signal from the signal generator and adjust the oscillator padding condenser (f), (see parts layout) while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

(e) After the above operation, turn the condenser rotor plates to the high frequency stop position. Check the 1560 k.c. setting and if necessary readjust trimmer (e) then return to 1400 k.c. for final antenna trimmer adjustment.

NOTE: If the entire alignment procedure has been accomplished correctly the receiver should be uniformly sensitive over the entire frequency range.

CHEVROLET DIV.—GEN. MOTORS

MODEL 985697

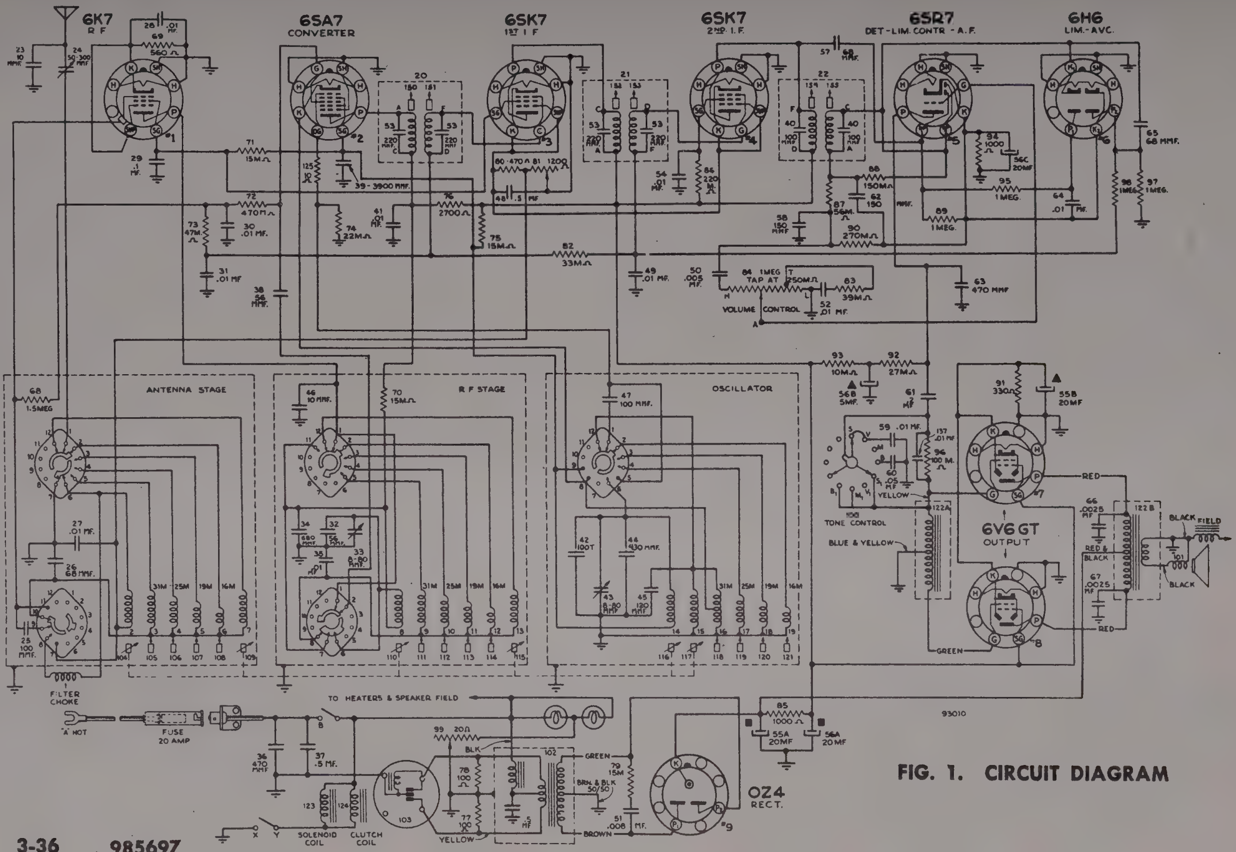


FIG. 1. CIRCUIT DIAGRAM

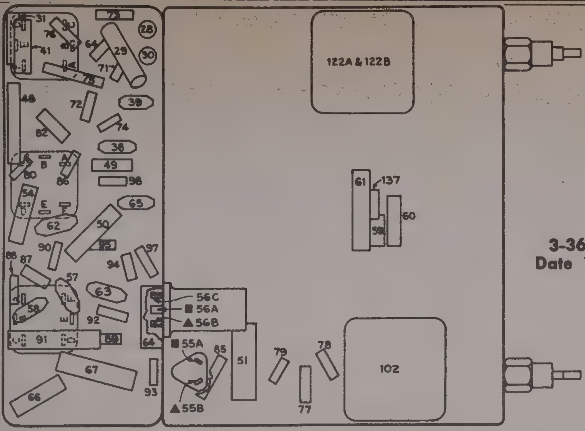
3-36 . 985697
Date 10-1-40

I.F. = 455 K.C.

ANTENNA SYSTEM: There are two antenna systems available for use with this receiver; the telescopic cowl antenna, and the telescopic reel-type antenna. Either of these antennas will operate very efficiently when used with this Chevrolet radio. A motor noise filter is built into the set end of the antenna system.

MODEL 985697

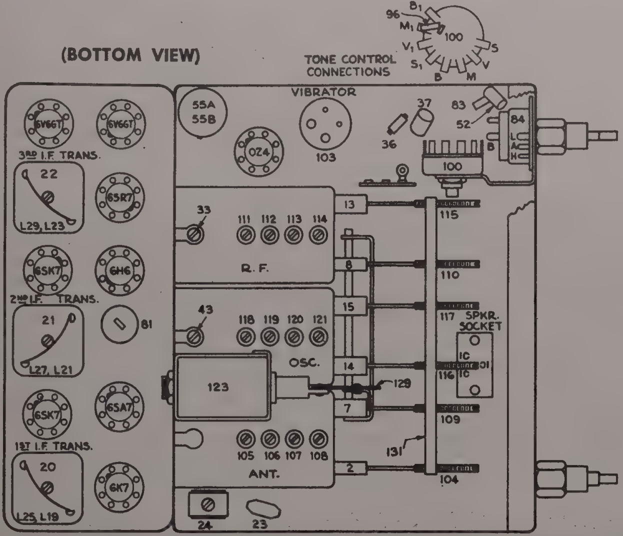
CHEVROLET DIV.—GEN. MOTORS



3-36 . 985697
Date 10-1-40

FIG. 4. PARTS LOCATING DIAGRAM (TOP VIEW)

(BOTTOM VIEW)



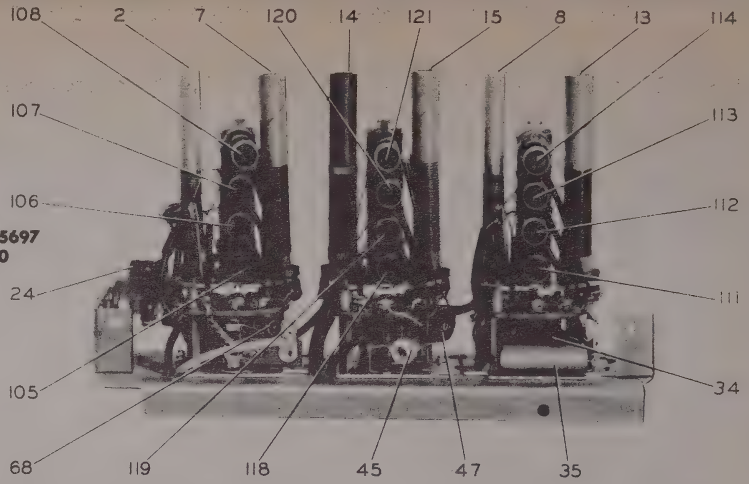
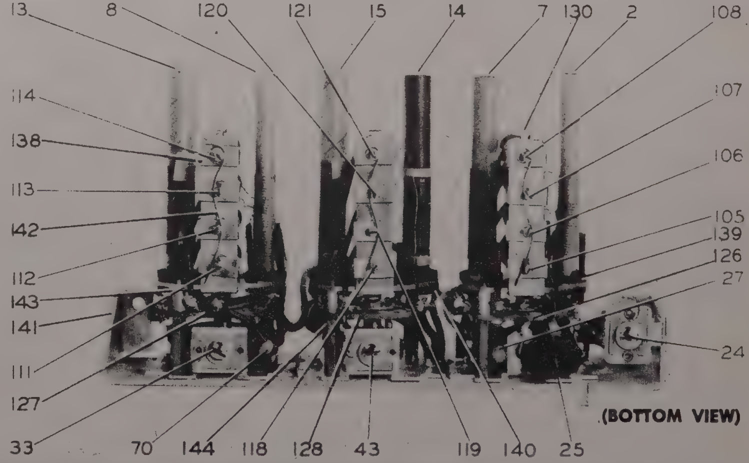


FIG. 9. COIL ASSEMBLIES (TOP VIEW)



(BOTTOM VIEW)

CHEVROLET DIV.—GEN. MOTORS

MODEL 985697

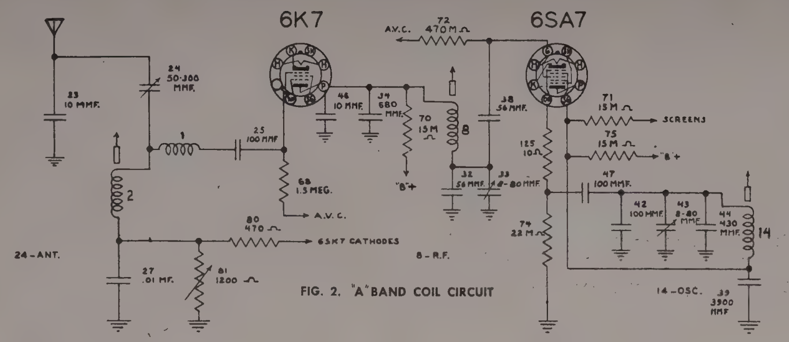


FIG. 2. "A" BAND COIL CIRCUIT

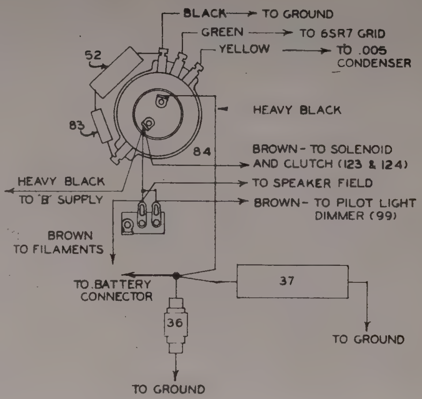


FIG. 7. VOLUME CONTROL WIRING

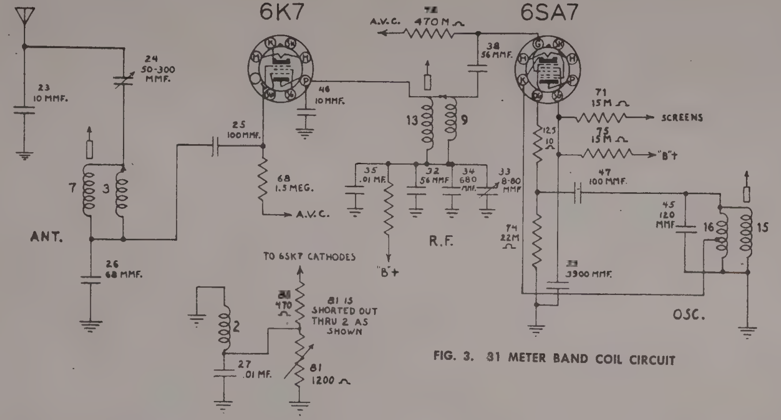


FIG. 3. 31 METER BAND COIL CIRCUIT

3-36 . 985697
Date 10-1-40

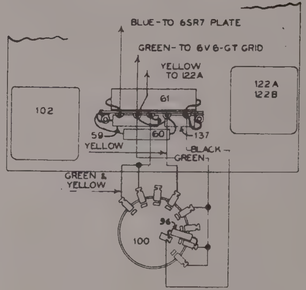
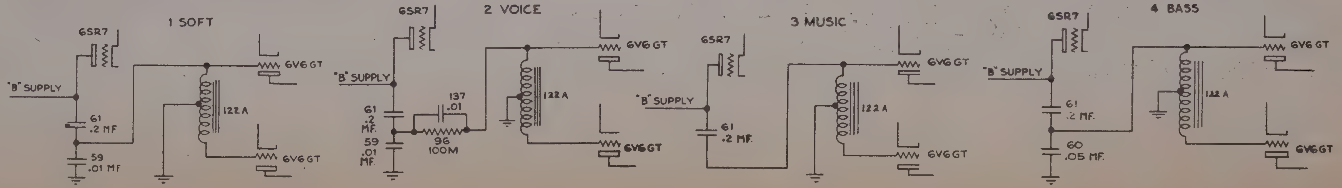


FIG. 7. TONE CONTROL WIRING

FIG. 6. TONE CONTROL POSITION WIRING



MODEL 985697

CHEVROLET DIV.—GEN. MOTORS

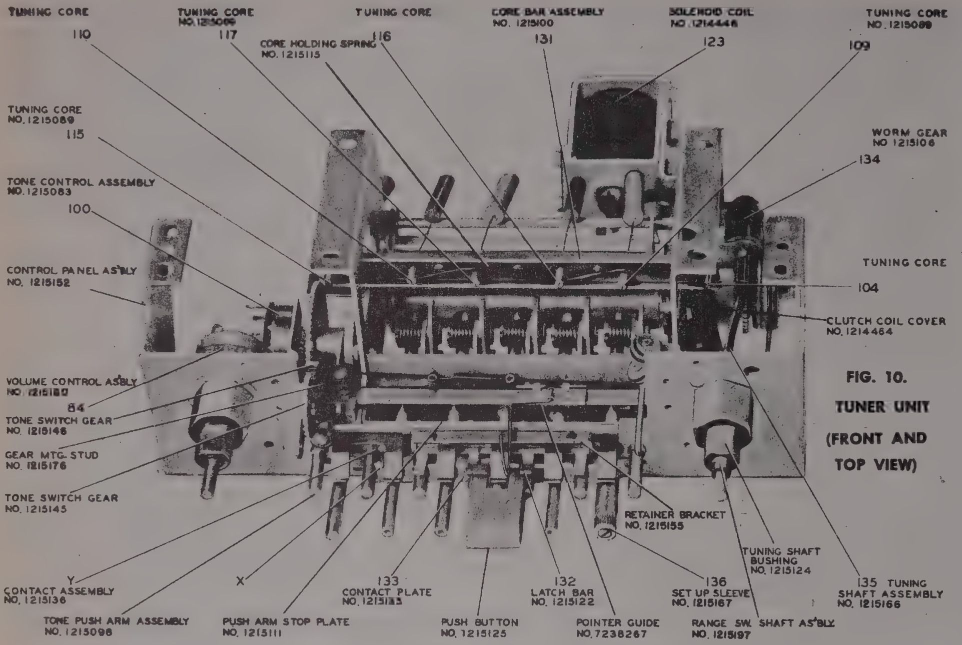


FIG. 10.
TUNER UNIT
(FRONT AND
TOP VIEW)

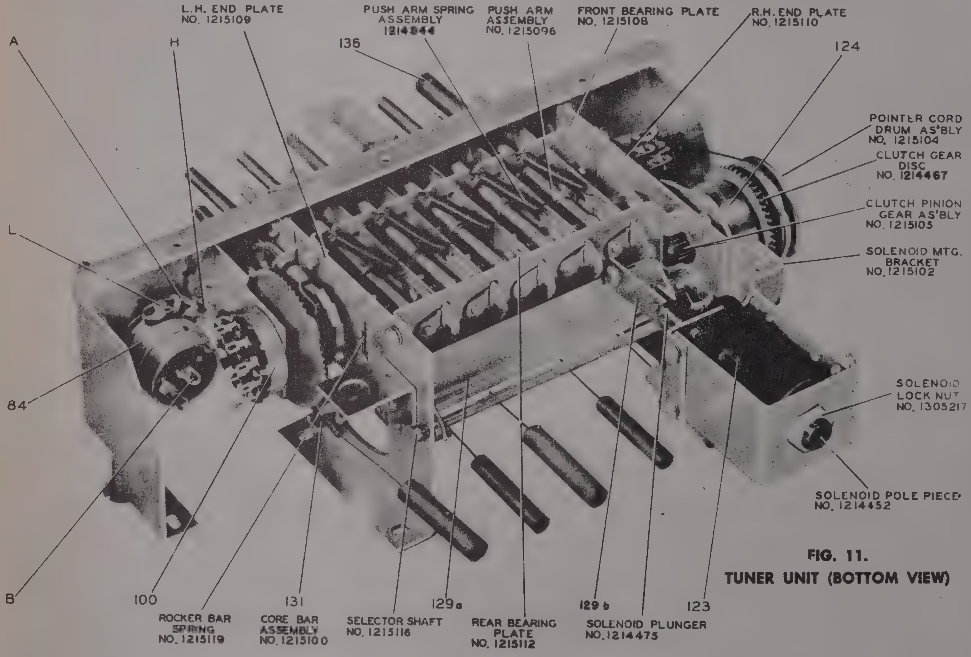


FIG. 11.
TUNER UNIT (BOTTOM VIEW)

CHEVROLET DIV.—GEN. MOTORS

MODEL 985697

Circuit Alignment

The adjustable condensers and magnetite cores in this receiver have been very carefully adjusted at the factory and should require no further adjustment (except antenna trimmer, item 24) unless tampered with or a defective unit has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that an adjustment is necessary.

To align the circuits of this receiver correctly a signal generator and an output meter must be used. In aligning the receiver it is very important that the correct frequencies be used and that all alignment adjustments be made in sequence, starting with the I.F. amplifier, then aligning the broadcast band, and finally the short wave band. Slight misadjusting of either the I.F. or R.F. circuits will result in a weak set over most of the dial. All R.F. and I.F. adjustments are accessible after removing the speaker cover, top cover and rear bottom cover. The I.F. primary windings are adjusted by magnetite core screws Nos. 150, 152 and 154, located on top of the I.F. transformers (Fig. 1); and the secondary windings are adjusted by core screws Nos. 151, 153 and 155, located at the bottom of each I.F. transformer (Fig. 1).

1. Aligning I.F. Stages at 455 Kilocycles

(a) Connect one terminal of the output meter to the plate of one of the 6V6GT output tubes and connect the other terminal through a .1 mfd. condenser to the plate of the other 6V6GT output tube.

(b) Connect the output of the signal generator through a .01 mfd. condenser to the grid of the 2nd I.F. tube, 6SK7 (Pin No. 4). Connect the ground lead from the signal generator to the frame of the receiver chassis.

(c) Turn the volume control on full.

(d) Adjust the signal generator to 455 kilocycles.

(e) Adjust core screws (154 and 155) on the 3rd I.F. transformer for maximum reading on the output meter. NOTE: Always use the lowest signal generator output that will give a reasonable deflection on the output meter.

(f) Connect the signal generator lead through the .01 condenser to the grid of the 1st I.F. tube. 6SK7 (Pin No. 4), and adjust core screws (152 and 153) in the 2nd I.F. transformer for maximum output.

(g) Connect the signal generator lead through the .01 condenser to the grid of the 6SA7 tube (Pin No. 8) and adjust core screws (150 and 151) in the 1st I.F. transformer for maximum output.

2. Aligning the R.F. Amplifier

The main tuning cores should never be touched unless a coil or core is replaced. Where one of these parts has been replaced the complete broadcast band alignment procedure (No. 3) should be followed. Generally when checking the R.F. circuits for proper peaking the following procedure and sequence must be used. There are fifteen trimmer screws properly labeled "Antenna", "Oscillator", and "R.F." The broadcast band is designated by the letter "A" and the four short wave bands are designated by the numbers indicating the bands—31, 25, 19 and 16. The labels all appear on the coil assembly shields.

(a) **"A" Band, or Broadcast:**

If the dial pointer is right on calibration, merely trim the "A" band, antenna and R.F. trimmers at 600 kilocycles. If the pointer is slightly off calibration it can be corrected by resetting the oscillator trimmer slightly and then trim the antenna and R.F. circuits for maximum output. (NOTE: When the radio is installed in the car the antenna trimmer should be aligned on the "A" band between 1000 and 1200 kilocycles.)

(b) **31 Meter Band:**

Using a signal of 9.6 megacycles, tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim antenna and R.F. trimmers for maximum output at 9.6 megacycles.

(c) **25 Meter Band:**

Using a signal of 11.8 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmer for maximum output at 11.8 megacycles.

(d) **19 Meter Band:**

Using a signal of 15.2 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmers for maximum output at 15.2 megacycles.

(e) **16 Meter Band:**

Using a signal of 17.8 megacycles tune in the signal with the receiver. If the pointer is slightly off calibration readjust the oscillator trimmer and then trim the antenna and R.F. trimmers for maximum output at 17.8 megacycles.

NOTE: The 31-meter band affects the tuning of the other short wave bands, therefore it must always be aligned first. It is equally important that the antenna trimmer (item 24) be aligned first on the broadcast band for proper tracking.

3. Broadcast Band Alignment

Six adjustments are provided which include trimmers Nos. 24, 33 and 43, associated with circuits Nos. 2, 8, 14 and the three iron cores Nos. 104, 110 and 116, which are mounted in front of the coil assemblies in conjunction with the core draw-bar No. 131. If complete realignment is found necessary the R.F. circuits should be adjusted in the following sequence.

(a) Tune the receiver to the extreme high frequency end of the band.

(b) Turn each of the three core screws (104, 110 and 116) in a counterclockwise direction ten turns. NOTE: This is done in order to separate the cores from the coil windings far enough so that the cores will have no effect on the frequency of the circuits.

(c) Connect the signal generator through a 35 mmf. condenser to the standard Chevrolet shielded antenna lead-in. Connect the ground lead from the signal generator to the shield of the antenna lead-in cable.

(d) Connect one terminal of the output meter to the plate of one of the 6V6GT output tubes, and connect the other terminal through a .1 mfd. condenser to the plate of the other 6V6GT output tube.

(e) Adjust the frequency of the signal generator to 1590 kilocycles and peak trimmers Nos. 24, 33 and 43 for maximum signal output, at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.

(f) Change the frequency of the signal generator to 1560 kilocycles and turn the oscillator core screw (116) clockwise until maximum output is obtained.

(g) Change the frequency of the signal generator to 1200 kilocycles and tune the receiver for maximum signal at 1200 kilocycles.

(h) Adjust core screws (104 and 110) for maximum signal output.

(i) Change the frequency of the signal generator to 600 kilocycles.

(j) Tune the receiver for maximum signal output at 600 kilocycles.

(k) Adjust the antenna and R.F. trimmers (24 and 33) for maximum output.

(l) Reset the signal generator to 1200 kilocycles and tune the receiver for maximum output at 1200 kilocycles.

(m) Adjust the antenna and R.F. cores (104 and 110) for maximum output.

4. Complete Short Wave Alignment

Because of the extensive range of this receiver, it is necessary that the short wave bands be completely aligned in exact accordance with the following procedure. Be sure to make all adjustments in the order specified.

(a) Check broadcast band antenna trimmer (item 24) for maximum peaking. This is very important.

(b) Tune the receiver so that the dial pointer is at the extreme high frequency end of the 31-meter band, and adjust the magnetite core screws (109, 115 and 117) so that each core end is flush with the coil forms (items No. 7, No. 13 and No. 15) which extend beyond the shield.

(c) Turn the magnetite trimmer core screws (105, 106, 107, 108, 111, 112, 113, 114, 118, 119, 120 and 121) in a counterclockwise direction, as far as they will go. NOTE: Do not force the cores against their stops as too much force may fracture the core.

(d) Connect the signal generator through a 35 mmf. condenser and the Chevrolet shielded antenna lead-in, to the antenna connection of the receiver. Connect the ground lead from the signal generator to the shield of the lead-in.

(e) Turn the band indicator to 31 meters and turn the volume control to the maximum position.

(f) Adjust the signal generator frequency to 9.6 megacycles and move the pointer to 9.6 megacycles on the dial scale.

(g) Turn the core screw (118) in a clockwise direction until the first peak is obtained, and then adjust carefully for maximum reading on the output meter.

(h) Turn the core screw (111) in a clockwise direction until the 2nd peak is obtained, if more than one peak can be found, and adjust for maximum reading on the output meter at the same time reducing the signal generator output to as low a value as is consistent with a reliable indication on the output meter.

(i) Turn the core screw (105) in a clockwise direction or until 2nd peak is obtained, and adjust for maximum reading on the output meter.

(j) Change the signal generator frequency to 11.8 megacycles, the band indicator to 25 meters, and move the pointer meter to 11.8 megacycles on the dial scale.

(k) Turn the core screw (119) in a clockwise direction, until 1st peak is obtained, and adjust for maximum reading on the output meter.

(l) Turn core screws (112 and 106) in a clockwise direction until 2nd peak is obtained, and adjust for maximum reading on output meter.

(m) Change the signal generator frequency to 15.2 megacycles, the band indicator to 19 meters, and move the dial pointer to 15.2 megacycles on the dial scale.

(n) Turn core screw (120) in a clockwise direction until the 1st peak is obtained and adjust for maximum reading on the output meter.

(o) Turn core screws (113 and 107) in a clockwise direction until 2nd peak is obtained, and adjust for maximum reading on output meter.

(p) Change the signal generator frequency to 17.8 megacycles, the band indicator to 16 meters, and move the pointer to 17.8 megacycles on the dial scale.

(q) Adjust core screw (121) by turning in a clockwise direction until 2nd peak is obtained and adjust for maximum output.

(r) Adjust core screws (114 and 108) by turning in a clockwise direction until 1st peak is obtained and adjust for maximum reading on output meter.

(s) Repeat all operations starting with (e) until no further improvement can be obtained.

5. General Alignment Information

Alignment of the short wave bands should never be attempted without first peaking trimmer condenser No. 24 in accordance with the procedure outlined under "Broadcast Band Alignment" (3.). A slight misalignment of this trimmer condenser will result in unsatisfactory short wave operation, the reason being that trimmer condenser No. 24, is in the circuit on all bands but it should be peaked on the broadcast band only.

The most satisfactory method of aligning or checking the spread band ranges is on actual reception of short wave stations of known frequency by adjusting the magnetite core oscillator coil for each band, so that the short wave stations come in at the correct points on the dial. In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short wave stations a signal generator should be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the signal generator as a slight error will produce considerable inaccuracy on the spread band dial.

When adjusting the magnetite core trimmer in the auxiliary short wave coils, if more than one peak is found, select the peak specified in the alignment procedure for each band.

6. Adjusting Antenna Compensating Condenser

This adjustment should be made after the receiver has been properly installed in the car. Tune the receiver to a weak signal at the high frequency end of the broadcast band at about 1200 kilocycles. This signal should be just audible with volume control on full. Adjust the antenna compensating condenser for maximum signal strength. NOTE: When aligning the antenna trimmer condenser, be sure that the antenna is fully extended.

7. Instructions for Removal of Coil Unit

(a) Remove the top, rear bottom, and speaker cover from the receiver.

(b) Remove the row of tubes immediately behind coil unit assembly.

(c) Remove the two No. 8 self-tapping screws that hold the antenna connector to the side of the case, then unsolder the antenna cable shielding from the two grounding lances which will leave this part entirely free. Pry up the clips which hold the leads from the R.F. coils to the chassis. Free these leads. Unsolder the leads from the antenna, R.F. and oscillator coil assembly which is to be removed.

(d) Remove the two No. 8 screws which hold the solenoid mounting bracket to the main tuner frame. Place the solenoid out of the way, taking care that the armature does not get damaged. Unsolder the small condenser (item 23) from the case.

(e) Remove the 5/32 hex. head screw from the end of the switch shaft to be found at the center of the coil unit base. Remove the two nuts from the end of the band indicator shaft. The short link arm which is retained by these nuts is to be removed after the main assembly is free. Remove the two ⅝ hex. head screws that hold the coil unit base to the main coil assembly bracket.

(f) Turn the tuning indicator to the high frequency end of the band, then remove the three No. 8 self-tapping screws and the two No. 8 machine screws that hold the coil unit mounting bracket to the chassis. Remove the sleeve covered tension wire on the core bar, part No. 1215115, and back out the threaded portion of the two cores. This will leave the wire only passing through the threaded holes in the core bar. Carefully pull the cores from the coil forms by drawing the whole assembly towards the I.F. transformers. With the coil unit assembly in this position the affected coil can be removed by first moving it away from the coil unit assembly bracket until the projections at its base just clear the bracket, then raising the base end and withdrawing the unit over the I.F. transformer. CAUTION: When performing this operation take care that the band indicator shaft is not withdrawn with the coil unit assembly bracket.

8. To Disassemble Coil Units

(a) Turn all trimmer screws until they are within the coil unit cover.

(b) Remove the small spring steel clip, part No. 1215134, which anchors the coil bracket to the end of the cover. Two corners of this clip dig into the aluminum of the cover and care must be exercised when removing it so that no damage is done to the protruding coil tubes.

(c) Remove the two ⅝ nuts holding the shield can in place and slide the cover off.

9. Reassembling Coil Units

(a) Replace the cable clamp which holds the coil leads located between the 6K7 and the 6SR7.

(b) In replacing the cores into the coil tubes, grasp the threaded stud end, raise the core and work it into the coil tube.

(c) When the oscillator coil is removed be sure that the two detent balls at the switch shaft do not get lost.

(d) The two nuts which hold the short link arm to the band indicator shaft must be taken up tight.

(e) While replacing the coil unit mounting bracket be sure that the three bronze clips enter their slots in the shield cans properly.

10. Stiff Manual Tuning

Excessive stress on the worm bearing caused by tension or compression in the flexible manual tuning shaft (item 135) may cause stiff manual tuning. Such stress can readily be eliminated by loosening and retightening the set screw in the worm (item 134).

11. Tone Control

The four positions of the tone control are: Soft, Voice, Music and Bass. The tone control and its tone compensating network in the circuit is between the audio amplifier and the output stage. When the switch is in the "soft" position, the 100,000 ohm resistor (item 96) and the .01 mfd. condenser (item 137) are shorted out resulting in maximum lows. Some of the high audio frequencies are bypassed to ground through the .01 condenser (item 59). In the "voice" position the high audio frequency response remains the same as in the soft position but the 100,000 ohm resistor and the .01 condenser are in series with the primary of the driver stage transformer (item 122A) resulting in a reduced low frequency response. With the tone control switch in the "music" position, none of the high frequencies are bypassed and maximum lows are available because the 100,000 ohm resistor (item 96) and the .01 mfd. condenser (item 137) are shorted out. When the switch is in the "bass" position the high frequencies are bypassed to ground through the .05 condenser (item 60). The low frequency response remains the same as when the switch is in the music position.

12. Band Switching Circuits

The two switch sections as shown on the schematic diagram in the antenna stage and in the R.F. stage are actually one switch wafer in each case. The top section on the diagram is that set of contacts toward the coils as viewed from the coils. The lower set of contacts is that set of contacts away from the coils. The switch sections are all shown in the 16-meter band position. Referring to the top wafer sections, when the upper rotor fingers touch terminals No. 2, the 16-meter band is in the circuit. Terminals No. 3 are the 19-meter band contacts. Terminals No. 4 are the 25-meter band contacts. Terminals No. 5 are the 31-meter band contacts. Terminals No. 6 are the "A" band or broadcast band contacts.

The "A" band coil circuit shows the actual simplified circuit diagram for the "A" band without the switch contacts being shown. The same applies to the 31-meter band coil circuit. Coils 7, 13, 15 and 16 remain in the circuit at all times for short wave operation. When switching to the 25-meter band, coil No. 3 is replaced by coil No. 4. Coil No. 9 is replaced by coil No. 10. Coil No. 17 is switched across coils Nos. 15 and 16, thus on each of the 25, 19 and 16-meter bands there are three oscillator coils in parallel at the same time. The sensitivity control is removed from the circuit for short wave operation thereby giving full sensitivity on short waves.

In order to provide good tracking sensitivity only perfectly matched main tuning cores are used in the receivers on the "A" band (No. 104, 110 and 116). The cores are color coded with a spot of red, yellow or green paint on the stud-end of the core. Only one particular color will be used in each receiver. When servicing one of these cores always replace the defective core assembly with a replacement core bearing the exact color coding, or replace all three cores with a new set of cores of another color code.

Circuit Description

The circuit used in this receiver is the conventional superheterodyne type with two stages of I.F. and six tuned I.F. circuits. In the short wave position the band switch operates by shunting respective coils (with their magnetite trimmer cores) across the main variable tuning inductances in the antenna, R.F. and oscillator circuits. When tuning either of the four short wave bands the signal is fed through the 100 mmf. condenser (item 25) to the grid of the R.F. amplifier tube 6K7 which also receives its A.V.C. bias through the 1.5 megohm resistor (item 68).

In the broadcast band position the filter choke (item 1) is included in the circuit and in conjunction with the input capacity of the tube constitutes a low-pass filter which effectively prevents unwanted disturbances from reaching the R.F. tube. The variable trimmer (item 24) is used for compensating the slight variations in the effective capacities of the antenna and the shielded lead-in cable. Bias for the 6K7 tube is developed across the 560 ohm resistor (item 69).

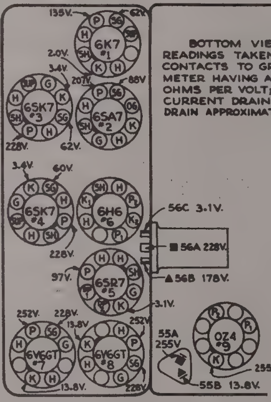
The 6SA7 tube serves the combined functions of 1st detector and oscillator. In the short wave position the oscillator section of 6SA7 uses the conventional Hartley circuit, however the band switching arrangement of this section differs slightly from that of the antenna and RF sections, in that a 31-meter auxiliary oscillator coil (item 16) is permanently shunted across the main tuning coil (item 15) and a tap is brought out for return to the cathode. In changing to the 25, 19 and 16 meter bands, the respective auxiliary oscillator coils (items 17, 18 and 19) are shunted in parallel to the previous combination. The negative coefficient 120 mmf. condenser (item 45) in parallel to the main tuning coil (item 15) constitutes the temperature compensating arrangement for the short wave bands. In the broadcast band the oscillator uses a modified Colpitts circuit arrangement formed by the main tuning inductance (item 14) 3900 mmf. condenser (item 39) and condensers consisting of items 42, 43 and 44 in which item 42 is the negative temperature coefficient condenser.

The two 6SK7 tubes are used in the two stage I.F. amplifier. In the short wave position, both tubes get their bias from the 470 ohm resistor (item 80), but in the broadcast position a 1200 ohm variable resistor (item 81) is connected in series with the 470 ohm resistor and is adjusted in the factory for uniform sensitivity. The variable resistor (item 81) increases the bias on the 6SK7 tubes, therefore the I.F. stage gain in the broadcast position is less than that in the short wave position so that the desired sensitivity is obtained on all bands.

The 6SR7 tube serves three distinct functions. The diode plate No. 2 is used for signal detection. Diode No. 1 is used for supplying bias for the noise limiter circuit, while the triode part is used for the audio amplifier. Diode plate No. 1 gets its signal from the primary of the 3rd I.F. transformer through the 68 mmf. condenser (item 57) and inasmuch as the secondary of the transformer is loaded with a 150,000 ohm resistor (item 88) the bias for the noise-limiter circuit is more than twice the DC voltage of the rectified signal. The bias for the tube is developed across the 1000 ohm resistor (item 94).

The 6H6 tube performs two functions: Plate No. 1 is used in the noise-limiter circuit, and plate No. 2 is used for supplying A.V.C. after the 2nd cathode of the 6H6 tube is connected to the cathode of the 6R7. The voltage developed across the 1000 ohm resistor (item 94) also acts as a delayed bias for the A.V.C. system.

The two 6V6GT tubes are used in the push-pull output circuit and both get their bias from the 330 ohm resistor (item 91). The OZ4 tube is used as the cold cathode rectifier with a conventional nonsynchronous type vibrator.



BOTTOM VIEW OF TUBE SOCKETS READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6.3 VOLTS. CURRENT DRAIN OF 9.2 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 70 M.A.

FIG. 5. VOLTAGE CHART

3-36 985697
Date 10-1-40

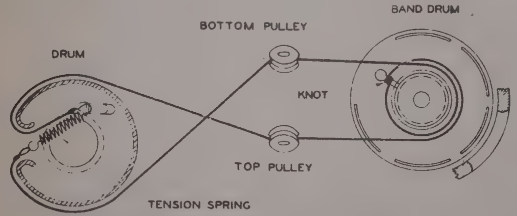


FIG. 8. CORD DRIVE FOR BAND INDICATOR DRUM

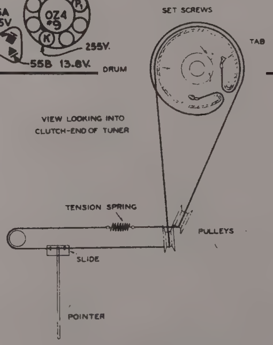
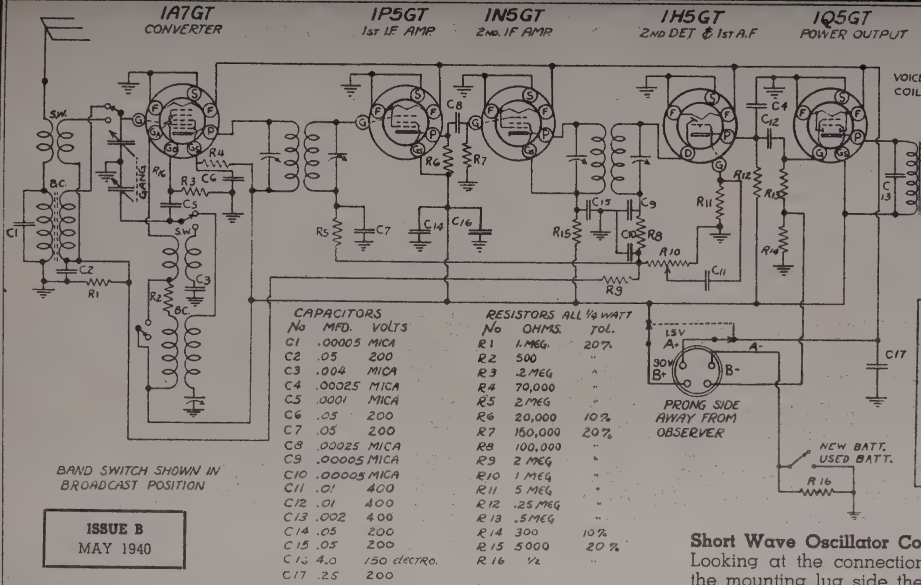


FIG. 8. DIAL POINTER CORD DRIVE



CAPACITORS

No	MFD.	VOLTS
C1	.00005	MICA
C2	.05	200
C3	.004	MICA
C4	.00025	MICA
C5	.0001	MICA
C6	.05	200
C7	.05	200
C8	.00025	MICA
C9	.00005	MICA
C10	.00005	MICA
C11	.01	400
C12	.01	400
C13	.002	400
C14	.05	200
C15	.05	200
C16	4.0	150 electro.
C17	.25	200

RESISTORS ALL ¼ WATT

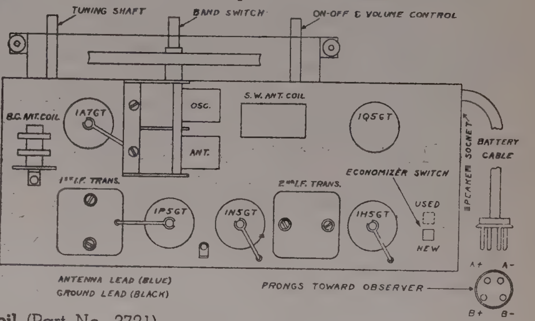
No	OHMS.	TOL.
R1	1. MEG.	20%
R2	500	"
R3	.2 MEG	"
R4	70,000	"
R5	2 MEG	"
R6	20,000	10%
R7	150,000	20%
R8	100,000	"
R9	2 MEG	"
R10	1 MEG	"
R11	5 MEG	"
R12	.25 MEG	"
R13	.5 MEG	"
R14	300	10%
R15	5000	20%
R16	½	"

ISSUE B
MAY 1940

BROADCAST BAND
535-1,730 KILOCYCLES
SHORT WAVE BAND
5,750-18,100 KILOCYCLES

I.F. 455 K.C.

Fig. 1—Top View of Chassis



Speaker (Part No. P-4045) 6" PM Type.

D.C. voice coil resistance........2.6 ohms
Voice coil impedance at 400 cycles........2.9 ohms

Broadcast Antenna Coil (Part No. G6096)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.
Primary—No. 3 and No. 4—Resistance 25.3 ohms.
Secondary—No. 1 and No. 2—Resistance 2.1 ohms.
A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Short Wave Antenna Coil (Part No. P3722)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, AVC; No. 2, Ant.; No. 3, Grid; No. 4, Ground.
Primary—No. 2 and No. 4—Resistance .3 ohm.
Secondary—No. 1 and No. 3—Resistance .07 ohm.

Broadcast Oscillator Coil (Part No. P3723)

Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are; No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.
Primary—No. 2 and No. 3—Resistance 2.8 ohms.
Secondary—No. 4 and No. 1—Resistance 4.9 ohms.

Short Wave Oscillator Coil (Part No. 3721)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, Plate; No. 2, B+; No. 3, Grid; No. 4, Pad.
Primary—No. 1 and No. 2—Resistance .8 ohm.
Secondary—No. 3 and No. 4—Resistance .07 ohm.

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+—Resistance 12.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 24.9 ohms.

Second I.F. Transformer (Part No. P3736)

Primary—Blue white, plate; red white B+—Resistance 15.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 11.8 ohms.

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on 150 volt scale. For the following voltages the "B" battery section of the power pack should read 94½ volts under load.

1A7GT TUBE	Volts
Plate—P—to ground	86½
Screen—Gs—to ground	31
Grid—G2—to ground	86½
1P5GT	
Plate—P—to ground	85
Screen—Gs—to ground	86½
1N5GT	
Plate—P—to ground	86½
Screen—Gs—to ground	86½
1H5GT	
Plate—P—to ground	24
1Q5GT	
Plate—P—to ground	84
Screen—Gs—to ground	86½
Grid—G—to ground	—2¼

MODELS A5,A7,B7,62-B7

ALIGNMENT DATA

I.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT **

Adjust the signal generator to 1630 K.C. and connect the output to a shielded loop radiator and place this loop about two feet from the rotary loop antenna. If no loop radiator is available the output of the signal generator should be connected to the antenna clip of the rotary loop antenna* thru a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer (upper left, front of chassis) to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer (on rotary loop antenna) to peak. Set the signal generator to 600 K.C., tune the signal and then slowly increase or decrease the B.C. oscillator padding condenser (top of chassis, center) and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 K.C. and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

* or to ANT.lead on models without loop

** 1730kc on Model A5

SHORT WAVE BAND ALIGNMENT

Adjust the signal generator to 18,100 K.C. and connect the output to the antenna clip, through a 400 ohm resistor. Set the gang condenser to minimum capacity and adjust the S.W. oscillator trimmer (lower left, front of chassis) to receive this signal. Set the signal generator to 16,000 K.C., tune signal and adjust the S.W. antenna trimmer (upper right, front of chassis) to peak. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 K.C. to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 K.C., the antenna and oscillator coils, as well as the padding condenser should be tested.

MODELS XJ5,XJ55,XJ55-PH

I.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. Connect ground of signal generator to chassis ground through a .1 mfd. condenser. On XJ55 only connect ground of signal generator to common ground thru a .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum output.

SHORT WAVE BAND ALIGNMENT

Set the signal generator to 6000 K.C., tune the signal and adjust the short wave antenna trimmer to give maximum output. Set the signal generator to 3000 K.C., tune the signal and then slowly increase or decrease the short wave antenna padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

MODELS J6,XJ6,A7,B7,A77,62-B7

PROCEDURE FOR SETTING UP PUSH BUTTONS

Loosen one of the push buttons by inserting a screw driver thru the center hole in the push button to the locking screw and turn the locking screw counter-clockwise one full turn and push in, while holding this screw in tune in the desired station by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now while still holding the above screw in, tighten it by turning clockwise. Release and turn the station selector to one end of the dial; then check the button by pushing it down and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and repeat the above procedure for the remaining buttons.

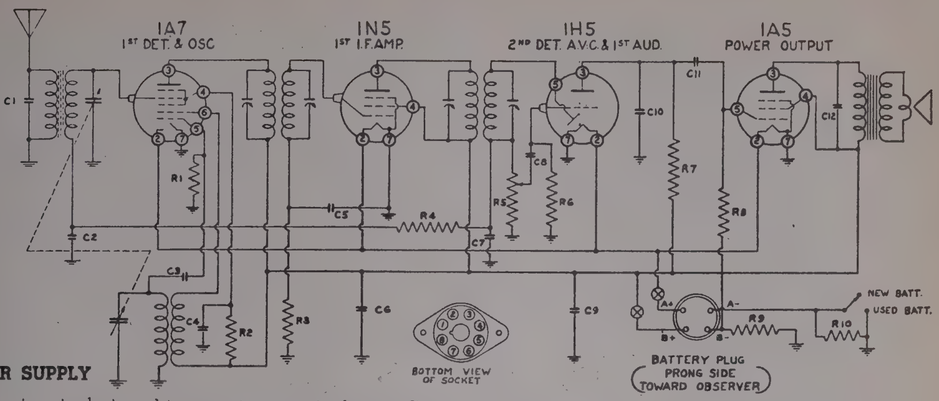
If it is desired to change a button to a different station simply re-set by repeating the above procedure.

Punch the correct station call letter tabs from the set of sheets supplied and insert them from the side into the grooves in the front of the push buttons. Punch celluloid squares from the sheet supplied and insert them in the afore mentioned grooves over the station call letter tabs.

The dial is now set up for quick tuning and all that is necessary is to push the button of the desired station down and then release.

CONTINENTAL RADIO & TELEV. CORP.

MODEL D4



I.F. FREQUENCY = 455 K.C.

POWER SUPPLY

This receiver is designed to operate on a single unit General 60B-6L or Burgess 6TA-60. The battery will fit inside the cabinet in back of the chassis.

A large single unit battery may also be used with this model such as the Burgess 17G-D60, Eveready 748, Ray-O-Vac No. AB-82, Bond 0528 or General 60DL-11L and will provide the most economical operation.

Speaker (Part No. P4311) 5" PM Type

D.C. voice coil resistance..3.1 ohms

Voice coil impedance at 400 cycles..........................3.5 ohms

Antenna Coil (Part No. G-6274)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.

Secondary—No. 1 and No. 2—Resistance 2.2 ohms.

A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. P4308) (Red & Brown Dots)

Looking at the connection end (with dots) starting at the chassis in clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.

Secondary—No. 4 and No. 1—Resistance 5.7 ohms.

First I.F. Transformer (Part No. P4323)

Primary—Blue white, plate; red white, B+ — Resistance 12.1 ohms

Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

Second I.F. Transformer (Part No. P3980)

Primary—Blue white, plate; red white, B+ — Resistance 15.1 ohms

Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

ISSUE A
JUNE 1940

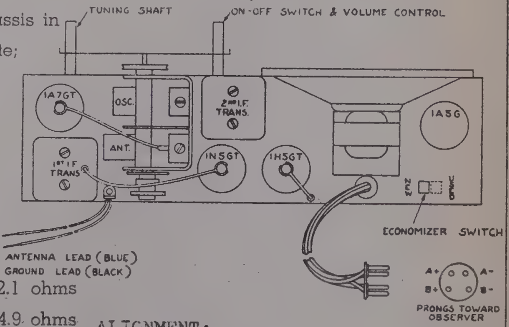
RESISTORS

No.	Ohms	Watts
R1	200,000	½
R2	30,000	½
R3	5,000,000	¼
R4	2,000,000	¼
R5	1,000,000	V.C.
R6	5,000,000	¼
R7	500,000	¼
R8	1,000,000	¼
R9	600—10%	¼
R10	1	½

No.	Capacity (Mfd.)	Volts
C1	.00005	Mica
C2	.05	200
C3	.00005	Mica
C4	.05	200
C5	.05	200
C6	.1	200
C7	.0001	Mica
C8	.01	400
C9	6. (Elect.)	150
C10	.0001	Mica
C11	.01	400
C12	.001	600

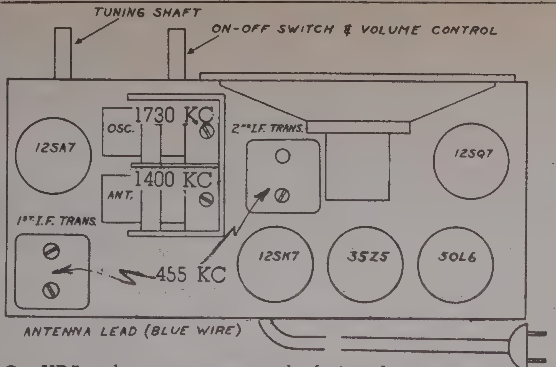
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION -- VOL.VIII

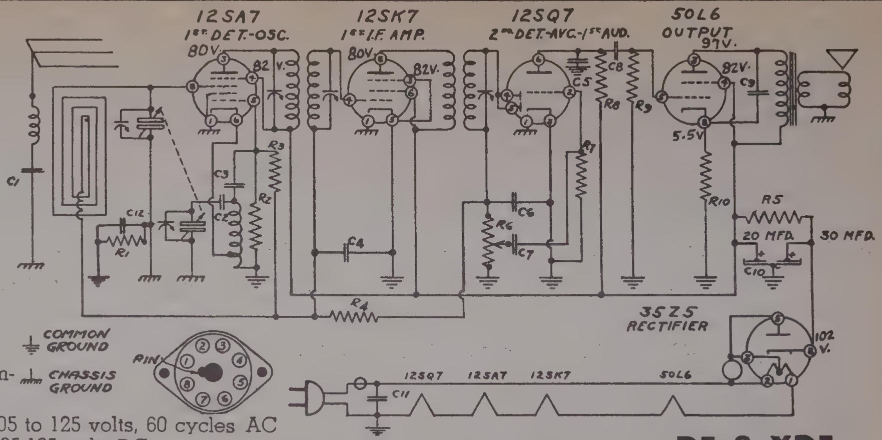
Fig. 1—Top View



ALIGNMENT:
IF - 455kc thru .05 or .1mf cond.
BC - With 1730kc sig. thru .0002mf cond., gang at minimum, adj. osc. trim. If gang cond. plates are bent, adj. with 600kc sig.

CONTINENTAL RADIO & TELEV. CORP.





On XD5 only connect ground of signal generator to common ground thru a .1 mfd. condenser.

105 to 125 volts, 60 cycles AC
105-125 volts DC

For CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII

D5 & XD5

ISSUE A
JUNE 1940

Speaker (Part No. P3553) 5" PM Type

D.C. voice coil resistance	3.4 ohms
Voice coil impedance at 400 cycles	3.8 ohms

Oscillator Coil (Part No. P3748) (D5 only)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 2 and No. 1—Resistance 4.9 ohms.
No. 3 and No. 1—Resistance 4.3 ohms.

Oscillator Coil (Part No. P3917) (XD5 only)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, tap; No. 2, start of winding; No. 3, end of winding.

No. 3 and No. 1—Resistance 4.9 ohms.
No. 2 and No. 1—Resistance 4.3 ohms.

First I.F. Transformer (Part No. P3923)

Primary—Blue, plate; red, B+—Resistance 21.8 ohms.
Secondary—White, grid; black, AVC—Resistance 20.9 ohms.

Secondary I.F. Transformer (Part No. P3924)

Primary—Blue, plate; red B+—Resistance 23.8 ohms.
Secondary—White, grid; black, AVC—Resistance 23.7 ohms.

Electrolytic Condenser (Part No. P3355)

Red, 30 mfd., 150 volt; green, 20 mfd., 150 volt; black, negative for both sections.

C2, C12 and R1 are used in Model XD5 only.

In D5 Model only, all common grounds are connected to chassis ground.

CONDENSERS

No.	Capacity	Volts
C1	.001	600
C2	.02	400
C3	.00005	Mica
C4	.05	200
C5	.0005	Mica
C6	.00025	Mica
C7	.01	400
C8	.002	600
C9	.01	400
C10	20.0 30.0	150 150
C11	.05	400
C12	.2	200

RESISTORS

No.	Ohms	
R1	150,000	½ Watt
R2	20,000	½ Watt
R3	15,000,000	½ Watt
R4	2,000,000	½ Watt
R5	1,000	1 Watt
R6	500,000	Vol. Cont.
R7	5,000,000	½ Watt
R8	250,000	½ Watt
R9	500,000	½ Watt
R10	150	½ Watt 10%

Models D5 and XD5 are the same except for a few parts and that the XD5 is approved by the Underwriters Laboratories. A condenser is used in the XD5 model to provide a floating ground.

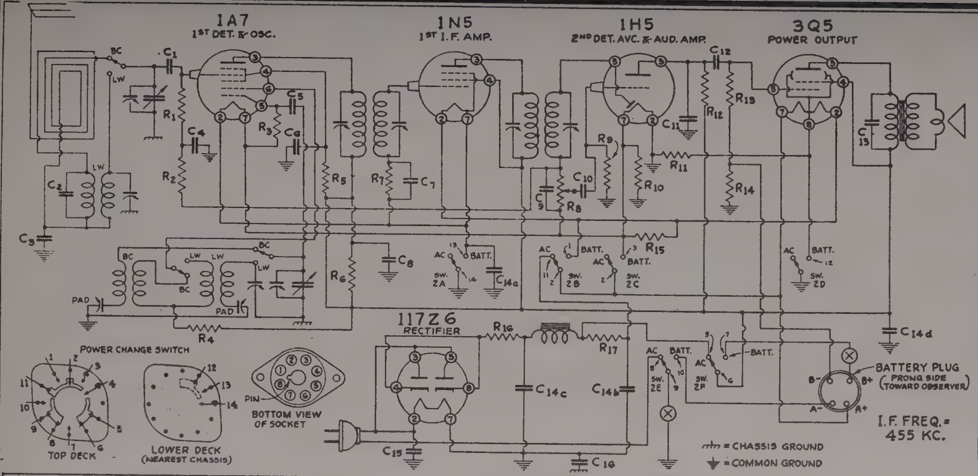
Voltages—Line 115 Volts AC—Power Consumption 30 Watts.

Volume Control maximum. Meter 1000 ohms per volt, 150 volt scale.

Plate (3) of 12SA7 tube to common ground	80 volts
Screen (4) of 12SA7 tube to common ground	82 volts
Plate (8) of 12SK7 tube to common ground	80 volts
Screen (3) of 12SK7 tube to common ground	82 volts
Plate (3) of 50L6 tube to common ground	97 volts
Screen (4) of 50L6 tube to common ground	82 volts
Cathode (2) of 50L6 tube to common ground	5.5 volts
Cathode (8) of 35Z5 tube to common ground	102 volts

CONTINENTAL RADIO & TELEV. CORP.

MODEL H5



ALIGNING FREQUENCIES:
IF trims. - 455KC; BC-OSC. - 1550KC; BC-PAD (nearest tuning shaft on front of chassis) - 540KC; Re-check BC-OSC. - Finally BC-ANT. at 1400 KC.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION -- VOL.VIII

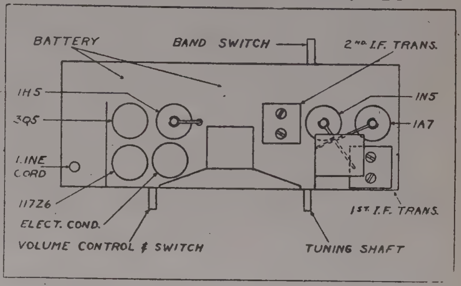


Fig. 1—Top View

NOTE:- POWER CHANGE SWITCH 2A THRU 2F, AND THE PICTORIAL VIEW SHOWN IN THE "AC-DC" POSITION.
SWITCH POINT 4 IS NOT USED.

RESISTORS

NO.	OHMS	WATTS	NO	OHMS	WATTS
R_1	1,000,000	½	R_{13}	1,000,000	½
R_2	1,000,000	½	R_{14}	400	½ 10%
R_3	200,000	½	R_{15}	400	½
R_4	5,000	½	R_{16}	30	½
R_5	30,000	½	R_{17}	2,100 (CANDOHM)	5
R_6	2,000	½			
R_7	5,000,000	½			
R_8	1,000,000 (VOL. CONT)				
R_9	5,000,000	½			
R_{10}	110	½			
R_{11}	750	½ 10%			
R_{12}	250,000	½			

CONDENSERS

NO	CAPACITY	VOLT	NO	CAPACITY	VOLTS
C_1	.00025	MICA	C_{13}	002	400
C_2	.0001	MICA	C_{14a}	40.0 ELECTROLYTIC	25
C_3	.1	200	C_{14b}	40.0 ELECTROLYTIC	25
C_4	.01	200	C_{14c}	30.0 ELECTROLYTIC	150
C_5	.00005	MICA	C_{14d}	30.0 ELECTROLYTIC	150
C_6	.05	200	C_{15}	.05	400
C_7	.01	200	C_{16}	.25	200
C_8	05	200			
C_9	.00025	MICA			
C_{10}	01	400			
C_{11}	.00025	MICA			
C_{12}	.01	400			

Voltages—Line 117.5 Volts AC—Power Consumption 25 Watts. Volume control maximum and no signal tuned in. Meter 1000 ohms per volt, 150 volt scale.

Plate (3) of 1A7 tube to common ground	100	volts
Screen (4) of 1A7 tube to common ground	62	volts
Anode grid (6) of 1A7 tube to common ground	100	volts
Filament (2) to (7) of 1A7 tube	1.35	volts
Plate (3) of 1N5 tube to common ground	100	volts
Screen (4) of 1N5 tube to common ground	102	volts
Filament (2) to (7) of 1N5 tube	1.3	volts
Plate (3) of 1H5 tube to common ground	38	volts
Filament (2) to (7) of 1H5 tube	1.35	volts
Plate (3) of 3Q5 tube to common ground	98	volts
Screen (4) of 3Q5 to common ground	102	volts
Filament (7) to (8) of 3Q5 tube	1.3	volts
Filament (2) to (8) of 3Q5 tube	1.35	volts
Plate (3) or (5) of 117Z6 tube to common ground	117.5v.	(AC)
Cathode (4) or (8) of 117Z6 tube to common ground	128	volts
Filament (2) to (7) of 117Z6 tube	117.5v.	(AC)

Speaker (Part No. P4004) 5" PM Type

D.C. voice coil resistance	3.2 ohms
Voice coil impedance at 400 cycles	3.5 ohms

L. W. Antenna Coil (Part No. P4019)
Looking at the connection end (with dot) in a clockwise direction starting at the mounting lug the terminals are: No. 1, grid; No. 2, ant.; No. 3, sec. ground; No. 4, pri. ground.

Primary—No. 2 and No. 4—Resistance	139.7 ohms
Secondary—No. 3 and No. 1—Resistance	29.4 ohms

B. C. Oscillator Coil (Part No. P4018)
Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are No. 1, grid; No. 2, plate; No. 3, B+; No. 4, pad.

Primary—No. 2 and No. 3—Resistance	2.9 ohms
Secondary—No. 4 and No. 1—Resistance	9.1 ohms

ISSUE A
FEB. 1940

L. W. Oscillator Coil (Part No. P4017)
Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are: No. 1, pad; No. 2, B+; No. 3, plate; No. 4, grid.

Primary—No. 3 and No. 2—Resistance	4.8 ohms
Secondary—No. 1 and No. 4—Resistance	11.9 ohms

First I.F. Transformer (Part No. P3962)	
Primary—Red white, B+; blue white, plate—Resistance	11.8 ohms
Secondary—White, grid; black white, AVC—Resistance	23.9 ohms
Second I.F. Transformer (Part No. P3980)	
Primary—Blue white, plate; red white B+—Resistance	15.1 ohms
Secondary—White, grid; black white, AVC—Resistance	11.8 ohms

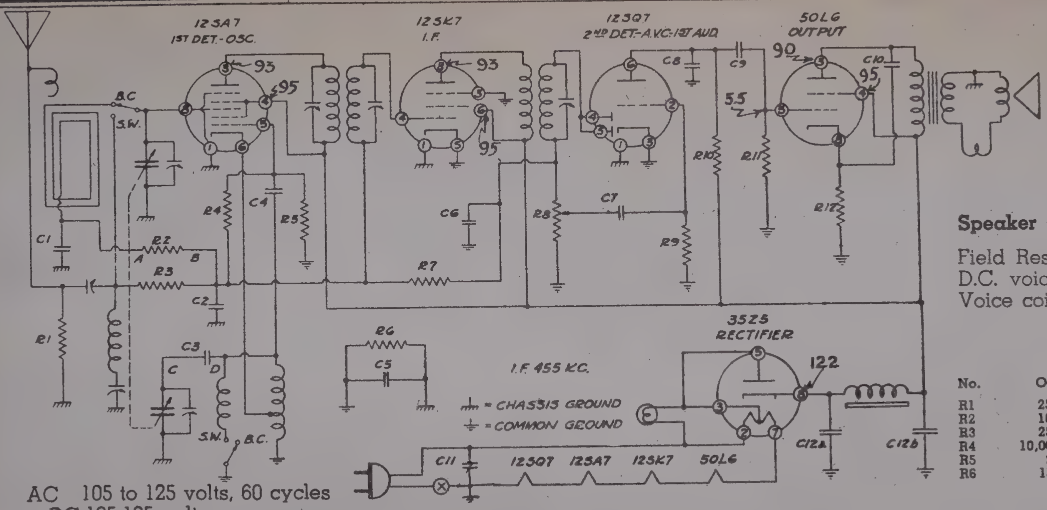
Power Change Switch
The power change switch connects the tube filaments in series (7½ volt) on AC-DC operation and parallel (1½ volt) on battery operation.

MODELS J5, XJ5
J55, XJ55, XJ55PH

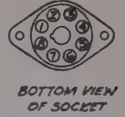
CONTINENTAL RADIO & TELEV. CORP.

Band Switch

right (535 to 1630 kilocycles)
left (2.8 to 6.58 megacycles)



MODEL J5 & XJ5



BOTTOM VIEW OF SOCKET

Speaker (Part No. P4169) 5" Dynamic.

Field Resistance ....400 ohms
D.C. voice coil resistance............3.6 ohms
Voice coil impedance at 400 cycles.... 4.0 ohms

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	250,000	¼	R7	2,000,000	¼
R2	100,000	¼	R8	500,000	V.C.
R3	250,000	¼	R9	5,000,000	¼
R4	10,000,000	¼	R10	250,000	¼
R5	25,000	¼	R11	500,000	¼
R6	150,000	¼	R12	150—10%	¼

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C8	.0005	Mica
C2	.05	200	C9	.01	400
C3	.02	200	C10	.02	400
C4	.0001	Mica	C11	.05	400
C5	.2	200	C12a	30. Elec.	150
C6	.00025	Mica	C12b	20. Elec.	150
C7	.005	400			

AC 105 to 125 volts, 60 cycles
or DC 105-125 volts

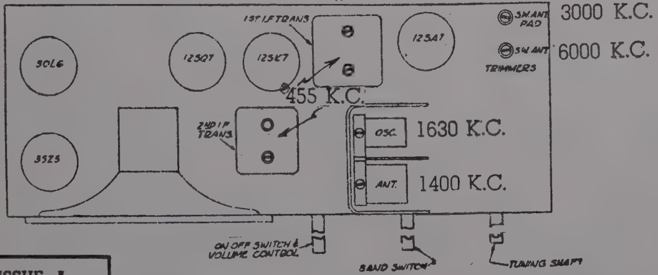
For CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII.

In model J5 all common grounds become chassis grounds, C1, C3, C5, R2, and R6 are omitted. Point "A" is connected to point "B" and point "C" to point "D."

Voltages—(tube to common ground) Line 117 Volts AC—

Volume Control maximum. Meter 1000 ohms per volt, 150 volt scale.

Models J5 and XJ5 are the same except for a few parts and that the XJ5 is approved by the Underwriters Laboratories. A condenser is used in the XJ5 model to provide a floating ground.



Oscillator and Short Wave Antenna Coil (Part No. G6187) J5 & XJ5
(PART NO. G6201) XJ55-PH

Looking at the five terminal connection end in a clockwise direction starting at the mounting bracket, the connections are: No. 1, ground; No. 2, grid; No. 3, B.C. osc. tap; No. 4, open; No. 5, open. Looking at the other end in a clockwise direction starting at the mounting bracket, the connections are: No. 6, pad; No. 7, open; No. 8, switch; No. 9, ant.

No. 1 and No. 2—Resistance...6.9 ohms
No. 1 and No. 3—Resistance... .4 ohm
No. 3 and No. 2—....6.5 ohms
No. 6 and No. 9—.... .3 ohm
No. 8 and No. 2—.... .3 ohm

First I.F. Transformer (Part No. P3923)

Primary—Blue, plate; red, B+—Resistance 20.4 ohms.
Secondary—White, grid; Black, AVC—Resistance 20.3 ohms.

Second I.F. Transformer (Part No. P3924)

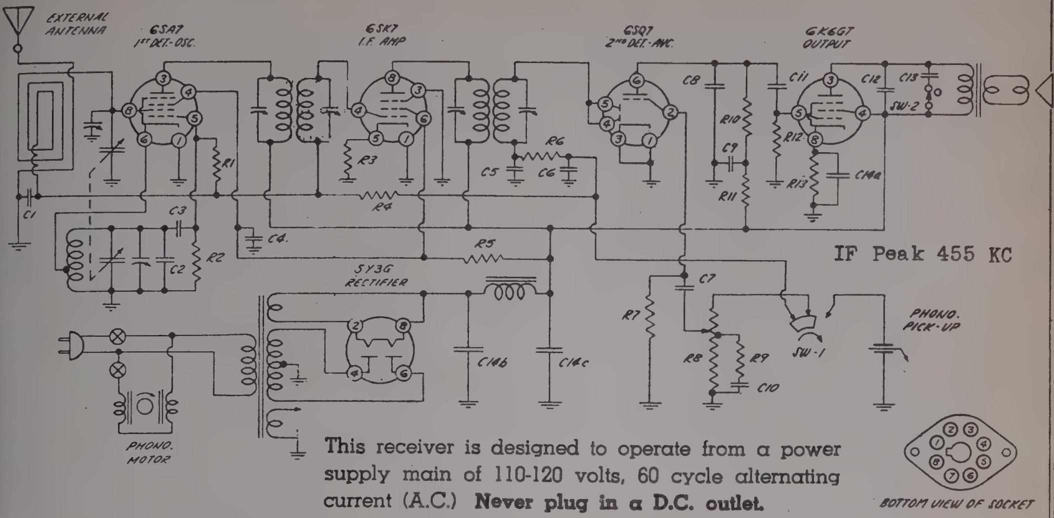
Primary—Blue, plate; red B+—Resistance 22.2 ohms.
Secondary—White, diode; black, AVC—Resistance 22.1 ohms.

ISSUE A
APRIL 1940

On XJ5 only connect ground of signal generator to common ground thru a .1 mfd. condenser.

MODEL K5

CONTINENTAL RADIO & TELEV. CORP.



IF Peak 455 KC

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.) **Never plug in a D.C. outlet.**

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	½	R8	500,000	V.C.
R2	20,000	½	R9	20,000	½
R3	100—10%	½	R10	250,000	½
R4	2,000,000	½	R11	50,000	½
R5	15,000—10%	2	R12	500,000	½
R6	50,000	½	R13	600—10%	½
R7	5,000,000	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C9	.1	400
C2	.000025	Mica	C10	.02	200
C3	.00005	Mica	C11	.01	400
C4	.05	400	C12	.002	600
C5	.0001	Mica	C13	.02	400
C6	.0001	Mica	C14a	20.	25
C7	.01	400	C14b	20.	350
C8	.00025	Mica	C14c	20.	350

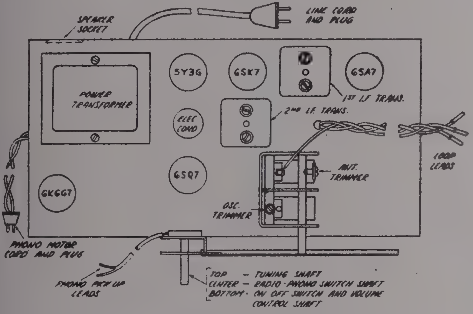
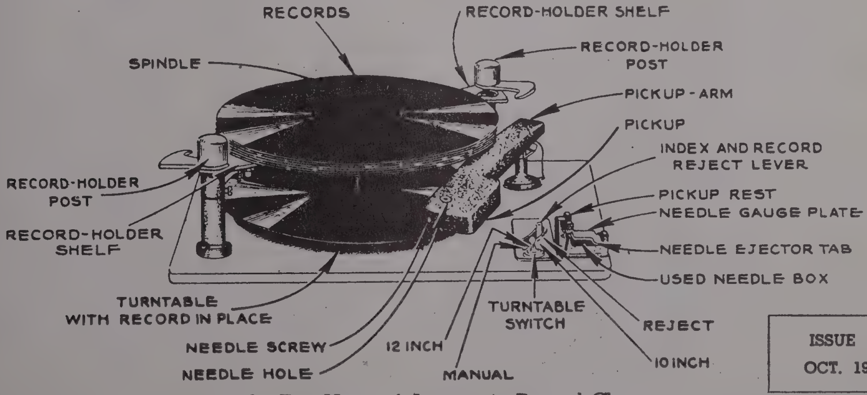


Fig. 3—Top View of Chassis

ALIGNMENT: IF - 455kc thru .05 or .1mf cond. BC - With 1630kc thru shielded loop radiator, 2 ft. from loop antenna; OR to blue lead of loop antenna thru .0002mf cond., gang at minimum, adjust osc. trim.
With 1400kc adj. Ant. trim. - If gang plates are bent adj. with 600kc.



ISSUE A
OCT. 1940

Fig. 2—Top View of Automatic Record Changer

©John F. Rider, Publisher

MODEL K5

CONTINENTAL RADIO & TELEV. CORP.

AUTOMATIC RECORD CHANGER

This **Record Changer** will automatically play a series of eight 10" or seven 12" records of the standard 78 R.P.M. type. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

OPERATION

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not, a "cycle" must be completed to bring it down. To do this, throw **Turntable Switch** "On." The turntable will begin to revolve and the cycle of motion on the pickup arm will be resumed. When the pickup arm comes down, turn off the **Turntable Switch.**

CAUTIONS

1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.

2. The use of records which have become warped **or damaged** through improper care, may cause the **mechanism** to jam and damage the instrument. **Records** which have become warped, will slide on **one** another when playing, resulting in unsatisfac**tory reproduction.**

3. This instrument is not recommended for play**ing** 10" and 12" records in mixed sequence. If this **service** is desired, all records must be perfectly flat and free from warp. The **index** and **record reject lever** must be set at 10" and after playing the last selection, the pickup will come down in position for a 10" record and repeat the playing of the record on a 10" diameter unless the **turntable switch** is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.

4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use.

5. The needle must be installed according to directions under "Pickup and Top-Loading Needle Socket" for proper operation of this instrument.

6. The two red mounting bolts which hold the Automatic Record Player solid for shipping must be removed before using the Automatic Record Player so it can "float" on the spring mountings.

7. LEVELING—When a record has been played the pickup moves out, another record is dropped down, and the needle is fed automatically into the starting groove of this record. If the needle fails to **enter** the starting groove, raise the right-hand side **of the** cabinet by inserting thin spacers under the **feet on** that side. If the needle slides over a few **grooves, raise** the left-hand side of the cabinet in a similar manner.

8. LUBRICATION—A few drops of good quality light machine oil should be applied about once every six months at the base of the spindle below the metal washer under the turntable.

CONTROLS AND MECHANISM

INDEX AND RECORD REJECT LEVER

This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"Manual", "12", "10", and "Reject" When it is desired to change record selections manually, this lever should be set in the "Manual" position. With the lever in the "12" position, the mechanism is set to play a series of 12" records automatically. To play either a series of 10" records or 10" and 12" records mixed, the lever should be set at the "10" position. To reject a record being played, or to start the record changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "reject" position and let go. The pickup will rise and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If a series of 12" records is to be played, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "Manual" position when not actually playing records automatically.

TURNTABLE SWITCH

The Slide Switch located just in front of the **Index** and **Record Reject Lever** controls the current to the turntable motor. To start the turntable, push the switch to the "On" position. To stop the turntable, push the switch to the "Off" position.

NEEDLES

The use of high grade long playing needles is absolutely essential for the proper operation of this instrument, as the regular needles are only good for one or at the most two records. If any needle is used too long, distortion and poor quality will be obtained and also the records will be damaged.

PICKUP AND TOP-LOADING NEEDLE SOCKET

The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm in the groove and the pickup over the needle gauge plate. The pickup must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pickup, place **needle in** hole at top so that it drops down **against the needle** plate and then tighten the needle screw.

NEEDLE EJECTOR

The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above.

RECORD HOLDER SHELVES

To place a record on the turntable or to remove records, raise the record holder **shelves** by lifting with the fingers under the shelf, and swing clear of the outer edge of record. Also push back vertical lever adjacent to the rear record holder post. The turntable is now accessible. Before loading the magazine for **automatic operation**, swing the record holder shelves back into position.

AUTOMATIC OPERATION

1. See that the pickup is over the needle gauge plate with the needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "Operation."

2. With the **Index** and **Record Reject Lever** at **"Manual"**, place the first of the series of records on the turntable and the remainder of the series (up to seven 10" or six 12" records) on the record holder posts (as shown in Fig. 2). The records should be arranged in the desired order with the desired selection face up and the last selection on top.

3. Set the **Index** and **Record Reject Lever** to the proper position. (See **Controls: Index and Record Reject Lever.**)

4. Push the turntable switch to the left—**"On"** —turntable should commence to revolve.

5. When the turntable has attained **speed**, lift pickup and lower gently on to the record so that the needle point enters the outside groove.

6. Adjust volume control to the desired intensity and tone control to the preferred setting.

7. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

The whole series of records will now play without further attention, and the last record will repeat until the **Turntable Switch** is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with the pickup over the needle gauge plate. The record player is then ready for reloading, or for manual operation.

TO PLAY RECORDS MANUALLY: MANUAL OPERATION

1. Proceed as in step 1, under **"Automatic Operation."**

2. Place a record on the turntable with the desired selection upwards.

3. Set the **Index** and **Record Reject Lever** to **"Manual"** position.

4. Proceed as in steps 4, 5, 6, and 7 under **"Automatic Operation."**

When the playing is finished, be sure that the turntable has stopped and the pickup is in the rest position over the needle gauge plate. Never leave the pickup with the needle resting on a record or the turntable.

Speaker (Part No. P-4515) 6½" P.M. Type.

D.C. voice coil resistance....................2.8 ohms
Voice coil impedance at 400 cycles....................3.1 ohms

Oscillator Coil (Part No. P-4495)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 1 and No. 2—Resistance.................... 4.5 ohms
No. 1 and No. 3—Resistance.................... 4.05 ohms
No. 2 and No. 3—Resistance.................... .45 ohm

First I.F. Transformer (Part No. P-4108)

Primary—Blue, plate; red, B+
Resistance ....18.2 ohms

Secondary—White, grid; black, AVC
Resistance ....15.1 ohms

Second I.F. Transformer (Part No. P-4109)

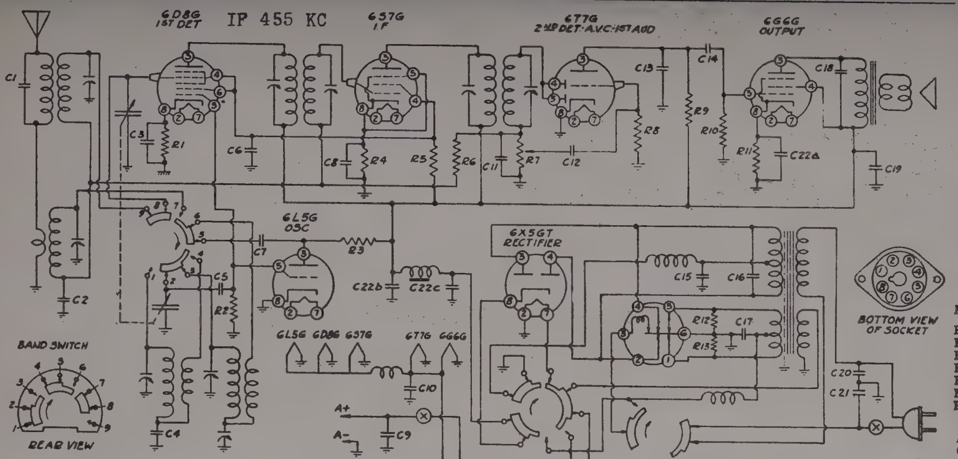
Primary—Blue, plate; red, B+
Resistance ....20.8 ohms

Secondary—White, diode; black, AVC
Resistance ....17.4 ohms

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 75 watts.

	Volts
6SA7 TUBE	
Plate (3) to ground	255
Screen (4) to ground	93
6SK7 TUBE	
Plate (8) to ground	255
Screen (6) to ground	93
6K6G TUBE	
Plate (3) to ground	240
Screen (4) to ground	258
Cathode (8) to ground	18
5Y3G TUBE	
Filament (8) to ground	286



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

ISSUE A
SEPT. 1940

	VOLTAGE 117 V.A.C.	6.2 V. Bat.
6D8G TUBE		
Plate (3) to ground	160	146
Screen (4) to ground	82	76
Cathode (8) to ground	4.3	3.3
6S7G TUBE		
Plate (3) to ground	160	146
Screen (4) to ground	82	76
Cathode (8) to ground	4.1	3.2
6G6G TUBE		
Plate (3) to ground	152	139
Screen (4) to ground	163	148
Cathode (8) to ground	7.5	6.9
6X5GT TUBE		
Cathode (8) to ground	169	154

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	800	½	R8	15,000,000	½
R2	60,000	½	R9	250,000	½
R3	15,000	½	R10	500,000	½
R4	1,000	½	R11	500	½
R5	20,000	½	R12	100	½
R6	1,000,000	½	R13	100	½
R7	500,000	V.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C13	.00025	Mica
C2	.05	200	C14	.01	400
C3	.05	200	C15	.1	400
C4	.004—5%	Mica	C16	.015	1000
C5	.0001	Mica	C17	.5	120
C6	.1	400	C18	.005	600
C7	.0005	Mica	C19	.1	400
C8	.05	200	C20	.05	400
C9	.5	10	C21	.05	400
C10	.0005	Mica	C22a	20.	25
C11	.0001	Mica	C22b	20.	250
C12	.01	400	C22c	20.	250

Speaker (Part No. P-4243) 6" PM Type.
D.C. voice coil resistance.....5.1 ohms
Voice coil impedance at 400 cycles.....5.5 ohms

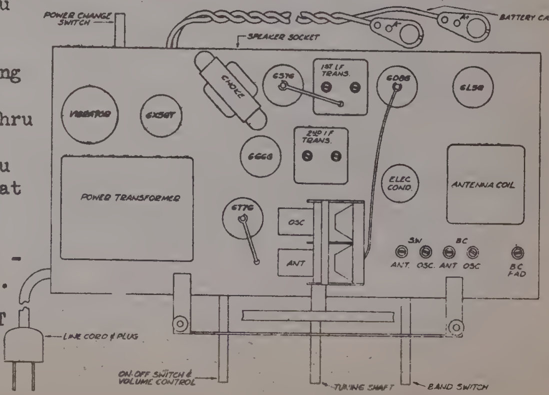
B.C. and S.W. Oscillator Coil (Part No. P-4226)
Looking at the mounting bracket end in a clockwise direction starting at the chassis, the connections are: No. 1, pad; No. 2, open. Looking at the other end in a clockwise direction starting at the chassis the connections are: No. 3, plate; No. 4, plate; No. 5, pad; No. 6, grid; No. 7, grid.
S.W. Primary—No. 4 and No. 5—Resistance.....44 ohm
B.C. Primary—No. 1 and No. 3—Resistance.....1.3 ohms
S.W. Secondary—No. 5 and No. 6—Resistance.....09 ohm
B.C. Secondary—No. 1 and No. 7—Resistance.....5.8 ohms

B.C. and S.W. Antenna Coil (Part No. P-4225)
Starting with the lug that is connected direct to ground in a clockwise direction, the terminals are: No. 1, ground; No. 2, open; No. 3, pad; No. 4, grid; No. 5, grid; No. 6 ant.
S.W. Primary—No. 6 and No. 2—Resistance.....35 ohm
B.C. Primary—No. 1 and No. 2—Resistance.....24.1 ohms
S.W. Secondary—No. 3 and No. 4—Resistance.....07 ohm
B.C. Secondary—No. 3 and No. 5—Resistance.....2.9 ohms

First I.F. Transformer (Part No. P-4245)
Primary—Blue, plate; red, B+—Resistance.....26.2 ohms
Secondary—White, grid; black, AVC—Resistance.....26.6 ohms

Second I.F. Transformer (Part No. P-4244)
Primary—Blue, plate; red, B+—Resistance.....15.1 ohms
Secondary—White, grid; black, AVC—Resistance.....11.8 ohms

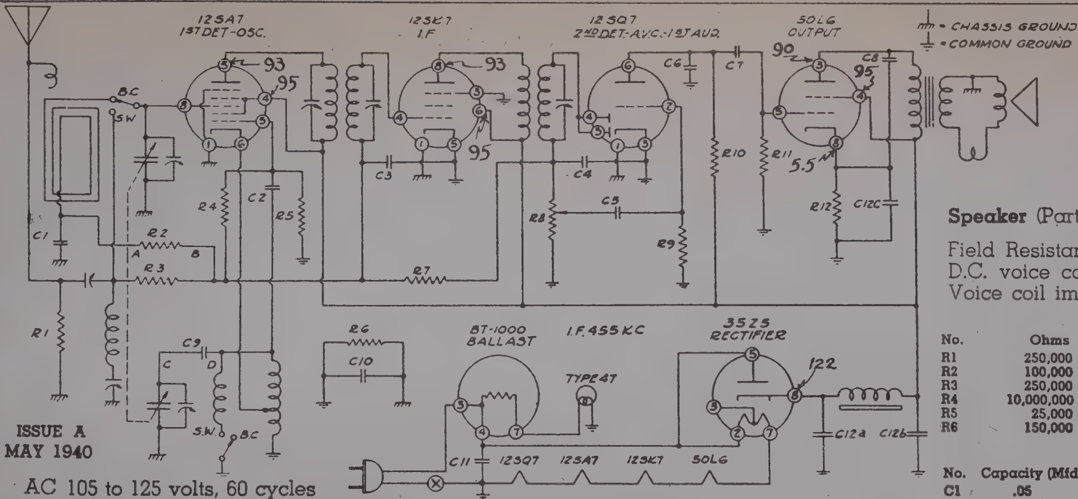
```
ALIGNING FREQUENCIES:
IF trims - 455kc thru
.05 or .1mf.
SW-OSC. - 18,100kc
thru 400 ohm res.,gang
cond. at minimum.
SW-ANT. - 16,000kc thru
400 ohm res.
BC-OSC. - 1730kc thru
.0002mf, gang cond. at
minimum.
BC-ANT. - 1400kc.
BC-OSC. PAD - 600 kc -
Recheck BC at 1400kc.
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL.VIII
```



POWER SUPPLY

This receiver is designed to operate on either a 6 volt storage battery or a power supply main of 110-120 volts, 60 cycle alternating current (A.C.) **Never plug in to a D.C. outlet.**

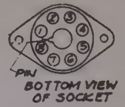
CONTINENTAL RADIO & TELEV. CORP.



ISSUE A
MAY 1940

Band Switch
right (535 to 1630 kilocycles)
left (2.8 to 6.58 megacycles)

MODEL J6 & XJ6



Speaker (Part No. P4169) 5" Dynamic.

Field Resistance ....400 ohms
D.C. voice coil resistance........................3.6 ohms
Voice coil impedance at 400 cycles.. 4.0 ohms

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	250,000	¼	R7	2,000,000	¼
R2	100,000	¼	R8	500,000	V.C.
R3	250,000	¼	R9	5,000,000	¼
R4	10,000,000	¼	R10	250,000	¼
R5	25,000	¼	R11	500,000	¼
R6	150,000	¼	R12	150—10%	¼

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C8	.02	400
C2	.0001	Mica	C9	.02	200
C3	.05	200	C10	.2	200
C4	.00025	Mica	C11	.05	400
C5	.005	400	C12a	30.	150
C6	.0005	Mica	C12b	20.	150
C7	.01	400	C12c	20.	25

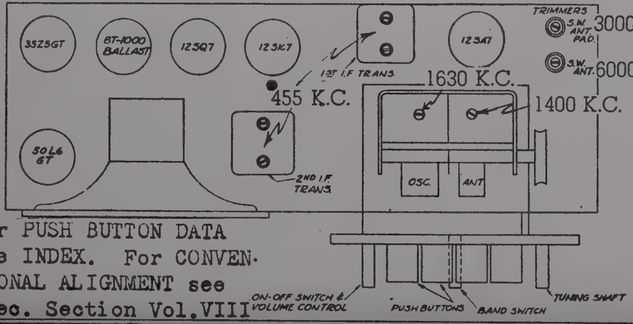
AC 105 to 125 volts, 60 cycles or DC 105-125 volts. **In model J6 all common grounds become chassis grounds, C1, C9, C10, R2 and R8 are omitted. Point "A" is connected to point "B" and point "C" to point "D."**

Voltages— tube to common ground Line 117 Volts AC—Power Consumption 50 Watts.

Volume Control maximum. Meter 1000 ohms per volt, 150 volt scale.

Models J6 and XJ6 are the same except for a few parts and that the XJ6 is approved by the Underwriters Laboratories. A condenser is used in the XJ6 model to provide a floating ground.

•On XJ6 only connect ground of signal generator to common ground thru a .1 mfd. condenser.



For PUSH BUTTON DATA see INDEX. For CONVENTIONAL ALIGNMENT see Spec. Section Vol.VIII

Oscillator and Short Wave Antenna Coil (Part No. G6187)

Looking at the five terminal connection end in a clockwise direction starting at the mounting bracket, the connections are: No. 1, ground; No. 2, grid; No. 3, B.C. osc. tap; No. 4, open; No. 5, open. Looking at the other end in a clockwise direction starting at the mounting bracket, the connections are: No. 6, pad; No. 7, open; No. 8, switch; No. 9, ant.

No. 1 and No. 2—Resistance...6.9 ohms
No. 1 and No. 3—Resistance... .4 ohm
No. 3 and No. 2-6.5 ohms
No. 6 and No. 9- .3 ohm
No. 8 and No. 2— .3 ohm

First I.F. Transformer (Part No. P3794)

Primary—Blue, plate; red, B+—Resistance.................................19.9 ohms
Secondary—White, grid; black, AVC—Resistance...................19.8 ohms

Second I.F. Transformer (Part No. P3924)

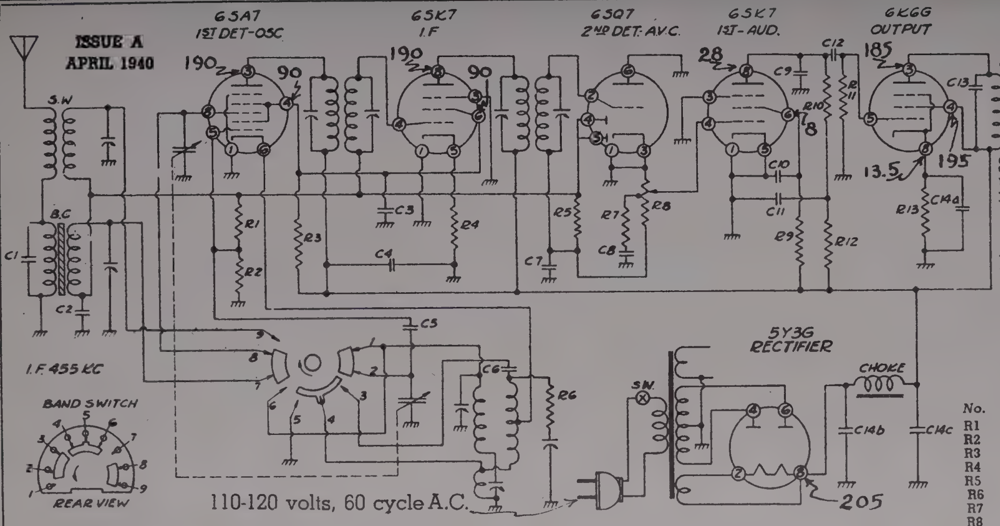
Primary—Blue, plate; red B+—Resistance 22.2 ohms.
Secondary—White, diode; black, AVC—Resistance 22.1 ohms.

Electrolytic Condenser (Part No. P3531)

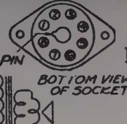
Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd, 25 volt; black, negative for all three sections.

CONTINENTAL RADIO & TELEV. CORP.

ISSUE A
APRIL 1940



110-120 volts, 60 cycle A.C.



Band Switch
right 535 to 1730 kilocycles
left 16.57 to 53.10 meters

MODEL K6

Speaker (Part No. P-4140) 5" PM Type
D.C. voice coil resistance ....3.1 ohms
Voice coil impedance at 400 cycles 3.5 ohms

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C9	.00025	Mica
C2	.05	200	C10	.05	200
C3	.05	400	C11	.1	200
C4	.05	400	C12	.01	400
C5	.00005	Mica	C13	.005	600
C6	.004 —5%	Mica	C14a	20.	25
C7	.00025	Mica	C14b	20.	350
C8	.05	200	C14c	20.	350

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	¼	R9	1,000,000	¼
R2	20,000	¼	R10	200,000	¼
R3	10,000	1	R11	500,000	¼
R4	100—10%	¼	R12	50,000	¼
R5	2,000,000	¼	R13	500—10%	½
R6	30	¼			
R7	8,000	¼			
R8	500,000	V.C.			

All voltages to ground with a 1,000 ohm per volt meter on the 250 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 45 watts.

Short Wave Antenna Coil (Part No. P3378)
Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, AVC; No. 2, Ant; No. 3, Grid; No. 4, Ground.
Primary—No. 2 and No. 4—Resistance.......... .3 ohm
Secondary—No. 1 and No. 3—Resistance.......... .07 ohm

Broadcast Antenna Coil (Part No. G6031)
Looking at the connection end in a clockwise direction starting at the mounting strip the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant; No. 4, ground. No. 4 is grounded to the mounting strip.
Primary—No. 3 and No. 4—Resistance..........27.1 ohms
Secondary—No. 1 and No. 2—Resistance.......... 1.9 ohms

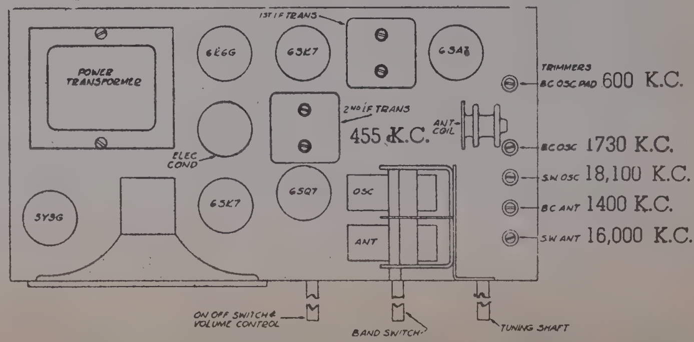
Oscillator Coil (Part No. P4185)
Looking at the mounting bracket end in a clockwise direction starting at the chassis the connections are: No. 1, pad; No. 2, B.C. grid; looking at the other end in a clockwise direction starting at the chassis the connections are: No. 3, ground; No. 4, sec. tap; No. 5, open; No. 6, S.W. grid; No. 7, tickler.
Tickler—No. 3 and No. 7—Resistance.......... .8 ohm
S.W. Secondary—No. 6 and No. 7—Resistance... .07 ohm
B.C. Secondary—No. 2 and No. 1—Resistance...5.1 ohms

Band switch shown in broadcast position in schematic and in short wave position in pictorial view

For CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII

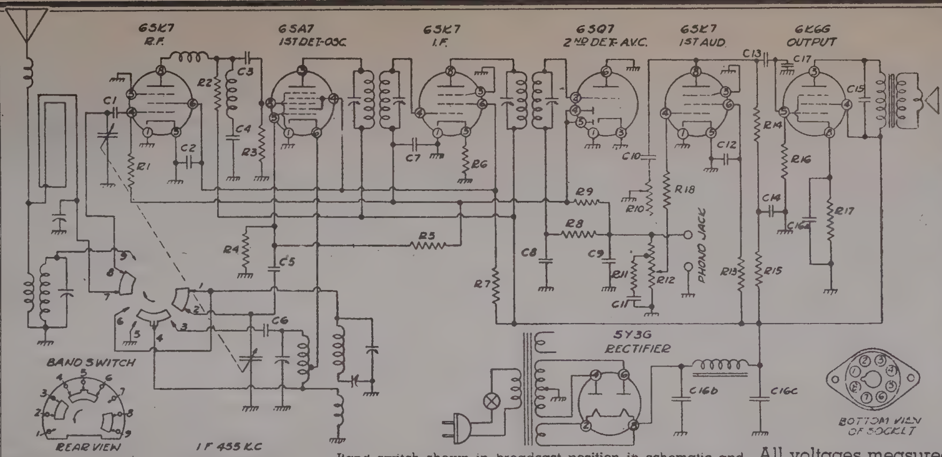
First I.F. Transformer (Part No. P4108)
Primary—Blue, plate; red, B+—Resistance.......... 18.2 ohms
Secondary—White, grid; black, AVC—Resistance.......... 15.1 ohms

Second I.F. Transformer (Part No. P4109)
Primary—Blue, plate; red B+—Resistance.......... 20.8 ohms
Secondary—White, diode; black, AVC—Resistance.......... 17.4 ohms



MODEL A7

CONTINENTAL RADIO & TELEV. CORP.



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

6SK7 (RF) TUBE

	Volts
Plate (8) to ground	208
Screen (6) to ground	93

6SA7 TUBE

Plate (3) to ground	255
Screen (4) to ground	93

6SK7 (IF) TUBE

Plate (8) to ground	255
Screen (6) to ground	93

6SK7 (AF) TUBE

Plate (8) to ground	20
Screen (6) to ground	10

6K6G TUBE

Plate (3) to ground	240
Screen (4) to ground	258
Cathode (8) to ground	18

5Y3G TUBE

Filament (8) to ground	266

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

Speaker (Part No. P4206) 6½" PM.

D. C. voice coil resistance	3.6 ohms
Voice coil impedance at 400 cycles	4.0 ohms

S. W. Antenna Coil (Part No. P3198)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, ground; No. 2, antenna; No. 3, switch; No. 4, ground.

Primary—No. 1 and No. 2—Resistance	.37 ohm
Secondary—No. 3 and No. 4—Resistance	.08 ohm

Oscillator Coil (Part No. P4194)

Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.

B.C. Primary—No. 1 and No. 5—Resistance	.29 ohm
S.W. Primary—No. 5 and No. 2—Resistance	.06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance	5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance	.08 ohm

First I.F. Transformer (Part No. P4108)

Primary—Blue, plate; red, B+—Resistance	18.2 ohms
Secondary—White, grid; black, AVC—Resistance	15.1 ohms

Second I.F. Transformer (Part No. P4109)

Primary—Blue, plate; red B+—Resistance	20.8 ohms
Secondary—White, diode; black, AVC—Resistance	17.4 ohms

RESISTORS

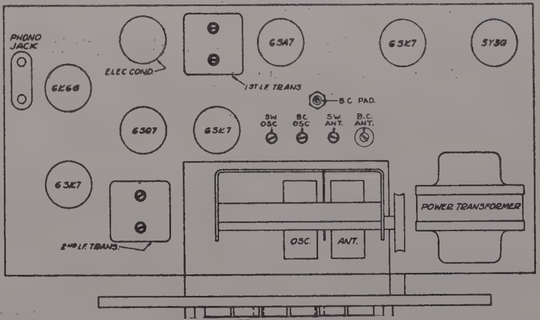
No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R10	500,000	T.C.
R2	4,000	½	R11	10,000	¼
R3	100,000	½	R12	500,000	V.C.
R4	25,000	½	R13	2,000,000	¼
R5	5,000,000	¼	R14	250,000	¼
R6	100	¼	R15	50,000	¼
R7	15,000	2	R16	500,000	¼
R8	50,000	¼	R17	600—10%	½
R9	1,000,000	¼	R18	150,000	½

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.0001	Mica
C2	.05	400
C3	.0001	Mica
C4	.00006—5%	Mica
C5	.0001	Mica
C6	.003—5%	Mica
C7	.05	200
C8	.0001	Mica
C9	.00025	Mica
C10	.002	600

No.	Capacity (Mfd.)	Volts
C11	.05	200
C12	.25	400
C13	.01	400
C14	.25	400
C15	.005	600
C16a	20.	25
C16b	20.	350
C16c	20.	350
C17	.0001	Mica

Fig. 1—Top View of Chassis



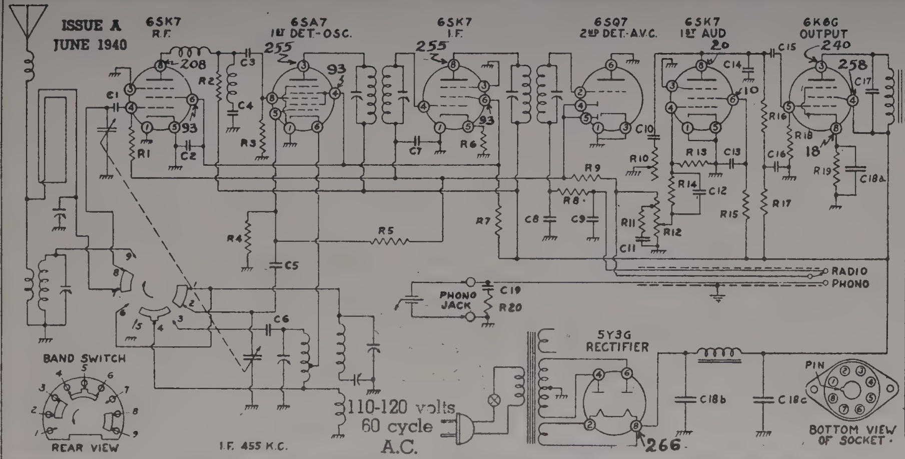
ISSUE C
OCT. 1940

FOR ALIGNMENT &
PUSH-BUTTON TUNER
DATA,-- SEE INDEX

POWER SUPPLY

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.). **Never plug in a D.C.**

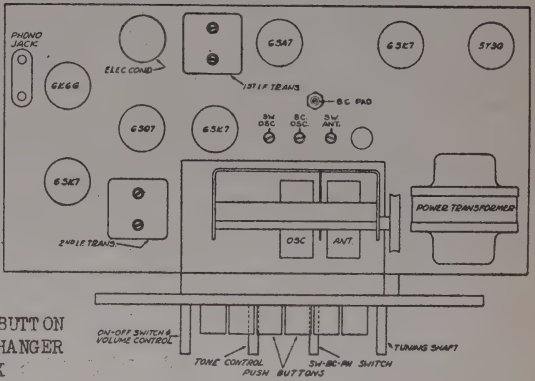
©John F. Rider, Publisher



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

Band Switch
left 535 to 1630 kilocycles
right 5,800 to 18,100 kilocycles

MODEL B7



All voltages to ground with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

FOR ALIGNMENT, PUSH-BUTTON TUNER, PHONO RECORD-CHANGER DATA----SEE INDEX

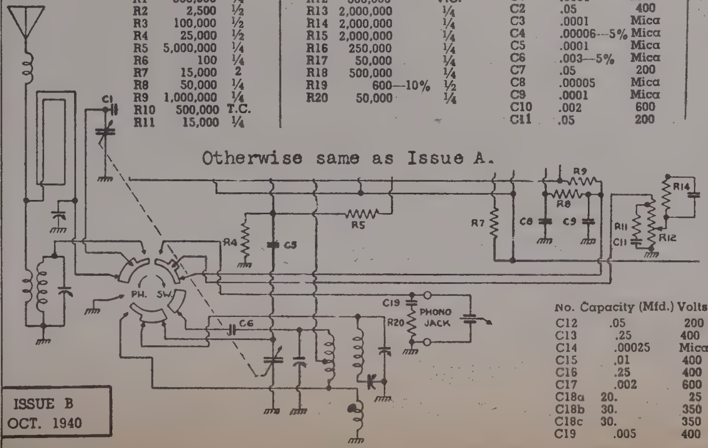
RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R12	500,000	V.C.
R2	2,500	½	R13	2,000,000	¼
R3	100,000	½	R14	2,000,000	¼
R4	25,000	½	R15	2,000,000	¼
R5	5,000,000	¼	R16	250,000	¼
R6	100	¼	R17	50,000	¼
R7	15,000	2	R18	500,000	¼
R8	50,000	¼	R19	600—10%	½
R9	1,000,000	¼	R20	50,000	¼
R10	500,000	T.C.			
R11	15,000	¼			

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.0001	Mica
C2	.05	400
C3	.0001	Mica
C4	.00006—5%	Mica
C5	.0001	Mica
C6	.003—5%	Mica
C7	.05	200
C8	.00005	Mica
C9	.0001	Mica
C10	.002	600
C11	.05	200

No.	Capacity (Mfd.)	Volts
C12	.05	200
C13	.25	400
C14	.00025	Mica
C15	.01	400
C16	.25	400
C17	.002	600
C18a	20.	25
C18b	30.	350
C18c	30.	350
C19	.005	400



Otherwise same as Issue A.

Speaker (Part No. P4283) 10" PM.
D. C. voice coil resistance.........3.7 ohms
Voice coil impedance at 400 cycles.........4.1 ohms

S. W. Antenna Coil (Part No. P3198)
Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, ground; No. 2, antenna; No. 3, switch; No. 4, ground.

Primary—No. 1 and No. 2—Resistance......... .37 ohm
Secondary—No. 3 and No. 4—Resistance......... .08 ohm

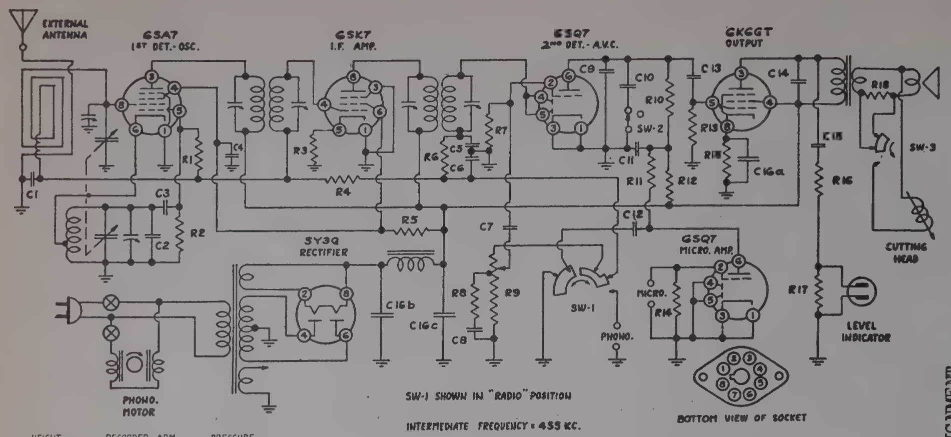
Oscillator Coil (Part No. P4194)
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.
B.C. Primary—No. 1 and No. 5—Resistance......... .29 ohm
S.W. Primary—No. 5 and No. 2—Resistance......... .06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance......... 5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance......... .08 ohm

First I.F. Transformer (Part No. P4108)
Primary—Blue, plate; red, B+—Resistance......... 18.2 ohms
Secondary—White, grid; black, AVC—Resistance......... 15.1 ohms

Second I.F. Transformer (Part No. P4109)
Primary—Blue, plate; red, B+—Resistance......... 20.8 ohms
Secondary—White, diode; black, AVC—Resistance......... 17.4 ohms

MODEL K7

CONTINENTAL RADIO & TELEV. CORP.



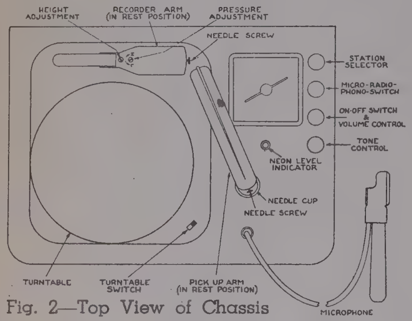
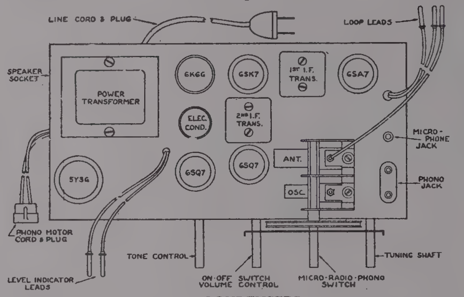


Fig. 2—Top View of Chassis

FOR PHONO RECORDER DATA SEE INDEX

Fig. 1—Top View



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION--VOL. III

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	½	R10	250,000	½
R2	20,000	½	R11	250,000	½
R3	100—10%	½	R12	50,000	½
R4	2,000,000	½	R13	500,000	½
R5	15,000—10%	2	R14	5,000,000	½
R6	50,000	½	R15	600—10%	½
R7	5,000,000	½	R16	250,000—10%	½
R8	20,000	½	R17	500,000—10%	½
R9	500,000	V.C.	R18	50	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C10	.002	400
C2	.000025	Mica	C11	.1	400
C3	.00005	Mica	C12	.005	600
C4	.05	400	C13	.01	400
C5	.0001	Mica	C14	.002	600
C6	.0001	Mica	C15	.002	400
C7	.01	400	C16a	20.	25
C8	.02	200	C16b	20.	350
C9	.00025	Mica	C16c	20.	350

Speaker (Part No. P-4490) 6½" P.M. Type.
D.C. voice coil resistance..............................2.8 ohms
Voice coil impedance at 400 cycles..........3.1 ohms

Oscillator Coil (Part No. P-4495)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 1 and No. 2—Resistance........................ 4.5 ohms
No. 1 and No. 3—Resistance........................ 4.05 ohms
No. 2 and No. 3—Resistance........................ .45 ohm

First I.F. Transformer (Part No. P-4108)

Primary—Blue, plate; red, B+
Resistance ....18.2 ohms
Secondary—White, grid; black, AVC
Resistance ....15.1 ohms

Second I.F. Transformer (Part No. P-4109)

Primary—Blue, plate; red, B+
Resistance .... 20.8 ohms
Secondary—White, diode; black, AVC
Resistance ....17.4 ohms

ALIGNING FREQUENCIES:

IF - 455kc. BC-OSC. - 1730kc thru .0002mf; cond. gang at minimum. BC-ANT. - 1400kc; check gang cond. plates at 600kc.

VOLTAGE CHART

Never plug in a D.C. outlet.

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 90 watts.

ISSUE A
OCT. 1940

Volts

6SA7 TUBE

Plate (3) to ground.. 255
Screen (4) to ground.. 93

6SK7 TUBE

Plate (8) to ground.. 255
Screen (6) to ground.. 93

6K6G TUBE

Plate (3) to ground.. 240
Screen (4) to ground.. 258
Cathode (8) to ground.. 18

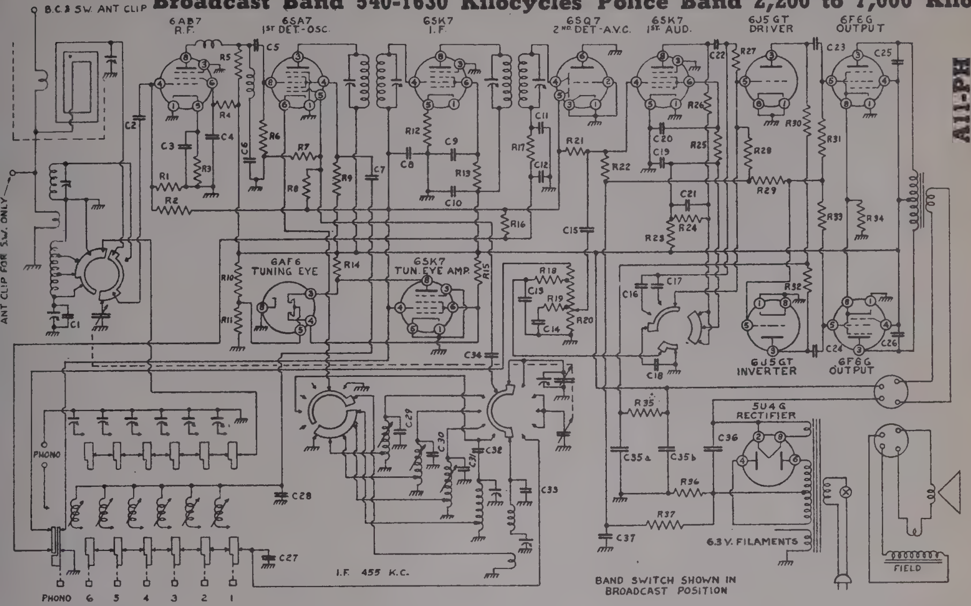
5Y3G TUBE

Filament (8) to ground.. 266

MODELS A11, A11-PH

CONTINENTAL RADIO & TELEV. CORP.

Short Wave Bands 9.45 to 9.77, 11.65 to 11.96 and 15.05 to 15.35 Megacycles
Broadcast Band 540-1630 Kilocycles Police Band 2,200 to 7,000 Kilocycles



A11-PH ISSUE A AUGUST 1940

A11 ISSUE A JULY 1940

RESISTORS		
No.	Ohms	Watts
R 1	1,000,000 ohm	½ watt
R 2	2,000,000 ohm	½ watt
R 3	250 ohm	½ watt
R 4	50,000 ohm	½ watt
R 5	5,000 ohm	½ watt
R 6	100,000 ohm	½ watt
R 7	25,000 ohm	½ watt
R 8	5,000,000 ohm	½ watt
R 9	15,000 ohm	2 watt
R10	25,000 ohm	1 watt
R11	30,000 ohm	½ watt
R12	100 ohm	½ watt
R13	50,000 ohm	½ watt
R14	200,000 ohm	½ watt
R15	200,000 chm	½ watt
R16	1,000,000 ohm	½ watt
R17	50,000 ohm	½ watt
R18	30,000 ohm	½ watt
R19	30,000 ohm	½ watt

RESISTORS		
No.	Capacity	Volts
R20	500,000 ohm	V.C.
R21	1,000,000 ohm	½ watt
R22	2,000,000 ohm	½ watt
R23	50,000 ohm	½ watt
R24	100,000 ohm	½ watt
R25	500,000 ohm	½ watt
R26	15,000 ohm	½ watt
R27	500,000 ohm	½ watt
R28	100,000 ohm	½ watt
R29	250,000 ohm	½ watt
R30	50,000 ohm	½ watt
R31	250,000 ohm	½ watt
R32	50,000 ohm	½ watt
R33	300,000 ohm	½ watt
R34	220 ohm	1 watt
R35	20,000 ohm	½ watt
R36	25 ohm	1 watt 10%
R37	250,000 ohm	½ watt

CONDENSERS		
No.	Capacity	Volts
C1	.00002	10% Mica
C2	.0001	Mica
C3	.05	200 V.
C4	.05	400 V.
C5	.0001	Mica
C6	.00006	5% Mica
C7	.05	400 V.
C8	.05	200 V.
C9	.05	400 V.
C10	.1	400 V.
C11	.0001	Mica
C12	.0001	Mica
C13	.02	200 V.
C14	.02	200 V.
C15	.05	400 V.
C16	.0001	Mica
C17	.00025	Mica
C18	.001	600 V.
C19	.25	400 V.

CONDENSERS		
No.	Ohms	Watts
C20	.05	400 V.
C21	.05	400 V.
C22	.01	400 V.
C23	.02	400 V.
C24	.02	400 V.
C25	.005	600 V.
C26	.005	600 V.
C27	.0005	2½% Mica
C28	.003	5% Mica
C29	.0003	2½% Mica
C30	.00025	2½% Mica
C31	.0002	2½% Mica
C32	.003	5% Mica
C33	.00003	10% Mica
C34	.0001	Mica
C35a	16 Mfd.	450 V.
C35b	20 Mfd.	450 V.
C36	25 Mfd.	450 V.
C37	.25	200 V.

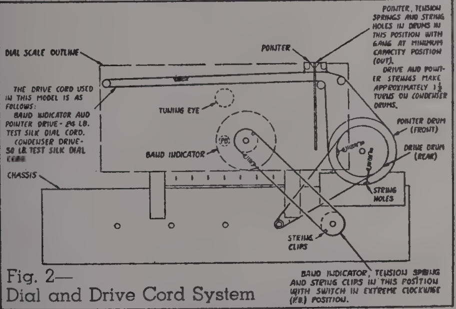

DIAL SCALE OUTLINE
POINTER
POINTER, TENSION SPRINGS AND STRING HOLES IN DRUMS IN THIS POSITION WITH GANG AT MINIMUM CAPACITY POSITION (OUT).
DRIVE AND POINTER STRINGS MAKE APPROXIMATELY 1½ TURNS ON CONDENSER DRUMS.
THE DRIVE CORD USED IN THIS MODEL IS AS FOLLOWS:
BAND INDICATOR AND POINTER DRIVE - 24 LB. TEST SILK DIAL CORD.
CONDENSER DRIVE - 50 LB. TEST SILK DIAL CORD
TUNING EYE
POINTER DRUM (FRONT)
DRIVE DRUM (REAR)
BAND INDICATOR
CHASSIS
STRING HOLES
STRING CLIPS
BAND INDICATOR, TENSION SPRING AND STRING CLIPS IN THIS POSITION WITH SWITCH IN EXTREME CLOCKWISE (P.B.) POSITION.

Fig. 2—
Dial and Drive Cord System

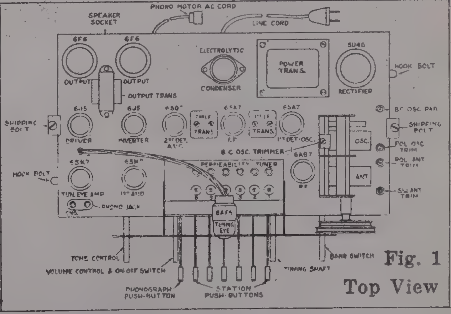


Fig. 1
Top View

PHONOGRAPH CONNECTIONS MODEL A11
connection may be made direct from the phonograph to this jack by means of phone tips, if the phonograph pickup is of the high impedance type. If the pickup is of the low impedance type, a coupling transformer must be used.

TELEVISION CONNECTIONS
The sound channel output from the second detector of a Television Receiver may be plugged directly into the Phono-Jack, thus using the speaker and audio system of this receiver.

MICROPHONE CONNECTIONS
A high impedance, high output microphone may be plugged directly into the phono jack with fair results. The results obtained will be mainly determined by the microphone used; the Quam Permanic Microphone giving fairly good results. A low output microphone such as the crystal, velocity, etc., will not operate properly.

MODELS A11-PH,
62-B7

CONTINENTAL RADIO & TELEV. CORP.

This Record Changer will automatically play a series of up to twelve 10", ten 12" or ten mixed 10" and 12" records of the standard 78 R. P. M. type. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

SHIPPING BOLTS

The automatic record changer is held solid for shipping by four bolts and before placing unit in operation the four channel shaped nuts must be loosened. The aforementioned four channel shaped nuts are located underneath the record changer and should be turned counter-clockwise until they are free from the wood rail of the cabinet.

DO NOT REMOVE THE BOLTS.

If it is necessary to later ship this radio the four channel shaped nuts must be tightened to the shipping position.

CAUTIONS

1. Never use force to start or stop the motor or any part of the record changing mechanism or pickup arm.
2. The use of records which have become warped or damaged thru improper care may cause the mechanism to jam and damage the instrument. Records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.
3. Do not leave records on the selector arms, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. This will protect them from warping and dust.
4. The Changing Cycle consists of the time interval beginning when the pickup arm automatically lifts at the end or center section of the record and moves out to its extreme position; the new record drops and the pickup arm resets itself on the outer edge of this new record. During this cycle, the pickup arm should not be handled. WHEN IT IS DESIRED TO STOP THE MECHANISM CARE SHOULD BE TAKEN TO SEE THAT THIS CHANGING CYCLE IS COMPLETE.
5. No damage will be done if you forget to turn off changer after it has played its entire load of records. It will simply repeat the last record until stopped.
6. LEVELING.—For proper operation of the record changer the unit must be level.

PHONOGRAPH NEEDLES

Various types and kinds of needles are available for use in phonograph pickup arms. All have their virtues, as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For playing up to twelve records at one set-up, as with this Changer, no attempt should be made to use ordinary steel or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the pickup arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so the records are not damaged and the quality of the music is not impaired.

It is recommended that a sapphire point needle be used as it is the only needle that can be satisfactorily used on both commercial records and home recordings. If any other type of needle is used it is necessary to change the needle every time it is desired to play home recordings after playing commercial records. If the same needle is used on both kinds of records (except sapphire types) the home recordings will be quickly damaged. A sapphire needle will play several thousand records before requiring replacement. Never under any condition should a needle be removed from the pickup arm and then re-installed.

To install a needle raise the pickup arm to a nearly **vertical** position, loosen needle screw and insert needle. The needle screw should now be firmly tightened.

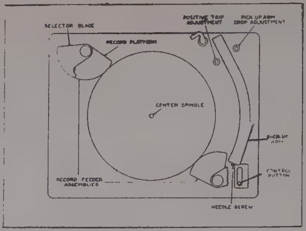


Fig. 1

LOADING

Turn the record feeder assemblies until they snap into place and then place the selected records (up to twelve 10", ten 12" or a mixed stack of 10" and 12" records, not exceeding ten) over the center spindle so they will rest on the record platforms of the record feeder assemblies.

The Record Feeder Assemblies consist of a top plate or Selector Blade which is tapered at the edge for the purpose of selecting the bottom record on the stack and to drop it during the changing cycle. The lower plate is called the Record Platform and it is upon this plate that the records are placed. Place the record desired last on top.

STARTING THE CHANGER

1. Turn on the radio and set the "Phono-Band Switch" to the "Phono" position.
2. Push the control button (see Fig. 1) to the "Rej." (Reject) position and release. The motor will start and the record changer will go into automatic operation.
3. Adjust volume control to the desired intensity and tone control to the preferred setting.
4. Close cabinet to eliminate mechanical reproduction of sound by the needle.
5. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

REJECTING A RECORD

To reject a record it is only necessary to push the control button on the record changer panel to the "Rej." (Reject) position for a few seconds and then release. A record can be rejected any time the needle is in contact with the record.

UNLOADING

1. Switch off the motor while the needle is in contact with a record.
2. Return the pickup arm to the rest position.
3. Lift the record feeder assemblies upward and turn them out of the way.
4. Lift the played records from the turntable.
5. Turn the record feeder assemblies until they snap back into position.

The changer may now be loaded with a new stack of records.

MANUAL OPERATION

Manual operation is used for all home recordings and records without spiral grooves.

1. Lift the record feeder assemblies upward and turn them out of the way.
2. Place record on turntable with the desired selection upward.
3. Push the control button to the first or "Man." (Manual) position.
4. When the turntable has attained speed, lift pickup arm and lower gently on to the record so the needle point enters the outside groove.
5. Adjust volume control to the desired intensity and tone control to the preferred setting.
6. Close cabinet to eliminate mechanical reproduction of sound by the needle.
7. When the playing is finished, be sure turntable is stopped and pickup arm is in the rest position. Never leave the pickup arm with the needle resting on a record or the turntable.

This record changer is provided with two trip mechanisms so that automatic changing can be secured from records with the conventional Eccentric Center Groove or with records lacking the Eccentric Center Groove, but which are recorded sufficiently near the center so that the Positive Trip comes into operation.

THE RATCHET TRIP

The Ratchet Trip requires no adjustment as its range of operation is greater than that of any standard records.

THE POSITIVE TRIP

The Positive Trip can be adjusted to operate at a definite point from the center spindle in the following manner. Remove the button covering the hole on the left side of the pickup arm. Using a small screw driver rotate the screw-head appearing thru this hole.

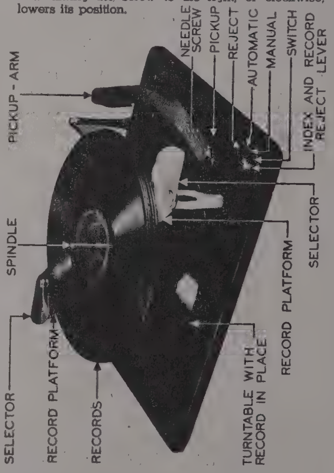
(Caution: This screw can be rotated only one half turn or 180 degrees. Therefore, slight adjustments are all that should be required.) A slight turn to the right or in a clockwise direction makes the trip operative earlier in the playing cycle or farther from the center of the record. Turning this screw slightly to the left or in a counter-clockwise direction causes the positive trip to set later in the playing cycle or nearer to the center of the record. The exact adjustment can be determined only by playing a record with its last groove located at the desired distance from its center.

PICKUP ARM DROP POINT

This Record Changer is provided with an adjustment controlling the position at which the Pickup arm is dropped on the outer edge of the record. This adjustment has a constant relationship for 10 or 12 inch records. Therefore, one adjustment on either diameter of record is sufficient. To make this adjustment, remove the button on the right side of the pickup arm and with a small screw driver, rotate the exposed screw head slightly. (Caution: This screw also can be rotated only one half turn or 180 degrees. Therefore, slight adjustments are all that should be required.) Turning to the right or in a clockwise direction causes the needle to drop farther from the edge of the record. Turning to the left or counter-clockwise direction causes the needle to drop nearer the edge of the record. The proper position for the needle to drop is approximately ⅛" from the edge of the record and in the blank space at this point, that is, in the space at the edge of the record where there are no grooves.

PICKUP ARM LIFT

This Record Changer is designed so that the pickup will start at the proper position on the top record of 12 ten inch records on the turntable. This is based upon the use of a needle which is inserted with approximately 5/16" protruding from the underside of the pickup arm. Adjustment for this is readily available by lifting the pickup arm to its maximum position. Turning the hexagon headed screw thus exposed on the underside of the Pickup Arm makes the adjustment. Turning the screw to the left or counter-clockwise raises the operating position of the Pickup Arm and turning the screw to the right, or clockwise, lowers its position.



©John F. Rider, Publisher

MODELS A11,A11-PH,B11

All alignments should be made with the volume control in the maximum position, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Remove the chassis from the cabinet, disconnect loop and adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT
(Band No. 1, 1st Part)

Adjust the signal generator to 1630 KC and connect the output to the green antenna loop lead through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer (See Fig. 1) to receive this signal. The other broadcast band adjustments are made later.

POLICE BAND ALIGNMENT
(Band No. 2)

Adjust the signal generator to 7000 KC and connect the output to the black antenna loop lead through a 400 ohm resistor. With the gang condenser at minimum capacity adjust the police oscillator trimmer (See Fig. 1) to receive this signal. Set the signal generator to 6000 KC and adjust the police antenna trimmer to peak.

31 METER BAND ALIGNMENT
(Band No. 3)

Set the signal generator to exactly 9,450 KC and connect the output to the black antenna loop lead through a 400 ohm resistor. With the gang condenser at maximum capacity adjust the iron slug (lower screw on right side of chassis) to receive signal. The antenna air trimmer is now adjusted by first loosening the large nut and then moving the plunger in or out until the point of maximum output is reached. This air trimmer should now be locked in place by means of the large nut and not changed during the rest of the alignment. If a signal generator of sufficient accuracy is not available adjust approximately, then tune in a station of known frequency and readjust until the station comes in at the correct dial setting.

25 METER BAND ALIGNMENT
(Band No. 4)

Set the signal generator to exactly 11,650 KC and connect the output to the black antenna loop lead through a 400 ohm resistor. With the gang condenser at maximum capacity adjust the iron slug (center screw on right side of chassis) to receive signal. This is the only adjustment on this band.

19 METER BAND ALIGNMENT
(Band No. 5)

Set the signal generator to exactly 15,050 KC and connect the output to the black antenna loop lead through a 400 ohm resistor. With the gang condenser at maximum capacity adjust the iron slug (upper screw on right side of chassis) to receive signal. This is the only adjustment on this band.

BROADCAST BAND ALIGNMENT
(Band No. 1, 2nd Part)

Re-install the receiver completely in its cabinet. Adjust the signal generator to 1400 KC and connect the output to a shielded loop radiator and place this loop about two feet from the rotary loop antenna. If no loop radiator is available the output of the signal generator should be connected to the antenna clip of the rotary loop antenna through a .0002 mfd. mica condenser. Tune signal and adjust the B.C. antenna trimmer (on rotary loop antenna) to peak. Set the signal generator to 600 KC, tune the signal and then slowly increase or decrease the B.C. oscillator padding condenser (See Fig. 1) and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

Speaker (Part No. P4382) 12" Dynamic

Field Resistance	600 ohms
D.C. Voice Coil Resistance	5.4 ohms
Voice Coil Impedance at 400 cycles	6.0 ohms

Short Wave Antenna Coil (Part No. G6282)

Looking at the five lug connection end starting at the chassis in a clockwise direction the terminals are: No. 1, switch; No. 2, sec. tap; No. 3, sec. tap; No. 4, ground; No. 5, antenna; other end, No. 6, trimmer.

Primary—No. 4 and No. 5—Resistance	.3 ohm
Secondary (Police)—No. 1 and No. 4—Resistance	.5 ohm
Secondary (S.W.)—No. 4 and No. 6—Resistance	.5 ohm

B.C. Oscillator Coil (Part No. G6283)

Starting at the mounting bracket in a clockwise direction the connections are: No. 1, pad; No. 2, ground; No. 3, grid; No. 4, cathode.

Primary—No. 2 and No. 4—Resistance	.14 ohm
Secondary—No. 1 and No. 3—Resistance	4.1 ohms

First I.F. Transformer (Part No. P4360)

Primary—Blue, plate; red, B+—Resistance	19.6 ohms
Secondary—White, grid; black, AVC—Resistance	16.9 ohms

Second I.F. Transformer (Part No. P4361)

Primary—Blue, plate; red B+—Resistance	19.3 ohms
Secondary—White, diode; black, AVC—Resistance	16.6 ohms

Power Transformer (Part No. P3476)

Primary—115 volt, 60 cycle; black leads; Resistance	2.5 ohms
Secondary—6.3 volt filament; green leads. Resistance	.12 ohm
Secondary—5 volt rectifier filament; yellow leads. Resistance	.11 ohm
Secondary—High voltage; red leads. Resistance	123.7 ohms
High voltage center tap; red and white lead. Resistance to one side	59.8 ohms
Resistance to other side	64.3 ohms

PROCEDURE FOR SETTING UP PUSH BUTTONS

The push buttons under the dial will provide instant tuning to any one of six stations. Make a list of the desired stations; two between 540 and 1080 kilocycles, two between 670 and 1270 kilocycles, and the last two between 1000 and 1630 kilocycles.

The adjustments of the push buttons are reached from the rear and are located above the chassis in the center. The top of the plate is numbered from 1 to 6 inclusive and there are two adjustments under each number. Numbers 1 and 2 cover the two stations between 1000 and 1630 kilocycles, numbers 3 and 4 cover the two stations between 670 and 1270 kilocycles and numbers 5 and 6 cover the two stations between 540 and 1080 kilocycles.

To set the aforementioned adjustments proceed as follows:

1. Turn band switch to band (1) (band indicator located in lower center of dial).
2. Tune in, by means of the station selector knob, the station selected above for number 1.
3. Turn band switch to (P.B.) position.
4. Loosen wing nut and remove the tuning eye located directly above the permeability tuner.
5. Turn the adjustment screw directly under number 1 until the station tuned in step number 2 is again received and then carefully adjust it until the tuning eye is the nearest to closed.
6. Turn the adjustment directly below the aforementioned adjustment until the tuning eye is the nearest to closed and the station is received the clearest.

The above procedure is repeated for each of the five remaining stations. The tuning eye should then be carefully replaced.

MODEL B11

Voltages—Line 117 volts A.C. Power consumption 165 watts. Volume control maximum. Loop antenna not connected and set tuned off station. Meter 20,000 ohms per volt. Meter scales used are as follows: Scale "A," 10 volts; Scale "B," 50 volts; Scale "C," 250 volts; Scale "D," 1,000 volts.

6AB7 RF Tube	Meter Scale	Voltage
Plate (8) to ground	"C"	225 volts
Screen (6) to ground	"C"	180 volts
Cathode (5) to ground	"A"	2.6 volts

6SA7 1st Det.-Osc. Tube		
Plate (3) to ground	"D"	260 volts
Screen (4) to ground	"C"	130 volts
Cathode (6) to ground	"A"	0.0 volts

6SK7 I.F. Amp. Tube		
Plate (8) to ground	"D"	230 volts
Screen (6) to ground	"C"	125 volts
Cathode (5) to ground	"A"	1.7 volts

6SQ7 2nd Det., AVC Tube		
Plate (6) to ground	"A"	0.0 volts

6U5 Tuning Eye and Volume Level Indicator Tube		
Target Plate (4) to ground	"D"	260 volts

6SQ7 Microphone Amp. Tube		
Plate (6) to ground	"B"	25 volts
Grid (2) to ground	"A"	0.0 volts

6SK7 1st Audio Tube		
Plate (8) to ground	"C"	70 volts
Screen (6) to ground	"B"	30 volts

6J5GT Driver Tube		
Plate (3) to ground	"C"	85 volts
Cathode (8) to ground	"A"	0.0 volts

6SR7 Inverter Tube		
Plate (6) to ground	"C"	75 volts
Diode Plate (4) to ground	"A"	—3 volts
Diode Plate (5) to ground	"A"	—3 volts

6F6G Output Tubes		
Plate (3) to ground	"D"	260 volts
Screen (4) to ground	"D"	260 volts
Cathode (8) to ground	"B"	15 volts

5U4G Rectifier Tube		
Filament (8) to ground	"D"	340 volts

MODELS A11,A11-PH

Voltages—Line 117 volts A.C. Power consumption 150 watts. Volume control maximum. Loop antenna not connected and set tuned off station. Meter 20,000 ohms per volt. Meter scales used are as follows: Scale "A," 10 volts; Scale "B," 50 volts; Scale "C," 250 volts; Scale "D," 1,000 volts.

6AB7 R.F. Tube	Meter Scale	Voltage
Plate (8) to ground	"C"	170 volts
Screen (6) to ground	"C"	155 volts
Cathode (5) to ground	"A"	2.9 volts

6SA7 1st Det.-Osc. Tube		
Plate (3) to ground	"C"	175 volts
Screen (4) to ground	"C"	105 volts

6AF6 Tuning Eye Tube		
Target (5) to ground	"C"	115 volts

6SK7 I.F. Tube		
Plate (8) to ground	"C"	175 volts
Screen (6) to ground	"C"	108 volts

6SK7 1st Aud. Tube		
Plate (8) to ground	"B"	38 volts

6J5GT Driver Tube		
Plate (3) to ground	"C"	86 volts

6J5GT Inverter Tube		
Plate (3) to ground	"C"	86 volts

6F6G Output Tube		
Plate (3) to ground	"C"	168 volts
Screen (4) to ground	"C"	175 volts
Cathode (8) to ground	"B"	15.5 volts

5U4G Rectifier Tube		
Filament (2) to ground	"D"	270 volts

AUTOMATIC RECORD CHANGER

This Record Changer will automatically play a series of fourteen 10" or ten 12" records of the standard 78 R.P.M. type. The records must all be one size when loading and may consist of less records than listed above. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

CAUTIONS

1. Never use force to start or stop the motor or any part of the record changing mechanism or pickup arm. The turntable is weighted for recording and will require about one minute to come to rest after the motor is turned off.
2. The use of records which have become warped or damaged thru improper care may cause the mechanism to jam and damage the instrument. Records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.
3. Do not leave records on the selector arms, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. This will protect them from warping and dust.
4. If the automatic record changer is turned off by the motor switch knob while the mechanism is going thru a "change cycle" the motor will not stop until the cycle is completed and the tone arm is again in playing position. The tone arm may now be lifted to the rest position. If it is desired to turn the record changer off by the use of any other switch than the one on the changer itself, be sure to turn it off while needle is resting upon record; otherwise the selecting arms cannot be correctly reset.
5. No damage will be done if you forget to turn off changer after it has played its entire load of records. It will simply repeat the last record until stopped.
6. LEVELING—For proper operation of the record changer and recorder the unit must be level.

PHONOGRAPH NEEDLES

Various types and kinds of needles are available for use in phonograph tone arms. All have their virtues, as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For playing ten or more records at one set-up, as with this Changer, no attempt should be made to use ordinary steel or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the tone arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so the records are not damaged and the quality of the music is not impaired.

It is recommended that a sapphire point needle be used as it is the only needle that can be satisfactorily used on both commercial records and home recordings. If any other type of needle is used it is necessary to change the needle every time it is desired to play home recordings after playing commercial records. If the same needle is used on both kinds of records (except sapphire types) the home recordings will be quickly damaged. A sapphire needle will play several thousand records before requiring replacement. Never under any condition should a needle be removed from the tone-arm head and then re-installed.

To install a needle raise the tone arm to a nearly vertical position, loosen needle screw and insert needle. The needle screw should now be firmly tightened.

SETTING FOR SIZE OF RECORD

On each post there are selecting arms (See Fig. 2 and Fig. 3) and their position determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Figure 2 shows the Record changer with the selecting arms set for 10" records and ready to be loaded; the tone arm in the rest position. Figure 3 shows the setting for 12" records.

LOADING

After both selecting arms are adjusted so the arrows marked with the desired record size point to the center, the selected records (up to fourteen 10" or ten 12") are placed over the center pin so they will rest on the selecting arms. Place the record desired last on top.

STARTING THE CHANGER

1. Move the manual control button (See Figure 2) to the "AUTOMATIC" position.
2. Turn on the radio and push in the "PHONOGRAPH" push button.
3. Turn the switch knob on the Record Changer panel to "ON." The motor will then start and the record changer will go into automatic operation.
4. Adjust volume control to the desired intensity and tone control to the preferred setting.
5. Close lid of the cabinet to eliminate mechanical reproduction of sound by the needle.
6. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

REJECTING A RECORD

To reject a record it is only necessary to press the switch knob on the record changer panel for a few seconds and then release. A record can be rejected any time the needle is in contact with the record.

UNLOADING

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way. Return the tone arm to the rest position.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms. (See Fig. 2 and 3). The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

MANUAL OPERATION

Manual operation is used for all home recordings and records without spiral grooves.

1. Move the manual control button as far as possible toward the needle screw and then move the tone arm to its extreme outside position. The combination of movements will result in the manual control button snapping into position at the end of the escutcheon plate and will completely free the tone arm from all locked or automatic positions.
2. Place record on turntable with the desired selection upward.
3. Turn the switch knob on the record changer panel to "On."
4. When the turntable has attained speed, lift tone arm and lower gently on to the record so the needle point enters the outside groove.
5. Adjust volume control to the desired intensity and tone control to the preferred setting.
6. Close lid of the cabinet to eliminate mechanical reproduction of sound by the needle.
7. When the playing is finished, be sure turntable is stopped and tone arm is in the rest position. Never leave the tone arm with the needle resting on a record or the turntable.

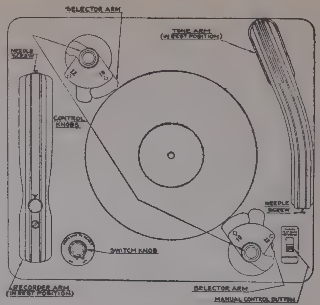


Fig. 2

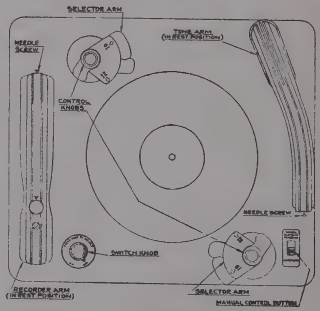


Fig. 3

ANTENNA CONTROL

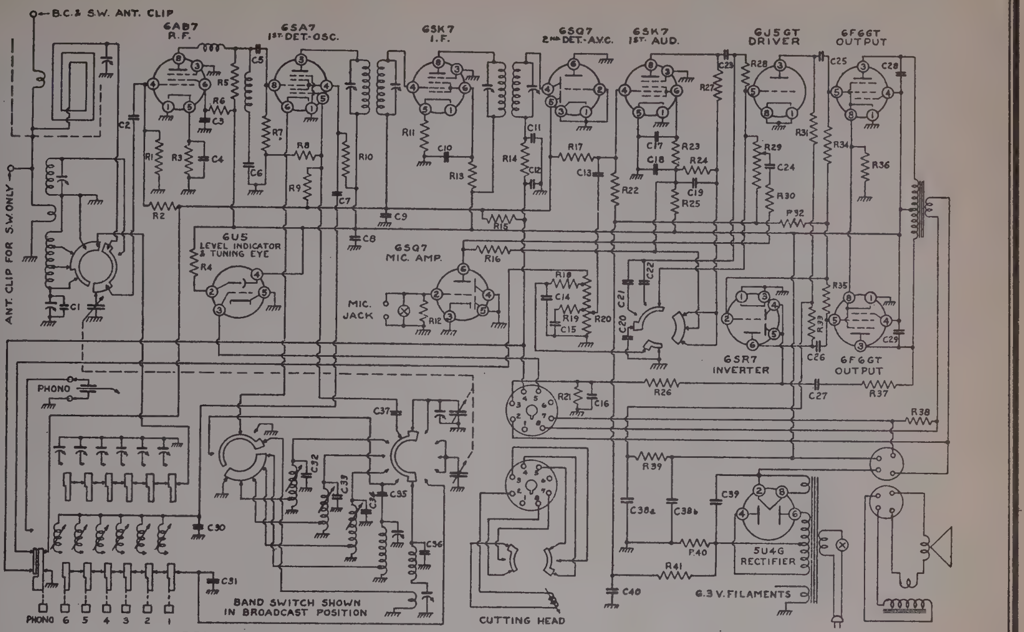
The antenna control knob is located above the dial scale and controls the position of the rotary loop antenna. On weak stations this knob should be turned right or left to the position of maximum output. In extremely noisy locations the knob should be turned to the point of minimum noise.

TELEVISION CONNECTIONS

The sound channel output from the second detector of a Television Receiver may be plugged directly into the Phono Jack, thus using the speaker and audio system of this receiver. The above connections will greatly reduce the cost of Television Receiving Equipment, because it eliminates the need for a speaker and audio system in the above equipment.

CONTINENTAL RADIO & TELEV. CORP.

MODEL B11



RESISTORS

R1	1,000,000 ohm ½ watt	
R2	2,000,000 ohm ½ watt	
R3	250 ohm ½ watt	10%
R4	1,000,000 ohm ½ watt	
R5	5,000 ohm ½ watt	
R6	50,000 ohm ½ watt	
R7	100,000 ohm ½ watt	
R8	25,000 ohm ½ watt	
R9	5,000,000 ohm ½ watt	
R10	15,000 ohm 2 watt	
R11	100 ohm ½ watt	
R12	5,000,000 ohm ½ watt	
R13	50,000 ohm ½ watt	
R14	50,000 ohm ½ watt	
R15	1,000,000 ohm ½ watt	
R16	500,000 ohm ½ watt	
R17	1,000,000 ohm ½ watt	
R18	30,000 ohm ½ watt	
R19	30,000 ohm ½ watt	
R20	500,000 ohm V.C.	
R21	400,000 ohm ½ watt	
R22	2,000,000 ohm ½ watt	
R23	500,000 ohm ½ watt	
R24	100,000 ohm ½ watt	
R25	50,000 ohm ½ watt	
R26	1,000,000 ohm ½ watt	
R27	15,000 ohm ½ watt	
R28	500,000 ohm ½ watt	
R29	100,000 ohm M.V.C.	
R30	50,000 ohm ½ watt	
R31	50,000 ohm ½ watt	
R32	250,000 ohm ½ watt	
R33	50,000 ohm ½ watt	
R34	250,000 ohm ½ watt	
R35	300,000 ohm ½ watt	
R36	220 ohm 1 watt	
R37	25,000 ohm 1 watt	10%
R38	50 ohm ½ watt	
R39	20,000 ohm ½ watt	
R40	25 ohm 1 watt	(10% wire wound)
R41	250,000 ohm ½ watt	

CONDENSERS

C1	.00002	10%—Mica
C2	.0001	Mica
C3	.05	400
C4	.05	200
C5	.0001	Mica
C6	.00006	5%—Mica
C7	.05	400
C8	.1	400
C9	.05	200
C10	.05	400
C11	.0001	Mica
C12	.0001	Mica
C13	.05	400
C14	.02	200
C15	.02	200
C16	.1	200
C17	.05	400
C18	.25	400
C19	.05	400
C20	.001	600
C21	.0001	Mica
C22	.00025	Mica
C23	.01	400
C24	.02	400
C25	.02	400
C26	.02	400
C27	.05	400
C28	.005	600
C29	.005	600
C30	.003	5%—Mica
C31	.0005	2½%—Mica
C32	.0003	2½%—Mica
C33	.00025	2½%—Mica
C34	.0002	2½%—Mica
C35	.003	5%—Mica
C36	.00003	10%—Mica
C37	.0001	Mica
C38a	16.	450
C38b	20.	450
C39	25.	450
C40	.25	200

POWER
110-120 V.
60 cycles
AC.

DO NOT PLUG INTO A DC OUTLET.

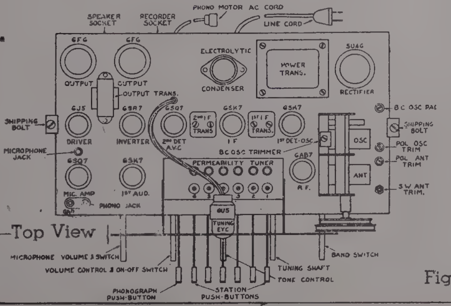
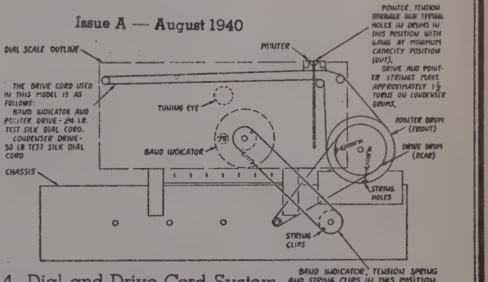


Fig. 1—Top View

Issue A — August 1940



THE DRIVE CORD USED IN THIS MODEL IS AS FOLLOWS:
BAND INDICATOR AND POINTER DRIVE - 24 LB. TEST SILK DIAL CORD.
CONDENSER DRIVE - 50 LB TEST SILK DIAL CORD

POINTER, TENSION [redacted] HOLES IN DRUMS IN THIS POSITION WITH GANG AT MINIMUM CAPACITY POSITION (OUT).
DRIVE AND POINTER STRINGS MAKE APPROXIMATELY 1½ TURNS ON CONDENSER DRUMS.

Fig. 4—Dial and Drive Cord System

BAND INDICATOR, TENSION SPRING AND STRING CLIPS IN THIS POSITION WITH SWITCH IN EXTREME CLOCKWISE (P.B.) POSITION.

RECORDER

This recorder will make up to 12 inch recordings. The recordings may be made from the microphone or radio; also the microphone and radio may be blended together in one recording.

CAUTIONS

1. Never try to record on a blank that is warped even though it be just slight.

2. When recording the recording needle will cut a fine thread, just a little thicker than a human hair, from the record blank and this thread should pile up toward the center of the blank. After the recording is completed, this thread may be gathered up and removed. Although it is possible to remove this thread continually with a soft brush while the record is being cut, considerable care must be taken so that the thread is not tangled around the recording needle or the turntable slowed up by touching it; since either will cause poor recordings.

3. If the shavings cut from the record gather under the recording needle the needle screw should be loosened and then retightened, being sure to keep the needle all the way in. The resulting minute change in the angular position of the needle will probably correct the trouble.

4. The recorder arm must be in the rest position when playing back recordings or using the automatic record changer.

5. Never try to remove or replace a recorded or plain blank with the motor running.

6. Be sure the recording needle is tight after each recording. Should it loosen during a recording, it will chatter and ruin the record.

7. The recording needle is razor sharp and must not be dropped or allowed to rest on the turntable. The recording needle should only be in contact with the record while actually recording or adjusting the Recorder Arm Height.

8. If the microphone is held too close to the speaker it will feed back and start a loud "howl." When recording from the microphone it should be kept well away from the cabinet and with the back toward the cabinet. When not recording the microphone volume control should be turned to the off position to prevent feedback or "howl."

9. Never record nearer than one and one-half inches from the center of the record. With some recording discs it is not possible to record this close to the center because of a large label; do not record closer than one-fourth inch from label.

TO RECORD A RADIO PROGRAM

1. Place a blank recording disc on the turntable with the driving pin, located in the top of the turntable about one inch from the center, in one of the three holes provided.

2. Set "Phono-Radio-Micro" Switch to Radio Position. (Model K7)

2. Move the manual control button as far as possible toward the needle screw and then move the tone arm to its extreme outside position. The combination of movements will result in the manual control button snapping into position at the end of the escutcheon plate and will completely free the tone arm from all locked or automatic positions. (Model B11)

3. Turn radio on and tune desired station.

4. Turn phonograph motor on.

5. Lift recorder arm about three inches and move it to the edge of the blank. This will switch from playback to record and decreases the volume. While holding the recorder arm adjust the volume control until the volume level indicator (tuning eye) almost closes and lower the recorder arm gently on to the record so the recording needle starts about one-fourth inch in from the edge of the blank disc. On loud music passages the volume level indicator should completely close.

6. After the recording is complete (never record closer than one and one-half inches from the center) the recorder arm should be returned to its rest position. Never leave the recorder arm resting on record or turntable.

TO RECORD FROM THE MICROPHONE

The procedure is the same as recording a radio program except (the volume control is set to minimum and the microphone volume control is used Mod. B11) (Mod. K7, Phono-Radio-Micro Sw. turned to Mike Position.)

TO RECORD MICROPHONE AND RADIO PROGRAM AT THE SAME TIME

The procedure is the same as recording a radio program except the microphone volume control is also used. The two may be blended as desired or only one used part of the time and by changing the volume controls slowly, fading from one to the other is obtained. Model B11 only.

PLAYBACK

As soon as a recording is completed it may be instantly played back after the recorder arm is returned to its rest position and the "Phono" button is pushed in. (See Manual Playback)

RECORDER ARM PRESSURE ADJUSTMENT

The pressure on the recording needle which determines the groove depth is controlled by the chrome-plated knob on the top of the recorder arm. This knob has engraved upon it the letters "L, M and H" indicating Light, Medium and Heavy pressures and provides an easy means of compensating for different types of recording needles, blanks or for the wearing of the recording needle after it is used. In general, the machine is properly set at the factory so that it will cut the average record correctly when this knob is in the "M" position. No "M" Pos. for Mod. K7.

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

A properly cut groove will leave a shaving just a little heavier than a human hair.

RECORDER ARM HEIGHT ADJUSTMENT

The height of the recorder arm can be varied by means of the slotted screw head which is on the top of the arm and toward the back, approximately flush with the surface. In order to make this adjustment, it is necessary to insert a recording needle and, with the motor turned OFF and a record blank on the turntable, place the recorder arm VERY CAREFULLY in the cutting position. Now raise or lower the recorder arm by means of the above mentioned adjustment until the needle screw is approximately centered in the slot at the front end of the recorder arm.

RECORDING NEEDLE

The recording needle or cutting stylus supplied with this recorder is a "Permo* Point" and will make about *350 six-inch recordings. The condition of the recording needle may be determined by comparing the color of the newly recorded portion of the record with the unrecorded portion. A good recording needle will result in grooves having a higher brilliance than the unrecorded portion; as the needle wears or if the needle is poor to begin with the cut portion will have less lustre and will eventually appear gray.

*25 Recordings for Mod. K7 (no Permo Point)

In case the recording needle tends to chatter as it is recording, it is advisable to replace it with a new needle.

The recording needle may be removed and replaced as desired, provided the adjustments are checked before recording. In all events, every precaution must be taken to protect the cutting point at all times; in cutting it should be lowered GENTLY on the blank with the turntable running.

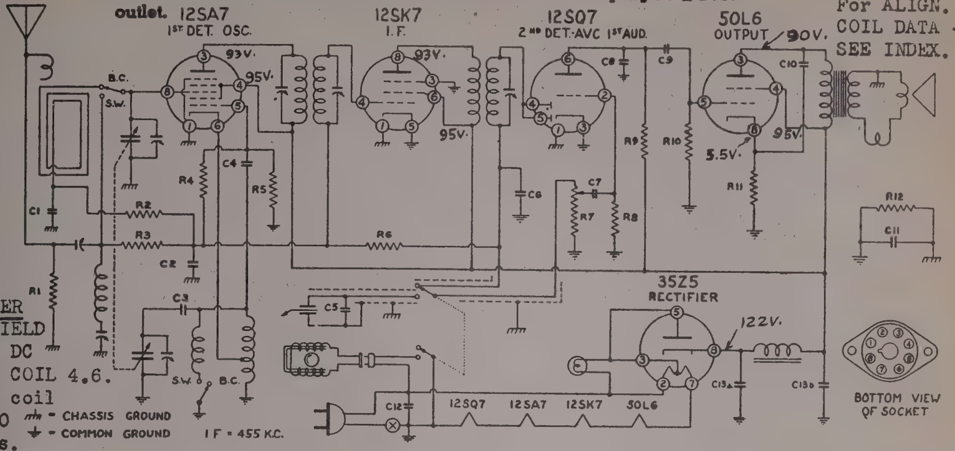
INSTALLING NEW RECORDING NEEDLE

The recording needle is provided with a flat on one side and should be inserted in the needle hole so this flat is toward the needle screw, now with the needle all the way in tighten it by means of the needle screw. The recorder arm adjustments must now be checked. See "Recorder Arm Height Adjustment" and "Recorder Arm Pressure Adjustment."

CONTINENTAL RADIO & TELEV. CORP.

MODELS J55, XJ55, XJ55-PH

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (A.C.). **Never plug in a D.C. outlet.**



For ALIGN. & COIL DATA - SEE INDEX.

SPEAKER
RES.FIELD
450;- DC
VOICE COIL 4.6.
Voice coil
at 400
cycles.

⏚ = CHASSIS GROUND
⏚ = COMMON GROUND
I F = 455 K.C.

XJ55

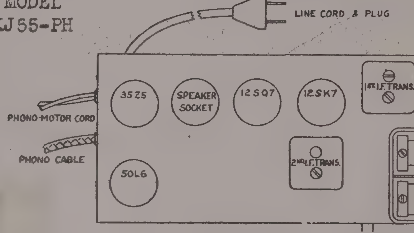
RESISTORS

No.	Ohms	Watts
R1	250,000	¼
R2	100,000	¼
R3	250,000	¼
R4	10,000,000	¼
R5	25,000	¼
R6	2,000,000	¼
R7	500,000	V.C.
R8	5,000,000	¼
R9	250,000	¼
R10	500,000	¼
R11	150—10%	¼
R12	150,000	¼

CONDENSERS

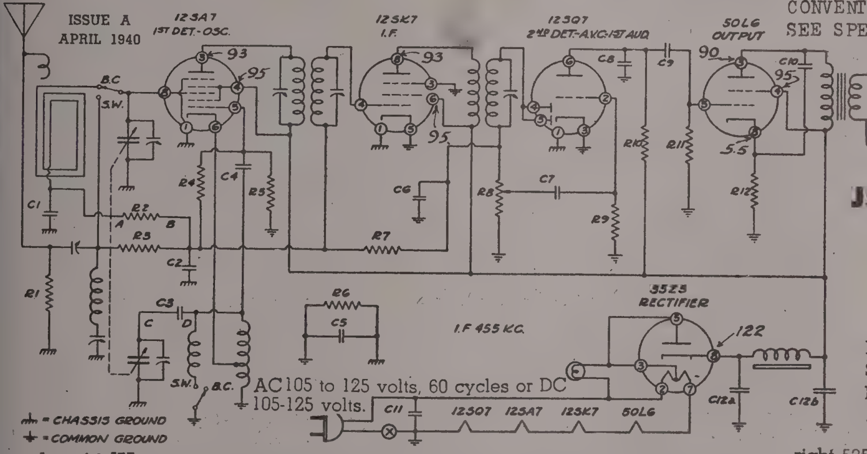
No.	Capacity (Mfd.)	Volts
C1	.05	200
C2	.05	200
C3	.02	200
C4	.0001	Mica
C5	.005	400
C6	.00025	Mica
C7	.005	400
C8	.0005	Mica
C9	.01	400
C10	.02	400
C11	.2	200
C12	.05	400
C13a	30.	150
C13b	20.	150

MODEL
XJ55-PH



ISSUE A
JUNE 1940

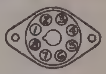
ISSUE A
APRIL 1940



AC 105 to 125 volts, 60 cycles or DC 105-125 volts.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

MODEL J55 & XJ55



For SPEAKER & COIL DATA - SEE INDEX.

(Band Switch)
right 535 to 1630 kilocycles
left 2.8 to 6.58 megacycles

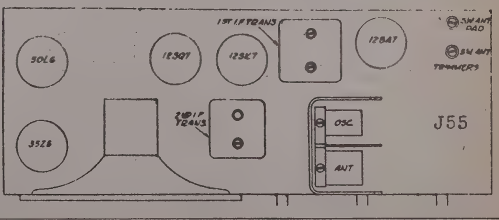
In model J55 all common grounds become chassis grounds, C1, C3, C5, R2, and R6 are omitted Point "A" is connected to point "B" and point "C" to point "D."

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)		Volts
C1	.05	200	C8	.0005		Mica
C2	.05	200	C9	.01		400
C3	.02	200	C10	.02		400
C4	.0001	Mica	C11	.05		400
C5	.2	200	C12a	30.	Elec.	150
C6	.00025	Mica	C12b	20.	Elec.	150
C7	.005	400				

RESISTORS

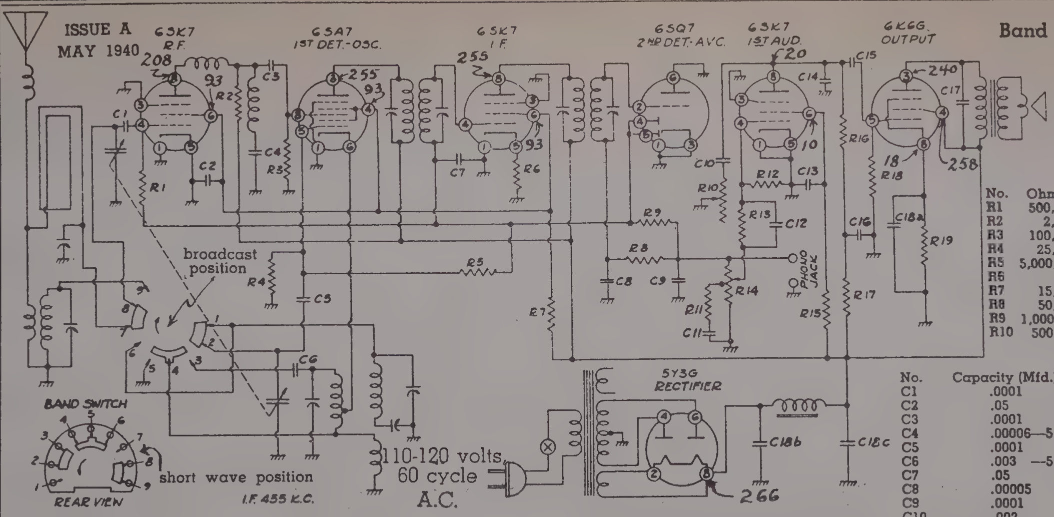
No.	Ohms	Watts	No.	Ohms	Watts
R1	250,000	¼	R7	2,000,000	¼
R2	100,000	¼	R8	500,000	V.C.
R3	250,000	¼	R9	5,000,000	¼
R4	10,000,000	¼	R10	250,000	¼
R5	25,000	¼	R11	500,000	¼
R6	150,000	¼	R12	150—10%	¼



J55

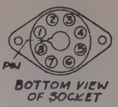
CONTINENTAL RADIO & TELEV. CORP.

ISSUE A
MAY 1940



Band Switch 535 to 1630 kilocycles.
1582 to 1630 kilocycles.

MODEL A77



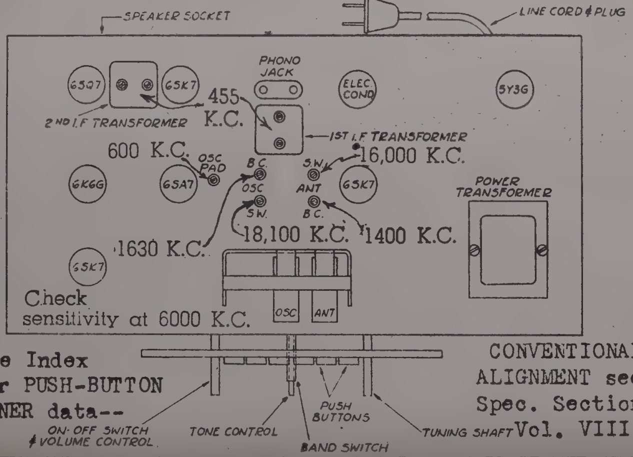
RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R11	15,000	¼
R2	2,500	½	R12	2,000,000	¼
R3	100,000	½	R13	2,000,000	¼
R4	25,000	½	R14	500,000	V.C.
R5	5,000,000	¼	R15	2,000,000	¼
R6	100	¼	R16	250,000	¼
R7	15,000	2	R17	50,000	¼
R8	50,000	¼	R18	500,000	¼
R9	1,000,000	¼	R19	600—10%	½
R10	500,000	T.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.05	200
C2	.05	400	C12	.05	200
C3	.0001	Mica	C13	.25	400
C4	.00006—5%	Mica	C14	.00025	Mica
C5	.0001	Mica	C15	.01	400
C6	.003 —5%	Mica	C16	.25	400
C7	.05	200	C17	.002	600
C8	.00005	Mica	C18a	20.	25
C9	.0001	Mica	C18b	30.	350
C10	.002	600	C18c	30.	350

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.



See Index for PUSH-BUTTON TUNER data--

CONVENTIONAL ALIGNMENT see Spec. Section Vol. VIII.

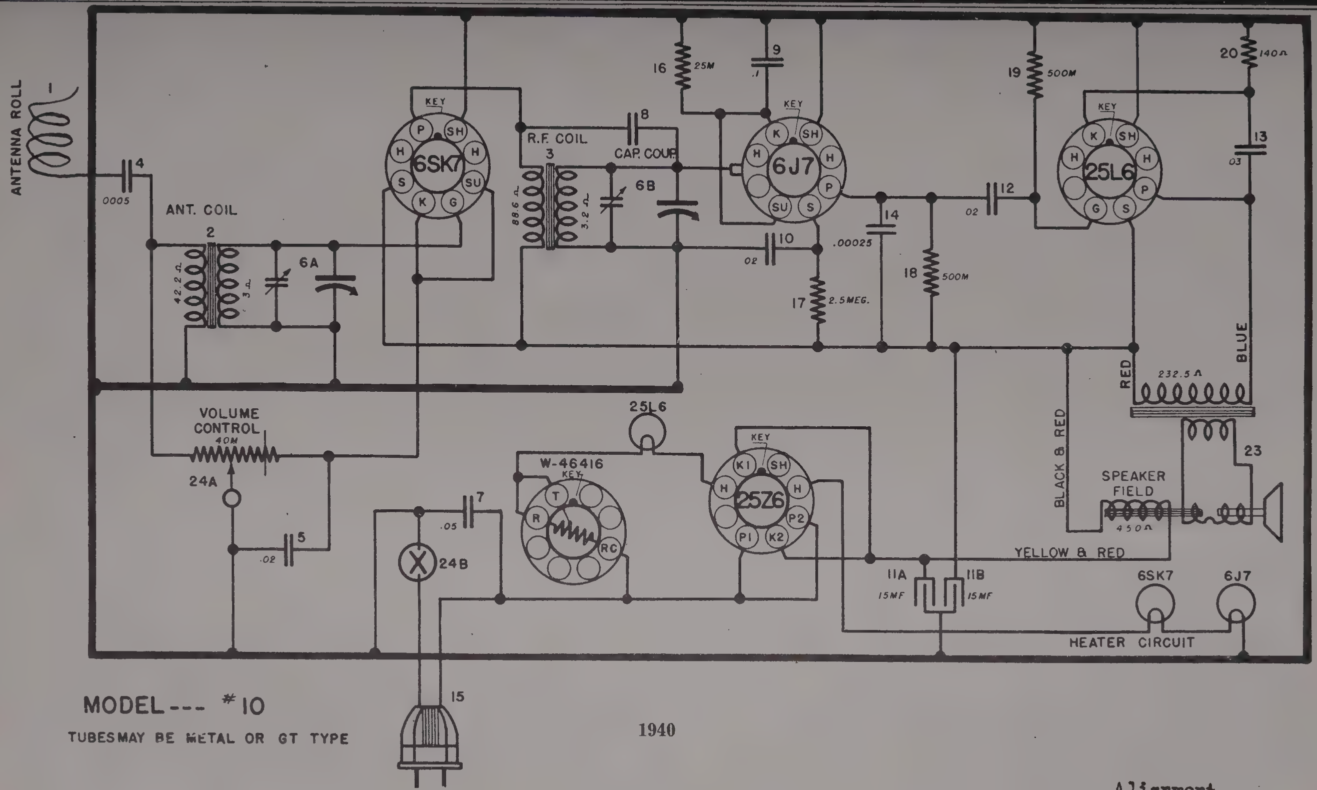
Speaker (Part No. P4283) 10" PM.
D. C. voice coil resistance....3.7 ohms
Voice coil impedance at 400 cycles....4.1 ohms

S. W. Antenna Coil (Part No. P3198)
Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, plate; No. 2, B+; No. 3, grid; No. 4, pad.
Primary—No. 3 and No. 4—Resistance.... .08 ohm
Secondary—No. 1 and No. 2—Resistance.... .37 ohm

Oscillator Coil (Part No. P4194)
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.
B.C. Primary—No. 1 and No. 5—Resistance.... .29 ohm
S.W. Primary—No. 5 and No. 2—Resistance.... .06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance.... 5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance.... .08 ohm

First I.F. Transformer (Part No. P4108)
Primary—Blue, plate; red, B+—Resistance.... 18.2 ohms
Secondary—White, grid; black, AVC—Resistance.... 15.1 ohms

Second I.F. Transformer (Part No. P4109)
Primary—Blue, plate; red, B+—Resistance.... 20.8 ohms
Secondary—White, diode; black, AVC—Resistance.... 17.4 ohms



MODEL --- #10

TUBES MAY BE METAL OR GT TYPE

1940

SOCKET VOLTAGES TAKEN @ 117.5 VOLT LINE (A. C.)

Tube	Function	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
		SOCKET PIN NUMBER							
6SK7	R. F. Amplifier	GND.	H	3.0	GRID	3.0	92	H	91
6J7	Detector	GND.	H	20	8	2.0	—	H	2.0
25L6	Output	GND.	H	82	91	GRID	N.C.	H	5.8
25Z6	Rectifier		H	A.C.	120	A.C.		H	120
W-46416	Ballast Resistor—165 Ohms (Cold) Between No. 3 and No. 7 Pins with No. 7 and No. 8 Pins Tied Together.								

Power Consumption @ 117.5 Volts Line—Approximately 43 Watts.
D. C. Drop Across Speaker Field—29 Volts.
Maximum Power Output Approximately 2.0 Watts.

Alignment

(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead on the receiver.

(b) Open the gang condenser all the way.

(c) Set the generator to 1712 kilocycles.

(d) Adjust the trimmer condensers on the gang until the 1712 kc. signal is heard. The gang should just tune through this signal.

(e) Set the generator to 1400 kc.

(f) Tune the set to the 1400 kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

MODEL 10
MODELS 11, J11
MODELS 12, J12,
13, J13, 14, J14

THE CROSLEY CORP.

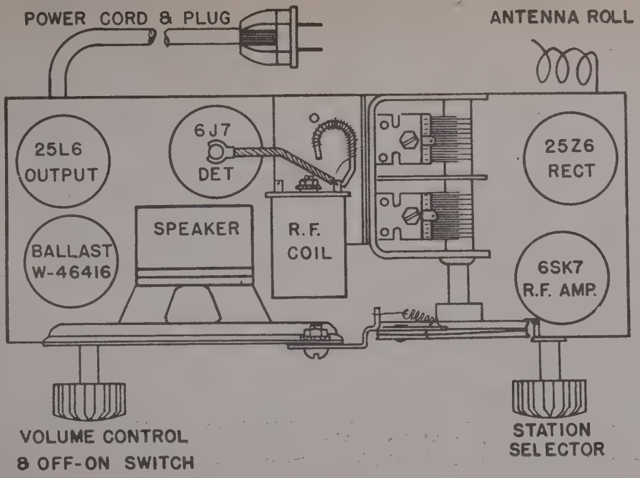


Fig. 2—Top View Chassis Model 10

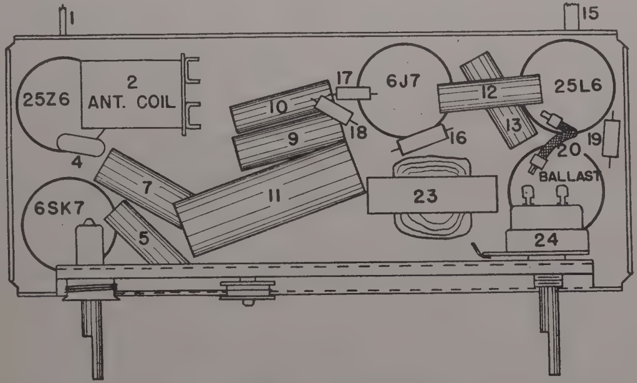
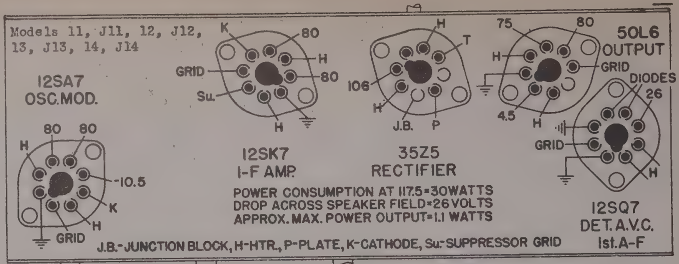


Fig. 3—Bottom View Chassis Model 10


Models 11, J11, 12, J12, 13, J13, 14, J14
12SA7 OSC.MOD.
80
80
H
-10.5
K
H
GRID
K
80
H
GRID
80
Su.
H
12SK7 I-F AMP.
H
T
106
H
J.B.
P
35Z5 RECTIFIER
75
80
H
GRID
4.5
H
50L6 OUTPUT
DIODES
26
GRID
H
12SQ7 DET. A.V.C. 1st. A-F
POWER CONSUMPTION AT 117.5=30WATTS
DROP ACROSS SPEAKER FIELD=26VOLTS
APPROX. MAX. POWER OUTPUT=1.1 WATTS
J.B.-JUNCTION BLOCK, H-HTR., P-PLATE, K-CATHODE, Su-SUPPRESSOR GRID

VOLTAGES MEASURED BETWEEN SOCKET PIN & GND. SIDE OF VOL. CONT. WITH 250VOLT, 1000 OHMS. PER. VOLT METER. READINGS MAY VARY 10%

Fig 4—Socket Voltage Chart

ALIGNMENT PROCEDURE Models 11, J11

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

This does not apply to the models J-11 as the power supply is isolated from the chassis by a .25 mf. condenser.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 50L6GT output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a 100 mmf. condenser to the antenna connection (Blue or Red lead extending from rear of loop) on the receiver. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser, Item 7, located in top of 2nd I-F assy., (Fig. 2) for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers, item 6, located on top of 1st I-F assy., (Fig. 2) for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning the R-F Amplifier.

(a) Set the signal generator to 1650 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser (Fig. 3) B. C. "OSC" so that the 1650 kilocycle signal is heard. It is not necessary that the receiver tunes through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condensers B. C. "ANT" for maximum output. (Fig. 3).

NOTE: Do not readjust the "OSC" trimmer.

(f) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

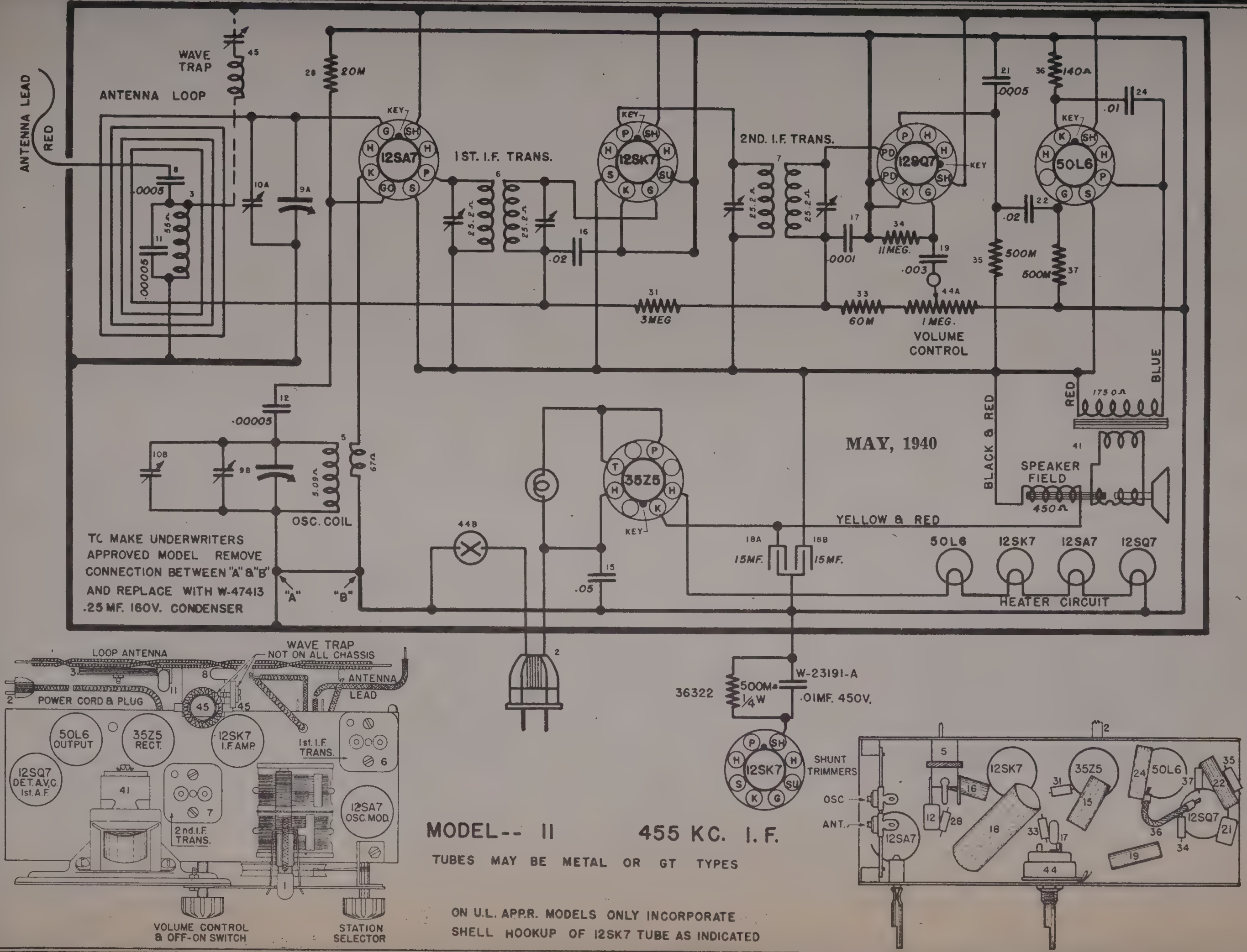
Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the loop mounting bracket (Fig. 2) and consists of a coil, and a trimmer condenser as illustrated by the dotted lines in the Wiring Diagram (item 45).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 50 mmf. condenser into the antenna terminal of the receiver. With the gang condenser set at approximately 60 on the dial and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

THE CROSLEY CORP.

MODELS 11, J11



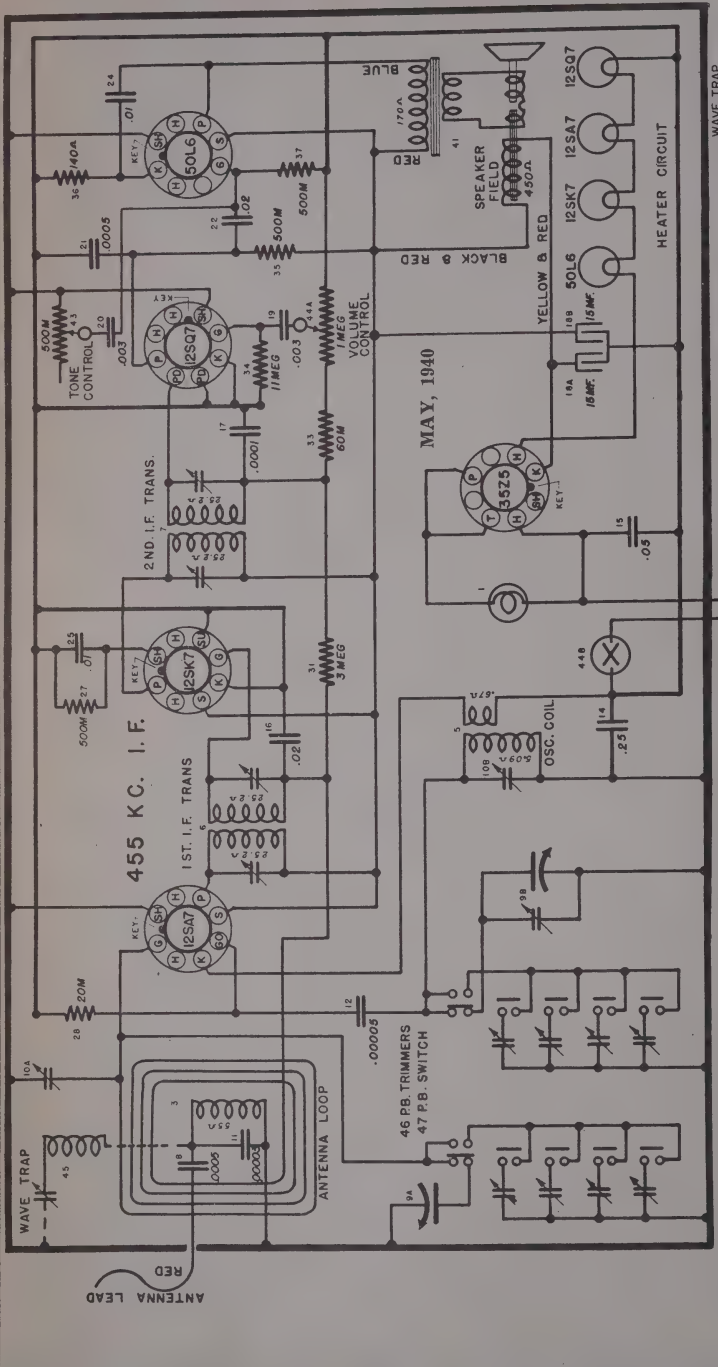
MODEL-- 11 455 KC. I.F.

TUBES MAY BE METAL OR GT TYPES

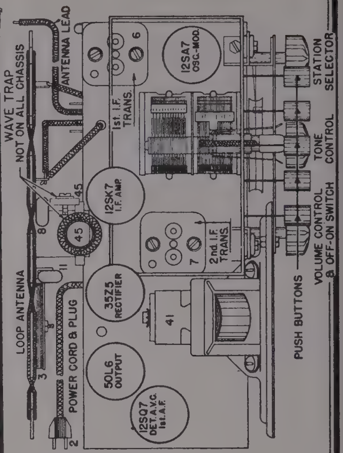
ON U.L. APPR. MODELS ONLY INCORPORATE SHELL HOOKUP OF 12SK7 TUBE AS INDICATED

MODELS 12, J12

THE CROSLEY CORP.

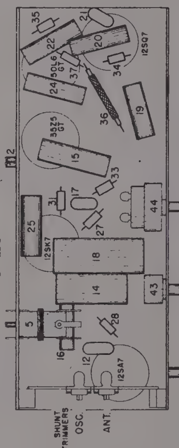


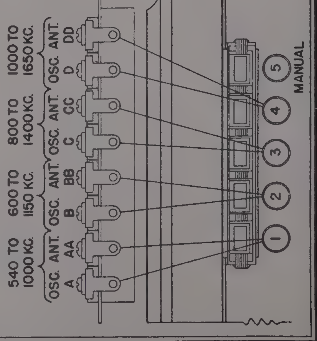
MAY, 1940



For voltage and wave trap adjustment, See Model 11

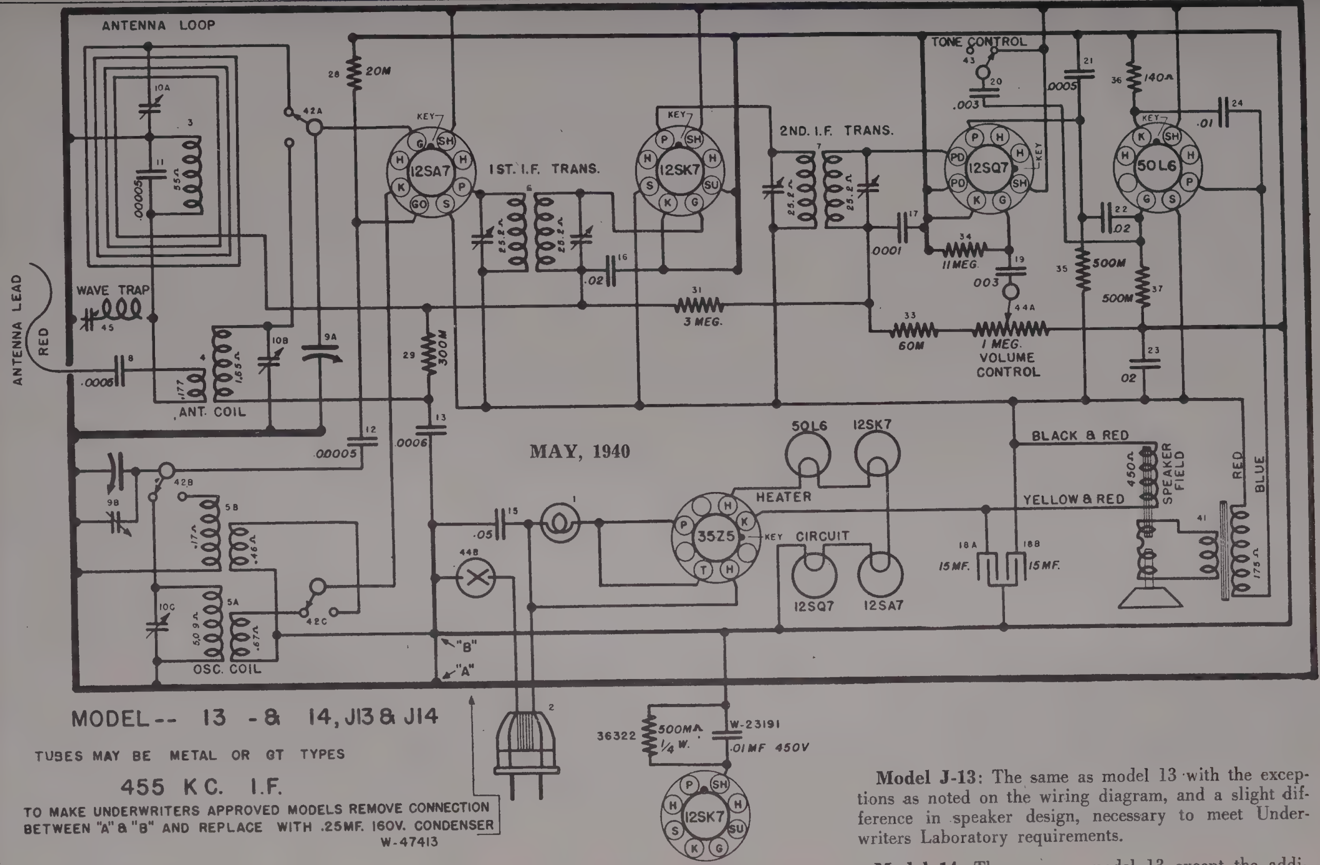
Trim OSC at 1650 KC
Trim ANT at 1400 KC





THE CROSLEY CORP.

MODELS 13, J13,
14, J14



MAY, 1940

MODEL-- 13 -& 14, J13 & J14

TUBES MAY BE METAL OR GT TYPES

455 KC. I.F.

TO MAKE UNDERWRITERS APPROVED MODELS REMOVE CONNECTION BETWEEN "A" & "B" AND REPLACE WITH .25MF. 160V. CONDENSER W-47413

ON ALL U.L APPR. MODELS ONLY INCORPORATE SHELL HOOKUP ON 12SK7 TUBE AS INDICATED

Model 13: This model is a five-tube, two band superheterodyne receiver. It is designed for operation on 117 volt power circuits either D. C. or A. C. (50-60 cycles).

The tuning range is divided into two bands as follows:

540 to 1,600 Kilocycles (American Broadcast)
6.0 to 15.0 Megacycles (High Frequency or Foreign Band)

Model J-13: The same as model 13 with the exceptions as noted on the wiring diagram, and a slight difference in speaker design, necessary to meet Underwriters Laboratory requirements.

Model 14: The same as model 13 except the addition of a two position tone control connected as shown by items 43, a two position switch and 20, a .003 mf. condenser.

Model J-14: The same as model 14 with the exceptions as noted on the wiring diagram, and a slight difference in speaker design, necessary to meet Underwriters Laboratory requirements.

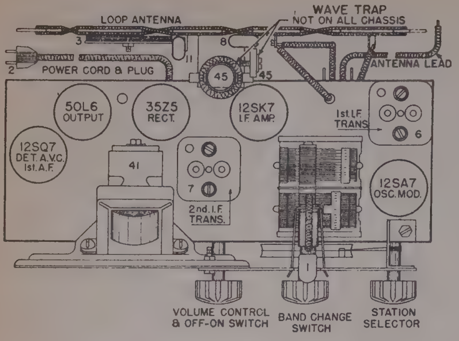


FIG. 2—Top View Model 13

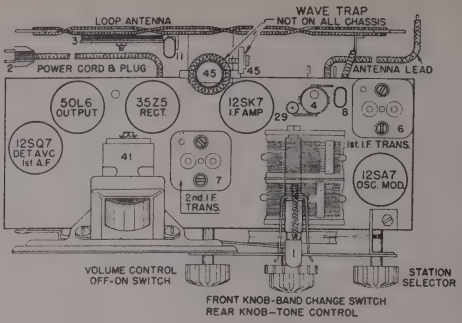


Fig. 3—Top View Model 14

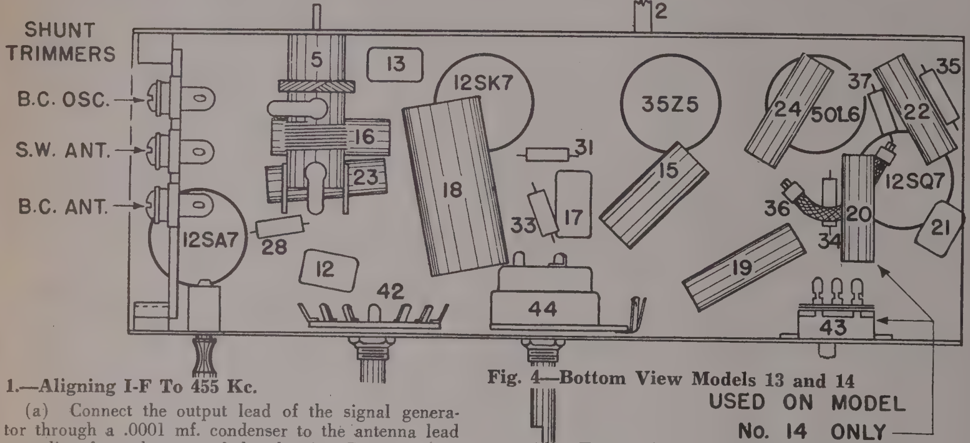


Fig. 4—Bottom View Models 13 and 14

1.—Aligning I-F To 455 Kc.

(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead extending from the rear of the chassis. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (.001 mf.) should be connected in series with the ground lead of the signal generator and the chassis.

(b) Open tuning gang condenser all the way (plates completely out of mesh). Turn volume control to maximum. On models 14 and J-14 turn tone control switch to right (treble). Turn band switch to the B. C. (left) position.

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the two trimmer condensers on top of 2nd I-F assembly (Fig. 3) for maximum output.

(e) Adjust the two trimmer condensers on top of the 1st I-F assembly (Fig. 3) for maximum output.

(f) Repeat (d) and (e) for more accurate adjustments.

2.—Aligning R-F Amplifier.

The short wave band 6-15 mc., must be aligned before the Broadcast Band 540-1600 kc.

(a) Connect the signal generator output lead through a dummy antenna (400 ohm carbon resistor) to lead (Blue or Red) extending from rear of chassis. Turn the band switch to S. W. (right) and open tuning condenser all the way.

(b) Set signal generator to 15.0 megacycles.

(c). Adjust the S. W. "OSC" trimmer condenser (Fig. 2) (on rear section of gang) for maximum output. The gang should just tune through this signal.

(d) Tune in 15.0 mc. signal with gang and while slowly rocking gang through signal, adjust the S. W. "ANT" trimmer condenser for maximum output. (Center trimmer on right end of chassis).

NOTE: When aligning the Short Wave band care should be exercised so that the circuits are aligned on the fundamental rather than on the image frequency which is approximately 910 kilocycles more than the fundamental. To check this increase the output of the signal generator approximately 10 times and try to tune in both, the fundamental, at the signal generator frequency as indicated on the dial and the image which should be approximately 910 kilocycles lower (approximately 14) on the dial.

(e) Repeat (c) and (d) for more accurate adjustments.

(f) Replace 400 ohm carbon antenna dummy with a .0001 mf. condenser. Turn band switch to the Broadcast band, open gang condenser all the way, etc.

(g) Set the signal generator to 1650 kilocycles.

(h) Adjust B. C. "OSC" trimmer (rear trimmer right end of chassis) Fig. 3, for maximum output.

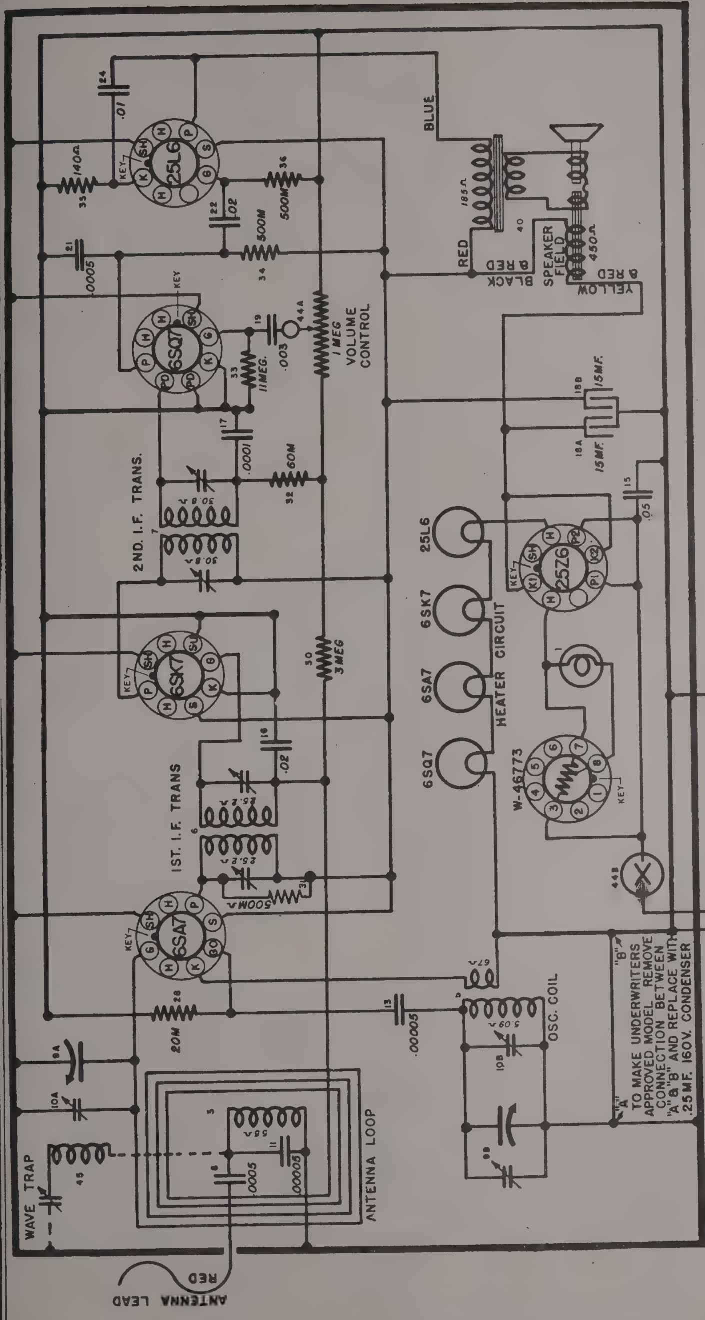
(i) Set signal generator to 1400 kilocycles.

(j) Tune in generator signal for maximum output then adjust B. C. "ANT" trimmer (front trimmer right end of chassis) Fig. 3, for maximum output.

(k) Repeat (h) and (j) for more accurate adjustments.

For voltage and wave trap data, See Model 11

THE CROSLEY CORP.

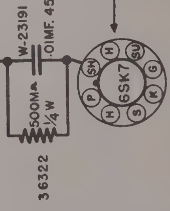


MODEL -- 15, J15

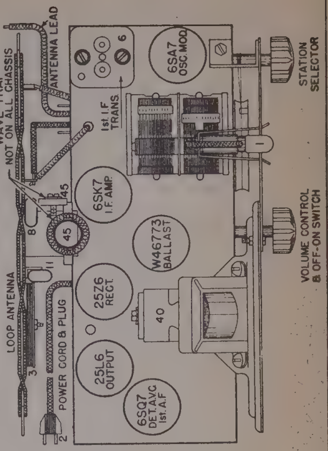
TUBES MAY BE METAL OR GT TYPES

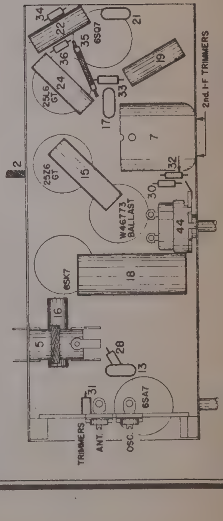
455 K.C. I.F.

MAY, 1940



ON U.L. APPR. MODELS ONLY INCORPORATE SHELL HOOKUP ON 6SK7 TUBE AS INDICATED



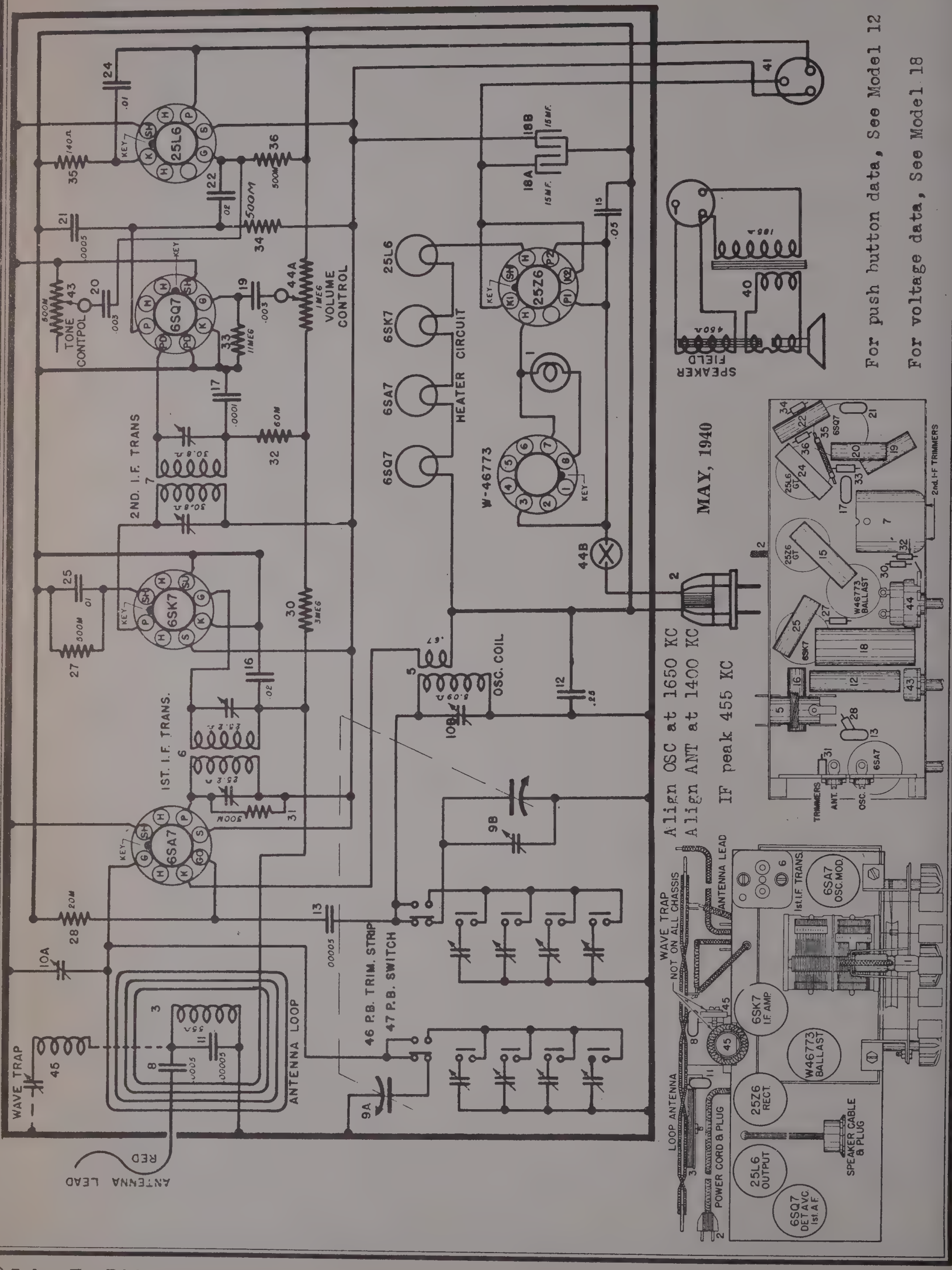


Align OSC at 1650 KC
Align ANT at 1400 KC

For wave trap adjustment
See Model 11

MODELS 16, J16

THE CROSLEY CORP.



MAY, 1940

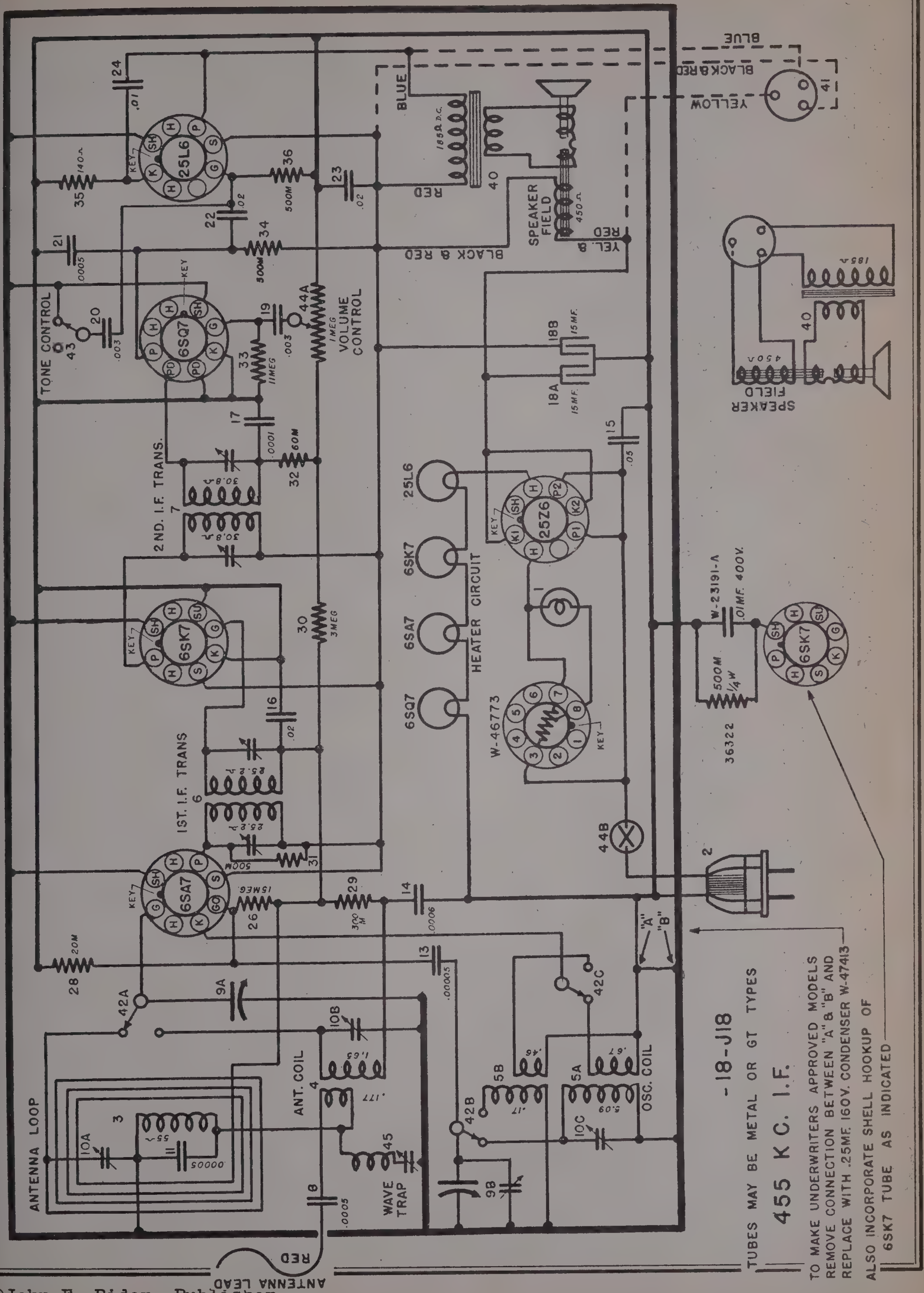
Align OSC at 1650 KC
Align ANT at 1400 KC
IF peak 455 KC

For push button data, See Model 12

For voltage data, See Model 18

THE CROSLEY CORP.

MODELS 18, J18



TUBES MAY BE METAL OR GT TYPES

455 KC. I.F.

-18-J18

TO MAKE UNDERWRITERS APPROVED MODELS REMOVE CONNECTION BETWEEN "A" & "B" AND REPLACE WITH .25MF. 160V. CONDENSER W-47413—

ALSO INCORPORATE SHELL HOOKUP OF 6SK7 TUBE AS INDICATED

MODELS 18, J18
MODELS 15, J15, 16, J16

THE CROSLEY CORP.

1.—Aligning I-F To 455 Kc.

(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead extending from the rear of the chassis. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (.001 mf.) should be connected in series with the ground lead of the signal generator and the chassis.

(b) Open tuning gang condenser all the way (plates completely out of mesh). Turn volume control to maximum, turn tone control switch to right (treble). Turn band switch to the B. C. (left) position.

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the two 2nd I-F trimmer condensers located through front chassis flange, below speaker (Fig. 3) for maximum output.

(e) Adjust the two trimmer condensers on top of the first I-F assembly (Fig. 2) for maximum output.

(f) Repeat (d) and (e) for more accurate adjustments.

2.—Aligning R-F Amplifier.

The short wave band 6-15 mc., MUST be aligned before the Broadcast Band 540-1600 kc.

(a) Connect the signal generator output lead through a dummy antenna (400 ohm carbon resistor) to lead (Blue or Red) extending from rear of chassis. Turn the band switch to S. W. (right) and open tuning condenser all the way.

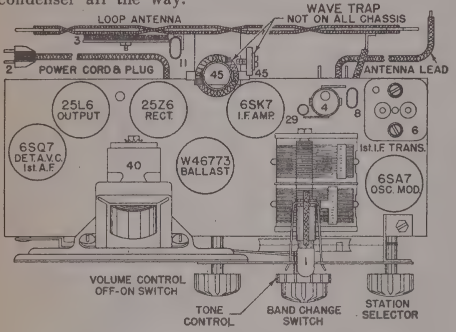


Fig. 2—Top View Model 18, J-18

(b) Set signal generator to 15.0 megacycles.

(c) Adjust the S. W. "OSC" trimmer condenser (Fig. 2) (on rear section of gang) for maximum output. The gang should just tune through this signal.

(d) Tune in 15.0 mc. signal with gang and while slowly rocking gang through signal, adjust the S. W. "ANT" trimmer condenser for maximum output. (Center trimmer on right end of chassis).

NOTE: When aligning the Short Wave band care should be exercised so that the circuits are aligned on the fundamental rather than on the image frequency which is approximately 910 kilocycles more than the fundamental. To check this increase the output of the signal generator approximately 10 times and try to tune in both, the fundamental, at the signal generator frequency as indicated on the dial and the image which should be approximately 910 kilocycles lower (approximately 14) on the dial.

(e) Repeat (c) and (d) for more accurate adjustments.

(f) Replace 400 ohm carbon antenna dummy with a .0001 mf. condenser. Turn band switch to the Broadcast band, open gang condenser all the way, etc.

(g) Set the signal generator to 1650 kilocycles.

(h) Adjust B. C. "OSC" trimmer (rear trimmer right end of chassis) Fig. 3, for maximum output.

(i) Set signal generator to 1400 kilocycles.

(j) Tune-in generator signal for maximum output then adjust B. C. "ANT" trimmer (front trimmer right end of chassis) Fig. 3, for maximum output.

(k) Repeat (h) and (j) for more accurate adjustments.

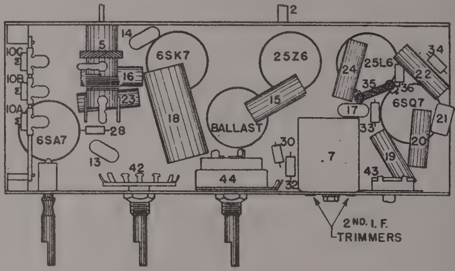
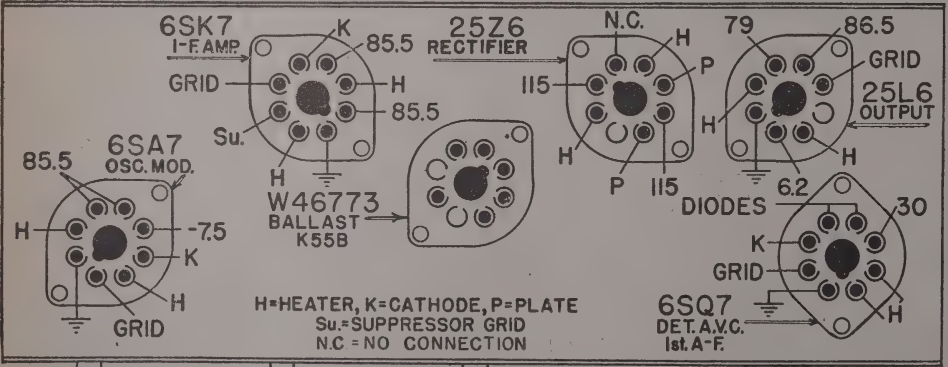


Fig. 3—Bottom View Models 18, J-18

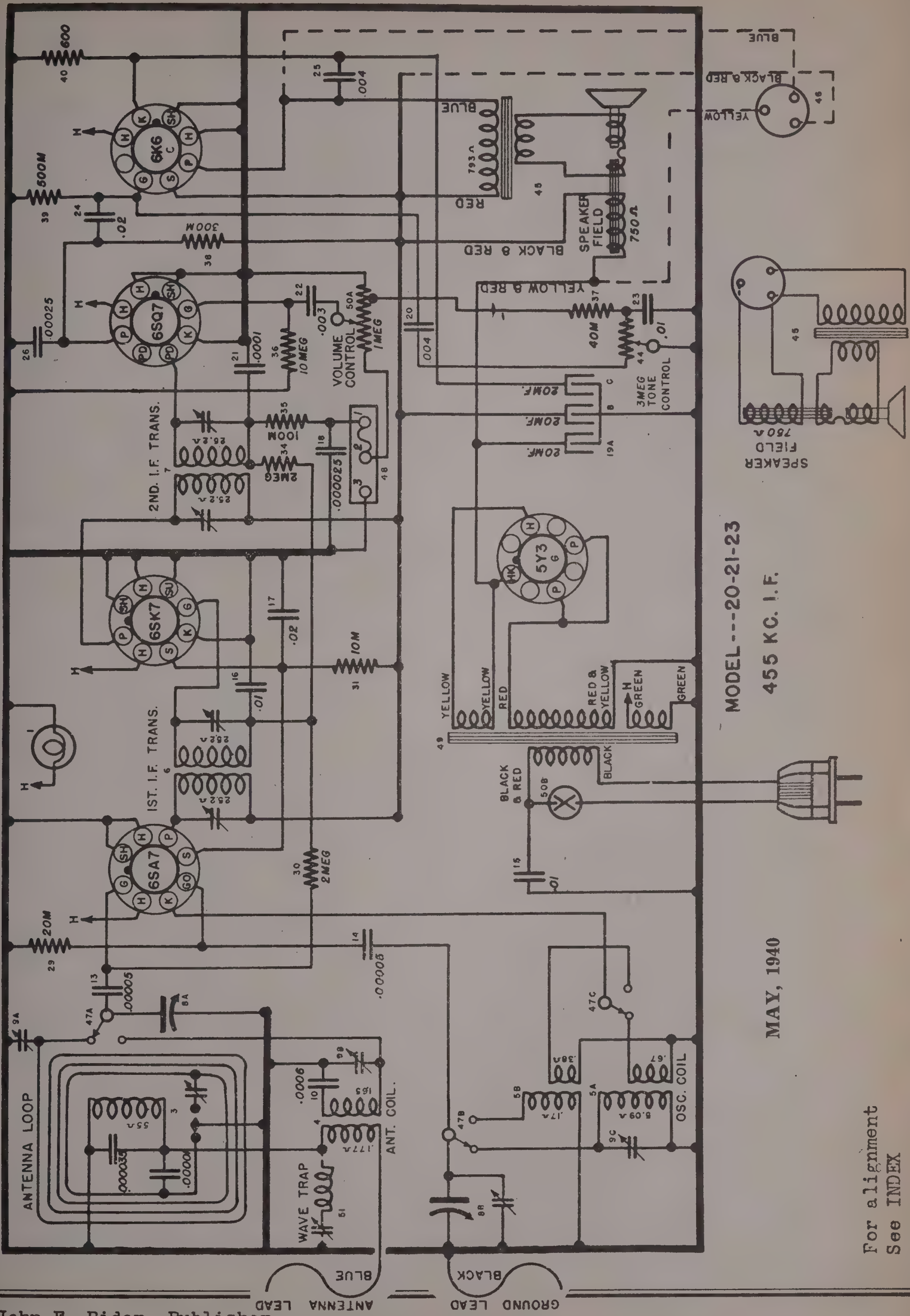


POWER CONSUMPTION AT 117.5 LINE = 50 WATTS
MAXIMUM POWER OUTPUT----------=1.2 WATTS
DROP ACROSS SPEAKER FIELD-------=28.5 VOLTS

For wave trap data, see Model 11

THE CROSLEY CORP.

MODELS 20, 21, 23



MODEL--20-21-23

455 KC. I.F.

MAY, 1940

For alignment
See INDEX

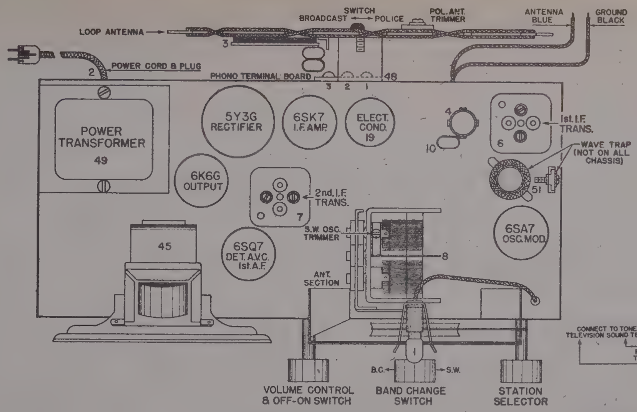
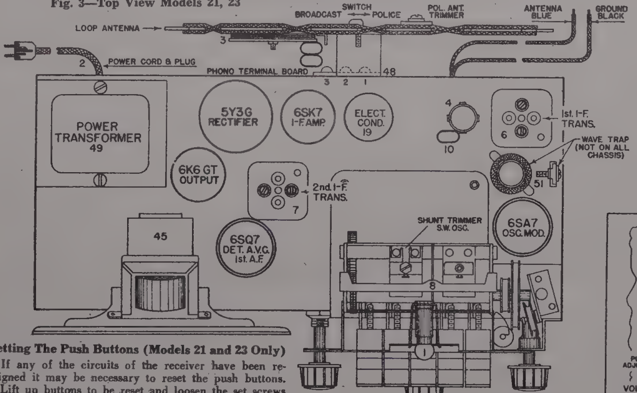


Fig. 2—Top View Model 20

Fig. 3—Top View Models 21, 23



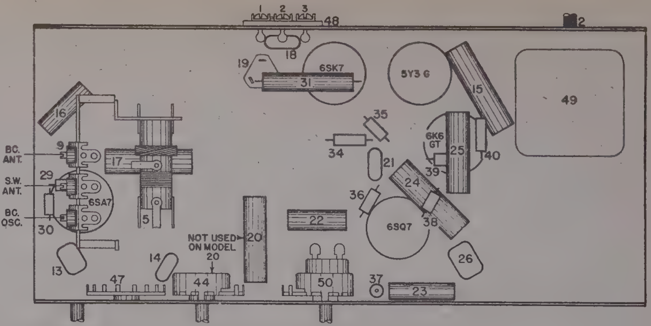
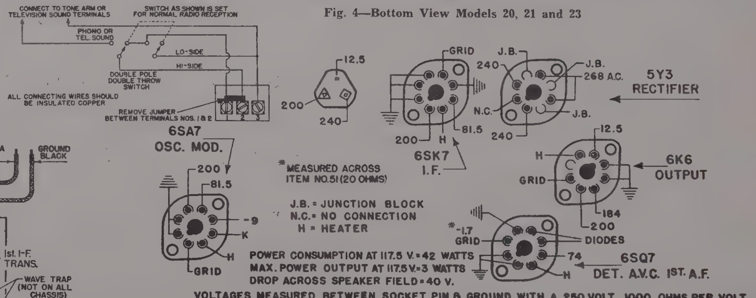


Fig. 4—Bottom View Models 20, 21 and 23



POWER CONSUMPTION AT 117.5 V. = 42 WATTS
MAX. POWER OUTPUT AT 117.5 V. = 3 WATTS
DROP ACROSS SPEAKER FIELD = 40 V.

VOLTAGES MEASURED BETWEEN SOCKET PIN & GROUND WITH A 250 VOLT, 1000 OHMS PER VOLT, VOLT METER. READINGS MAY VARY 10%

Fig. 5—Socket Voltage Chart

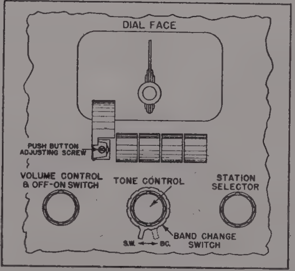


Fig. 6—Controls Models 21 and 23

Setting The Push Buttons (Models 21 and 23 Only)

If any of the circuits of the receiver have been realigned it may be necessary to reset the push buttons. Lift up buttons to be reset and loosen the set screws two or three turns. Tune-in accurately the station to which the first button is to be set, with a small screw driver inserted in the adjusting screw, push the adjusting screw ALL THE WAY IN and while holding in that position, securely tighten the screw. It is essential that you apply a steady pressure while tightening the setting screw in order to keep the mechanism lined up with the station tuned-in.

Models 24, 25

The double pole double throw switch for changing from Radio to Phono or television sound, should be connected as shown in the diagram

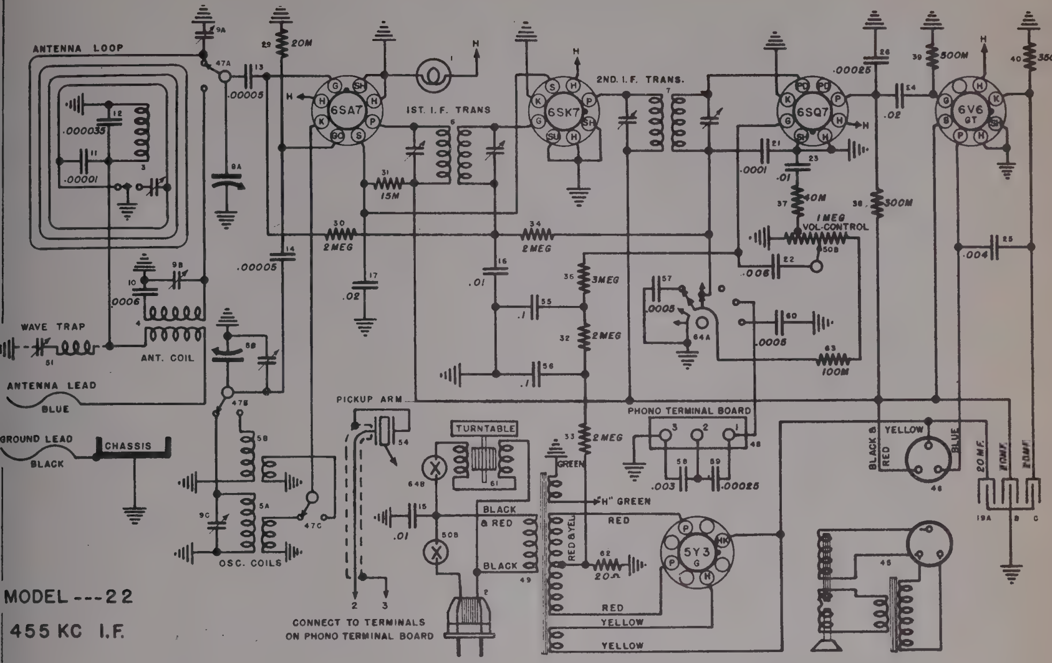
The terminals are coded as follows: 1, 2, 3, respectively. The No. 2 terminal connects to the high side of the phono pickup or television A-F connection.

NOTE: The jumper between No. 1 and No. 2 terminals must be removed when phono-radio switch is connected. If phono switch is removed, it is absolutely essential that the jumper wire between No. 1 and No. 2 terminals be replaced. Be sure all connections are tight.

The No. 3 terminal is the ground or low side connection. The No. 1 terminal should be connected to the No. 3 terminal by some means (as indicated in the above diagram). This prevents any radio signals from the receiver proper interfering with the Phono o. Television sound reproduction.

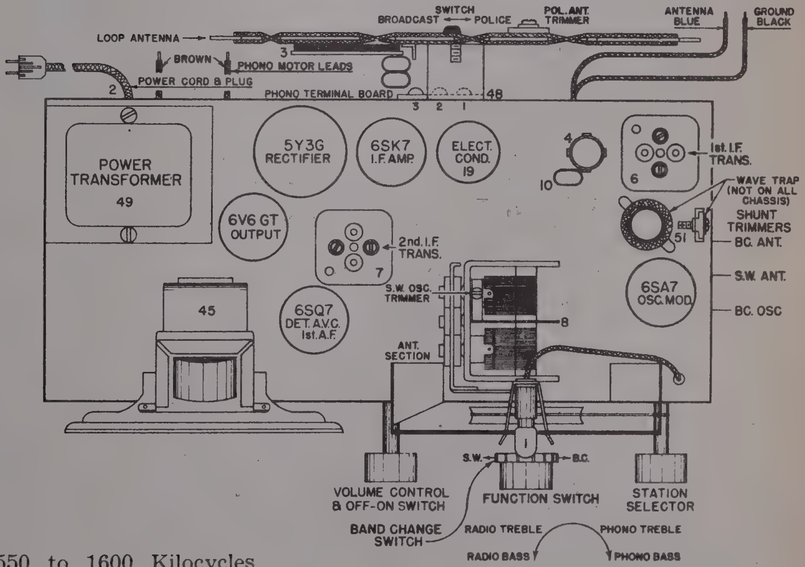
THE CROSLEY CORP.

MODEL 22AS



MODEL ---22

455 KC I.F.



Broadcast Band—550 to 1600 Kilocycles
Short Wave Band—6.0 to 15.0 Megacycles
Special Police Band—2.3 to 2.5 Megacycles

FIG. 2

MODEL 22AS
MODEL 20, 21, 23

THE CROSLEY CORP.

CHASSIS NO. 20, 21 AND 23

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plate and screen of the 6K6G output tube. Be certain that the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the antenna lead (Blue). Connect the ground lead from the signal generator to the ground lead (Black) of the receiver.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the Broadcast Band. (Left). Push switch on loop ant. to B. C. position.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE*THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R.-F Circuits.

(1) Connect the signal generator output through a 400 ohm carbon resistor to the antenna lead (Blue) of the receiver and the generator return to the ground lead (Black).

(a) Set signal generator to 15.4 megacycles.

(b) Open tuning condenser all the way (rotor completely out of mesh) turn band switch to the right, (short wave) and volume on full. On models 21 and 23 turn tone control to treble position.

(c) Adjust the S. W. "OSC" trimmer, located on gang condenser, for maximum output.

(d) Set signal generator to 15.0 megacycles.

(e) Tune-in signal generator frequency with the station selector knob (approximately 15 on the dial) and while slowly rocking the station selector knob adjust the S. W. "ANT." trimmer condenser, center trimmer on right end of chassis, for maximum output.

NOTE: Check the image frequency by increasing the signal generator output. Tune-in 15 mc. signal and then the image which should come in around 14 on the dial. If image is not heard the oscillator is aligned on the wrong peak and S. W. "OSC" trimmer should be further opened until correct peak is found.

(f) Repeat (a) to (e) for more accurate adjustments.

(2) Change the 400 ohm dummy antenna to a .0002 mf. (200 mmf.) condenser. Turn band switch to B. C. position (left), open gang condenser all the way, etc.

(a) Set signal generator to 1650 kilocycles.

(b) Adjust the B. C. "OSC" trimmer for maximum output (front trimmer, right end of chassis).

(c) Set signal generator to 1400 kilocycles.

(d) Tune-in 1400 kc. signal with tuning condenser, (should be approximately 14 on the dial), then adjust the B. C. "ANT" trimmer (rear trimmer, right end of chassis) for maximum output.

(e) Repeat (a) to (d) for more accurate adjustments.

(3.) Using same dummy antenna (.0001 mf.) align the Special Police Band antenna trimmer (there is no oscillator adjustment for this band).

(a) Set signal generator to 2.5 kilocycles.

(b) Push switch on loop antenna to Pol. position and then tune-in the generator signal with gang, approx. 2.5 on the dial.

(c) Adjust trimmer on loop antenna for maximum output.

CAUTION: Be sure to push the switch on the loop antenna back to B. C. position if receiver is to be used for broadcast reception.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly consists of a coil and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram.

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .0002 mfd. condenser into the antenna lead of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser set to approximately 60 in the dial, and the volume control full on, adjust the wave trap trimmer condenser for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal an antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

PRELIMINARY

Output Meter Connections	Plate to Screen of 6V6GT
Generator Ground Connection	To chassis or Ground Lead
Dummy Antenna to be in series with generator output	See Chart Below
Position of Volume Control	Fully On
Position of Tone Control	Treble or Speech

ALIGNMENT PROCEDURE CHART

Alignment Sequence	Dummy Antenna	Frequency Setting	Input to Receiver	Band Switch	Tuning Cond. Setting	Trimmers Adjusted	Remarks
1.	.02MF.	455 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum output. Adjust for Maximum output.
2.	400 ohm (carbon)	15.3 Mc.	Ant. Lead (Blue)	S. W.	Fully Open	S. W. "OSC" (on gang)	Adjust for Peak. See foot note.
3.	400 ohm (carbon)	15.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 15 on dial	S. W. "ANT" center trimmer on right end	Adjust for Maximum while rocking gang back and forth.
4.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	B. C. "OSC" front trimmer on right end	Adjust for peak. Make sure the switch on loop is in B. C. position.
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" rear trimmer on right end	Adjust for Maximum output.
6.	.0002 MF.	2.5 Mc.	Ant. Lead (Blue)	B. C. and switch on loop to Pol.	Approx. 2.5 on dial lower right corner	Pol. Ant on loop	Adjust for Maximum output.

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency which is approximately 910 kilocycles less **as indicated on the dial**. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments.

Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly consists of a coil and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram. The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .0002 mfd. condenser into the antenna lead of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser set to approximately 60 on the dial, and the volume control full on, adjust the wave trap trimmer condenser for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interferring signal should be used. If it is not possible to determine the exact frequency of the interferring signal an antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

VOLTAGE CHART

ALL VOLTAGES MEASURED FROM SOCKET PIN TO CHASSIS @ 117.5 VOLT LINE

	SOCKET PIN NUMBER							
TUBE SECTION	1	2	3	4	5	6	7	8
6SA7—Osc.-Mod.	0	0	225	74	0	0	6.3 A.C.	0
6SK7—I. F. Amp.	0	0	0	0	0	74	6.3 A.C.	225
6SQ7—Det. A.V.C.—1st A.F.	0	0	0	0	0	100	6.3 A.C.	0
6V6GT—Output	0	0	209	225	0	0	6.3 A.C.	10.5
5Y3G—Rectifier	0	5.0 A.C.	0	316 A.C.	0	316 A.C.	0	283

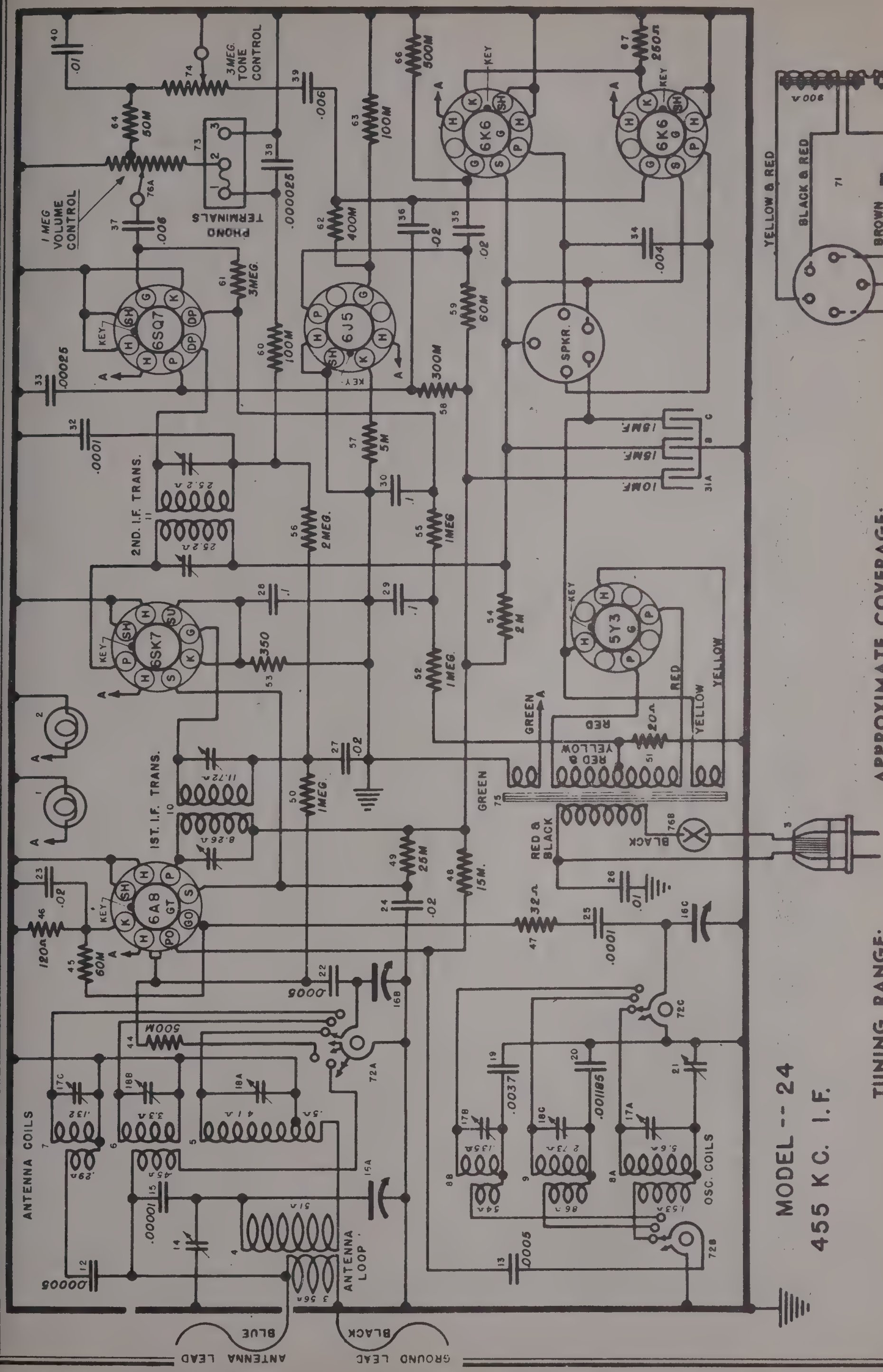
All voltages measured with 1000 OHM/Volt Voltmeter except heaters. Voltages may vary 10% of values given.

DROP ACROSS SPEAKER FIELD	58	Volts
MAXIMUM POWER OUTPUT @ 130 V. LINE	6.5	Watts
MAXIMUM POWER CONSUMPTION @ 130 V. LINE	*60	Watts

*Phono Motor 40 Watts additional.

THE CROSLEY CORP.

MODEL 24



MODEL -- 24
455 KC. I.F.

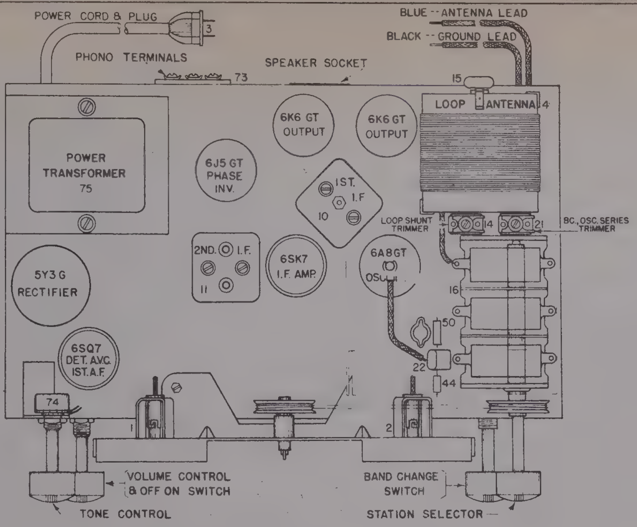
TUNING RANGE:

Standard Broadcast Band — 550 to 1600 Kilocycles
International Short Wave (Foreign) 6.0 to 18.0 Megacycles
Special Service (Police, Amateurs, etc.) 1.6 to 5.0 Megacycles

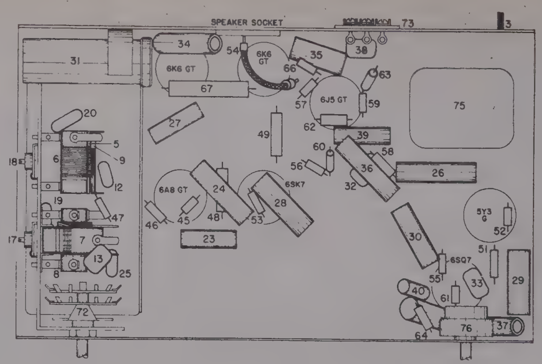
APPROXIMATE COVERAGE:

MODEL 24
MODEL 25

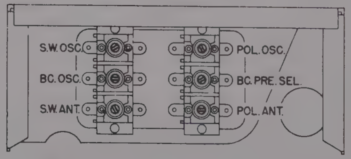
THE CROSLEY CORP.



BOTTOM VIEW OF CHASSIS



TRIMMER LOCATIONS



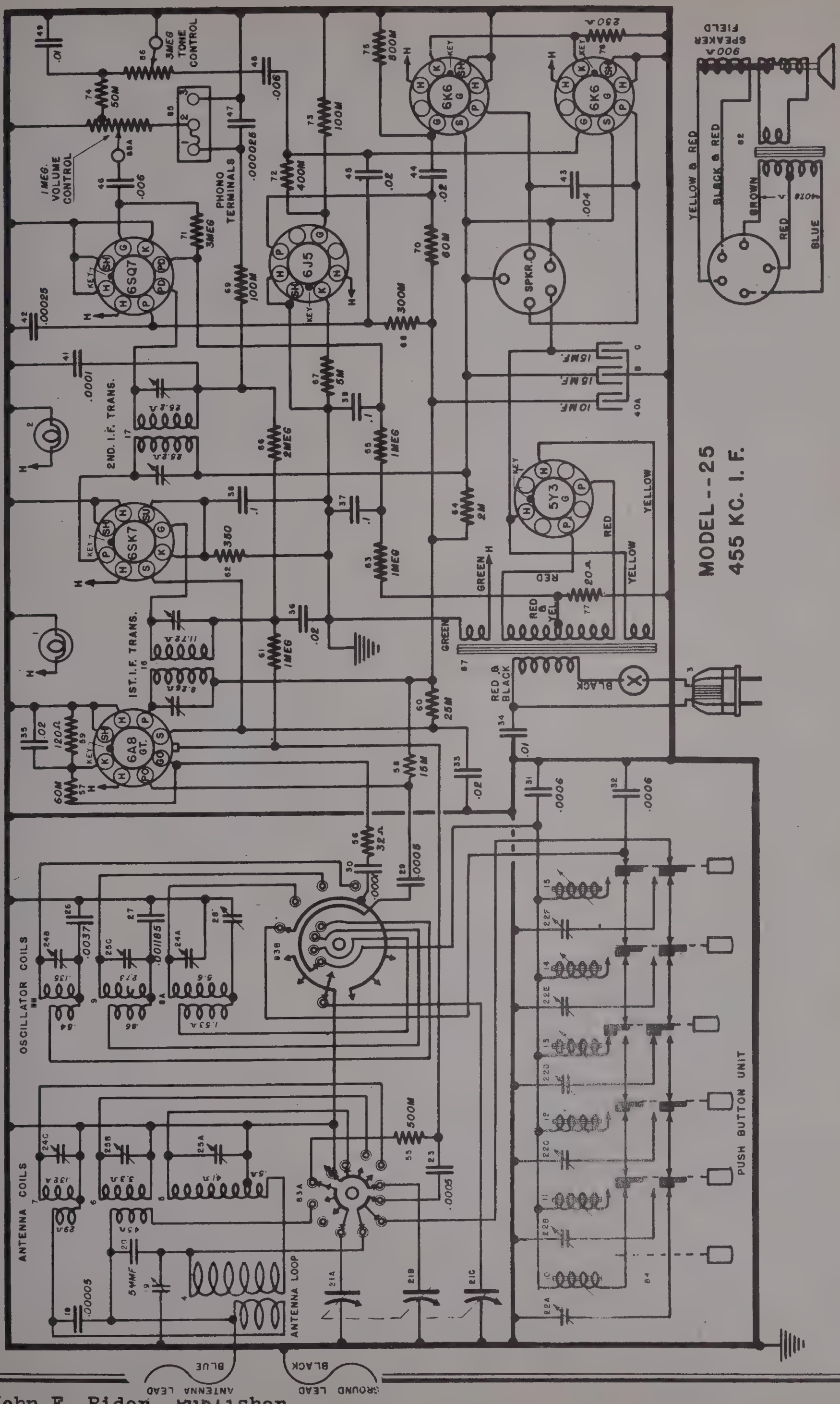
Signal Generator

Align-ment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "PRE" Trimmer	Adjust for maximum output to not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak gang; does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT"	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT"	Adjust for maximum output while rocking gang thru signal.

For Phonograph connections
See Model 20

For Voltage data
See Index

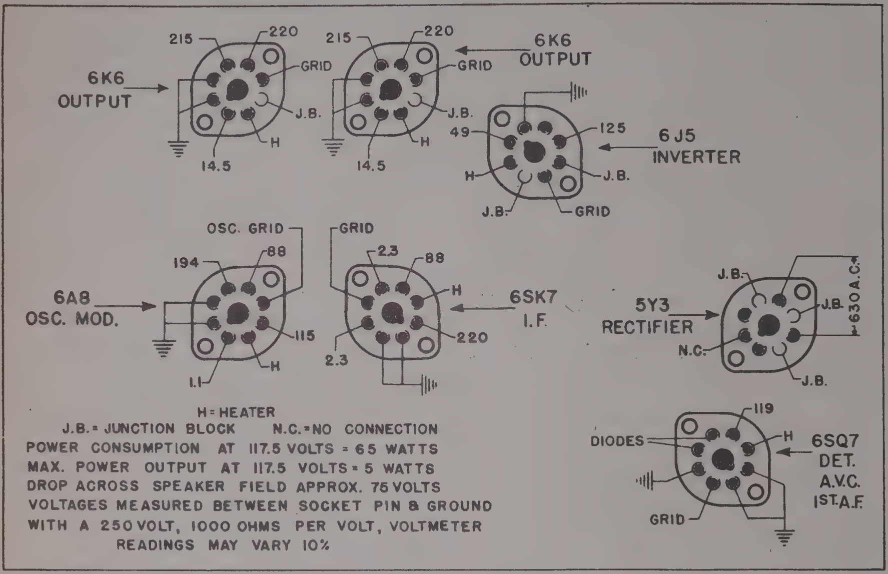
THE CROSLEY CORP.



Standard Broadcast Band — 550 to 1600 Kilocycles
International Short Wave (Foreign)—6.0 to 18.0 Megacycles
Special Service (Police, Amateurs, etc.) 1.6 to 5.0 Megacycles.

SOCKET VOLTAGE CHART

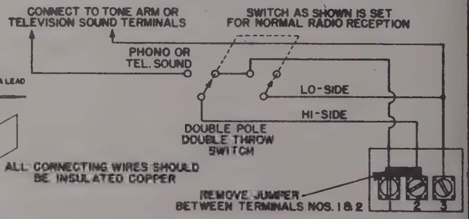
Models 24, 25



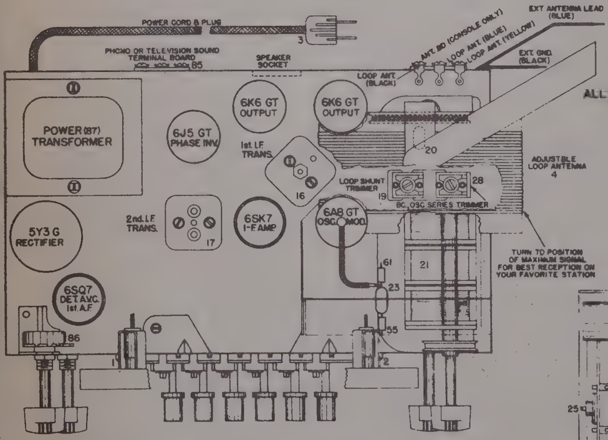
H = HEATER
J.B. = JUNCTION BLOCK N.C. = NO CONNECTION
POWER CONSUMPTION AT 117.5 VOLTS = 65 WATTS
MAX. POWER OUTPUT AT 117.5 VOLTS = 5 WATTS
DROP ACROSS SPEAKER FIELD APPROX. 75 VOLTS
VOLTAGES MEASURED BETWEEN SOCKET PIN & GROUND
WITH A 250 VOLT, 1000 OHMS PER VOLT, VOLTMETER
READINGS MAY VARY 10%

PHONO CONNECTIONS

Model 25

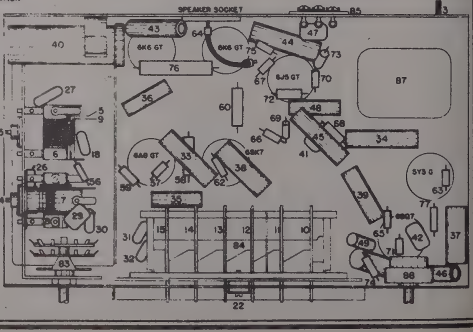


Model 25



Model 25

BOTTOM VIEW OF CHASSIS

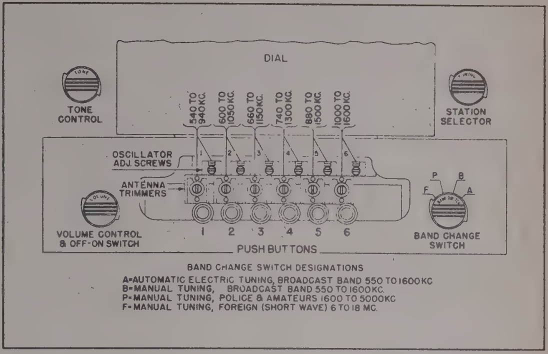


SET UP PROCEDURE

Remove push button escutcheon. Turn the set on and leave operate a sufficient length of time to permit the tubes to reach their normal operating conditions.

NOTE: To simplify the set up and insure accurate adjustments the following pre-adjustments should be made.

Tighten all the "ANT" Trimmer screws just moderately tight. See Fig. 1.



BAND CHANGE SWITCH DESIGNATIONS

A=AUTOMATIC ELECTRIC TUNING, BROADCAST BAND 550 TO 1600 KC
B=MANUAL TUNING, BROADCAST BAND 550 TO 1600 KC.
P=MANUAL TUNING, POLICE & AMATEURS 1600 TO 5000 KC
F=MANUAL TUNING, FOREIGN (SHORT WAVE) 6 TO 18 MC.

FIG. 1

Turn the "OSC" screws to the left (counter-clockwise) until the end of the screw is about flush (even) with the top of the "ANT" padded condenser. Note: Care should be exercised when adjusting the "OSC" screws so that the selected station is not passed over, turn screws slowly.

It is essential that the frequency (kilocycles) of the station selected is within the range of the push button to be set for that station, see Fig. 1.

1. Turn the band switch to "B" position, first notch from left end. Using the station selector knob (upper right) carefully tune in the station to which the No. 1 push button is to be set. Note program.

2. Turn the band switch to the left ("A") and using a small screw driver, carefully turn the "OSC" screw to the right (clockwise) for the No. 1 push button (first screw on left in the upper row), until the station you tuned in (Manually) is heard again. Adjust for maximum output in speaker.

3. Adjust the No. 1 push button "ANT" adjusting screw for maximum volume in speaker. NOTE: If this adjustment does not seem to have much effect adjust loop antenna for miuimum signal from that station, then adjust the "ANT" screw for maximum signal.

4. Turn band switch one notch to right "B" then back to "A" to check if push button is correctly adjusted. There should be no change in tone quality when switched from one to the other.

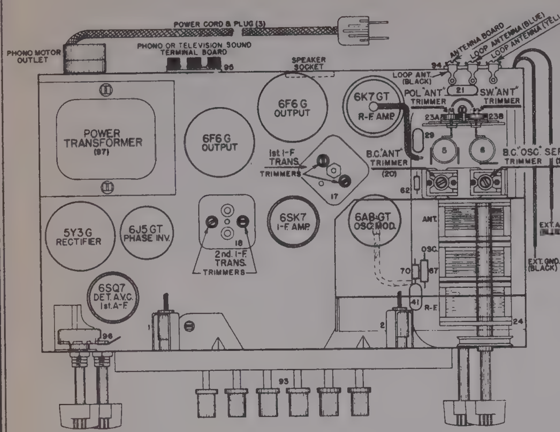
5. The set-up for No. 1 push button is now complete. Set up remaining buttons to be set, following the same procedure, adjusting the "OSC" screw first, then the "ANT" padder screw.

6. After all the buttons have been set, they should be rechecked, turning the loop antenna for minimum pickup on each station to insure accurate adjustments.

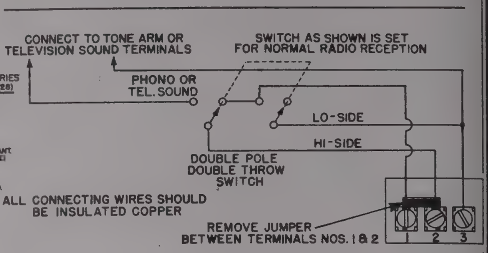
To tune the receiver with the push buttons the Band Switch must be turned all the way to the left "A" then completely depress the button which represents the station you wish to hear.

MODELS 26,
26 (Revised)

THE CROSLEY CORP.



PHONO CONNECTIONS


CONNECT TO TONE ARM OR TELEVISION SOUND TERMINALS
SWITCH AS SHOWN IS SET FOR NORMAL RADIO RECEPTION
PHONO OR TEL. SOUND
LO-SIDE
HI-SIDE
DOUBLE POLE DOUBLE THROW SWITCH
ALL CONNECTING WIRES SHOULD BE INSULATED COPPER
REMOVE JUMPER BETWEEN TERMINALS NOS. 1 & 2
1
2
3

For tuner data
See INDEX

Preliminary
Output Meter Connections.......Plate to Plate of 6F6's
Generator Ground Connection.......To chassis or Ground Lead
Dummy Antenna to be in series with generator output.......See Chart Below
Position of Volume Control.......Fully On
Position of Tone Control.......Treble or Speech

ALIGNMENT PROCEDURE CHART

	Signal Generator						
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output to not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT" and "R-F" Trimmers	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT" and "R-F" Trimmers	Adjust for maximum output while rocking gang thru signal.

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS)
WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

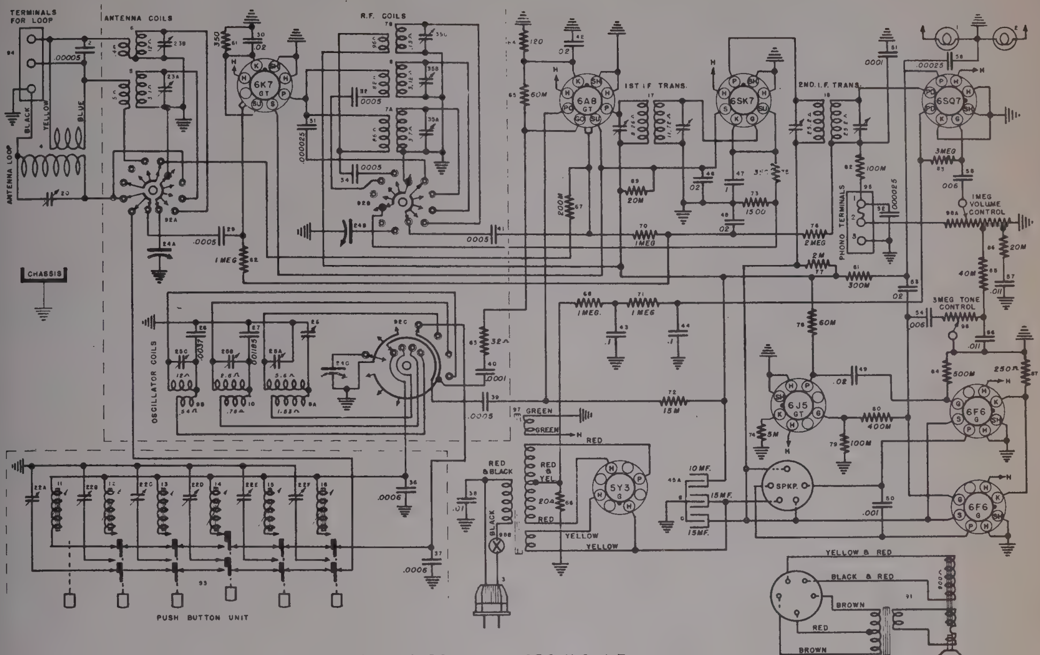
	PIN NUMBER							
TUBE FUNCTION	1	2	3	4	5	6	7	8
6K7GT—R. F. Amp.	0	0	187	75	0	J.B.	*6.3	2
6A8GT—Osc.-Mod.	0	0	187	75	0	130	*6.3	1
6SK7—I. F. Amp.	0	0	2.3	0	2.3	78	*6.3	228
6SQ7—Det. A.V.C.-A. F.	0	0	0	0	0	110	*6.3	0
6J5GT—Phase Invert.	0	0	120	0	0	J.B.	*6.3	5.5
6F6G—Output	0	0	220	230	0	J.B.	*6.3	14.5
6F6G—Output	0	0	220	230	0	J.B.	*6.3	14.5
5Y3G—Rectifier	NC	329.0	J.B.	*358.0	J.B.	*358	J.B.	329.0

*Measure with A. C. Voltmeter.

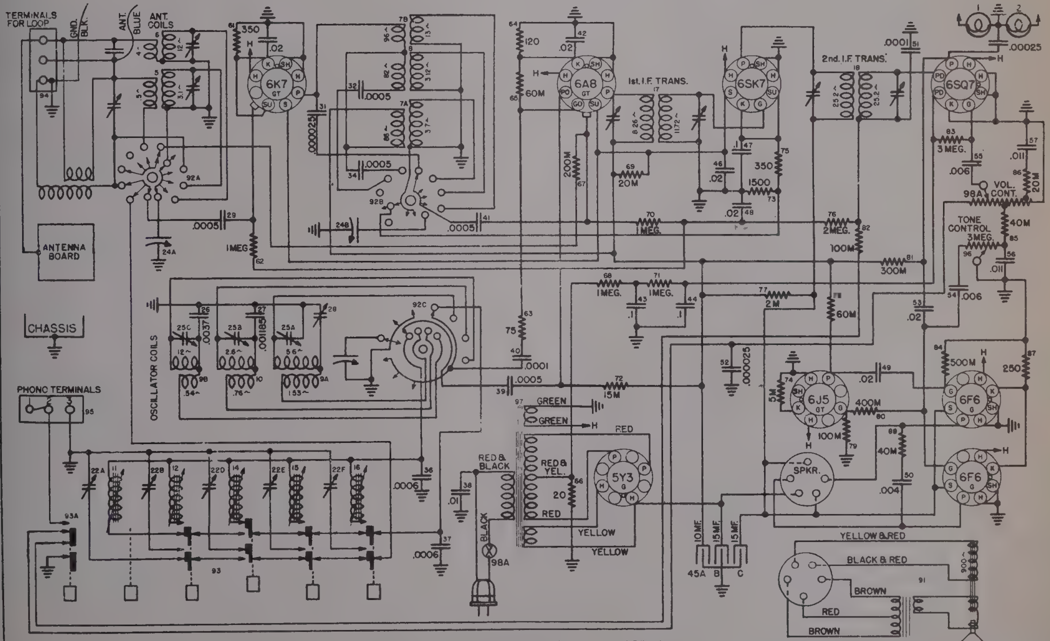
Max. POWER OUTPUT @ 117.5 V. LINE.......8.0 Watts
POWER CONSUMPTION @ 117.5 V. LINE.......85 Watts
DROP ACROSS SPEAKER FIELD.......95.0 Volts

THE CROSLEY CORP.

MODEL 26
MODEL 26 Revised



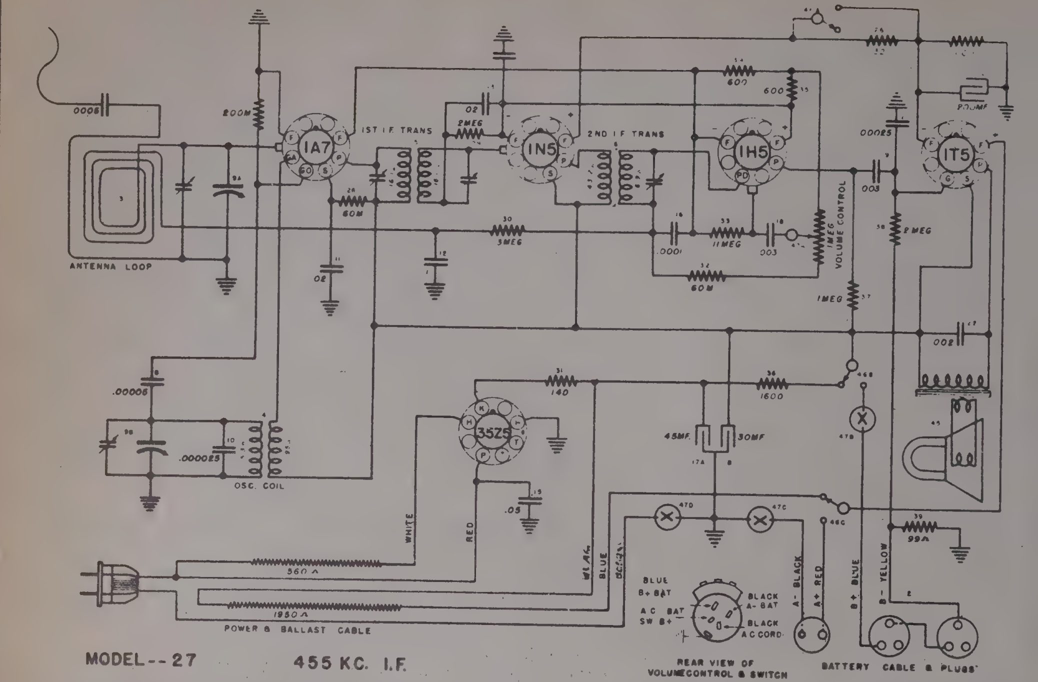
MODEL 26 455 K C. I.F.



MODEL 26-REVISED 455 KC. I.F.

MODELS 27BD, 27BE

THE CROSLEY CORP.



MODEL--27

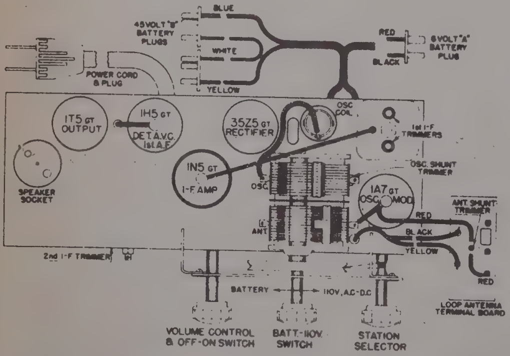
455 KC. I.F.

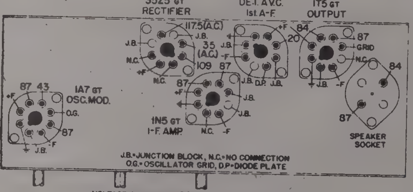
ALIGNMENT PROCEDURE Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
455 Kc	Grid 1A7GT	.02 MF	Fully open	2nd 1-F (1) located on front	Adjust for maximum signal.
455 Kc	Grid 1A7GT	.02 MF	Fully open	chassis flange 1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Approx. 140	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	on dial	"ANT" shunt on loop ant. through hole in right side of cabinet	Adjust for maximum output.

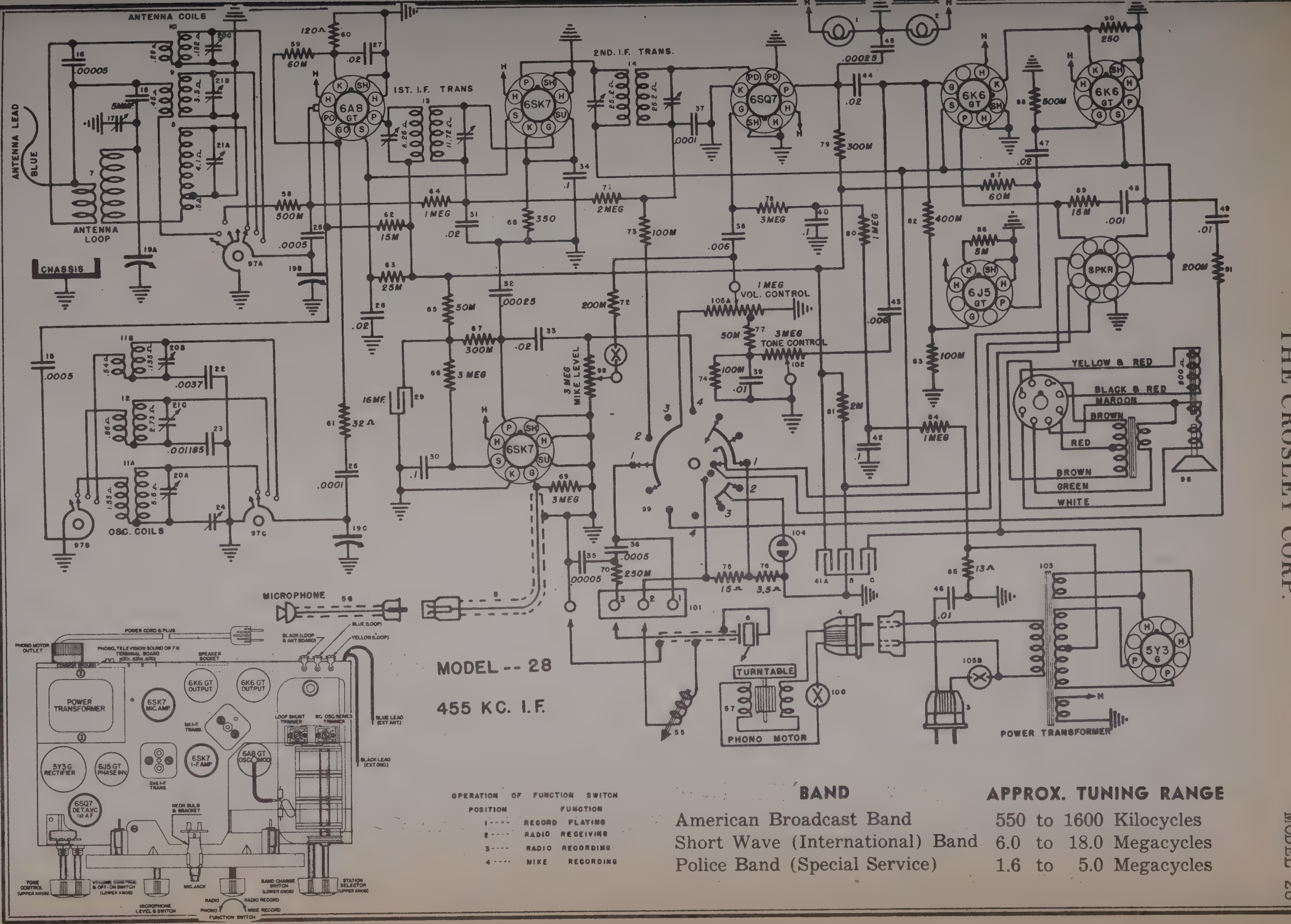
Repeat above for more accurate adjustments
Maximum power output @ 75 V. "B"—approx. 200 M. W.
Maximum power output @ 90 V. "B"—approx. 340 M. W.
Maximum power output @ 90 V. "B"—approx. 200 M. W. undistorted

A Battery drain @ 6 volts, .05 Amp.; "B" Battery drain @ 75 V., 9 M. A.; @ 90 V., 12 M. A.
Power consumption @ 117.5 volts line—30 Watts





VOLTAGE DROP-1950Ω "A" BALLAST RESISTOR = 79V.
VOLTAGE DROP-1600Ω "B" FILTER RESISTOR = 13V.
ALL VOLTAGES MEAS. TO CHASSIS WITH 250V. 1000Ω/V. VOLTMETER (D.C.) (EXCEPT A.C. VOLTAGES) AT 117.5 VOLTS LINE A.C.



BAND	APPROX. TUNING RANGE
American Broadcast Band	550 to 1600 Kilocycles
Short Wave (International) Band	6.0 to 18.0 Megacycles
Police Band (Special Service)	1.6 to 5.0 Megacycles

OPERATION OF FUNCTION SWITCH

POSITION	FUNCTION
1 ----	RECORD PLAYING
2 ----	RADIO RECEIVING
3 ----	RADIO RECORDING
4 ----	MIKE RECORDING

Position of Volume Control............Fully On
Position of Tone Control............Treble or Speech
Position of Function Switch............Radio
Position of Mike Level Control............All the Way to Left (Off)

ALIGNMENT PROCEDURE CHART Models 28, 30

	Signal Generator						
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "PRE" Trimmer	Adjust for maximum output to not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak gang; does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT"	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT"	Adjust for maximum output while rocking gang thru signal.

Model 28

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

	PIN NUMBER							
TUBE FUNCTION	1	2	3	4	5	6	7	8
6SK7—Pre-Amp.	0	0	......	....	0	J. B.	*6.3	52
6A8GT—Osc.-Mod.	0	0	198	76.5	0	132	*6.3	1
6SK7—I. F. Amp.	0	0	2.4	0	2.3	76.5	*6.3	226
6SQ7—Det. A. V.C.-A. F.	0	0	0	0	0	98	*6.3	0
6J5GT—Phase Invert.	0	0	118.5	0	0	J. B.	*6.3	6.0
6K6G—Output	0	0	226	236	0	J. B.	*6.3	15.5
6K6G—Output	0	0	226	236	0	J. B.	*6.3	15.5
5Y3G—Rectifier	NC	310	J. B.	*300	J. B.	*300	J. B.	310

*Measure with A. C. Voltmeter.

MAX. POWER OUTPUT @ 117.5 V. LINE............5.0 Watts
POWER CONSUMPTION @ 117.5 V. LINE............66 Watts (Radio Only)
TOTAL POWER CONSUMPTION @ 117.5 V. LINE......110 Watts (Including Phono Motor)
DROP ACROSS SPEAKER FIELD............74 Volts

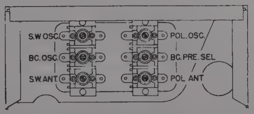
Voltages may vary 10% of values given.

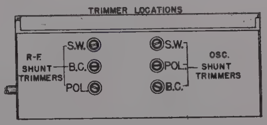
J. B.—JUNCTION BLOCK

N. C.—NO CONNECTION

Models 28, 30

TRIMMER LOCATIONS





Models 29, 31, 34

Position of Volume Control............Fully On
Position of Tone Control............Treble or Speech

ALIGNMENT PROCEDURE CHART Models 29, 31, 34

	Signal Generator						
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. R-F Trimmer	Adjust for maximum output to not touch B. C. Osc. Trimmer. Adjust for maximum output.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak gang; does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT" and R-F Trimmers	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT" and R-F Trimmers	Adjust for maximum output while rocking gang thru signal.

Models 28, 29, J30, 31BF, 34BH

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less **as indicated on the dial.** To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

Model 29

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

	PIN NUMBER							
TUBE FUNCTION	1	2	3	4	5	6	7	8
6K7GT—R. F. Amp.	0	0	187	75	0	J.B.	*6.3	2
6A8GT—Osc.-Mod.	0	0	187	75	0	130	*6.3	1
6SK7—I. F. Amp.	0	0	2.3	0	2.3	78	*6.3	228
6SQ7—Det. A.V.C.-A. F.	0	0	0	0	0	110	*6.3	0
6J5GT—Phase Invert.	0	0	120	0	0	J.B.	*6.3	5.5
6F6G—Output	0	0	220	230	0	J.B.	*6.3	14.5
6F6G—Output	0	0	220	230	0	J.B.	*6.3	14.5
5Y3G—Rectifier	NC	329.0	J.B.	*358.0	J.B.	*358	J.B.	329.0

*Measure with A. C. Voltmeter.

MAX. POWER OUTPUT @ 117.5 V. LINE............8.0 Watts
POWER CONSUMPTION @ 117.5 V. LINE............85 Watts
DROP ACROSS SPEAKER FIELD............95.0 Volts

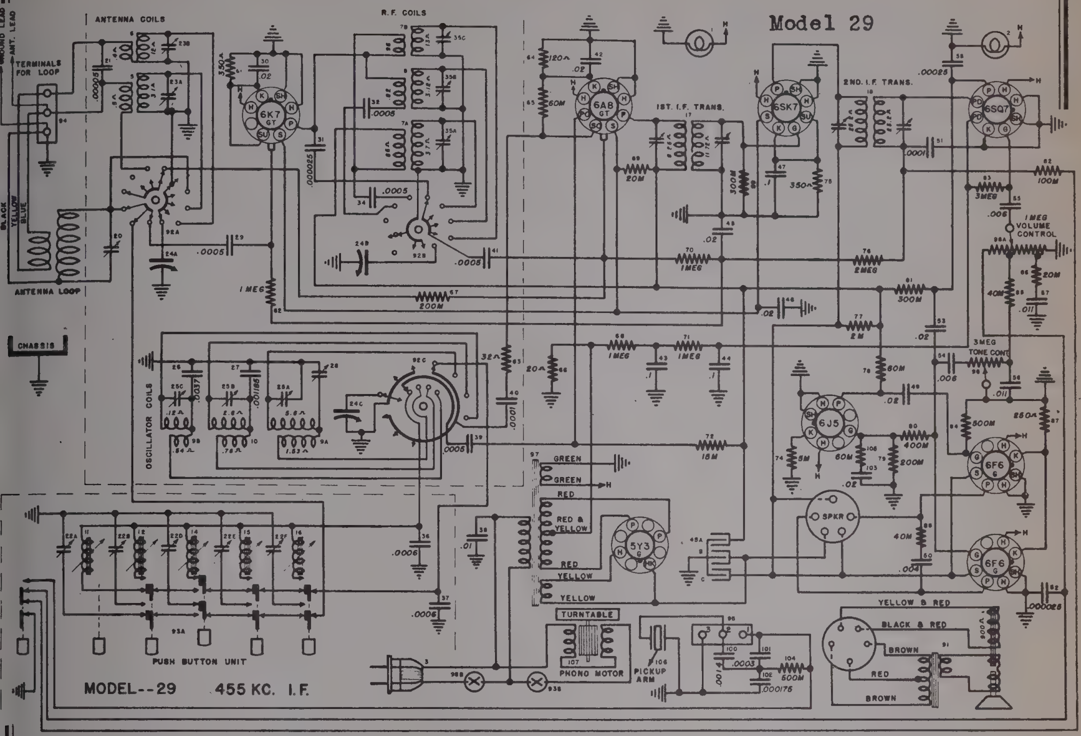
Voltages may vary 10% of values given.

J. B.—JUNCTION BLOCK

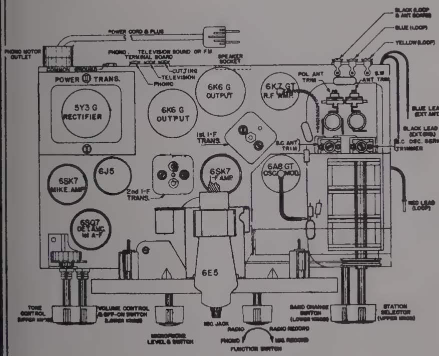
N. C.—NO CONNECTION

THE CROSLEY CORP.

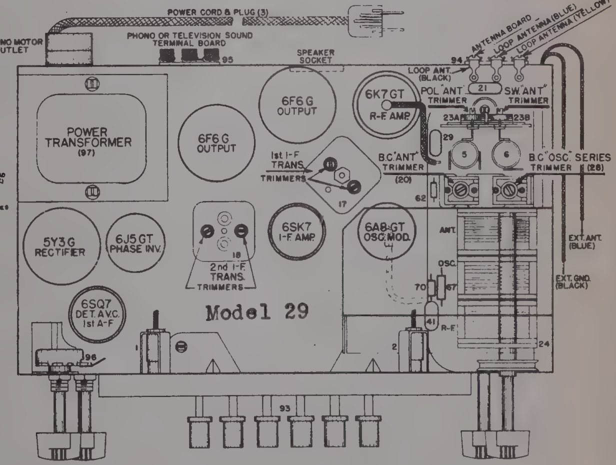
MODEL 29
MODEL 34BH



For tuner, alignment
voltage, See INDEX



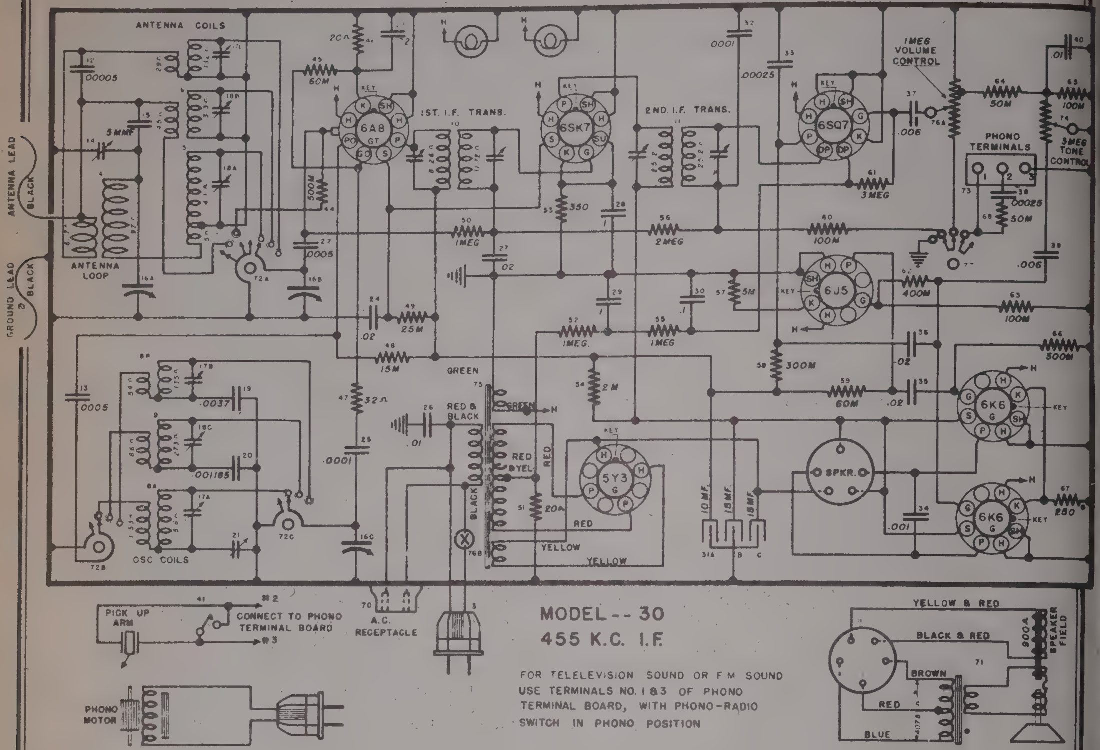
Model 34BH



American Broadcast—550 to 1600 Kc. (545-187 Meters)
Police, Amateur, etc.—1600 to 5000 Kc. (187-60 Meters)
Short Wave (Foreign)—6.0 to 18.0 Mc. (50-16.6 Meters)

MODEL J30BC

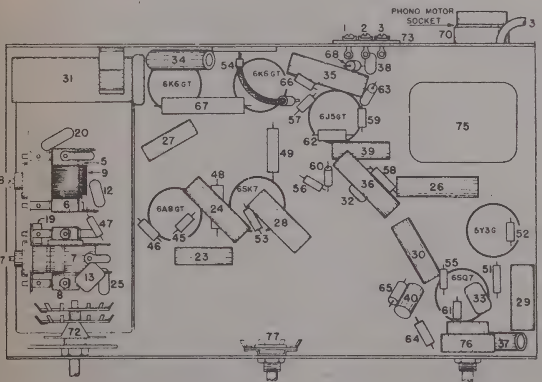
THE CROSLEY CORP.

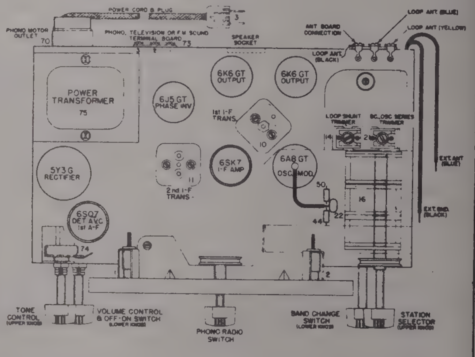


MODEL -- 30
455 K.C. I.F.

FOR TELELEVISION SOUND OR F M SOUND USE TERMINALS NO. 1 & 3 OF PHONO TERMINAL BOARD, WITH PHONO-RADIO SWITCH IN PHONO POSITION

BOTTOM VIEW OF CHASSIS



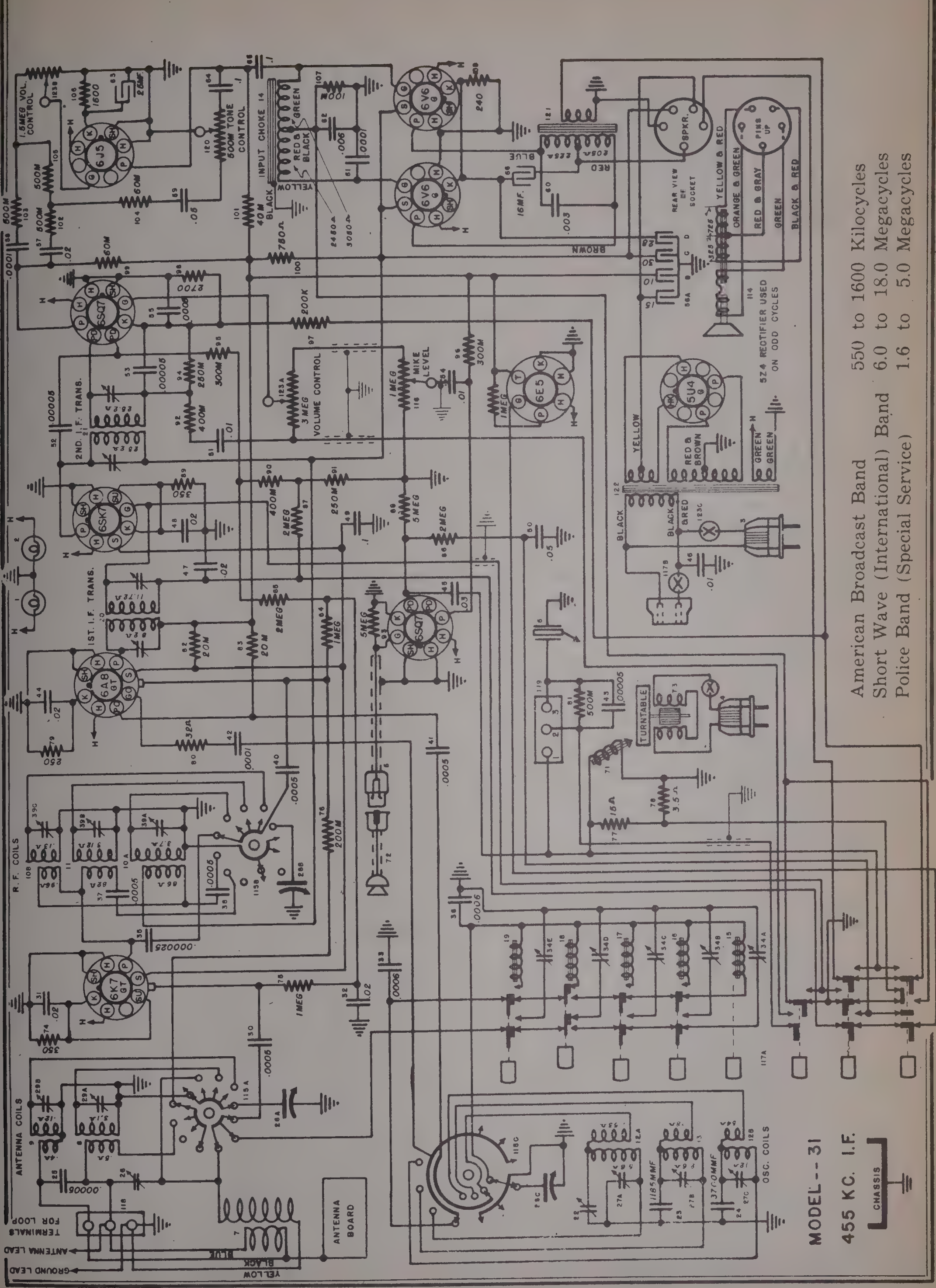


American Broadcast—550 to 1600 Kc. (545-187 Meters)
Police, Amateur, etc.—1600 to 5000 Kc. (187-60 Meters)
Short Wave (Foreign)—6.0 to 18.0 Mc. (50-16.6 Meters

For alignment and voltage See INDEX

THE CROSLEY CORP.

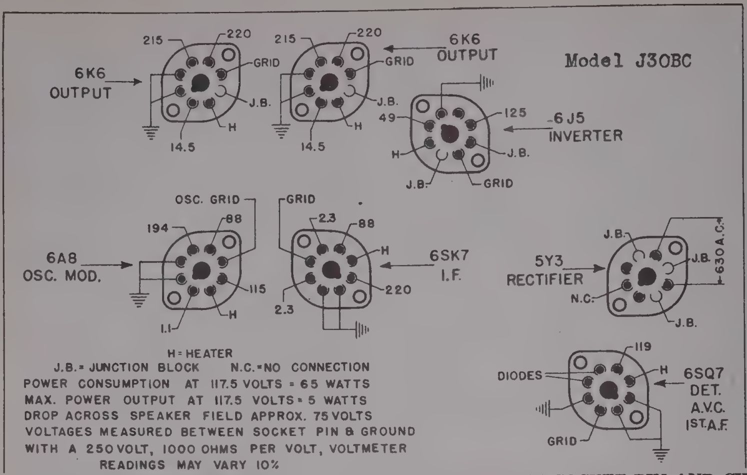
MODEL 31BF



American Broadcast Band 550 to 1600 Kilocycles
Short Wave (International) Band 6.0 to 18.0 Megacycles
Police Band (Special Service) 1.6 to 5.0 Megacycles

MODELS 33BG,
J30BC, 31BF

THE CROSLEY CORP.



H=HEATER
J.B.=JUNCTION BLOCK N.C.=NO CONNECTION
POWER CONSUMPTION AT 117.5 VOLTS = 65 WATTS
MAX. POWER OUTPUT AT 117.5 VOLTS = 5 WATTS
DROP ACROSS SPEAKER FIELD APPROX. 75 VOLTS
VOLTAGES MEASURED BETWEEN SOCKET PIN & GROUND
WITH A 250 VOLT, 1000 OHMS PER VOLT, VOLTMETER
READINGS MAY VARY 10%

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS)
WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)
VOLTAGES MAY VARY 10% OF VALUES GIVEN

Model 31BF

SOCKET PIN NUMBER

TUBE	FUNCTION	1	2	3	4	5	6	7	8
6K7GT	R.F. Amplifier	GND.	GND.	280	110	3.25	J.B.	*6.5	3.25
6A8GT	Osc.-Mod	GND.	GND.	260	110	—NEG.	135	*6.5	3.00
6SK7	I-F Amplifier	GND.	GND.	GND.	GRID	3.6	110	*6.5	280
6SQ7	Det.-A.V.C.-1st A-F	GND.	GND.	1.75	A.V.C. DIODE	AUDIO DIODE	220	*6.5	GND.
6J5	Driver	GND.	6.5	145	J.B. 265	GRID	J.B. A.V.C.	GND.	4.85
6V6G	Output	GND.	GND.	300	280	GRID	J.B.	*6.5	18.5
6V6G	Output	GND.	GND.	300	280	GRID	J.B.	*6.5	18.5
6SQ7	Mic. Amp. & Ind. Rect.	GND.	GND.	GND.	LEVEL DIODE	N.C.	85	*6.5	GND.
6E5	Indicator—(Tun.-Level)								
5U4G	Rectifier								

*Measured with A.C. Voltmeter. N.C.=No Connection. GND.=Ground. J.B.=Junction Block.
MAXIMUM POWER OUTPUT @ 117.5 V. Line=20 Watts @ Voice Coil.
POWER CONSUMPTION @ 117.5 V. Line = Radio 115 Watts + Phono Motor 35 Watts = 150 Watts, Total.
DROP ACROSS SPEAKER FIELD: Red/Black to Red/Gray = 25 Volts.
Red/Gray to Red/Yellow = 45 Volts.

Position of Volume Control.......Fully On
Position of Tone Control.......Treble or Speech

Model 33

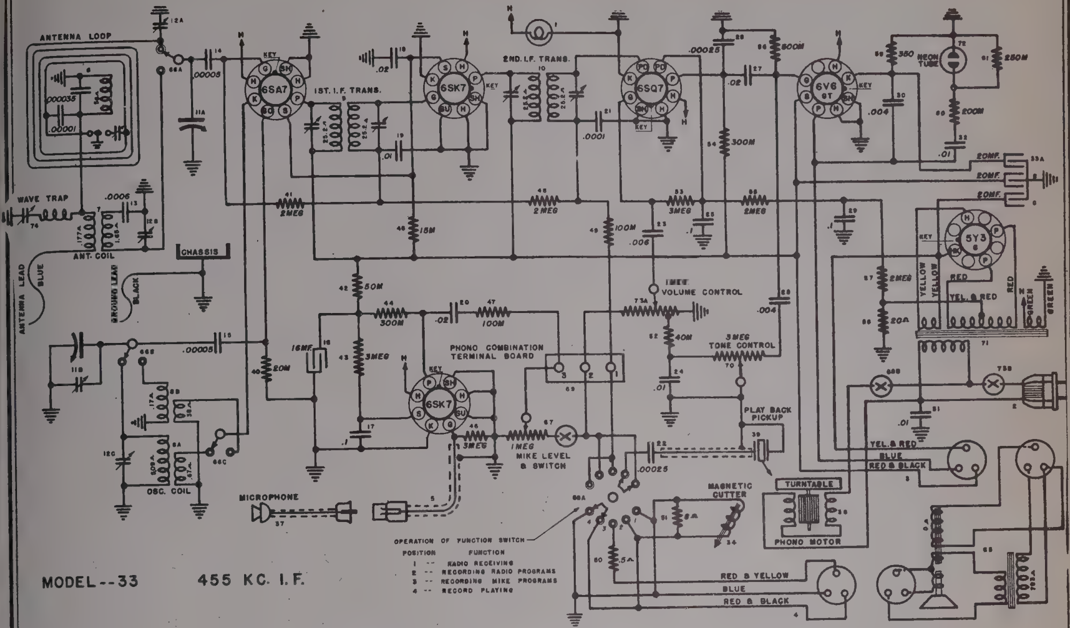
ALIGNMENT PROCEDURE CHART

Alignment Sequence	Dummy Antenna	Frequency Setting	Input to Receiver	Band Switch	Tuning Cond. Setting	Trimmers Adjusted	Remarks
1.	.02MF.	455 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum output. Adjust for Maximum output.
2.	400 ohm (carbon)	15.3 Mc.	Ant. Lead (Blue)	S. W.	Fully Open	S. W. "OSC" (on gang)	Adjust for Peak. See foot note.
3.	400 ohm (carbon)	15.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 15 on dial	S. W. "ANT" center trimmer on right end	Adjust for Maximum while rocking gang back and forth.
4.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	B. C. "OSC" front trimmer on right end	Adjust for peak. Make sure the switch on loop is in B. C. position.
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" rear trimmer on right end	Adjust for Maximum output.
6.	.0002 MF.	2.5 Mc.	Ant. Lead (Blue)	B. C. and switch on loop to Pol	Approx. 2.5 on dial lower right corner	Pol. Ant on loop	Adjust for Maximum output.

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency which is approximately 910 kilocycles less **as indicated on the dial.** To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

THE CROSLEY CORP.

MODEL 33BG
MODEL 31BF



Model 33BG VOLTAGE CHART

ALL VOLTAGES MEASURED FROM SOCKET PIN TO CHASSIS @ 117.5 VOLT LINE

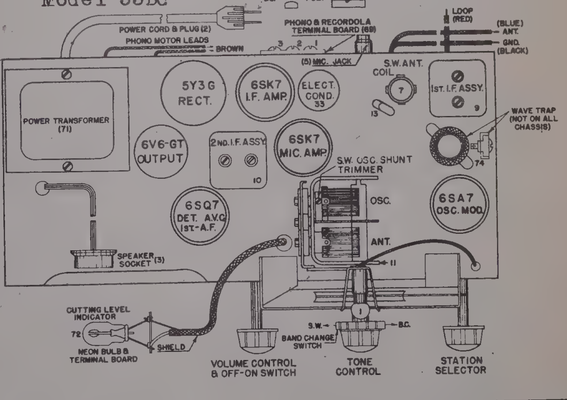
	SOCKET PIN NUMBER							
TUBE SECTION	1	2	3	4	5	6	7	8
6SA7—Osc.-Mod.	0	0	225	74	0	0	6.3	0
6SK7—I. F. Amp.	0	0	0	0	0	74	6.3	225
6SQ7—Det. A.V.C.—1st A.F.	0	0	0	0	0	100	6.3	0
6V6GT—Output	0	0	209	225	0	0	6.3	10.5
6SK7—Mike Amp.	0	0	0	0	0	+	6.3	+
5Y3G—Rectifier	0	5.0	0	316 A.C.	0	316 A.C.	0	283

All voltages measured with 1000 OHM/Volt Voltmeter except heaters. Voltages may vary 10% of values given.

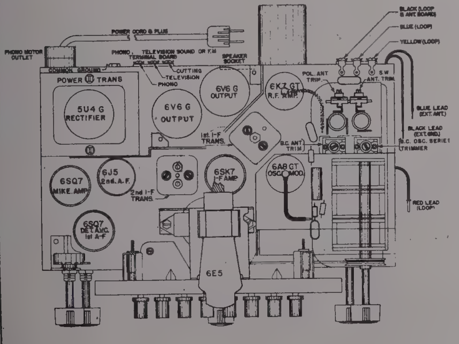
DROP ACROSS SPEAKER FIELD	58	Volts
MAXIMUM POWER OUTPUT @ 130 V. LINE	6.5	Watts
MAXIMUM POWER CONSUMPTION @ 130 V. LINE	*60	Watts

*Phono Motor 40 Watts additional.

Model 33BG



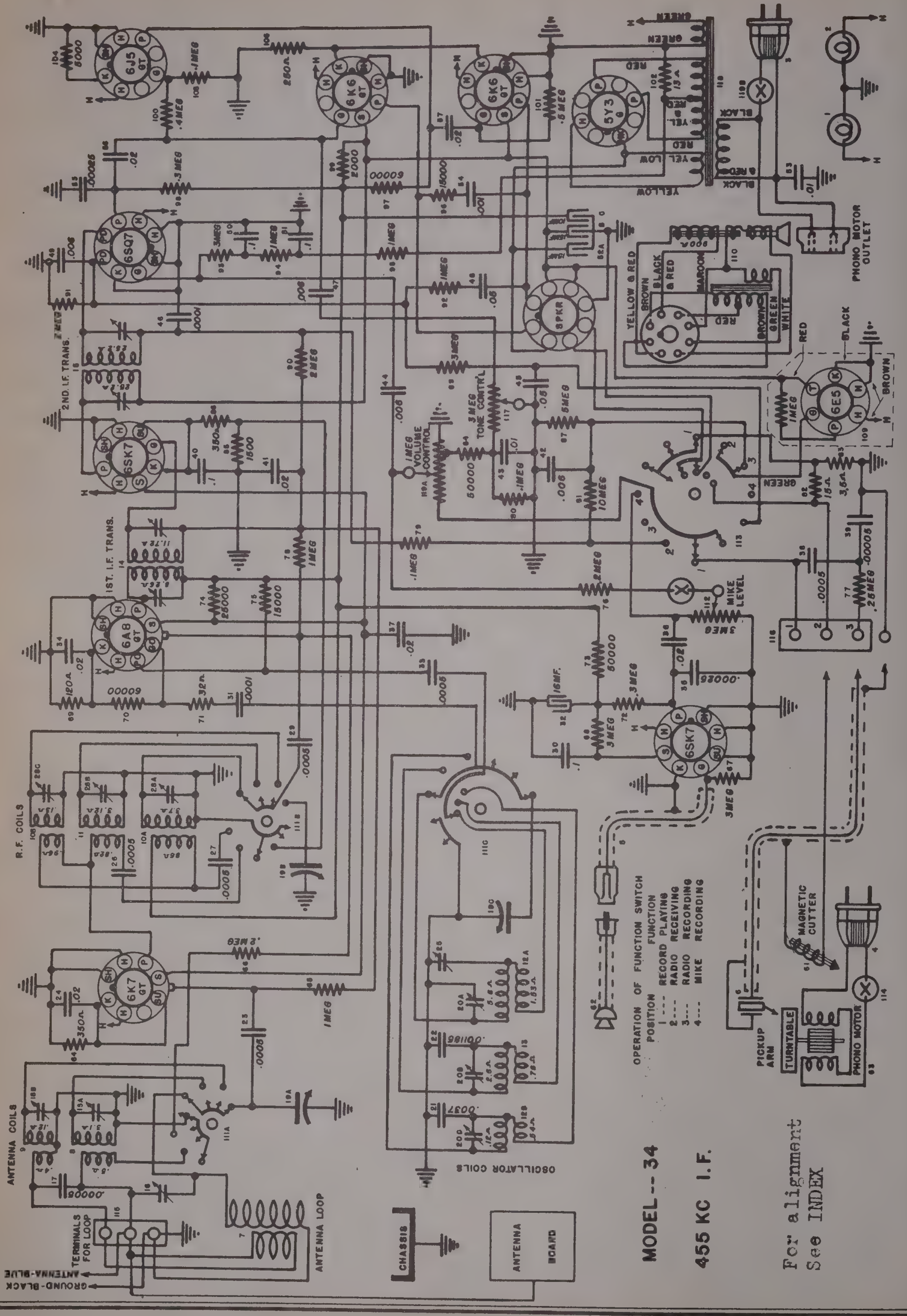
Model 31BF



©John F. Rider, Publisher

MODEL 34BH

THE CROSLEY CORP.



OPERATION OF FUNCTION SWITCH

POSITION	FUNCTION
1---	RECORD PLAYING
2---	RADIO RECEIVING
3---	RADIO RECORDING
4---	MIKE RECORDING

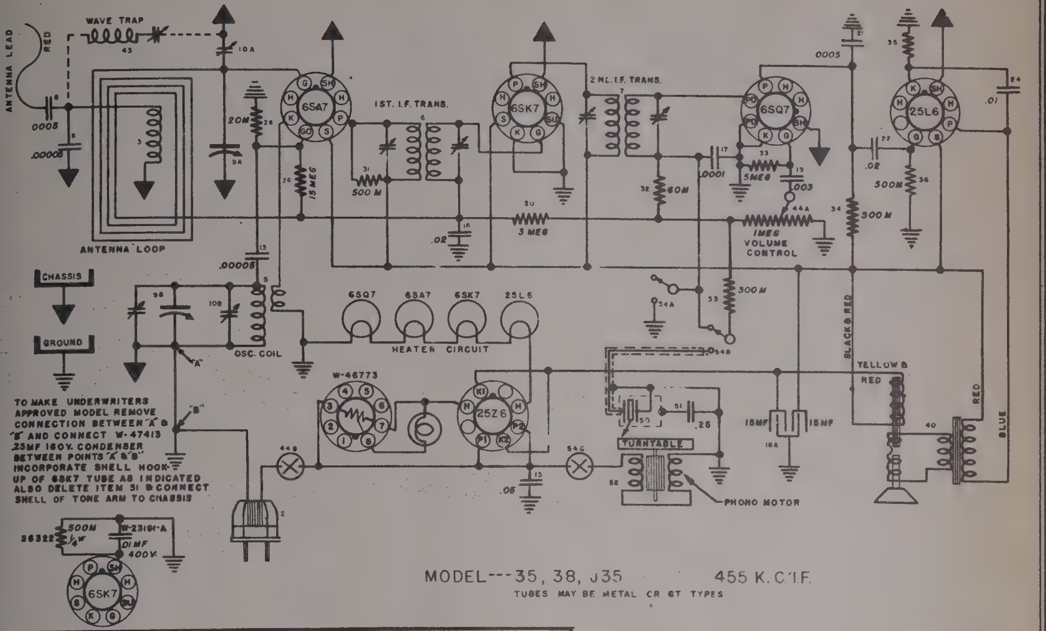
MODEL -- 34

455 KC I.F.

For alignment
See INDEX

THE CROSLEY CORP.

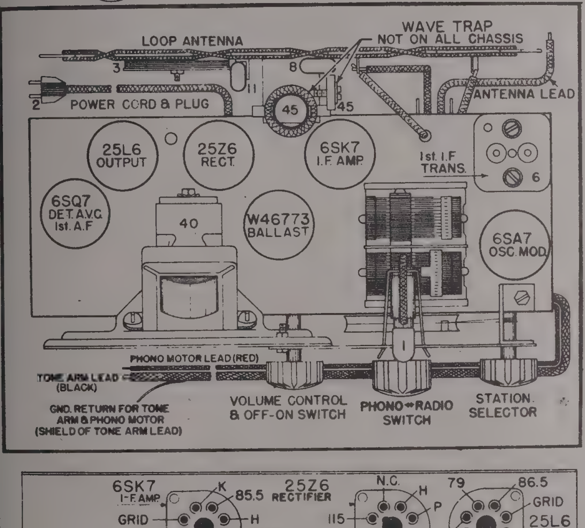
MODELS 35AK, 38BM

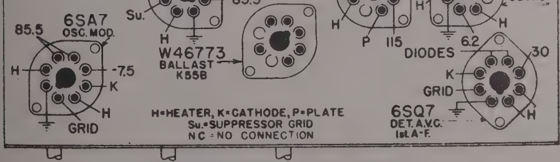


TO MAKE UNDERWRITERS APPROVED MODEL REMOVE CONNECTION BETWEEN "A" & "B" AND CONNECT W-47413 .25MF 160V. CONDENSER BETWEEN POINTS "A" & "B" INCORPORATE SHELL HOOK-UP OF 6SK7 TUBE AS INDICATED ALSO DELETE ITEM 51 & CONNECT SHELL OF TONE ARM TO CHASSIS

MODEL---35, 38, J35 455 K.C.I.F.

TUBES MAY BE METAL OR GT TYPES





POWER CONSUMPTION AT 117.5 LINE = 50 WATTS
MAXIMUM POWER OUTPUT----------=1.2 WATTS
DROP ACROSS SPEAKER FIELD-------=28.5 VOLTS

Socket Voltage Chart

ALIGNMENT:

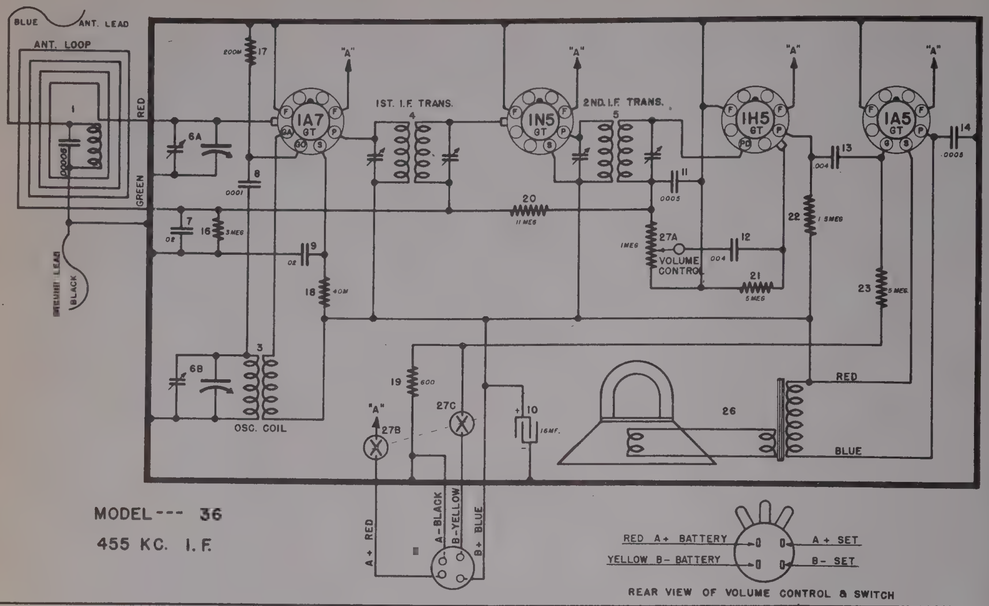
I.F. -- Set signal generator to 455 kc and connect to Red or Blue antenna lead through a 100 mmf dummy. Adjust 2nd i-f trimmers located through front chassis flange below speaker. Adjust 1st i-f trimmers for maximum output. See layout at left.

R.F. -- Set signal generator to 1650 kc. Condenser gang to minimum. Adjust B.C. OSC. trimmer so that signal is heard. Set signal generator to 1400 kc. Adjust tuning dial to 140 and adjust BC ANT. trimmer for maximum output.

NOTE: Do not readjust the OSC trimmer.

MODEL 36AM

THE CROSLEY CORP.



TUBE SOCKET VOLTAGE READINGS (MEASURED FROM SOCKET PIN TO CHASSIS)

Tube	Function	PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1A7-GT	Oscilator-Modulator	—	1.5	86	46	Neg.	86	—	—
1N5-GT	I-F Amplifier	—	1.5	86	86	—	J.B.	—	—
1H5-GT	Detector & 1st A-F Amp.	—	1.5	12	—	—	—	—	—
1A5-GT	Output	—	1.5	84	86	4.3*	—	—	J.B.

Power Output approximately 200 milliwatts. "A" Battery Drain approximately .20 Ampere at 1.5 Volts. "B" Battery Drain approximately 9.0 Milliamperes at 90 Volts. *Measured across item 19. J.B.=Junction Block.

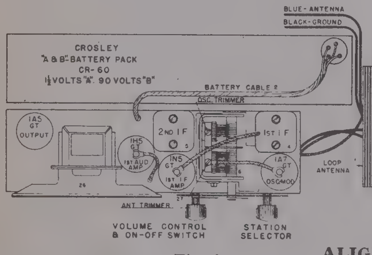


Fig. 1

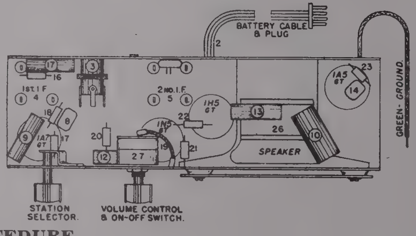


Fig. 2

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 1A5GT output tube. Be certain that the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 1A7GT tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" lead or chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob on the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both 2nd I-F trimmers for maximum reading on the output meter.

(e) Adjust both trimmers on the 1st I-F transformer for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .0001 mfd. condenser to the "ANT" lead (Blue). (Check dial pointer to see that it covers complete range.)

(a) Set the signal generator to 1500 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser on gang for maximum output.

(d) Set the signal generator to 1400 kilocycles.

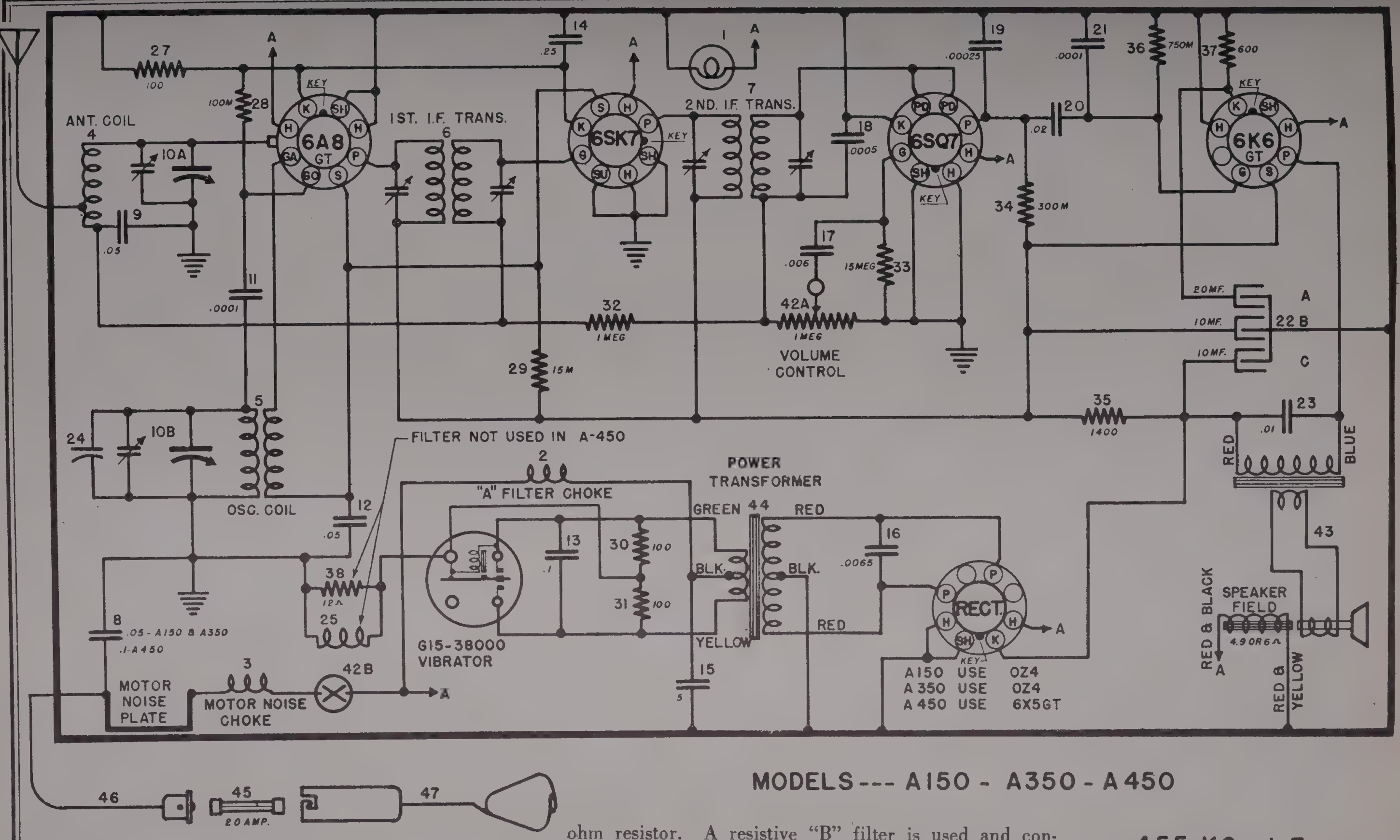
(e) Tune the receiver to the generator signal for maximum output (approximately 140 on the dial).

(f) Adjust the "ANT" trimmer condenser on gang for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

THE CROSLEY CORP.

MODELS A150, A350,
A450 Roamio



MODELS --- A150 - A350 - A450

The vibrator is a 150 cycle full wave primary type. Bias for the 6A8GT and the 6SK7 is obtained from the voltage drop across item 27, a 100 ohm resistor. The 6SQ7 is operated at zero bias. Bias for the 6K6GT is obtained from the voltage drop across item 37, a 600 ohm resistor. A resistive "B" filter is used and consists of item 35, a 1400 ohm resistor and sections B and C of item 22, a three section electrolytic condenser (section A used as by-pass for output cathode).

Models A-150 and A-450 are manually tuned receivers while model A-350 has a five station mechanical push button tuning system.

455 KC. I. F.

MARCH 1940

MODEL A-150
MODEL A-350
MODEL A-450

THE CROSLEY CORP.

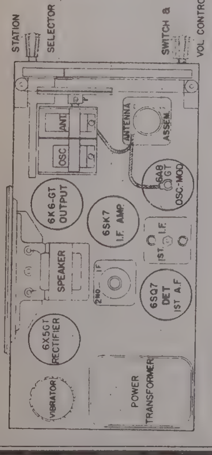


Fig. 2-A—Top View Model A-450

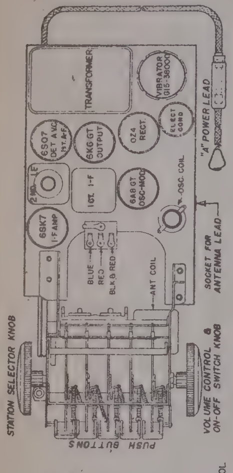


Fig. 2-B—Top View Model A-350

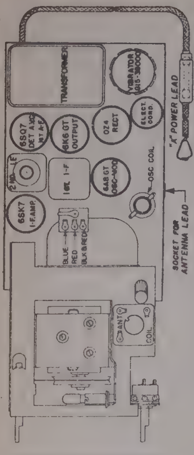


Fig. 2-C—Top View Model A-150

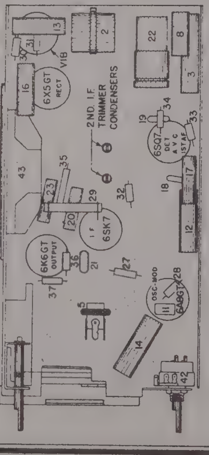


Fig. 3-A—Bottom View Model A-450

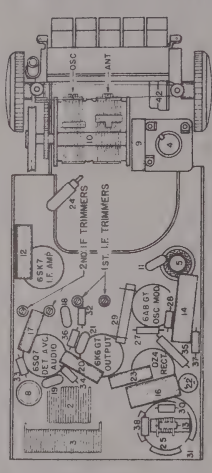


Fig. 3-B—Bottom View Model A-350

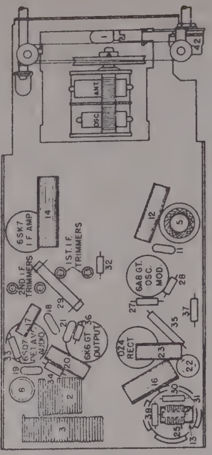
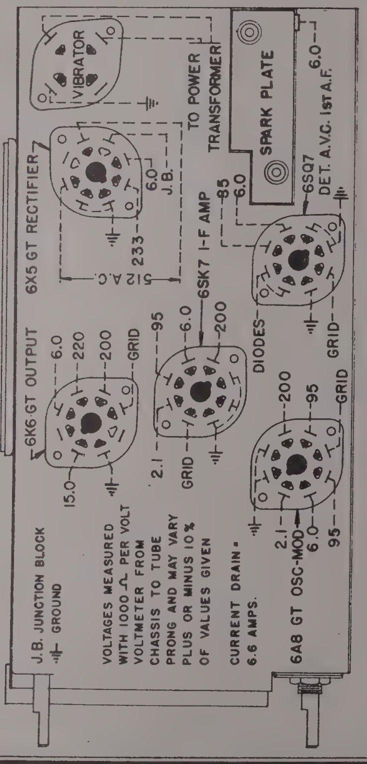


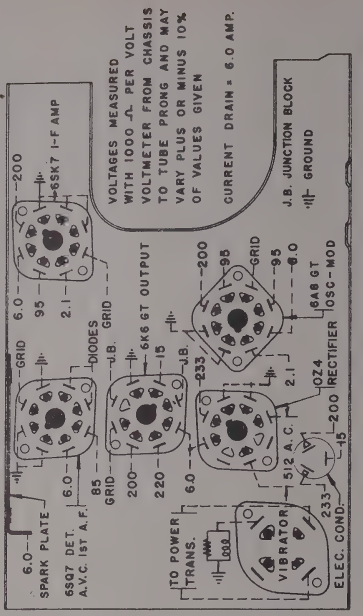
Fig. 3-C—Bottom View Model A-150



VOLTAGES MEASURED WITH 1000 Ω PER VOLT VOLTMETER FROM CHASSIS TO TUBE PRONG AND MAY VARY PLUS OR MINUS 10% OF VALUES GIVEN

CURRENT DRAIN = 6.6 AMPS.

Fig. 4-A—Socket Voltage Chart Model A-450



VOLTAGES MEASURED WITH 1000 Ω PER VOLT VOLTMETER FROM CHASSIS TO TUBE PRONG AND MAY VARY PLUS OR MINUS 10% OF VALUES GIVEN

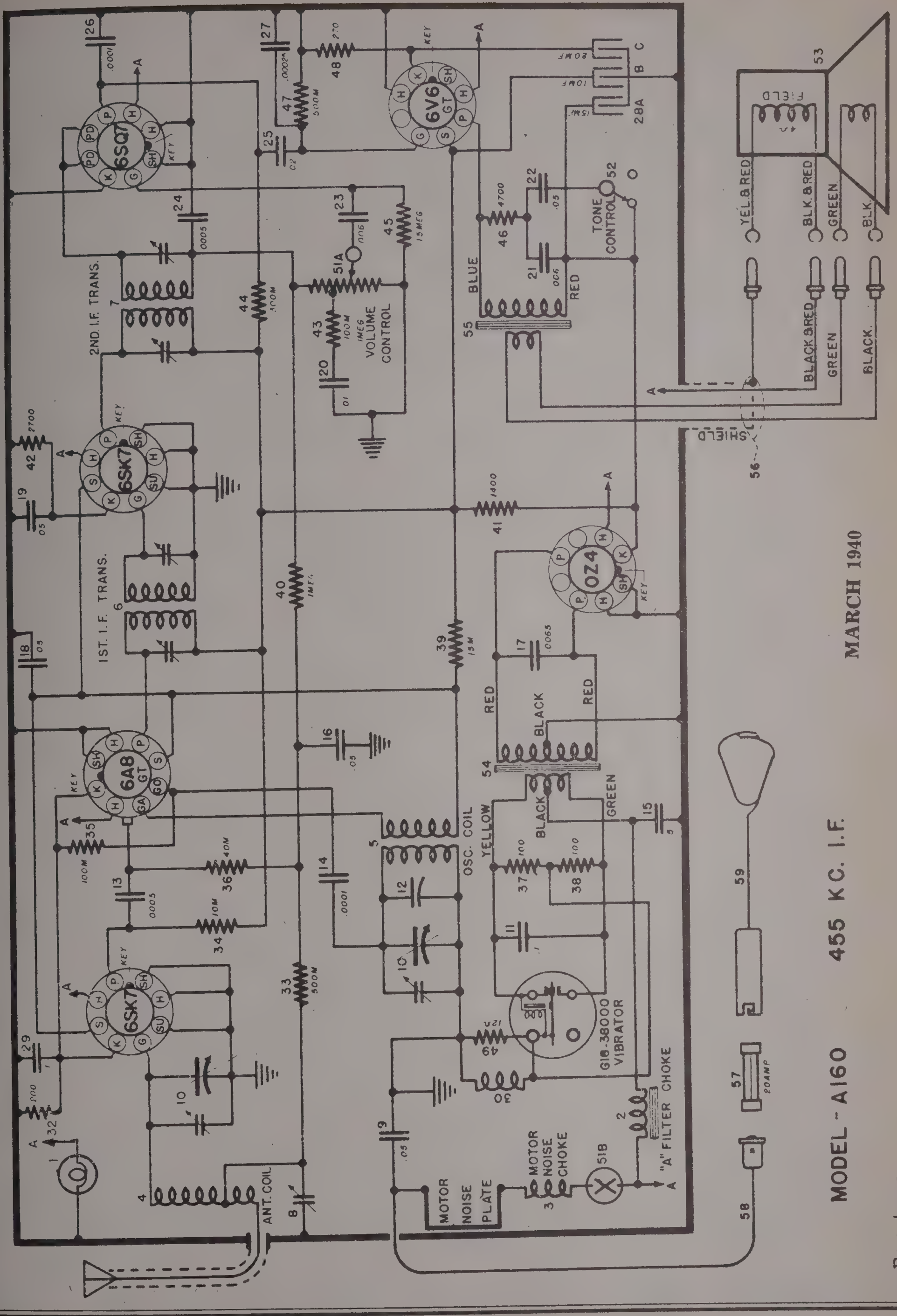
CURRENT DRAIN = 6.0 AMP.

Fig. 4-B—Socket Voltage Chart Models A-150 and A-350

Conventional alignment; See Special Section Vol. VIII

THE CROSLEY CORP.

MODEL A-160



MARCH 1940

455 KC. I.F.

MODEL - A160

For tuner
See Model A250

THE CROSLEY CORP.

SPEAKER INSTALLATION

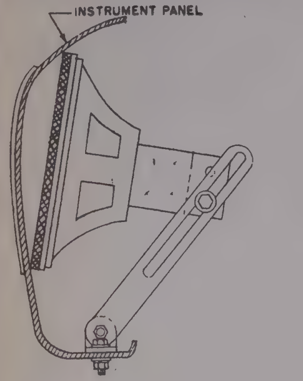


Fig. 5—Instr. Panel Mtg.

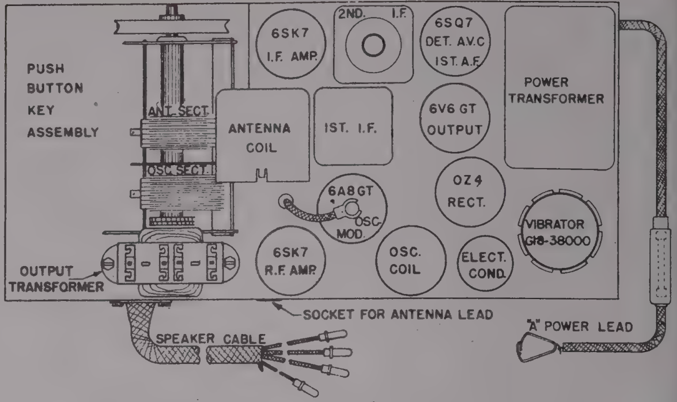


Fig. 2—Top View Model A-160

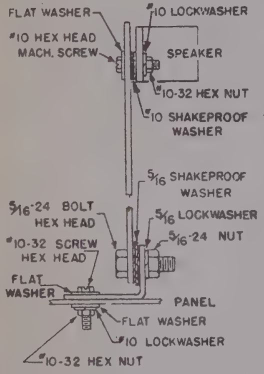


Fig. 6—Bracket Assembly

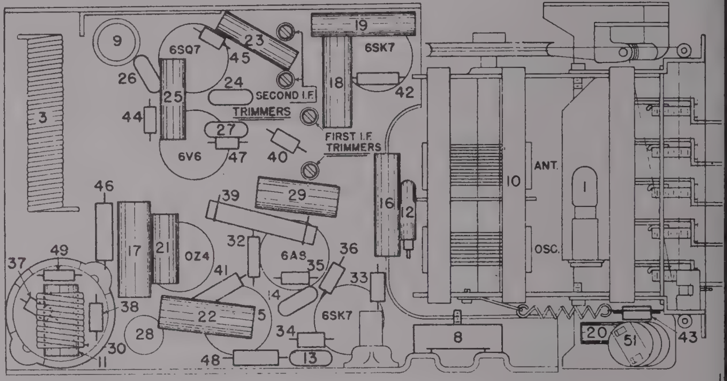


Fig. 3—Bottom View Model A-160

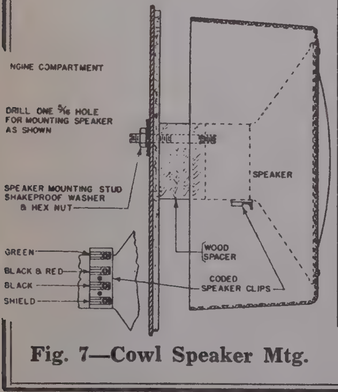
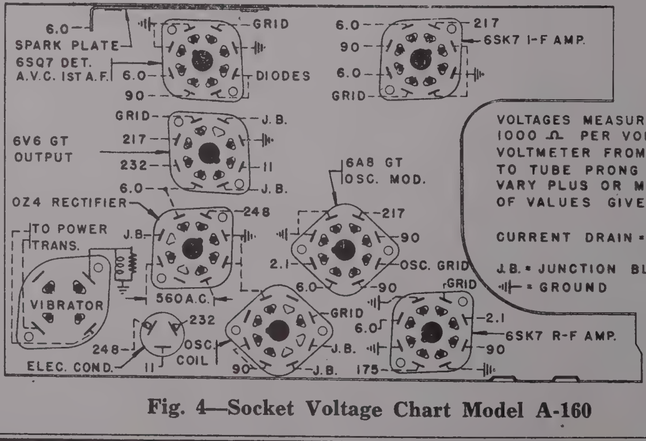

NGINE COMPARTMENT
DRILL ONE 5/16 HOLE FOR MOUNTING SPEAKER AS SHOWN
SPEAKER MOUNTING STUD SHAKEPROOF WASHER & HEX NUT
SPEAKER
WOOD SPACER
CODED SPEAKER CLIPS
GREEN
BLACK & RED
BLACK
SHIELD

Fig. 7—Cowl Speaker Mtg.



VOLTAGES MEASURED WITH 1000 Ω PER VOLT. VOLTMETER FROM CHASSIS TO TUBE PRONG AND MAY VARY PLUS OR MINUS 10% OF VALUES GIVEN.

CURRENT DRAIN = 8.0 AMP.

J.B. = JUNCTION BLOCK
⊣|⊢ = GROUND

Fig. 4—Socket Voltage Chart Model A-160

THE CROSLEY CORP.

MODEL A160
MODEL A250
MODEL 34BH

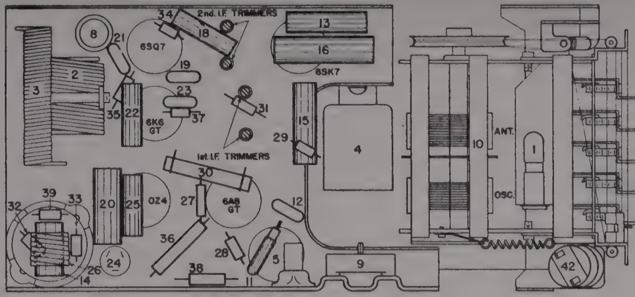


Fig. 3—Bottom View Model A-250

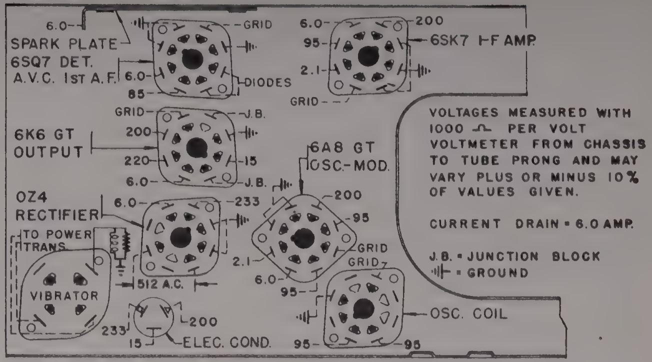


Fig. 5—Socket Voltage Layout

1. Aligning The I-F Amplifier (455 Kc.)

(a) Connect the output of the signal generator through a .02 mf., or larger, condenser to the top cap of the 6A8GT oscillator-modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the chassis.

(b) Set the signal generator to 455 kilocycles.

(c) Open the tuning condenser all the way, turn the volume control on full.

(d) Adjust both trimmers on the 2nd. I-F transformer for maximum output. (See figure 3).

(e) Adjust both trimmers on the 1st I-F transformer for maximum output. (See figure 3).

(f) Repeat (d) and (e) for more accurate adjustments. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING TO PREVENT A. V. C. ACTION.

2. Aligning R-F Amplifier

To obtain the greatest gain from the R. F. amplifier, the capacity of the dummy antenna should be equal to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. (.000065 mf.) to 250 mmf. (.00025 mf.), depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity and vice versa.

(a) If the receiver is to be used with a whip or streamlined antenna, the output lead from the signal generator should be connected through a .0001 mf. condenser to the "Ant" connection of the receiver. If a large antenna such as a running board type or built-in top antenna is to be used, a .0002 mf. condenser should be used in place of the .0001 mf. condenser.

(b) Set the signal generator to 1400 kilocycles.

(c) Check the pointer travel on the dial to see that it makes a complete trip, reset if necessary. Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output. DO NOT READUST THE OSC. TRIMMER.

(g) Repeat operation (e) for more accurate adjustment.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, located to the right of antenna receptacle, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "Ant" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

SOCKET VOLTAGES MEASURED @ 117.5 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER (D. C.)

Model 34BH

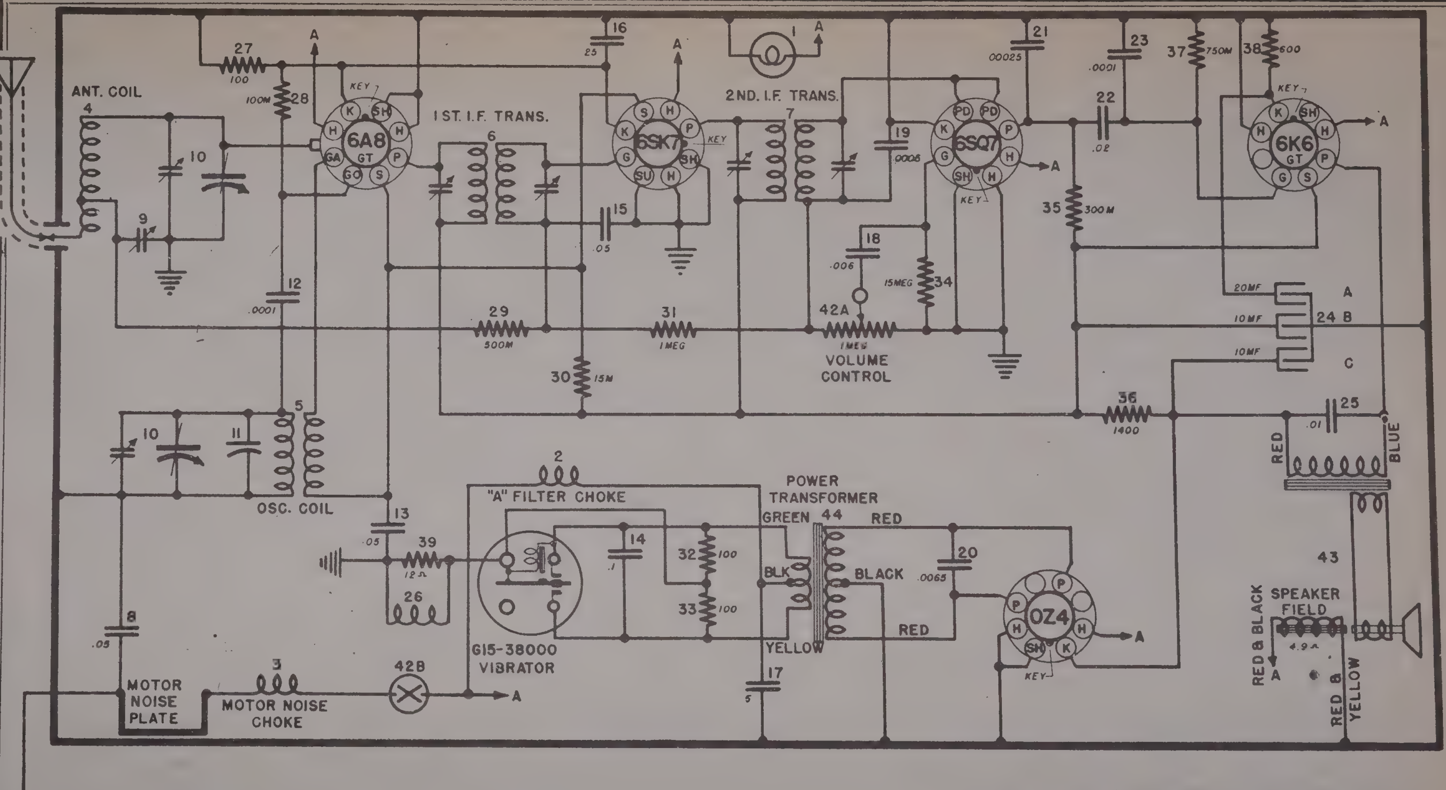
TUBE FUNCTION	SOCKET PIN NUMBER							
	1	2	3	4	5	6	7	8
6K7GT—R-F Amp.	......	......	195	78.6	......	2.0	*6.3	2.0
6A8GT—Osc.-Mod.	......	......	195	78.6	......	136	*6.3	1.0
6SK7—I-F Amp.	......	......	......	......	5.5 B.C. 2.6 S.W.	78.6	*6.3	234
6SQ7—Det. A.V.C. 1st A-F	......	......	......	......	......	110	*6.3	......
6J5GT—Phase Invert.	......	......	118	195	......	110	*6.3	4.5
6K6GT—Output	......	......	220	228	......	......	*6.3	15.0
6K6GT—Output	......	......	220	228	......	......	*6.3	15.0
6SK7—Mike Amp.	......	......	......	......	......	......	*6.3	POS.
5Y3G—Rectifier	......	305 D.C.	......	*325	......	*325	......	305 D.C.
6E5—Indicator	......	......	......	225	......	*6.3		

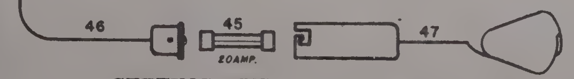
*Measured with A.C. volt meter

VOLTAGE DROP ACROSS SPEAKER FIELD= 77 VOLTS
MAXIMUM POWER OUTPUT @ 130 V. Line=7.5 Watts
POWER CONSUMPTION @ 117.5 V. Line=Radio 80 Watts, Phono Motor 35 Watts—TOTAL=115 WATTS
Voltages may vary 10% of values given.

MODEL A250 Roamio

THE CROSLEY CORP.





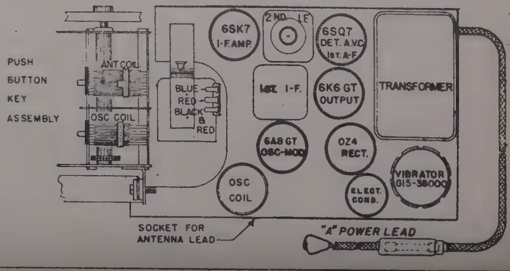
SETTING PUSH BUTTONS for A160 and A250

The push buttons are easily reset if necessary. Remove the push button by pulling straight out. Loosen the set screw two or three turns. With the manual control tune-in station to which key is to be set. With a small screw driver inserted in set screw push the key ALL THE WAY DOWN, then securely tighten set screw.

MARCH 1940

MODEL --- A250

455 KC. I.F.



I—RECORDERS

The quality and life of instantaneous home recordings is largely dependent upon the operators working knowledge of his equipment and the type blank discs and cutting needles used. For the operation and adjustment of the various controls read the operating instructions supplied with the receiver.

The type recorders used in Crosley equipment employ low impedance magnetic cutting heads and have crystal tone arms for play back. The turntable is rim driven. The deluxe recorder also has the automatic record changer capable of playing 14 ten inch or 10 twelve inch records at one loading.

A.—CUTTING NEEDLES

The cutting needle or stylus as furnished with the Crosley recorders will cut approximately 30, 6½" records one side or 15, 6½" records both sides (one hour life cutting time).

These needles are of the hardened steel type and the cutting point and edges are extremely sharp and quite easily damaged should they be bumped or scraped against a metal surface. The point of these needles is ground to a sharp "V" as shown in fig. 1B while the more expensive needles are of sapphire or a special metal alloy with their points having a very slight radius as shown in fig. 1A.

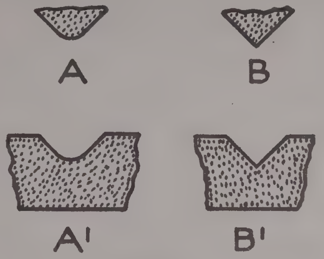


Figure 1

A simple rule of the thumb method for determining needle wear is, that the grooves cut out with a new or good needle have a high brilliance and as the needle wears the lustre of the cut section will be less and eventually appear gray.

If cutting needle tends to chatter as it is recording, it is advisable to replace it with a new one. (Also check the cutting arm height, see following paragraphs). The recording needle may be removed and replaced as desired, provided the adjustments are checked each time before recording. In all events, every precaution must be taken to protect the cutting point at all times; in cutting it should be lowered GENTLY on the blank with turntable RUNNING.

NOTE: Most cutting needles have a flat ground on the shank. The needle screw must be tightened against this flat. Always firmly tighten the needle screw before making a recording.

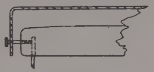


Figure 2

B.—PLAY BACK NEEDLES. (Use Recoton needles as furnished by Crosley for best results)

Instantaneous recordings (home recordings) require special play back needles if the quality and life of the record is to be retained. Needles purchased as "100% shadowgraphed" steel needles should be used at all times. This type needle is individually inspected to see that it has a perfectly rounded point of proper radius with no sharp edges or flat sides so that it will have no tendency to harm the record.

Several home recordings may be played with one needle, *PROVIDED* the needle does not touch a commercial record. Never play an instantaneous recording with a needle that has been used on a commercial record.

A rule of the thumb method for judging the amount of wear on a home recording when it is being played back it to watch the change in the color of that portion of the record which the needle has played in comparison with the rest of the record. The first time the record is played back after it has been recorded the grooves may turn slightly darker as the playback needle passes over them, but the change should not be great. Further play-back shoud how little or no change in color, provided the play-back is in good condition and that the record is free from dust and dirt. Whenever any great changes in color does occur, it is advisable to immediately stop the record and put in a new needle.

c.—CUTTING ARM ADJUSTMENTS.

"Recorder with Automatic Record Changer." "Seeburg Type" used on Models 28AZ, 34BH, 31BF. and 48BF.

The height of the cutting arm can be varied by means of the slotted screw head which is on top of the arm and near the back, approximately flush with the top surface of the arm. In order to make this adjustment, it is necessary to insert a cutting needle and, with the motor turned OFF and a record blank on the turntable, place the recording arm in the cutting position. Now turn cutting arm height adjusting screw UNTIL THE NEEDLE SCREW IS CENTERED IN THE SLOT THROUGH WHICH IT PROTRUDES (AT FRONT END OF RECORDER ARM).

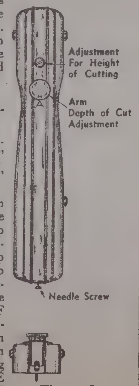


Figure 3

Any change in the cutting arm height adjustment will change the vertical angle of the cutting needle therefore it is absolutely essential that the depth of cut be rechecked.

"Recorder as used in Model 33BG." (General Industries Type).

The height adjustment of the cutting arm on this recorder is accomplished by raising the cutting arm and loosening the locknut of the cutting arm Height Adjusting Screw, see fig. 4. Place needle in cutting arm and place a record blank on turn table. Carefully lower cutting arm on record, with the motor turned OFF.

Set the Arm Height Adjusting Screw so that there is exactly ¼" space between the surface of the record and the bottom edge of the cutting arm (Front) see fig. 4.

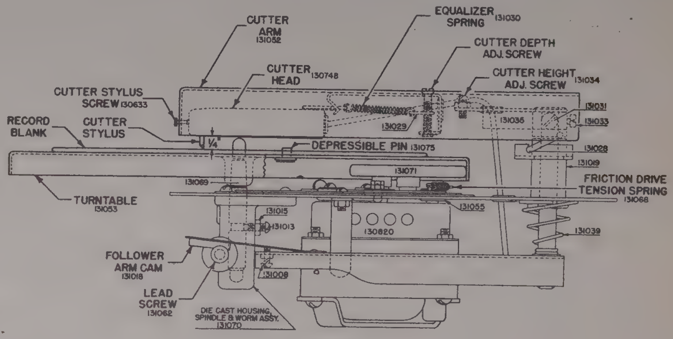


Figure 4

NOTE: A change in cutting arm height adjustment may affect the depth of cut or vice-versa.

C.—ADJUSTING DEPTH OF CUT.

The correct depth of cut is important to insure maximum record life and good reproduction quality.

The depth of cut which is determined by the cutting needle pressure on the blank disc should be such THAT THE WIDTH OF THE GROOVE IS APPROXIMATELY THE WIDTH OF THE SPACE (Land) BETWEEN THE GROOVES. With no sound applied the ratio of 60 percent groove and 40 percent land is the ideal cutting depth for most conditions. The importance of the depth of cut CANNOT BE OVER EMPHASIZED, since too light a cut or too heavy a cut will tend to give distortion and generally poor results.

Illustrations A, B, C, and D in fig. 5, are typical results obtained, "A" shows a groove which is cut too light, "C" a groove of approximately 60-40 or which is the generally preferred depth, "D" illustrates an appearance of a groove of "C" depth after recording while "B" illustrates a too heavy a cut (over 60-40) with an excessive amount of (too high a cutting level) signal applied to cutting head causing an overcut of the grooves.

The adjustment of the depth of cut is accomplished by rotating the chrome knob on the cutting arm of the recorder with automatic record changer, see fig. 3. This knob has the letters "L, M, and H" engraved on it indicating Light, Medium and Heavy pressures. In general, the machine is properly adjusted and set at the factory so that it will cut the average record correctly when this knob is in the "M" position.

On the recorder as employed in Model 33BG the

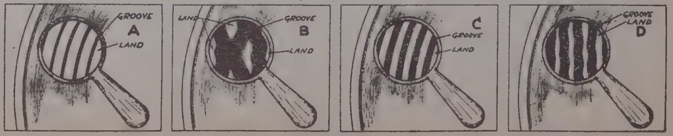


Figure 5

depth of cut is adjusted by rotating the screw approximately in the middle of the cutting arm and flush with the top, see fig. 4. To increase the depth of cut this screw should be turned to the right (clockwise). Conversely to decrease the depth of the cut the screw should be turned to the left (counter-clockwise). This adjustment is rather critical and should be moved only in quarter or half turns at a time.

When the cutting head is in proper adjustment, and the cutter arm is raised to the point (approximately 45°) where it can be freely moved over the record, the cutting head needle screw should JUST REST on the bottom of the slot in the nose of the arm,—that is, the equalizer spring tension should be such that the cutter head ALMOST FLOATS FREELY.

ALWAYS TRY A TEST CUT WITH A NEW CUTTING NEEDLE before making any adjustments, since often times when casual observation indicates faulty adjustment, the whole trouble may be due to a cutting needle that has been dulled either through accident or natural wear.

NOTE: Changing the arm height usually necessitates a change in cutting depth adjustment and changing the depth of cut may call for a slight variation in the arm height adjustment to prevent cutting needle chatter or reduce surface noise.

E.—CUTTING LEVEL.

The cutting level as required for instantaneous recordings as made on the two type recorders as used in Crosley equipment will vary with the type cutting needle used and its condition and the type record blank used. Provided the cutting arm height is correct and the depth of cut is correct the following cutting levels should give good results.

For those models having the cathode ray type indicator, the volume level should be adjusted until the shadow on the indicator tube forms a narrow vertical line approximately 1/32" wide for loud or peak signals. During recording this shadow will vary in width in accordance with the loud and soft passages of the program.

For the models equipped with a Neon Tube as a Cutting Level Indicator the volume level should be raised to a point where the neon tube elements give an even pinkish glow during loud or peak signals. The correct cutting level can only be found by experimentation as the level is dependent upon the type and condition of cutting needle and blank disc used.

F.—RECORDS (BLANK & CUT)

The record blanks for instantaneous home recordings differ from commercial records in many respects. Commercial records are usually made of shellac compound pressings formed under hydraulic pressure, resulting in recordings which are extremely resistant to wear but which are quite brittle and easily broken. Record blanks for instantaneous recordings are quite soft in comparison with commercial records but their durability is about as good as that of the cheaper grade phonograph record provided they are given the proper care.

NEVER USE REPRODUCING NEEDLE ON INSTANTANEOUS RECORD THAT HAS BEEN USED TO PLAY COMMERCIAL PHONOGRAPH RECORD.

The Crosley home recording disc is of the non-flamable or slow burning type. Always exercise care in the storage of home recordings. Keeping them clean, free from dust and dirt will add many hours to the life of the record.

NEVER ATTEMPT TO PLAYBACK AN INSTANTANEOUS RECORDING ON A MECHANICAL PHONOGRAPH.

NOTE: Excessive rumble which may sometimes be encountered during the playback of home recordings usually can be eliminated entirely (on Models 33BG, 28AZ, and 34BH by just turning the microphone fader or level control in a clockwise direction until the switch clicks.

II—SERVICE NOTES

Recorder with Automatic Record Changer.

(Models 28AZ, 34BH, 31BF, and 48BF)

1.—FUNCTION OF MANUAL CONTROL BUTTON AND RELATIVE PARTS

When Manual Control Button (Item 84, Fig. 6) is moved to the Manual Play-Back recording position, it moves the Manual Control Slide (Item 102, Fig. 7) which in turn moves Clutch Lock Slide (Item 103, Fig. 7) into a position which prevents Engagement Clutch Cam Assembly (Item 79, Fig. 8) from rotating. When Engagement Clutch Cam Assembly is in the above mentioned position and is not free to rotate, the Changer will not go into its changing cycle.

Also when the Manual Control Button is in the above mentioned position, the Manual Control Slide has moved the Locator Lock Slide (Item 106, Fig. 7) into a position where it engages the Tone Arm Locator & Bushing Assembly (Item 12, Fig. 7) and prevents same from bearing against Tone Arm Lever Assembly (Item 19, Fig. 7) allowing the Tone Arm to swing freely without hindrance and without setting Changer into its changing cycle. When the Manual Control button is in the automatic position the Changer will function normally as an automatic record changer.

2.—POSSIBLE MECHANICAL CAUSES OF POOR RECORDINGS

(A) Threads from record cuttings getting down onto Rubber Idler wheel (Item 83, Fig. 6) and between drive wheel and motor pulley. This will cause very bad speed variation of the turntable and, of course, will result in very inferior recording. Cuttings may also wrap around motor shaft and cause motor to slow down or stop.

To remove the record cuttings, the turntable should be lifted by applying an even lifting force at opposite edges of the turntable while the turntable spindle is gently tapped downward on its top end, and the record cuttings then removed. The Rubber Idler Drive Wheel should be taken off—this can be accomplished by unsnapping the small snap cotter ring and slipping Rubber Idler Drive Wheel off its shaft, after which all record cuttings can be removed.

NOTE: It is very important that no grease or oil be gotten on the surface of the Rubber Idler Drive Wheel.

(B). *Tight pivot bearings:* Check cartridge pivot screw (Item 108, Fig. 6) for binding. Also recording arm pivot screw (Item 107, Fig. 6) and Traverse arm pivot screws (Item 101, Fig. 8). These bearings should all be free, but have no looseness or play.

If the pivot screw, (Item 108, Fig. 6) of the Cutter Cartridge is tight, the Cutter Cartridge cannot follow a slight up and down variation of the record or turntable. A record cut in this manner will, when played back, have a high scratch level, rough cutting and a tendency for the needle to jump from one groove to another.

(C) *Damaged Rubber Idler Drive Wheel* (Item 83, Fig. 6) *Rubber Idler Drive Wheel may have become damaged by:*

1. Allowing oil or grease to come in contact with same.
2. By allowing turntable to drop and cut into the outside surface of the Rubber Idler Drive Wheel.
3. Stopping the turntable by hand while the motor is running will cause a flat spot on the surface of the Rubber Idler Drive Wheel.

NOTE: If the Rubber Idler Drive Wheel has been damaged in any of the above mentioned ways, it should be replaced with a new one.

(D) *Vibration Reaching the Recorder While A Blank is Being Cut:*

It is very important the floor or the surface upon which the Recorder rests remain quiet as any vibration such as people walking across the floor or shaking of the instrument in which the recorder is mounted will seriously affect the quality of the finished recording.

(E) *Recorder Not Level:* It is very important that the Recorder is standing Level. This can be checked by placing a small level on the turntable and checking same in two positions at right angles to each other and then leveling instrument in which Recorder is mounted.

(F) *Bent or Damaged Turntable Spindle:* If the Turntable Spindle (Item 59 Fig. 6) has been bent in shipment, or by someone exerting a heavy pressure on one side, it should be replaced with a new one. A bent Turntable Spindle will cause the surface of the Turntable to move up and down while it is turning and, of course, will seriously effect the quality of both recording and play-back.

NOTE: When removing the Turntable an even upward lifting force should be applied at opposite edges of the Turntable while Turntable Spindle is gently tapped downward on its top end.

(G) *Record Cutting Causing A Bind Between Turntable Spindle* (Item 59, Fig. 6) *and Its Bearing:*

It is very important that all record cuttings are removed from Turntable Spindle and its bearing.

(H) *Tension On Rubber Idler Drive Wheel* (Item 83, Fig. 6) *Too Great:*

If the tension on the Rubber Idler Drive Wheel is too great, this will result in a "wow" or a rumble in the recording. To decrease the tension on Rubber Idler Drive Wheel, loosen the screw holding the lug which is located beneath the Rubber Idler Drive Wheel and turn it slightly in a clockwise direction. This will reduce the spring tension on the Rubber Idler Drive Wheel. When the spring tension is correct, the spring will be approximately at right angles to the lug.

(I) *Tension On Rubber Idler Drive Wheel* (Item 83, Fig. 6) *Too Weak:*

This will cause very bad speed variation. Turntable will slow down and then speed up as audio current of varying intensity reaches the cutter cartridge.

RECORDER AS USED IN MODEL 33BG

(a) *Possible Mechanical causes of Poor Recordings.* Thread from record cuttings getting down on to Turntable Drive Wheel (Fig. 4, Section 1). This will cause very bad speed variation of turntable. Cuttings may also wrap around motor shaft and cause motor to slow down or stop. To remove record cuttings, the turntable should be lifted by applying an even lifting force at opposite edges of the turntable. The rubber drive wheel should be taken off—Remove hairpin retainer and fibre washer and left wheel off, remove all cuttings and replace wheel.

NOTE: It is very important that NO GREASE or OIL be gotten on the surface of the rubber on drive wheel.

Turntable Drive Wheel may become damaged by—

1. By permitting turntable to drop and cut into the outside surface of the rubber drive wheel.
2. Stopping the turntable by hand while the motor is still running is liable to cause a flat spot on the surface of rubber drive wheel.
3. Permitting oil or grease to come in contact with the rubber surface of drive wheel.

NOTE: If the rubber drive wheel has been damaged in any of the above ways, replace with a new one.

(b) *Mechanical Vibration Transmitted to Recorder while a record is being cut.*

It is VERY IMPORTANT THAT THE BASE UPON WHICH RECORDER RESTS REMAINS QUIET, as any vibration such as people walking across the floor or shaking of instrument will seriously affect the quality of the finished recording.

(c) *Recorder Not Level.*

It is very important that recorder is standing level. This can be checked by placing a smooth marble on uncut record.

(d) *Tension On Turntable Drive Wheel.*

If the tension on the rubber drive wheel is too great the usual result is a rumble in the recording. To decrease the tension on the drive wheel, loosen screw holding the tension spring lug, located beneath the drive wheel and turn lug a few degrees in a clockwise direction.

If the tension on the rubber drive wheel is too weak, a very marked change in the turntable speed will be noted during cutting operation. To increase tension move the tension spring lug a few degrees in a counter-clockwise direction.

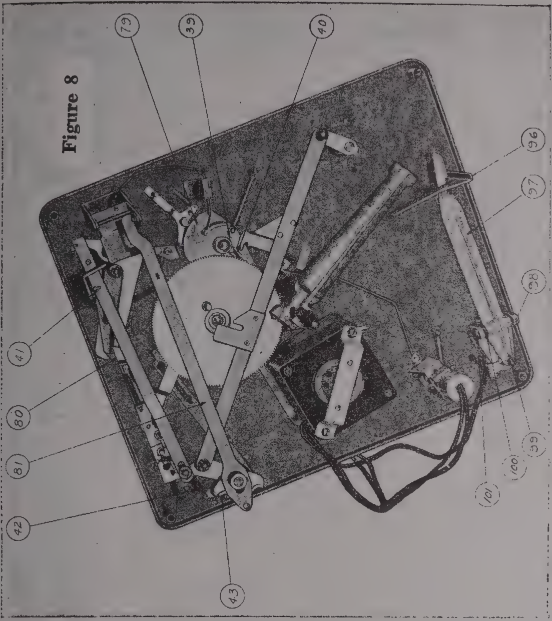


Figure 8

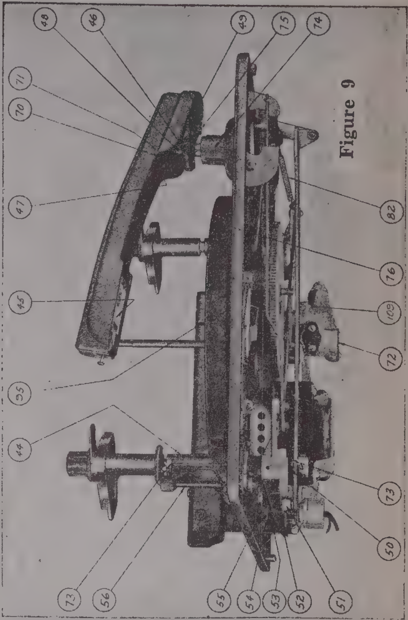


Figure 9

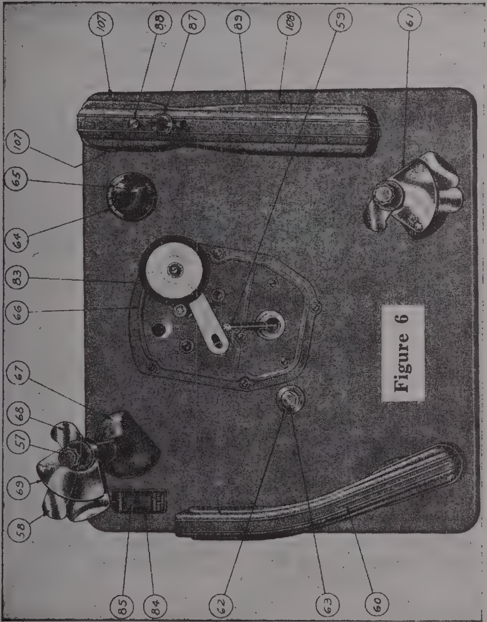


Figure 6

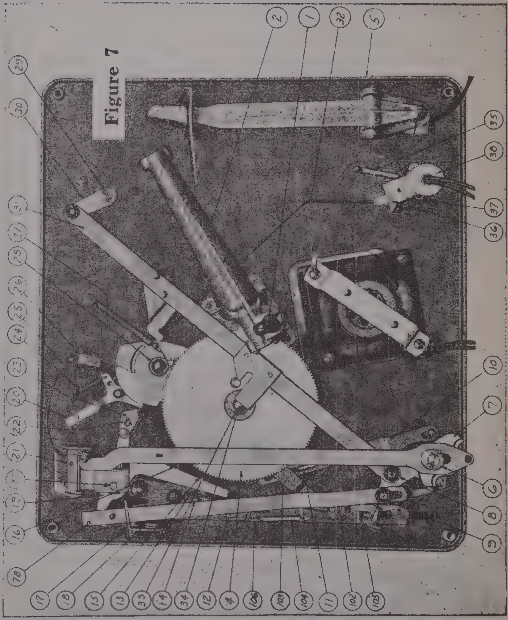


Figure 7

III—AUTOMATIC RECORD CHANGER

General Instructions

1.—FUNCTION OF RECORD CHANGER WHEN IT IS GOING THRU A CHANGE CYCLE—

The Record Changer plays and automatically changes 14 or less ten-inch records or 10 or less 12-inch records.

The Record Changer is started by turning the switch control knob, (Item 65, Fig. 11) to "ON" this starts the motor and moves trip rod (Item 32, Fig. 12), which rotates trip lever assembly (Item 20, Fig. 12), causing it to disengage from Engagement Clutch Cam, (Item 79, Fig. 12). The Engagement Clutch Cam will then rotate due to tension from spring, (Item 27, Fig. 12). This causes it to contact the pin on the top side of Drive Gear Assembly, (Item 4, Fig. 12), as it rotates, and in turn, moves the Drive Link Assembly, (Item 31, Fig. 12), and the Selector Shaft Crank Assembly No. 11 and No. 12 to the position shown in Fig. 12. Also the tone arm reset link (Item 80, Fig. 12), has moved to where it has released the latch, (Item 18, Fig. 12), and carried the tone arm to its extreme outward position. The Tone Arm lifter link (Item 81, Fig. 12), has raised the tone arm to its extreme height, by means of the Lifter Plate Assembly, (Item 21, Fig. 12). The tone arm is kept from "floating" free by the friction of the Tone Arm Brake Spring which also compresses the tone arm booster spring, (Item 13, Fig. 12) due to its very light tension.

The Drive Gear Assembly (Item 4, Fig. 12) continues to rotate which causes the top pin to disengage from the Automatic Engagement Clutch Cam which is moved back to latch with the tone arm trip lever, and the lower pin to engage the drive link assembly, moving it back to its initial position. This swings in the tone arm to either the 10-inch or 12-inch record playing position and lowers it to the record. At the same time it releases the Tone Arm Brake Spring allowing the Tone Arm Booster Spring to act.

2.—PHONOGRAPH NEEDLES

Various types and kinds of needles are available for use in phonograph tone arms.

For playing ten or more records at one setup with this Record Changer, no attempt should be made to use ordinary needles with steel or fibre points since continued use of worn needle points will damage the records being played.

Any needle can be used that is designed to play 15 or more records. It is well to keep in mind that even if the amplifying system, speaker and tone arm are of the best quality, a poor needle will result in poor reproduction of music.

There are a number of good semi-permanent types of needles on the market which are rated in number of plays. It is usually more economical to use one of these needles which is rated at 1000 plays or more.

It is very important to remember not to remove and then replace any needle that has been used.

3.—CHASSIS MOUNTING

On the bottom surface of the panel are four mounting studs, each threaded to take a ¼"—20 machine screw. The mounting panel rests on four tapered coil springs, the small end of each spring is pressed over a mounting stud and the large end of each spring fits into a socket in the top surface of the mounting shelf in cabinet.

Four spacing blocks ½" thick and with a ⅝" hole are fastened to the lower side of the mounting shelf. The ⅝" hole in each is centered with the center of the 7/16" screw clearance hole. These are to be provided and located on the lower side of the mounting shelf into which each of the lower mounting springs are to fit.

The ¼"—20 machine screws are turned through the four wing nuts until the head of each screw is against the bottom side of each wing nut.

The four lower springs which are of smaller diameter than the upper springs are slipped over the ends of each of the ¼"—20 machine screws with the tapered end toward the head and resting on the wing nuts.

OPERATING INSTRUCTIONS

1.—TO PREPARE CHANGER FOR OPERATION

(A) *Setting Record Changer to Play Ten-Inch Records:*

Turn both knobs until the arrows are pointing toward the center of the turntable. When in this position any number up to and including fourteen 10-inch records can be played.

(B) *Setting Record Changer to Play Twelve Inch Records:*

Turn both knobs until the arrows marked "12" are pointing toward the center of the turntable. When in this position any number up to and including ten 12-inch records can be played.

2.—LOADING

(A) If 10-inch records are to be played, set knobs as described in (A) above and place any number up to and including 14 records (*ten inch only*) over center pin so that they will rest on the selecting arms.

(B) If 12-inch records are to be played, set knobs as described in (B) above and place any number up to and including 10 records (*twelve inch only*) over center pin so that they will rest on the arms.

3.—STARTING THE RECORD CHANGER

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and throw the phonograph-radio knob or control to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

4.—PLAYING AN INDIVIDUAL RECORD

An individual record can be played in the same manner as a stack of records would be played, i. e., if it is a 10-inch record, follow the instructions pertaining to 10-inch records. If it is a 12-inch record, follow the instructions pertaining to 12-inch records.

A 10-inch record may be played manually by turning the selecting arm knobs to the unloading position and leaving them in this position—records may then be put on or taken off the turntable by merely moving the tone arm outward until it catches, and placing the 10-inch records over the spindle and down onto the turntable. The "ON" and "OFF" switch knob is then pushed down and the 10-inch record will be played and repeated if left on the turntable. To remove the record it is only necessary to move the tone arm outward until it catches, and lift the record off of the turntable.

5.—TURNING OFF RECORD CHANGER

Turn switch knob to "OFF" position *while the tone arm is still on the record.* If the switch knob should be turned off while Record Changer is going through a change cycle, it will be difficult to adjust the selector arms correctly for the automatic playing of 10-inch or 12-inch records.

6.—UNLOADING RECORDS

1. Turn switch knob to "OFF" position.

2. Remove any records remaining on the selector arms.

3. Move tone arm outward until it catches in outward position.

4. Turn selector arms so that records will clear them.

5. Remove records from turntable.

7.—LUBRICATION

(A) *Motor:* The motor is equipped with oilless bearing and requires no lubrication.

(B) *Turntable Spindle Bearings:* Are lubricated at the factory and do not require any lubrication for one year. After one year they should be oiled with 1 or 2 drops of a light grade oil. The top bearing can be oiled by lifting off turntable. Make sure when replacing turntable to see that pin in Turntable Spindle slips into slot on bottom surface of Turntable hub and also care should be taken not to injure Rubber Idler Drive Wheel.

Never under any circumstances allow oil to come in contact with Rubber Idler Drive Wheel.

(C) *Squeak Due To Records Rubbing On Turntable Spindle:* This can be eliminated by gently lining up the stack of records.

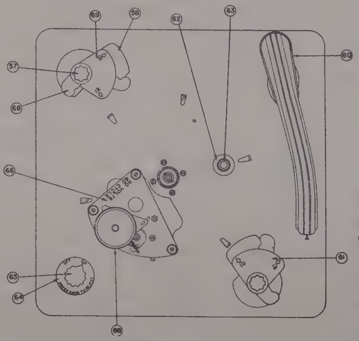


Figure 11

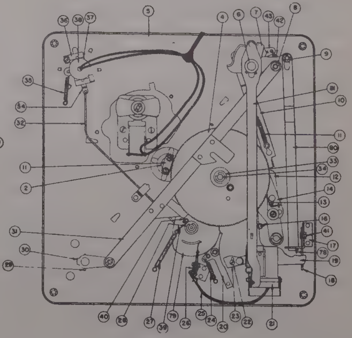


Figure 12

IV—SERVICE NOTES

1.—PICKUP DOES NOT INDEX PROPERLY ON TEN OR TWELVE INCH RECORDS

(A) *Adjustment for correct indexing of 10-inch records:*

1. Swing tone arm outward until tone arm lever assembly, (Item 19, Fig. 12) latches with tone arm latch lever, (Item 18, Fig. 12) which is held to the tone arm shaft, (Item 77, Fig. 13) by two setscrews.

2. Make sure these setscrews are tight and that there is a slight play between the tone arm lever assembly and the panel, (Item 5, Fig. 12). This will give proper clearance at ball race assembly, (Item 74, Fig. 13).

The tone arm lever assembly, (Item 19, Fig. 12) is held against tone arm latch lever, (Item 18, Fig. 12) by the tension of tone arm locater lever spring, (Item 16, Fig. 12).

3. Next loosen the clamping screw in the Swivel Bracket Assembly, (Item 46, Fig. 13).

4. Now move tone arm, (Item 60, Fig. 11) until its outside edge is ⅛" from the outside edge of the panel (Item 5, Fig. 12) and re-tighten screw securely.

2.—RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE AT END OF RECORD

(A) *Worn or Damaged Stop Groove:* If the stop groove in the record is worn out or damaged, discard such a record.

(B) *Cut-off Adjustment May Be Incorrect:* The Record Changer should go into its changing cycle when the needle enters the stop groove and has traveled to within a distance of 1⅞" from the center of the turntable shaft.

If the Record Changer does not go into its changing cycle when the needle has reached the above-mentioned distance, the Tone Arm Trip Lever Shoe, (Item 23, Fig. 12), should be moved toward the outside edge of the panel. To do this, it is necessary to loosen the thumb nut, (Item 22, Fig. 12), and then retighten after adjustment has been made.

If the Record Changer goes into its changing cycle before the needle has reached a distance of 1⅞" from the center of the turntable, the Tone Arm Trip Lever Shoe should be moved inward toward the center of the Record Changer.

3.—RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE WHEN SWITCH KNOB IS TURNED ON

When the switch is turned to "ON" the Record Changer should start its changing cycle. If it does not, the following points should be checked.

1. Make sure motor is running.

2. Check Trip Rod, (Item 32, Fig. 12), to make sure it releases Trip Lever Assembly, (Item 20, Fig. 12), from Engagement Clutch Cam Assembly, (Item 79, Fig. 12), when Switch Knob is being turned on. If Trip Lever Assembly is not released, Trip rod should be shortened by bending until Trip Lever clears Engagement Clutch Cam Assembly, when Switch Knob is turned.

3. Make sure that Clutch Reset Pawl, (Item 40, Fig. 12) clears Drive Link Assembly, (Item 31, Fig. 12).

4.—RECORD CHANGER CONTINUES TO REPEAT ITS CHANGING CYCLE WITHOUT PLAYING RECORDS

(A) Trip Lever Assembly, (Item 20, Fig. 2) does not latch in Engagement Clutch Cam Assembly (Item 79, Fig. 12), which may be due to causes listed below:

1. Trip Rod (Item 32, Fig 12), may be bent so that it is too short, holding Trip Lever Assembly from contacting Engagement Clutch Cam Assembly.

2. Springs (Item 24 or 35, Fig. 12) may disconnected.

5.—NO SOUND WHEN NEEDLE IS ON MOVING RECORD

1. Muting switch (Item 26, Fig. 12), may be out of adjustment. The contacts of this switch should be open whenevver its long blade is not resting on the shoe of the Engagement Clutch Cam Assembly (Item 79, Fig. 12). If the contacts remain closed after the long blade has left the shoe, they should be adjusted by bending until there is a separation of approximately 1/32".

Switch should be checked to make sure contacts are closed when long blade is resting on the shoe of the Engagement Clutch Cam Assembly.

2. The lugs on the Muting switch may have been bent together.

3. Pickup cartridge in Tone Arm may have been damaged or may be defective.

6.—TONE ARM ADJUSTMENTS FOR 12" RECORDS

1. Turn both Control Knobs until the arrows marked "12" are pointing toward the center of the turntable.

2. Place a twelve inch record on the turntable.

3. Start Record Changer and note where needle contacts record. Correct contacting is about ⅛" from the outside edge of record.

4. Set Rod (Item 56, Fig. 13), is operated by Selector Arm (Item 61, Fig. 11). The 12" Set Link (Item 10, Fig. 11), operates as a stop when Record Changer is set for 12" records. When Tone Arm Locator Assembly (Item 12, Fig. 11) contacts 12" Set Link the Tone Arm should be in the correct position to play a 12" record.

If at this point, the position of Tone Arm is incorrect, loosen the screw which holds the Tone Arm Locator Shoe 12" (Item 14, Fig. 11) and move in either direction as required and tighten screw.

7.—TONE ARM ADJUSTMENTS FOR 10" RECORDS

1. Turn both knobs until the arrows marked "10" are pointing toward the center of the turntable.

2. Place a 10" record on the turntable and start Record Changer.

3.—Note where needle contacts record. Correct contacting is about ⅛" from the outside edge of record. If contacting of needle is not correct as mentioned, loosen the screw which holds Tone Arm Locator Shoe 10" (Item 15, Fig. 13) and slide shoe in or out as required, then tighten screw.

8.—TONE ARM HEIGHT ADJUSTMENTS

Set the Record Changer for ten-inch records, turn Switch to "ON" and allow Record Changer to go thru a changing cycle with no record on the turntable. The clearance between Turntable and the bottom surface of the Tone Arm should be approximately ⅛". Usually this clearance can be obtained by adjusting the Tone Arm Adjustment Screw (Item 70, Fig. 13). It is well to check the following points before making any adjustment.

Check clearance between Roller (Item 51, Fig. 13), and Selector Crank Shaft Assembly (Item 7, Fig. 12). There should be approximately 1/32" clearance at this point. If the clearance is greater, it would be due to the pressure on the Spring Washer (Item 50, Fig. 13) being too great. This will prevent the Tone Arm Lifter Reset Spring (Item 82, Fig. 13) from returning the Tone Arm Lifter Link Assembly (Item 81, Fig. 12) sufficiently. To relieve the pressure on the Spring Washer, lower the Selector Shaft Collar (Item 6, Fig. 11) slightly.

9.—TONE ARM LOWERS ON RECORD TOO SUDDENLY

If the Tone Arm lowers too suddenly, the Spring Washer (Item 50, Fig. 3) which is located between the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) and Selector Crank Shaft Assembly Post (Item 7, Fig. 2) is not under sufficient pressure. The setscrews in the Selector Shaft Collar (Item 6, Fig. 2) should be loosened and the Selector Shaft Collar pressed upward slightly and set screws tightened.

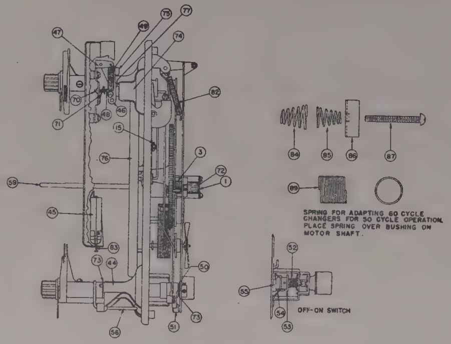


Figure 13

V—PHONO MOTORS & TONE ARMS

As Used on Models 22AS and 35AK

The miscellaneous parts for the Phono motors and tone arms as used in models 22 and 35 combination receivers are illustrated below along with their part numbers.

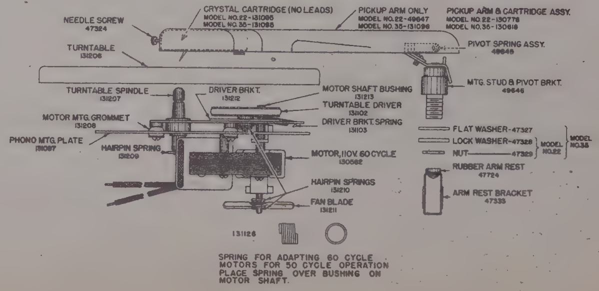

NEEDLE SCREW 47324
CRYSTAL CARTRIDGE (NO LEADS) MODEL NO.22-131086 MODEL NO.35-131086
PICKUP ARM ONLY MODEL NO.22-49647 MODEL NO.35-131096
PICKUP ARM & CARTRIDGE ASSY. MODEL NO.22-130776 MODEL NO.35-130618
TURNTABLE 131206
PIVOT SPRING ASSY. 49648
MTG. STUD & PIVOT BRKT. 49646
TURNTABLE SPINDLE 131207
DRIVER BRKT. 131212
MOTOR SHAFT BUSHING 131213
TURNTABLE DRIVER 131102
MOTOR MTG. GROMMET 131208
DRIVER BRKT. SPRING 131103
PHONO MTG. PLATE 131087
HAIRPIN SPRING 131209
FLAT WASHER-47327
LOCK WASHER-47328
NUT-47329
MODEL NO.22
MODEL NO.35
MOTOR, 110V. 60 CYCLE 130562
RUBBER ARM REST 47724
HAIRPIN SPRINGS 131210
ARM REST BRACKET 47333
FAN BLADE 131211
131126
SPRING FOR ADAPTING 60 CYCLE MOTORS FOR 50 CYCLE OPERATION PLACE SPRING OVER BUSHING ON MOTOR SHAFT.

Figure 14

DETROLA CORP.

MODELS 327,3271,3331, 3332

ALINEMENT PROCEDURE

Turn the band switch to the Broadcast position.

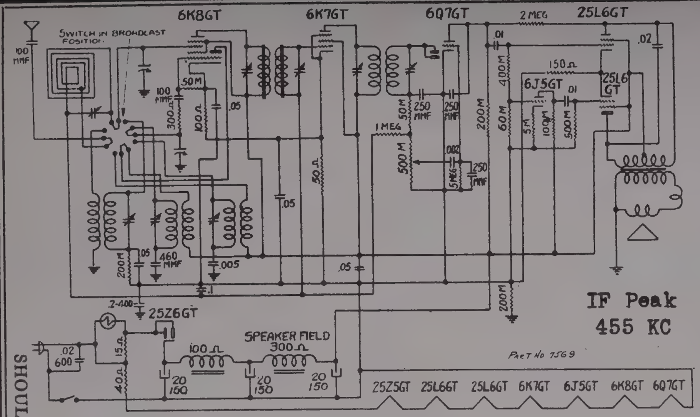
Connect an output meter across the speaker voice coil. The volume control should be set a few degrees from the maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

IF alignment: Connect the signal generator ground to the receiver chassis through a .1 mfd. condenser. Using a .1 mfd. condenser in series with the high side of the generator, apply a 455 kc. signal to the grid of the 6K7GT tube and align the 2nd IF transformer. Connect to the grid of the 6K8 tube and align the 1st IF transformer. (See Tube Layout Diagram for location of these adjustments.) From this postion recheck both transformers again.

Broadcast Band Alignment: Turn the band switch to the Broadcast position, turn the tuning condenser all the way to the right, (minimum capacity), apply a 1720 kc. signal to the grid of the 6K8 tube and adjust the broadcast oscillator trimmer. The oscillator coil is under the right hand end of the chassis and this trimmer is the one nearest the front of the chassis. To align the loop antenna, connect a single turn loop across the terminals of the generator, place the receiver about one foot in front of the single turn loop, set the generator at about 1400 kc., tune in the signal and adjust the trimmer on the loop antenna assembly for maximum response.

Short Wave Alignment: Using a 400 ohm resistor between the high side of the generator and the antenna terminal (on the LOOP frame), turn the tuning condenser to minimum capacity, set the generator at 18,500 kc., and adjust the short wave oscillator trimmer. This trimmer is immediately in back of the broadcast oscillator trimmer. Set the generator at about 17,000 kc., tune in the signal and adjust the short wave antenna trimmer for maximum response. This trimmer is mounted on the loop antenna.

NOTE: If considerable hum appears when the generator is connected as described above use smaller condensers between the generator and the receiver. **The best way is** to use a 1:1 transformer to isolate either the receiver or the generator from the line. The adjustments of this receiver are very stable and no aligning should be attempted **unless absolutely necessary.**

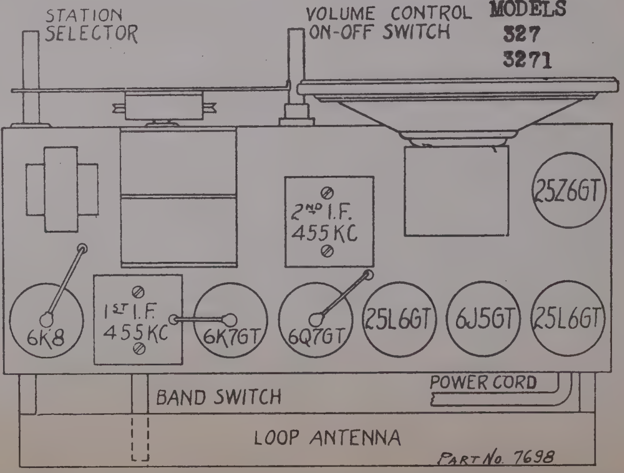


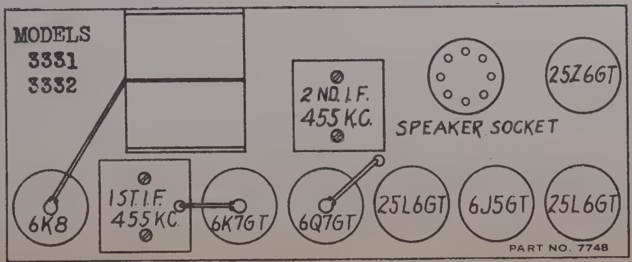
Part Number	Description
7564	Loop Antenna Assembly
7566	Oscillator Coil
6625	Volume Control and Switch
7567	Variable Condenser
5780	20 MF 150 Volt Electrolytic Condenser
7664	460 MMF Padding Condenser
7660	Filter Choke 100 Ohm
7661	Candohm Resistor—15/40 Ohm
7326	150 Ohm Wire Wound Resistor

Part Number	Description
6623	1st IF Transformer
6624	2nd IF Transformer
7028	Antenna Reel and Wire
7570	Dial Chart
7096	Pointer
7746	8" Speaker
7575	Wave Switch
7576	Speaker, 5"

short wave range 5.55 to 18.5 megacycles
105 to 125 volts D.C. or 50-60 cycle A.C.
broadcast range 540 to 1720 K.C.

1—6K8 Translator-Oscillator
6K7GT—Intermediate Frequency Amplifier
1—6Q7GT Detector-AVC-First Audio
1—6J5GT Phase Inverter
2—25L6GT Power Output
1—25Z6GT Rectifier

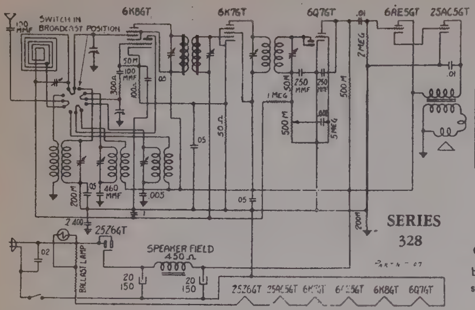




NO GROUND IS NECESSARY AND UNDER NO CONDITION SHOULD A GROUND CONNECTION BE MADE TO THIS RECEIVER.

MODEL 328
MODEL 349

DETROLA CORP.



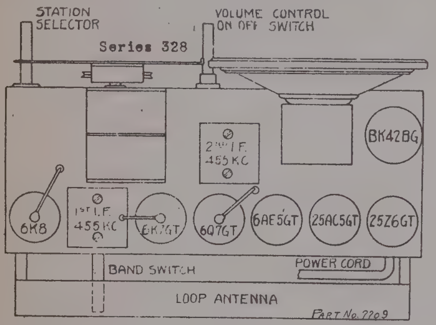
Part Number	Description	Part Number	Description
7564	Loop Antenna Assembly	6623	1st IF Transformer
7566	Oscillator Coil	6624	2nd IF Transformer
6625	Volume Control and Switch	7028	Antenna Reel and Wire
7567	Variable Condenser	7570	Dial Chart
5780	20 MF 150 Volt Electrolytic Condenser	7096	Pointer
7664	460 MMF Padding Condenser	7710	Speaker, 5"
7575	Wave Switch		
5197	Ballast Tube		

Series 328

105 to 125 volts D.C. or 50-60 cycle A.C.
short wave range 5.55 to 18.5 megacycles
broadcast range 540 to 1720 K.C.

6K7GT—Intermediate Frequency Amplifier
1—6K8 Translator-Oscillator
1—6Q7GT Detector-AVC-First Audio
1—6AE5GT Driver
1—25AC5GT Power Output
1—25Z6GT Rectifier

NO GROUND IS NECESSARY AND UNDER NO CONDITION SHOULD A GROUND CONNECTION BE MADE TO THIS RECEIVER.



ALINEMENT PROCEDURE

328 SERIES

Turn the band switch to the Broadcast position.

Connect an output meter across the speaker voice coil. The volume control should be set a few degrees from the maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

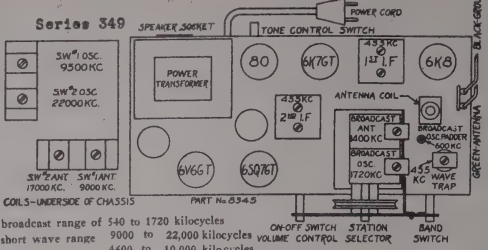
IF alignment: Connect the signal generator ground to the receiver chassis through a .1 mfd. condenser. Using a .1 mfd. condenser in series with the high side of the generator, apply a 455 kc. signal to the grid of the 6K7GT tube and align the 2nd IF transformer. Connect to the grid of the 6K8 tube and align the 1st IF transformer. (See Tube Layout Diagram for location of these adjustments.) From this postion recheck both transformers again.

Broadcast Band Alignment: Turn the band switch to the Broadcast position, turn the tuning condenser all the way to the right, (minimum capacity), apply a 1720 kc. signal to the grid of the 6K8 tube and adjust the broadcast oscillator trimmer. The oscillator coil is under the right hand end of the chassis and this trimmer is the one nearest the front of the chassis. To align the loop antenna, connect a single turn loop across the terminals of the generator, place the receiver about one foot in front of the single turn loop, set the generator at about 1400 kc., tune in the signal and adjust the trimmer on the loop antenna assembly for maximum response.

Short Wave Alignment: Using a 400 ohm resistor between the high side of the generator and the antenna terminal (on the LOOP frame), turn the tuning condenser to minimum capacity, set the generator at 18,500 kc., and adjust the short wave oscillator trimmer. This trimmer is immediately in back of the broadcast oscillator trimmer. Set the generator at about 17,000 kc., tune in the signal and adjust the short wave antenna trimmer for maximum response. This trimmer is mounted on the loop antenna.

NOTE: If considerable hum appears when the generator is connected as described above use smaller condensers between the generator and the receiver. The best way is to use a 1:1 transformer to isolate either the receiver or the generator from the line. The adjustments of this receiver are very stable and no aligning should be attempted unless absolutely necessary.

1—6K8GT Oscillator Translator
1—6K7GT I.F. Amplier
1—6SQ7GT Detector AVC Audio
1—6V6GT—Power Output
1—80 Rectifier



broadcast range of 540 to 1720 kilocycles
short wave range 9000 to 22,000 kilocycles
4600 to 10,000 kilocycles

ALIGNMENT PROCEDURE SERIES 349

The alignment adjustments of this receiver are very stable. Should realignment be necessary, it should only be attempted by a competent technician with an accurately calibrated test oscillator or signal generator and an output meter with a one or two volt scale. The following realignment procedure should be followed exactly. For accurate alignment, all adjustments must be made with a weak signal. The location of the I.F. transformers and all trimmers and the frequencies at which they should be adjusted are shown on the diagram at the top of this page.

Connections

Connect the output meter across the speaker voice coil. Connect the ground side (outer cable) of the signal generator to the receiver chassis. These connections are used during the entire alignment. Other necessary connections are described in the following paragraphs.

Intermediate Frequency Alignment

Turn the band selector switch to the broadcast position ("B" on the band selector knob). Connect a .1 mfd. condenser to the output terminal of the signal generator and connect the other end of this condenser to the control grid of the 6K7GT tube. Do not disconnect the grid clip on the tube. Generate a weak 455 KC signal in the signal generator, and adjust the trimmer of the second I.F. transformer for maximum response in the output meter. If the signal measures above ½ volt during the adjustment, reduce its strength. Now transfer the connection of the signal generator through the .1 mfd. condenser to the grid of the 6K8GT tube and align the trimmers of the first I.F. transformer.

R. F. ALIGNMENT

Broadcast Band

Disconnect the .1 mfd. condenser from the output of the signal generator and in its place substitute a 200 or 250 mmf. condenser, connecting the other end of this condenser to the ANTENNA LEAD of the receiver. Turn the tuning condenser to about 600 KC. With the generator producing a fairly powerful signal of 455 KC, adjust the WAVE TRAP trimmer for MINIMUM RESPONSE. Set the tuning condenser of the receiver at minimum capacity (plates all the way out). Generate a weak signal of 1700 KC in the signal generator. Adjust the BROADCAST OSCILLATOR TRIMMER until the signal is tuned in. Next produce a weak signal of 1400 KC in the signal generator. Tune the receiver very carefully to the signal and adjust the BROADCAST ANTENNA TRIMMER for maximum response in the output meter. Produce a 600 KC signal in the signal generator and tuning the receiver carefully to this signal, adjust the BROADCAST OSCILLATOR PADDER for maximum response. The tuning condtnser of the receiver should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.

Tune in a broadcast station of known frequency between 1200 and 800 KC and set the pointer to the proper calibration on the dial chart. Be sure to use a station whose frequency is reliable as the accuracy of calibration depends on this setting. Note that the square dots in the upper half of the black band are accurately calibrated for the frequencies of the broadcast band.

ALIGNMENT OF SHORT WAVE BANDS

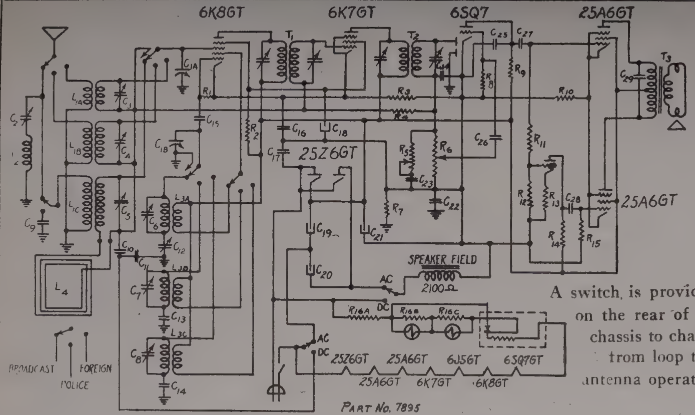
S. W. Band No. 1

Rotate the band selector switch to the center position (No. 1 on band selector knob). Disconnect the 200 mmf. condenser from the output of the signal generator and in its place substitute a 400 ohm resistor which serves as a dummy antenna for aligning both short wave bands. The other end of the 400 ohm resistor is connected to the antenna lead of the receiver.. Tune the receiver so that the pointer is at exactly 9500 KC. The pointer should bisect tht small black dot to the right and slightly above the figures 9.5. Produce a weak signal of exactly 9500 KC in the signal generator. Screw the S. W. No. 1 OSCILLATOR TRIMMER all the way down and then unscrew it to the second peak at which the signal is heard. If the trimmer is not unscrewed to the second peak, the circuits will not be in proper relation and the calibration will be incorrect and there may also be a dead spot on some position on the dial. Next produce a signal of 9000 KC in the signal generator and tune this signal carefully in the receiver. If the signal can be heard at two places, the proper signal to tune is the one which is the closest to 9000 KC (the black dot above 9.0) on the dial chart of the receiver. Adjust the S. W. No. 1 ANTENNA TRIMMER until a definite peak is noted in the output meter. During this adjustment, rock the tuning condenser back and forth through the signal, while adjusting this trimmer in order to assure perfect alignment.

S. W. Band No. 2

Using exactly the same procedure and taking the same precautions as for S. W. band No. 1, turn the band selector switch to the No. 2 position. Align the S. W. No. 2 OSCILLATOR TRIMMER at 21,000 KC, with signal generator producing a signal of 21,000 KC and with pointer indicating 21,000 KC on the dial chart. The pointer should bisect the light coloreddot in the black band immediately at the right of the figure 22. Align the S. W. No. 2 ANTENNA TRIMMER at 17,000 KC with a 17,000 KC signal in the signal generator and be sure to tune the receiver to the signal nearest 17,000 KC on the dial chart (light colored dot in black band above and slightly to the right of figure 17). The same procedure of screwing the oscillator trimmer all the way down and then unscrewing on the second peak is followed and the same precautions of rocking the tuning condenser back and forth through the signal are followed to secure a proper alignment of this band.

DETROLA CORP.



A switch is provided on the rear of the chassis to change from loop to antenna operation.

Symbol	Part No.	Description
C1a,b	7975	Variable Condenser
C2	3272	Trimmer Cond. 140mmf.
C3	1611	Trimmer Cond. 3-35 mmf.
C4,5,6,7,8	2597	Trimmer Cond. 1-10 mmf.
C9,25,24		250 mmf. Mica
C10,16		.1 mfd. 200 volt
C11,22		.1 mfd. 400 volt
C12	2560	250 mmf. Padder
C13	2741	1330 mmf. 5%
C14	2793	.006 mfd. 600 volt 10%
C15		50 mmf Mica
C17		.02 mfd. 600 volt
C18		4 mfd. 150 volt Electrolytic
C19	5779	8 mfd. 150 volt Electrolytic
C20	7892	8 mfd. 250 volt Electrolytic
C21	7894	16 mfd. 250 volt Electrolytic
C23		.003 mfd. 600 volt
C26		.01 mfd. 200 volt
C27,28		.02 mfd. 400 volt
C29		.005 mfd. 600 volt
R1		50 M 1/3 watt
R2		10 M 1/3 watt
R3		150 ohm 1/3 watt
R4		1 meg. 1/3 watt
R5	2737	2 meg tone control
R6	2726	500 M volume control
R7		200 M 1/3 watt
R8		5 meg. 1/3 watt
R9		200 M. 1/3 watt
R10		500 ohm 1 watt
R11		400 M 1/3 watt 10%
R12		60 M 1/3 wat 10%
R13		5 M 1/3 watt
R14		100 M 1/3 watt
R15		500 M 1/3 watt
R16a,b,c	7898	30/22½/22½ Special wire wound
L1a,b,c	7890	Antenna coil
L2	7891	Wave trap coil
L3a,b,c	7482	Oscallator coil
L4	7908	Loop Antenna
	7909	6 In. Speaker
T1	7903	1st IF transformer
T2	7904	2nd IF transformer
T3		Output Trans.
	7615	Dial Chart
		Dial light bulb Mazda No. 47.
	4689	Pointer
	2724	Wave Switch
	5422	AC-DC Switch
	6182	Dial light socket
	7902	Dial light socket (Long leads)

105 to 125 volts AC or DC. WHEN OPERATED ON DIRECT CURRENT THE SWITCH LOCATED ON THE BACK OF THE CHASSIS MUST BE TURNED TO THE DC POSITION. WHEN OPERATED ON ALTERNATING CURRENT THE SWITCH MUST BE IN THE AC POSITION.

NO GROUND IS NECESSARY—UNDER NO CONDITION SHOULD A GROUND WIRE BE ATTACHED TO THIS RECEIVER.

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 455 kc. signal to grid of 6K7GT I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6K8GT tube and aline transformer No. 1.

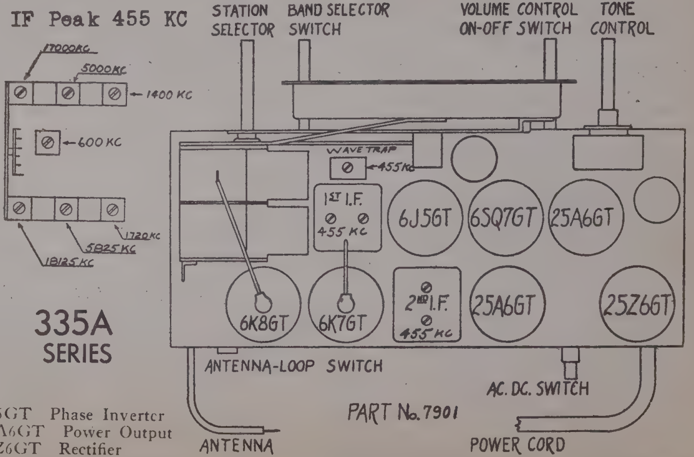
RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to left hand position and the tuning condenser to about 600 kc. Feed a 455 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1720 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5825 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc. tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 18,100 kc.—screw trimmer down tight, then unscrew to *second* peak. Set generator to 17,000 kc., tune receiver to signal and adjust antenna trimmer—screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. Above procedure for alinement at 17,000 kc. must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc. will result if antenna and oscillator circuits are not set in proper relation to each other.

IF Peak 455 KC



335A
SERIES

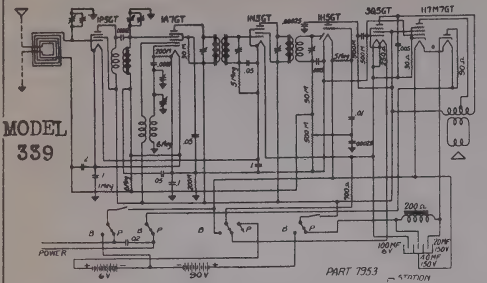
6J5GT	Phase Inverter
25A6GT	Power Output
25Z6GT	Rectifier
6A8GT	Oscillator-translator
6K7GT	Intermediate Frequency Amplifier
6SQ7GT	Detector-AVC-Audio

broadcast range from 540 to 1720 kilocycles.
short wave range
1.65 megacycles to 5.8 megacycles
5.5 megacycles to 18.1 megacycles.

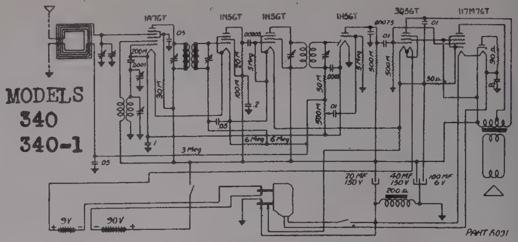
MODEL 339
MODELS 340,340-1
MODELS 341,341-1,341-2
MODELS 360,360-1,360-2

DETROLA CORP.

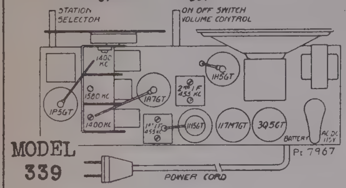
MODEL 339



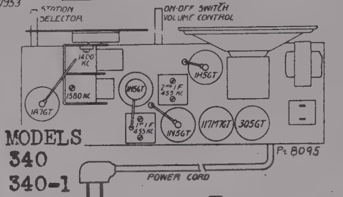
MODELS 340 340-1



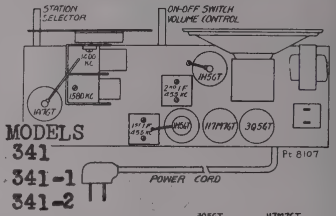
MODEL 339



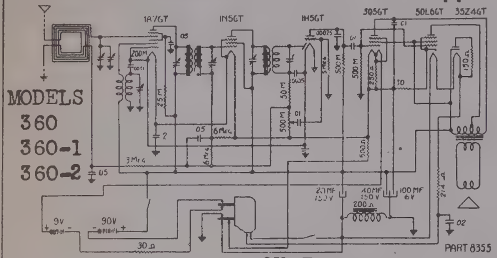
MODELS 340 340-1



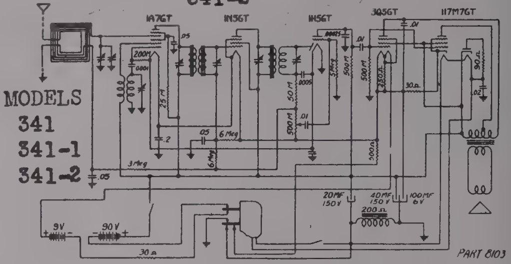
MODELS 341 341-1 341-2



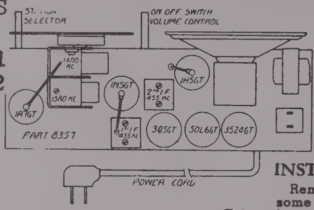
MODELS 360 360-1 360-2



MODELS 341 341-1 341-2



MODELS 360 360-1 360-2



Part No.	Description	
6256	Oscillator Coil	for all models
7952	Volume Control	
7958	Pointer	
7954	Dial Indicator	
7968	1st IF Transformer	
7969	2nd IF Transformer	*
8070	Dial Crystal	
8138	200 Ohm Choke	
8102	40MF 150V 100MF 6V Dual Condenser	**
5780	20MF 150V Condenser	**
7957	"A" Battery Plug	
6263	"B" Battery Plug	
7990	"A" Battery	
7991	"B" Battery	
6644	30 Ohm 10% Resistor	
8158	30 Ohm 5% Resistor	
8088	90 Ohm 5% Resistor	
7951	Loop Assembly	*** on Model 339

* 8096 2nd IF Transformer on 340 series

** 8010 20MF 150 V 40 MF 150 V 100MF 6V Triple Condenser on 339 only

*** 8164 Loop Assembly on 341 series

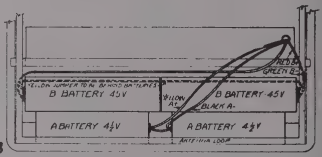
The power control switch is on the back of the chassis. Pushing this lever towards the center of the set connects the circuits for power operation, 115 V. AC-DC. With the lever in the other position the circuits are connected for battery operation. **on all other models**

For power operation of the receiver it is only necessary to plug into a 115 volt AC or DC outlet. To connect the receiver for battery operation, plug the line cord into the socket provided in the back of the chassis. This makes all the necessary battery connections. **for all models**

Since in the power-operation position the batteries are completely disconnected, there is no need of disconnecting the batteries when using the receiver where power is available.

DO NOT USE A GROUND WHEN SET IS OPERATED OFF THE POWER LINES AS AN AC- DC SET.

for all models



INSTRUCTIONS FOR BATTERY INSTALLATION

Remove the batteries from the shipping carton. Save some of the packing. Pull the bottom of the loop away from the cabinet. Plug the "A" leads into the two "A" batteries and place the batteries in the bottom of the cabinet. Fold a piece of the packing and wedge between the two "A" batteries. Plug the "B" leads into the two 45 volt "B" batteries and place these batteries on top of the "A" batteries with the plugs facing the sides of the cabinet. Before the "B" batteries are pushed all the way in, slip the loop over the "B" batteries then push the batteries and loop in as far as they will go. The long connection between the two "B" batteries should be towards the front of the cabinet away from the loop. Wedge some of the packing over the "B" batteries to keep them from being loose in the case.

WARNING

Be sure the switch is turned off when connecting batteries.

ALIGNMENT PROCEDURE

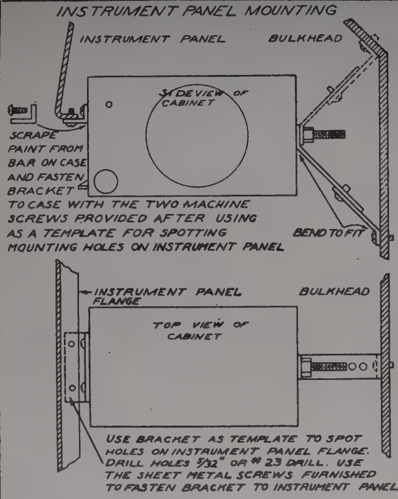
I.F. Frequency 455 KC. Set Range 540-1580 KC.

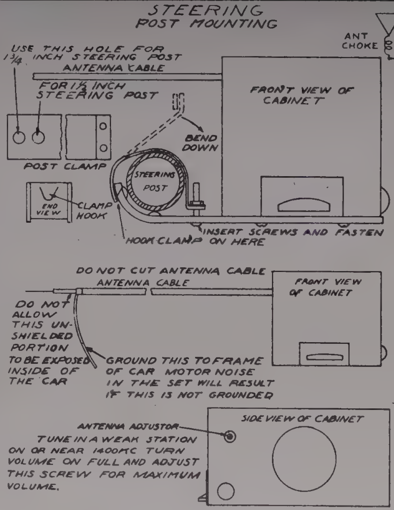
Connect the test oscillator, or signal generator, to the set as follows: Connect the "hot" side of the signal generator to the grid of the 1A7GT tube, and the ground side to the chassis. If the set is alined on AC or DC be sure that the test oscillator or signal generator is isolated from the receiver and line by either a transformer or .2MFD condensers in both test leads. An output meter should be connected across the voice coil leads of the speaker to indicate resonance. Align the I.F. trimmers at 455 KC. for maximum meter reading.

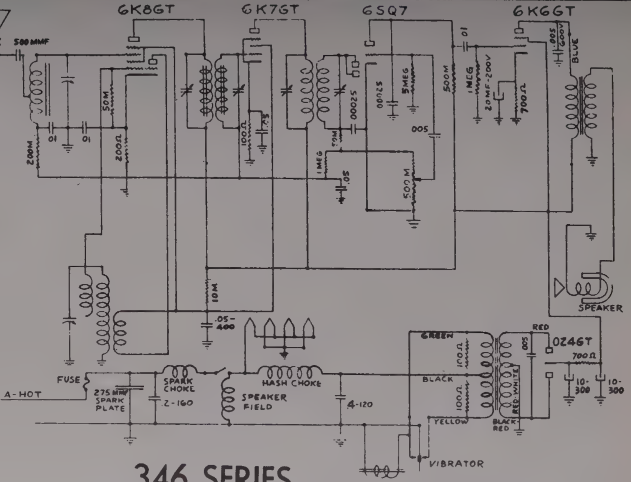
Turn the condenser plates all the way out. Set the test oscillator to 1580 KC and adjust the oscillator trimmer for maximum signal. Disconnect the test oscillator and tune in a weak station near 1400 KC. at full volume. Adjust the trimmer on the front of the variable condenser for maximum signal. When aligning the set do not set the receiver on or near a metal work bench or other large metal object, as it will affect the tracking of the receiver.

MODEL 346

DETROLA CORP.


INSTRUMENT PANEL MOUNTING
INSTRUMENT PANEL
BULKHEAD
SIDE VIEW OF CABINET
SCRAPE PAINT FROM BAR ON CASE AND FASTEN BRACKET TO CASE WITH THE TWO MACHINE SCREWS PROVIDED AFTER USING AS A TEMPLATE FOR SPOTTING MOUNTING HOLES ON INSTRUMENT PANEL
BEND TO FIT
INSTRUMENT PANEL FLANGE
BULKHEAD
TOP VIEW OF CABINET
USE BRACKET AS TEMPLATE TO SPOT HOLES ON INSTRUMENT PANEL FLANGE. DRILL HOLES 5/32" OR # 23 DRILL. USE THE SHEET METAL SCREWS FURNISHED TO FASTEN BRACKET TO INSTRUMENT PANEL

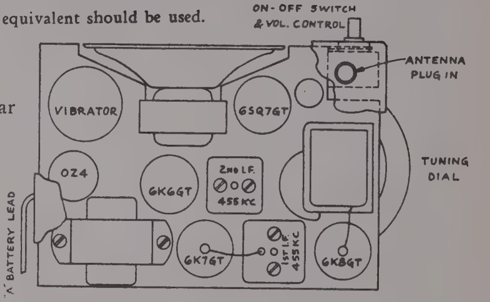

STEERING POST MOUNTING
USE THIS HOLE FOR 1 3/4 INCH STEERING POST ANTENNA CABLE
FOR 1 1/2 INCH STEERING POST
POST CLAMP
END VIEW
CLAMP HOOK
STEERING POST
BEND DOWN
FRONT VIEW OF CABINET
INSERT SCREWS AND FASTEN
HOOK CLAMP ON HERE
DO NOT CUT ANTENNA CABLE
ANTENNA CABLE
DO NOT ALLOW THIS UN-SHIELDED PORTION TO BE EXPOSED INSIDE OF THE CAR
GROUND THIS TO FRAME OF CAR MOTOR NOISE IN THE SET WILL RESULT IF THIS IS NOT GROUNDED
FRONT VIEW OF CABINET
SIDE VIEW OF CABINET
ANTENNA ADJUSTOR
TUNE IN A WEAK STATION ON OR NEAR 1400KC TURN VOLUME ON FULL AND ADJUST THIS SCREW FOR MAXIMUM VOLUME.



346 SERIES

This receiver is designed to use *only* the whip type of antenna. Cowl or hinge pin mounting types or their equivalent should be used.

Part No.	Description				
8205	Antenna Coil	8216	10-ohm Flexohm Resistor	8223	Speaker, 4 inch
8206	Oscillator Coil	6704	Speaker Grille	6691	Front mounting bracket
6687	Volume Control	8229	Power Transformer	6686	Steering Post mounting bar
8211	10 x 10—350V x 20 25V	6689	1st IF. Transformer	6696	Steering Post clamp
6715	.005-1200V Buffer condenser	8821	2nd IF. Transformer	6739	Dial Escutcheon
6682	Tuning Dial	3000	Vibrator	6740	Volume control knob
		8210	Variable condenser	6694	Clamp bar (for screws)
		6717	Spark plate	6746	Rear mounting straps



PART #8227

ANTENNA ADJUSTMENT

When the set is installed and the antenna is connected, tune in a weak station on or near 1400 kc. (140 on dial), turn volume full on, remove the upper snap button above the volume control, and with a long screwdriver, turn the adjusting screw in and out until maximum volume is obtained. Replace the snap button. The set is then adjusted.

ALIGNMENT

I.F. Frequency	455 KC.
Frequency Range	1550—540 KC.
Dummy Antenna	30 MMF.
Input to I.F.	1/10 MF.

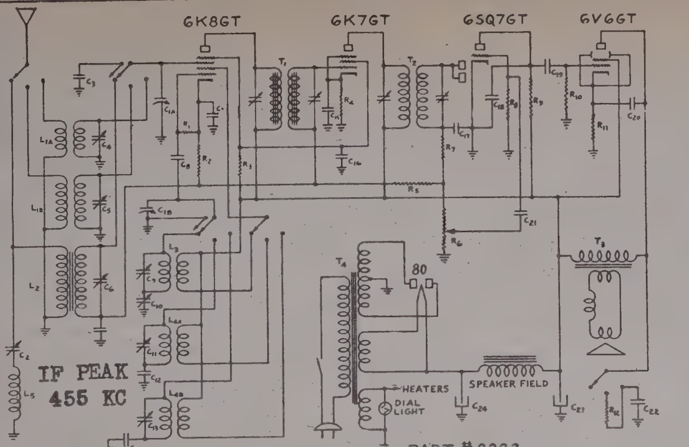
To align the I.F., feed the signal generator or test oscillator through a 1/10 MF condenser to the grid of the 6K8 tube, ground the ground side of signal generator to the case. With volume control full on and a weak signal, adjust screws of 1st and 2nd I.F. transformers using a suitable output meter to indicate resonance.

The oscillator should be set at 1550 K.C. Turn variable condenser to minimum capacity and with a 30 MMF dummy antenna condenser connected to the antenna cable and a low signal input, set the oscillator to its top frequency. The antenna trimmer should be adjusted at 1400 KC. The antenna trimmer should be readjusted at this frequency when the set is installed in the car.

PART NO. 8214

MODEL 349
MODEL 372
MODEL 3422

DETROLA CORP.



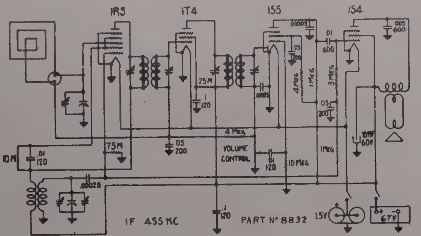
PART #8323

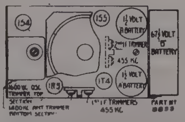
Model 349

Symbol	Part No.	Description
C1a,b	8318	Variable Condenser
C2 & L5	8315	Wave Trap Assembly
C3		.01 mfd. 200 volt
C4,5,6,9, 11,13	7197	2-25 mmf. Trimmer
C7,15,16 26,27		.1 mfd. 200 Volt
C8		50 mmf. Mica
C10	2560	200-550 mmf. Padder
C12		.006 mfd. 600 Volt
C14		.01 mfd. 400 Volt
C17		500 mmf. Mica
C18		250 mmf. Mica
C19		.02 mfd. 400 Volt
C20,21		.01 mfd. 400 Volt
C22		.02 mfd. 600 Volt
C23	5101	16 mfd. 225 Volt Electrolytic
C24	3285	16 mfd. 350 Volt Electrolytic
R1,7,12		50 M 1/3 Watt
R2,4		200 Ohm 1/3 watt
R3		10 M 1/3 watt
R5		1 Meg 1/3 watt
R6	8314	500 M Vol. Control and Switch
R8		5 Meg. 1/3 watt
R9		200 M 1/3 watt
R10		500 M 1/3 watt
R11		300 Ohm 1/3 watt
R13		25 M 1/3 watt
L1a,b	8334	2 Band S. W. Antenna Coil
L2	8415	Broadcast Antenna Coil
L3	8336	Broadcast Oscillator Coil
L4a,b	8335	2 Band S. W. Oscillator Coil
T1	8325	Input IF Transformer
T2	8326	Output IF Transformer
T3		*Output Transformer
T4	8324	Universal Power Transformer
	8369	Power Transformer
	8337	Band Switch
	8330	Dynamic Speaker 7½"
	6158	Dial Lamp (Mazda No. 47)
	8319	Dial Chart
	8343	Pointer
	5142	Drive Pulley
	8322	Drive Shaft
	8373	Tone Control Switch
	8374	Dial Lamp Socket

Two types of power transformers are available for these receivers. Unless specifically stated otherwise on a tag attached to the receiver it is equipped with a transformer for operation on 105 to 125 volts 50 to 60 cycle alternating current.

The receivers equipped with UNIVERSAL POWER TRANSFORMERS will operate on 110, 120, 150, or 225 volts 50 to 60 cycles alternating current. A small cover on top of the transformer should be removed and the plug inserted in the proper clip for the voltage available.





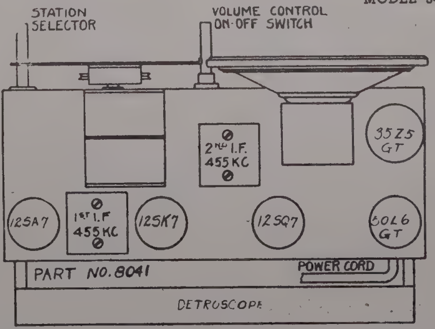
DETROLA

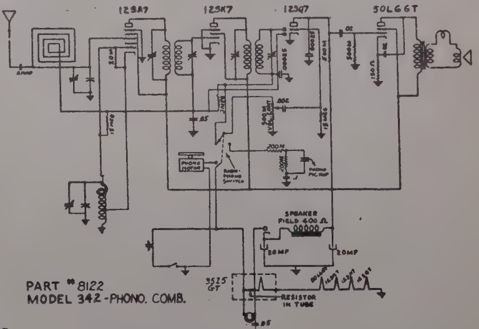
MODEL 372

PORTABLE

SUPERHETERODYNE

MODEL 3422 SERIES





PART #8122
MODEL 342-PHONO. COMB.

For radio operation make certain that the Radio-Phono switch, which is on the phonograph motor panel, is turned to the left position.

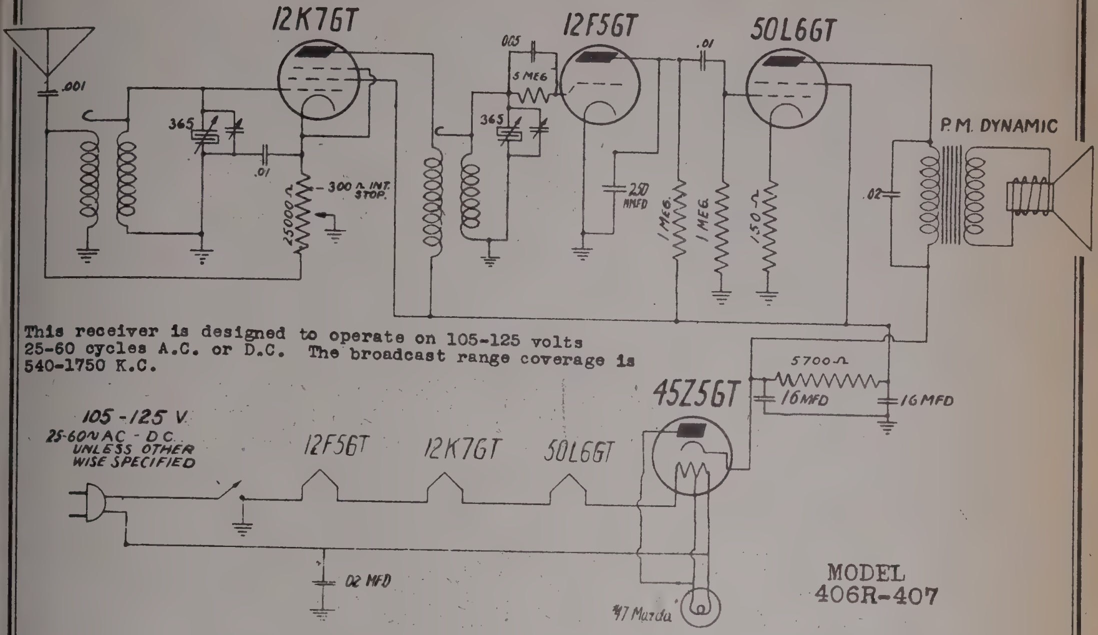
For phonograph operation turn the Radio Phono switch to the Phono position. THE AC-DC SWITCH MUST BE SET IN THE PROPER POSITION. (This switch is on the phonograph panel.)

105 TO 125 VOLTS,
DIRECT OR ALTERNATING CURRENT.

12SA7	Translator	12SQ7	Detector AVC
12SK7	IF Amplifier	50L6GT	Output
		35Z5GT	Rectifier

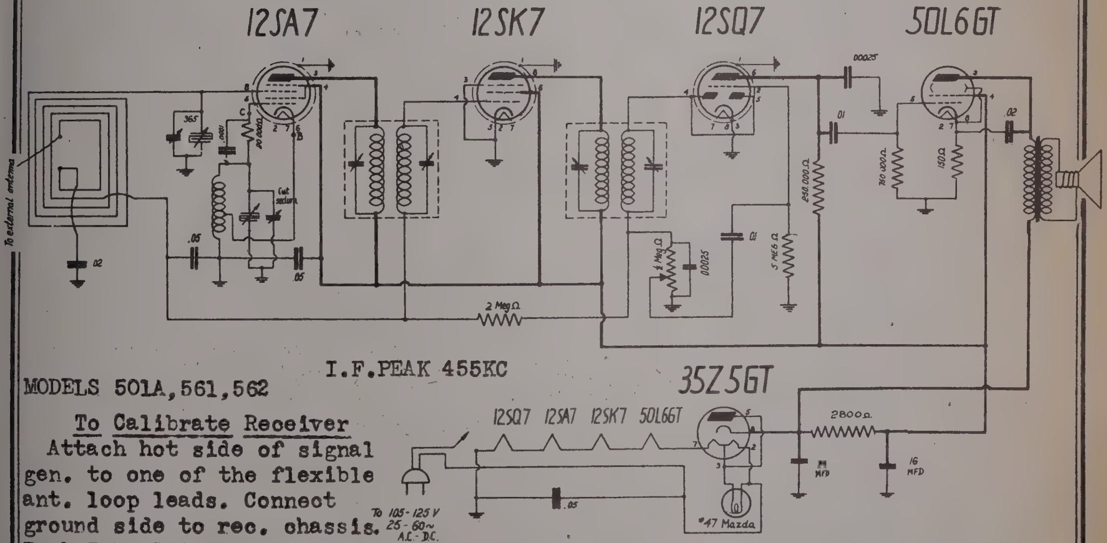
DeWALD RADIO MFG. CORP.

MODELS 406R,407
MODELS 501A,561,562



This receiver is designed to operate on 105-125 volts 25-60 cycles A.C. or D.C. The broadcast range coverage is 540-1750 K.C.

MODEL
406R-407



I.F.PEAK 455KC

MODELS 501A,561,562

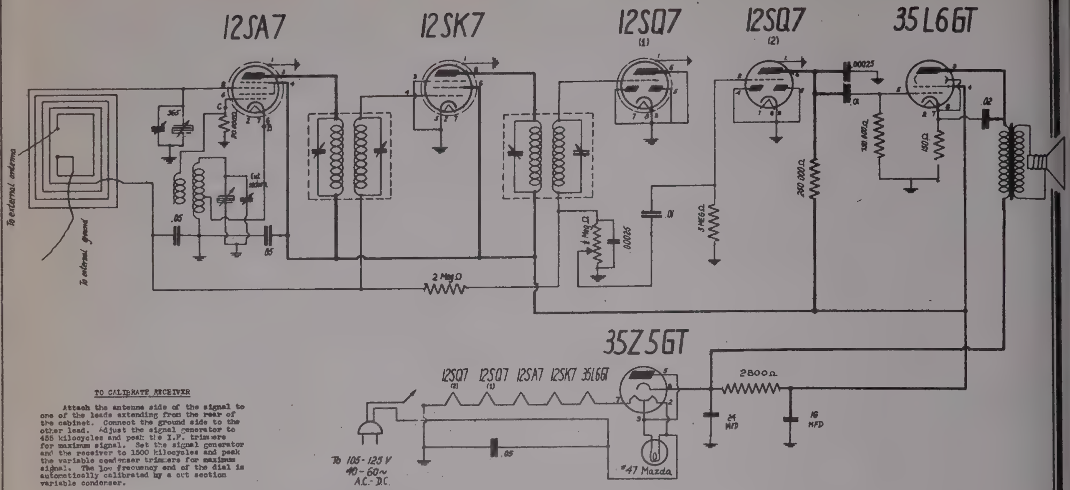
To Calibrate Receiver

Attach hot side of signal gen. to one of the flexible ant. loop leads. Connect ground side to rec. chassis. Peak I.F. Trimmers at 455kc. Adj. rec. dial and sig.gen. to 1500kc and peak variable condenser trimmers to max.

This model is a five tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 540-1700 kilocycles. The receiver has been designed to operate on 105-125 volts, 40-60 cycles A.C.-D.C. unless otherwise specified.

MODELS 410,410A,410R
MODEL 666

DeWALD RADIO MFG. CORP.



TO CALIBRATE RECEIVER

Attach the antenna side of the signal to one of the leads extending from the rear of the cabinet. Connect the ground side to the other lead. Adjust the signal generator to 455 kilocycles and peak the I.F. trimmers for maximum signal. Set the signal generator and the receiver to 1500 kilocycles and peak the variable condenser trimmers for maximum signal. The low frequency end of the dial is automatically calibrated by a cut section variable condenser.

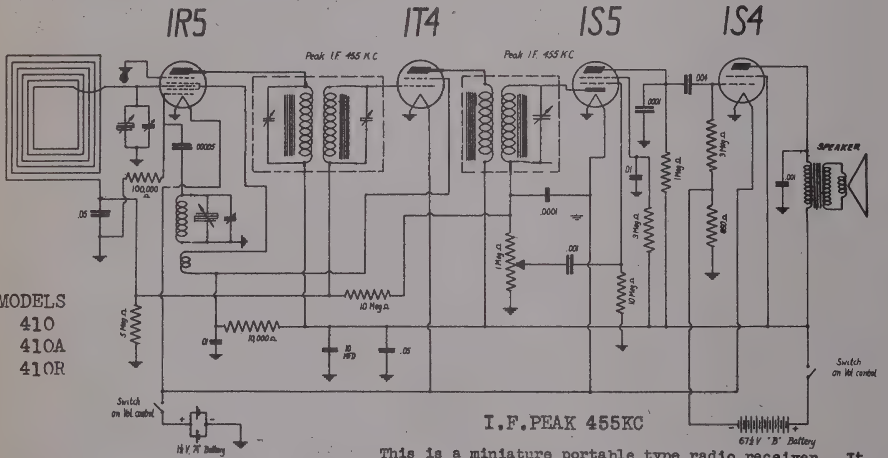
MODEL 666

This model is a six tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 540-1700 kilocycles. The receiver has been designed to operate on 105-125 volts, 40-60 cycles A.C.-D.C. unless otherwise specified.

IMPORTANT:

Since the loop used has a directional effect, it may be found necessary at times to turn the receiver for best reception on weaker stations.

I.F.PEAK 455KC



MODELS
410
410A
410R

I.F.PEAK 455KC

This is a miniature portable type radio receiver. It employs a superheterodyne circuit with full automatic volume control. A self-contained antenna loop is incorporated, which makes the use of an outside aerial or ground unnecessary. The "A" supply consists of two dry-cell batteries, EVEREADY #950 or the equivalent. The "B" supply consists of one 67.5 volt battery, EVEREADY #467 or the equivalent. The range coverage is 540 to 1700 kilocycles.

INSTALLATION OF BATTERIES

Rest the cabinet on the knobs with the speaker grille facing you. Open up the door by sliding the latch of the lock toward the leather tab. Then pull on the tab. The dry cell batteries go on the right side. Slide them in the metal container so that the brass terminal of the battery runs along the narrow slot of the container (see sketch on cover). For the "B" battery, merely snap the two connectors to the battery and place it in the cabinet with the terminals toward the left.

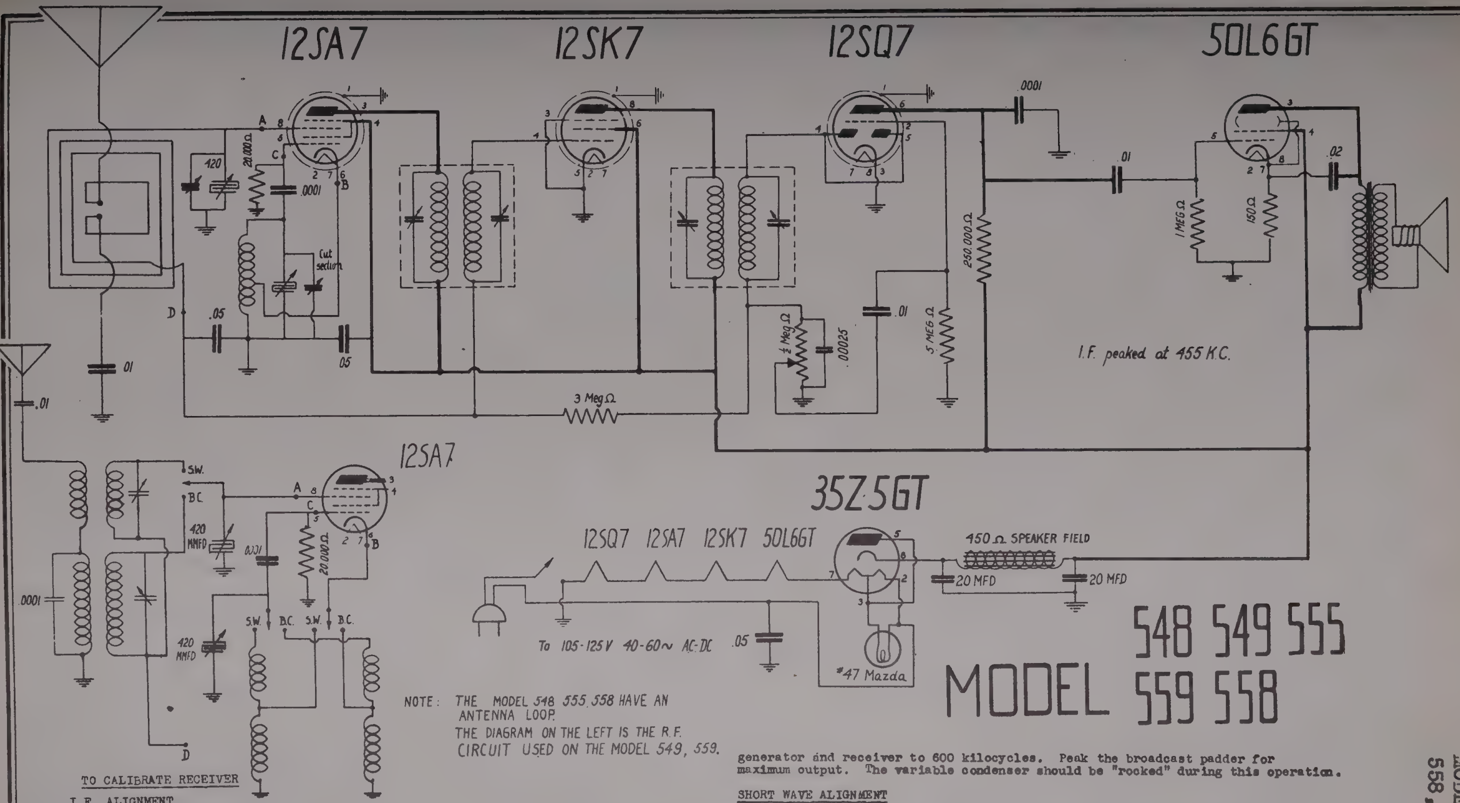
LIST PRICE OF REPLACEMENT PARTS

1621	1st I.F.coil	1.10
1622	2nd det. I.F.	1.10
1623	Antenna loop	.85
1624	oscillator coil	.40
2520	2 gang var. cond.	1.75
2521	8 mfd. electrolytic	1.00
3515	volume control	.90
5206	"B" battery cable	.30
7309	speaker	3.00
80026	knob	.15

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

DeWALD RADIO MFG. CORP.

MODELS 548,549,555(1940)
558,559



MODEL 548 549 555 559 558

NOTE: THE MODEL 548 555 558 HAVE AN ANTENNA LOOP.
THE DIAGRAM ON THE LEFT IS THE R.F. CIRCUIT USED ON THE MODEL 549, 559.

TO CALIBRATE RECEIVER

I.F. ALIGNMENT

Attach the antenna lead of the signal generator to the antenna lead of the receiver. Connect the ground side of the signal generator to the receiver chassis. If calibrating the model 549, the wave band switch should be in the broadcast position. Attach an output meter or resonance indicator across the primary leads of the speaker output transformer, or across the speaker voice coil. Adjust the signal generator to 455 kilocycles. Have the volume control in the maximum position. Peak the I.F. adjusting screws for maximum output. Do not use a greater generator signal than is necessary to obtain a good output level.

BROADCAST ALIGNMENT

The model 548 and 555 have the adjusting trimmers on the variable condenser. The model 549 has individual trimmers on each coil and no trimmers on the variable condenser. Set the signal generator and receiver dial to 1500 kilocycles. Adjust the broadcast oscillator trimmer screw until the signal from the generator is heard. Peak the antenna trimmer screw for maximum output. The low frequency end of the receiver on the model 548 and 555 is automatically adjusted. To adjust the low frequency of the model 549, set the signal generator and receiver to 600 kilocycles. Peak the broadcast padder for maximum output. The variable condenser should be "rocked" during this operation.

SHORT WAVE ALIGNMENT

Slide the wave band switch button to the short wave position. Set the signal generator and receiver to 16 megacycles. Adjust the short wave oscillator coil trimmer until the generator signal is heard. Peak the short wave antenna coil trimmer for maximum output. The low frequency end of the dial is automatically adjusted.

HOW TO ADJUST THE PUSH BUTTONS

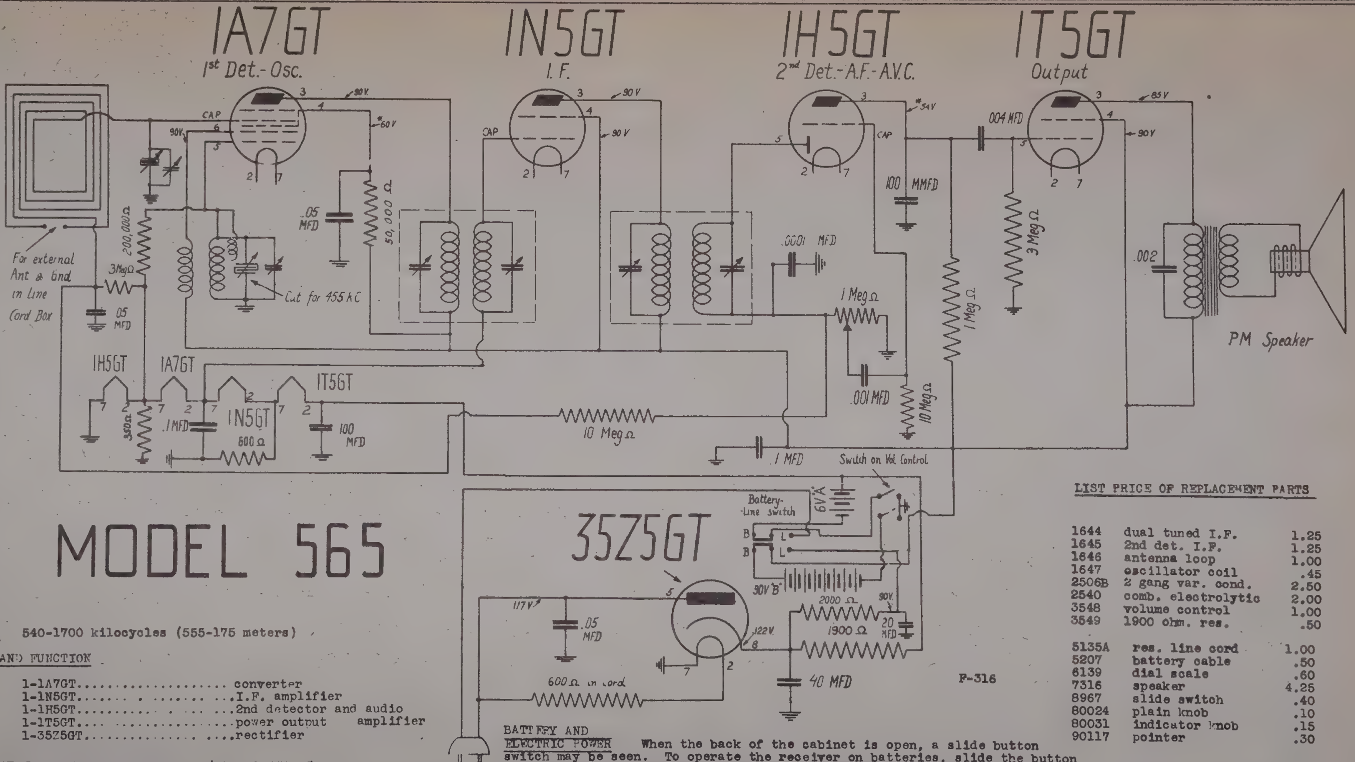
Insert a screw driver blade into the hole in the button which is to be adjusted. After engaging the blade in the adjusting screw slot, loosen the screw by turning it one complete revolution counterclockwise. Keep the blade engaged in the slot and bear down on the screw driver so that the adjusting screw will remain depressed. Tune in the desired station with the station selector knob. Maintain enough pressure on the screw driver to keep the adjusting screw depressed; and, at the same time tighten it by turning it in a clockwise direction. The adjustment may be checked by setting the pointer in any position, pushing the knob down as far as it will go and noting if the intended station is received. The remaining knobs can be adjusted in the same manner. After all adjustments have been made the station tabs and celluloid pieces may be placed in the recess on the buttons.

MODEL 565

DeWALD RADIO MFG. CORP.

IMPORTANT BE SURE THE RECEIVER IS TURNED "OFF" WHEN NOT IN USE. SINCE THE LOOP USED IN THE RECEIVER HAS A DIRECTIONAL EFFECT, IN ORDER TO OBTAIN BEST RECEPTION AND DECREASE NOISE INTERFERENCE, IT MAY BE FOUND NECESSARY AT TIMES TO TURN THE RECEIVER.

MODEL 565



RANGE 540-1700 kilocycles (555-175 meters)

TUBES AND FUNCTION

- 1-1A7GT.................... converter
- 1-1N5GT........................I.F. amplifier
- 1-1H5GT........................2nd detector and audio
- 1-1T5GT...........................power output amplifier
- 1-35Z5GT.........................rectifier

MODEL 565 PORTABLE BATTERY ELECTRIC RECEIVER

The model 565 is a combination portable battery and electric receiver. It uses the latest low drain tubes and employs a circuit designed for low power consumption. An antenna loop is incorporated which makes the use of an outside aerial unnecessary for reception in most localities. The receiver will operate with an "A" supply of 6 volts and a "B" supply of 90 volts. It will also operate on 105-125 volts, 40-60 cycles A.C. or D.C. unless otherwise specified. Following is a list of manufacturers and their numbers of the batteries that may be used with this receiver. Other batteries may be used if the electrical and physical characteristics correspond to the recommended list.

"A" battery (one required)	
EVEREADY	# 747
BRIGHT STAR	# 868
USALITE	# 646
RAY-O-VAC	# P698L
BURGESS	# 2F4L

"B" battery (two required)	
EVEREADY	# 482
BRIGHT STAR	# 30-33
USALITE	# 640
RAY-O-VAC	# P5830
BURGESS	# M30

The life of the batteries is from 250-300 hours, when the receiver is used about four hours per day.

BATTERY AND ELECTRIC POWER When the back of the cabinet is open, a slide button switch may be seen. To operate the receiver on batteries, slide the button to the side marked BATT. Keep the line cord in the remaining space of the "A" battery compartment. When desiring to operate the receiver on electric power, the slide button should be on LINE position. Bring the line cord out of the cabinet so that when the back is closed, the cord is in the notch provided in the corner of the cabinet. The back of the cabinet should always be kept closed when operating the receiver.

The batteries may be installed or replaced without removing the antenna loop from the back. Care should be exercised not to break the loop connecting leads when connecting or disconnecting the batteries. The tubes are accessible so that they may be changed without removing the chassis from the cabinet.

ANTENNA In most locations the receiver will operate satisfactorily without an outside antenna. For unfavorable localities, additional signal pick up may be desired. To obtain this, attach an aerial to one of the leads inside the back. A ground wire may be attached to the other lead. Tape the connections well to prevent short-circuiting of leads together and ground.

LIST PRICE OF REPLACEMENT PARTS

1644	dual tuned I.F.	1.25
1645	2nd det. I.F.	1.25
1646	antenna loop	1.00
1647	oscillator coil	.45
2506B	2 gang var. cond.	2.50
2540	comb. electrolytic	2.00
3548	volume control	1.00
3549	1900 ohm. res.	.50
5135A	res. line cord	1.00
5207	battery cable	.50
6139	dial scale	.60
7316	speaker	4.25
8967	slide switch	.40
80024	plain knob	.10
80031	indicator knob	.15
90117	pointer	.30

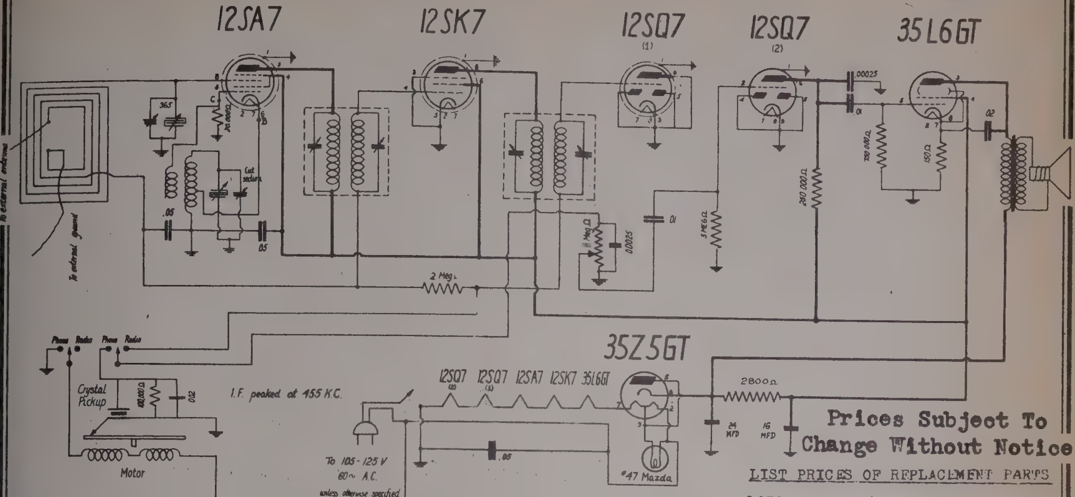
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

I.F. PEAK

455 KC

DeWALD RADIO MFG. CORP.

MODEL 669
MODEL 812



Prices Subject To Change Without Notice

F-321

LIST PRICES OF REPLACEMENT PARTS

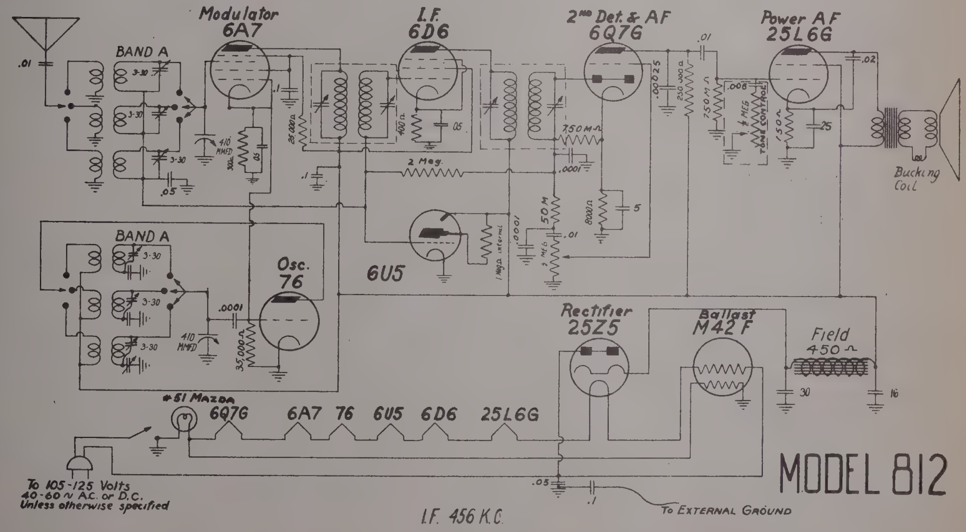
1630	first I.F. coil	$1.10
1631	second det. coil	1.10
1632	loop antenna	.85
1633	oscillator coil	.45
2507	comb. electrolytic	1.10
2529	2 gang var. cond.	2.00
3519A	volume control	.90
4229	cabinet	15.00
6228	dial scale	.40
6229	dial crystal	.30
7311	speaker	$3.50
8906	pick-up cartridge	5.00
8916	pilot lamp	.10
8939	phono switch	.40
8958	phono pick-up	5.25
8973	switch plate	.35
80032	knob	.20
80034	phono motor	6.00
80035	pilot socket	.30
90157	dial pointer	.25

MODEL 669

PHONOGRAPH OPERATION

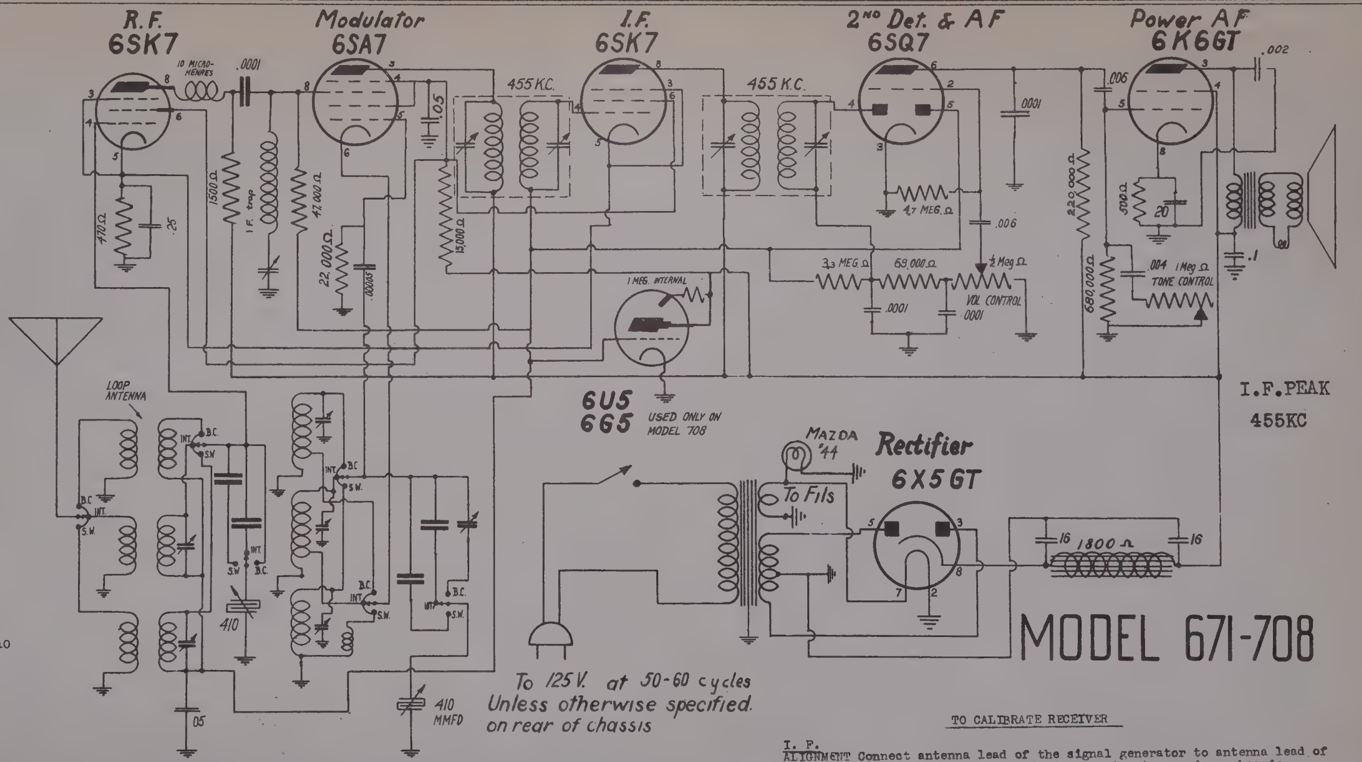
The button on the top panel of the cabinet is the phono-radio switch. When the slide switch button is on the "radio" side, the receiver will pick up radio signals. When on the "phono" side, the turn table will begin to turn and phonograph records may be reproduced through the receiver. For best results, the lid cover should be closed while playing records.

The model 669 is a RADIO-PHONO combination that provides reproduction of recordings with good fidelity as well as regular radio broadcast reception. All types of records up to 12 inches may be played with the lid closed. A self-starting motor together with a crystal pick-up are used for phonograph reproduction. The radio receiver employs a superheterodyne circuit using the latest low drain tubes for low power consumption. A self-contained antenna loop is incorporated which makes the use of an outside antenna unnecessary in most localities. It will operate on 105-125 volts, 40-60 cycles A.C. or D.C. The phonograph motor will function on 105-125 volts, 60 cycles A.C. only, unless otherwise specified. A range of 540-1700 kilocycles is covered by the receiver.



MODEL 812

DeWALD RADIO MFG. CORP.



F-310

These models are superheterodyne receivers having full automatic volume control on all bands. They are designed to operate on 117 volts A.C. 50-60 cycles, unless otherwise specified. A slide rule instrument type dial with a high ratio tuning mechanism is used to facilitate station tuning. In addition a circuit incorporating a semi-band spread feature is used to make station selection on some parts of the short wave bands almost as simple as on broadcast. The range coverage is 540-1650 K.C. (555-182 meters) 4.7-10 M.C. (64-30 meters) 11.5-24 M.C. (26-12.6 meters).

LIST PRICES OF REPLACEMENT PARTS

1473	wave trap coil	.35	3538	comb. vol. cont.	1.00
1635	power transformer	4.50	3539	tone control	.75
1637	comb. osc. coil	1.75	6232	dial scale	1.10
1638	comb. ant. coil	1.25	7314	speaker	4.50
1639	antenna loop	1.00	8067	pilot lamp	.10 net
1640	dual tuned I.F.	1.10	8975	pilot lamp assembly	.20
1641	2nd det. I.F.	1.10	80042	wave band switch	2.00
1643	tuned choke	.25	80043	plain knob	.20
2533A	2 gang var cond.	2.00	80044	indicator knob	.20
2534	comb electrolytic	1.25	9779	drive string	.15
90174	pointer	.30	90138	pilot lamp shade	.10

**Prices
Subject
To Change
Without
Notice**

TO CALIBRATE RECEIVER

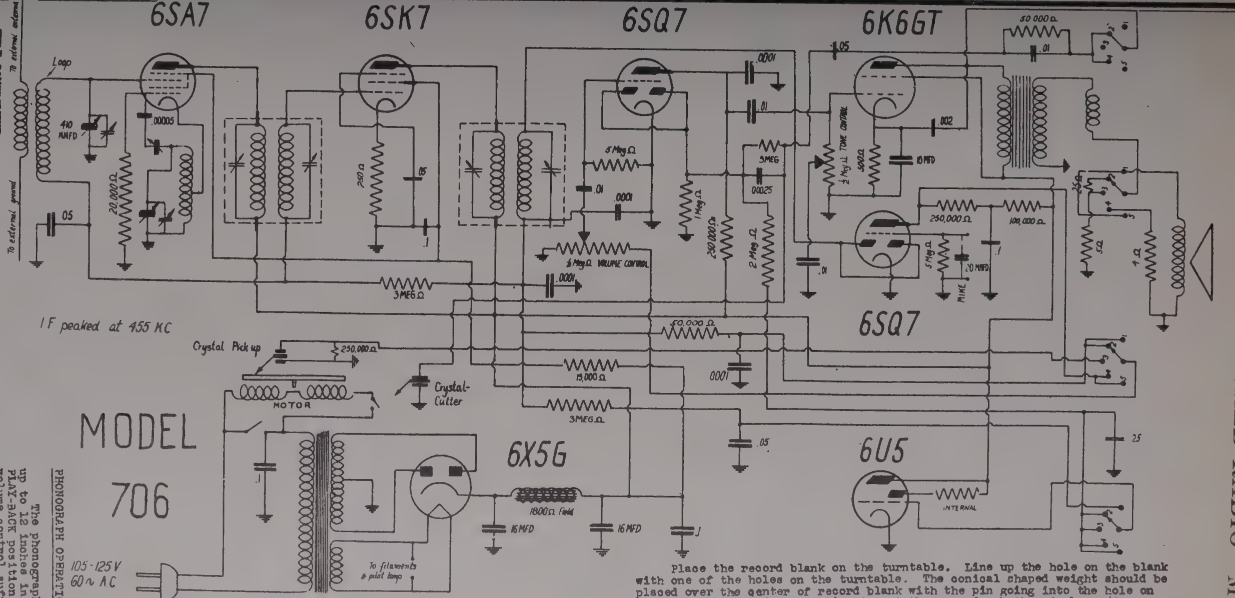
I. F. ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 455 K.C. and peak I.F. trimmers or maximum signal.

BROADCAST ALIGNMENT Remove short from variable condenser. Have the wave band switch on broadcast position. Adjust the generator and receiver to 1500 K.C. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the broadcast padder for maximum signal. The variable condenser should be "rocked" during this operation.

SHORT WAVE ALIGNMENT For 4.7-10 M.C. Turn wave band switch knob to this band. Adjust the generator and receiver to 10 M.C. and peak the trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder. For 11.5-24 M.C. Turn wave band switch knob to this band. Adjust the generator and receiver to 22 M.C. Peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

DEWALD RADIO MFG. CORP.

MODEL 706



NOTES ON RECORDING:

Before attempting to cut any records, it is important to observe the following precautions.

1. Records up to 10 inches in diameter may be cut.
2. A proper cutting stylus must be used in the cutting head.
3. Insert the cutting stylus into the head so that the flat portion of it will face the knurled screw. The stylus is held in place by tightening the thumb screw.
4. Great care must be exercised whenever moving the cutting arm. It should be raised to an angle of about 45 degrees before moving it along a horizontal plane, in order to avoid injuring the feed mechanism.
5. A new cutting stylus will cut dozens of records satisfactorily before being dulled so that replacement is necessary.
6. Some record blanks are made of inflammable material. Do not bring the thread material cut from the record near a flame or have it come in contact with a hot object.
7. When not in use the cutting arm should be kept on the arm rest provided.

RECORD CUTTING PROCEDURE

Favorite radio programs may be easily recorded. Records may also be made of a person or group talking, singing, or playing instruments. The procedure for either type of recording is essentially the same. To make records of radio programs, the five point selector switch knob should be in the RADIO RECORDING position. When making microphone recordings the switch knob should be in the MICROPHONE RECORDING position. and the plug at the end of the microphone cable inserted in the microphone socket. The microphone should be held at a distance of 6 to 18 inches away from the sound.

Place the record blank on the turntable. Line up the hole on the blank with one of the holes on the turntable. The conical shaped weight should be placed over the center of record blank with the pin going into the hole on the turntable. Before starting to cut the record, whether it be radio or microphone recording, the volume control must be adjusted so that the record will be properly cut. The correct adjustment can be made by watching the tuning eye. Components in the circuit have been so chosen to permit the "eye" to close just before the recorded volume becomes great enough to cause over-cutting into adjacent grooves on the record. For this reason it is necessary to adjust the control so that the "eye" just closes when recording. It may be necessary to regulate the volume during the cutting because of variations of signal input to the receiver. The tone control should be adjusted to the "brilliant" position. After the recording has been made, the control may be used to adjust the tone to the desired shade.

Bring the cutting head over the record blank until the stylus is about 1/8 inch in from the edge of the record Lower the cutting arm gently on the face of the disc. From now on the cutting is done automatically. However, as the grooves are being cut, threads will appear on the record surface. These threads should be brushed off occasionally. When the record is finished, the depth of cut may be observed by holding it in such a position that a light is reflected from the grooves If the depth of cut is correct, the grooves will appear to be as wide as the space between them. The cut may also be checked by the quality of the thread being cut. It should not be coarse and stiff nor light and fluffy.

Should the cut be unsatisfactory, it may be due to a dulled cutting stylus or improper adjustment of the recording arm. The depth of cut may be regulated by an adjustment of the flat head screw on the top of the recording arm. Turning the screw to the left (counterclockwise) decreases the depth of cut. Turning the screw to the right (clockwise) increases the depth of cut.

MICROPHONE ADDRESS

The unit may be used on an audio amplifier. hen the five position selector switch knob is in the MICROPHONE ADDRESS position, any sound picked up by the microphone will be greatly amplified. The volume may be adjusted by means of the volume control knob. Do not keep the microphone too close to the receiver. for it may cause a feedback howl. To avoid this effect either keep the volume control at a low level or take the microphone into another room.

TUBE COMPLEMENT

1-6SA7 -	oscillator and first detector.
1-6SK7 -	intermediate frequency amplifier.
1-6SQ7 -	second detector, A.V.C. and first audio.
1-6K6GT-	power output.
1-6X5G -	rectifier
1-6U5 -	tuning indicator.
1-6SQ7 -	pre-amplifier

This receiver has a superheterodyne circuit with full automatic volume control, and will operate on 105-125 volts, 60 cycles ALTERNATING CURRENT unless otherwise specified. An antenna loop has been incorporated which makes the use of an outside aerial or ground unnecessary. A large slide rule instrument type dial with a high tuning ratio is used to make tuning of stations easy and accurate. The range coverage is 540 to 1700 kilocycles. The recording instructions should be carefully read and followed for best results.

PHONOGRAPH OPERATION

The phonograph unit will reproduce either home-made or commercial records up to 12 inches in diameter. Turn the SELECTOR SWITCH knob to the PHONOGRAPH PLAY-BACK position. Make certain the receiver power is turned "on", and the volume control sufficiently advanced to allow reproduction through the speaker. Slide the button of the switch on the motorboard to the "on" position. As soon as the turntable begins to spin, the pick-up arm (the one on the left of the cabinet) may be brought gently on the record. When not in use, this arm should be placed on the arm rest provided.

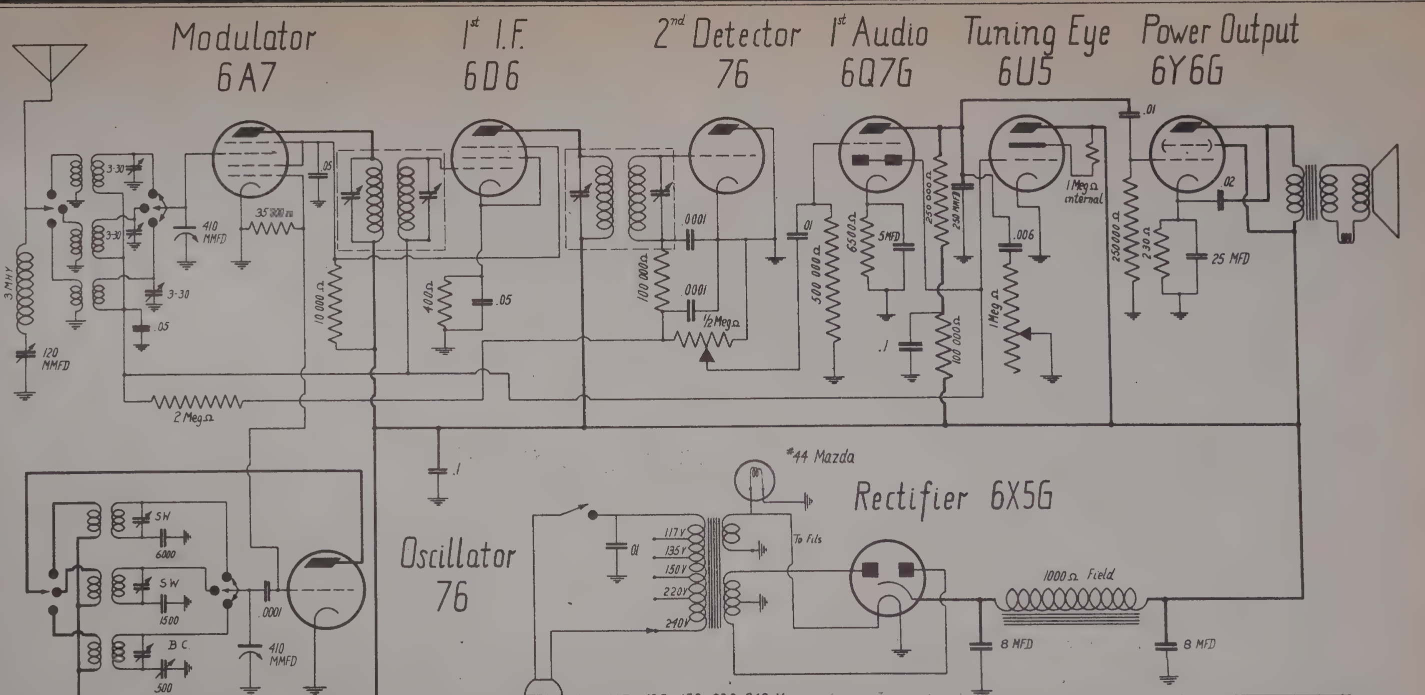
LIST PRICES OF REPLACEMENT PARTS

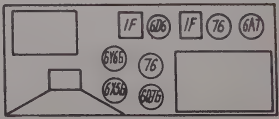
1625	power transformer	3.00	7310	speaker	4.25
1626	first I.F. coil	1.10	3916	pilot lamp	.10 net
1627	second det. coil	1.10	8947A	pilot socket	.30
1628	antenna loop	1.50	80024	knob	10
1529	oscillator coil	.50	80031	indicator knob	.15
2526A	variable cond.	2.50	80033	selector switch	1.30
2527	comb. electrolytic	1.75	80039	slide switch	.25
3430	volume control	1.00	9762	drive spring	.05
3432	tone control	.75	9943	dial pointer	.30
6113	dial scale	.85			

Prices Subject To Change Without Notice.

MODEL 810

DeWALD RADIO MFG. CORP.





I.F. 456 KC.

TO CALIBRATE RECEIVER

I.F. ALIGNMENT: Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit **left** section of variable condenser. Adjust generator to 456 K.C. and peak I.F. trimmers for maximum signal.

BROADCAST ALIGNMENT: Remove short from variable condenser. Have wave band switch on broadcast position. Adjust generator and receiver to 1500 K.G. Peak trimmers for maximum signal. Adjust generator and receiver to 600 K.C., peak the broadcast padder for maximum signal. The variable condenser should be "rocked" during this operation.

SHORT WAVE ALIGNMENT: For 2.7-8.2 M.C. (Model 810). Turn wave band switch to this band. Adjust the generator and receiver to 7.0 M.C. and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder. For 7.8-24 M.C. Turn wave band switch to this band. Adjust generator and receiver to 22 M.C . and peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

RANGE COVERAGE

555-174 meters,	112-37 meters,	39-12.5 meters
540-1725 K.C.	2.7-8.2 M.C.	7.8-24 M.C.

HOW TO ADJUST THE PUSH-BUTTONS

Tune in the desired station with the station selector knob. Determine which button is to be used to receive this station. Loosen this button by turning it in a counterclockwise direction approximately one full turn. Then push the button in as far as it will go and tighten with a coin in the button slot. The adjustment may be checked by setting the pointer in any position, pushing the button in as far as it will go and noting if the intended station is received. After all adjustments have been made the station tabs and celluloids may be put on the button.

©John F. Rider, Publisher

DeWALD RADIO MFG. CORP.

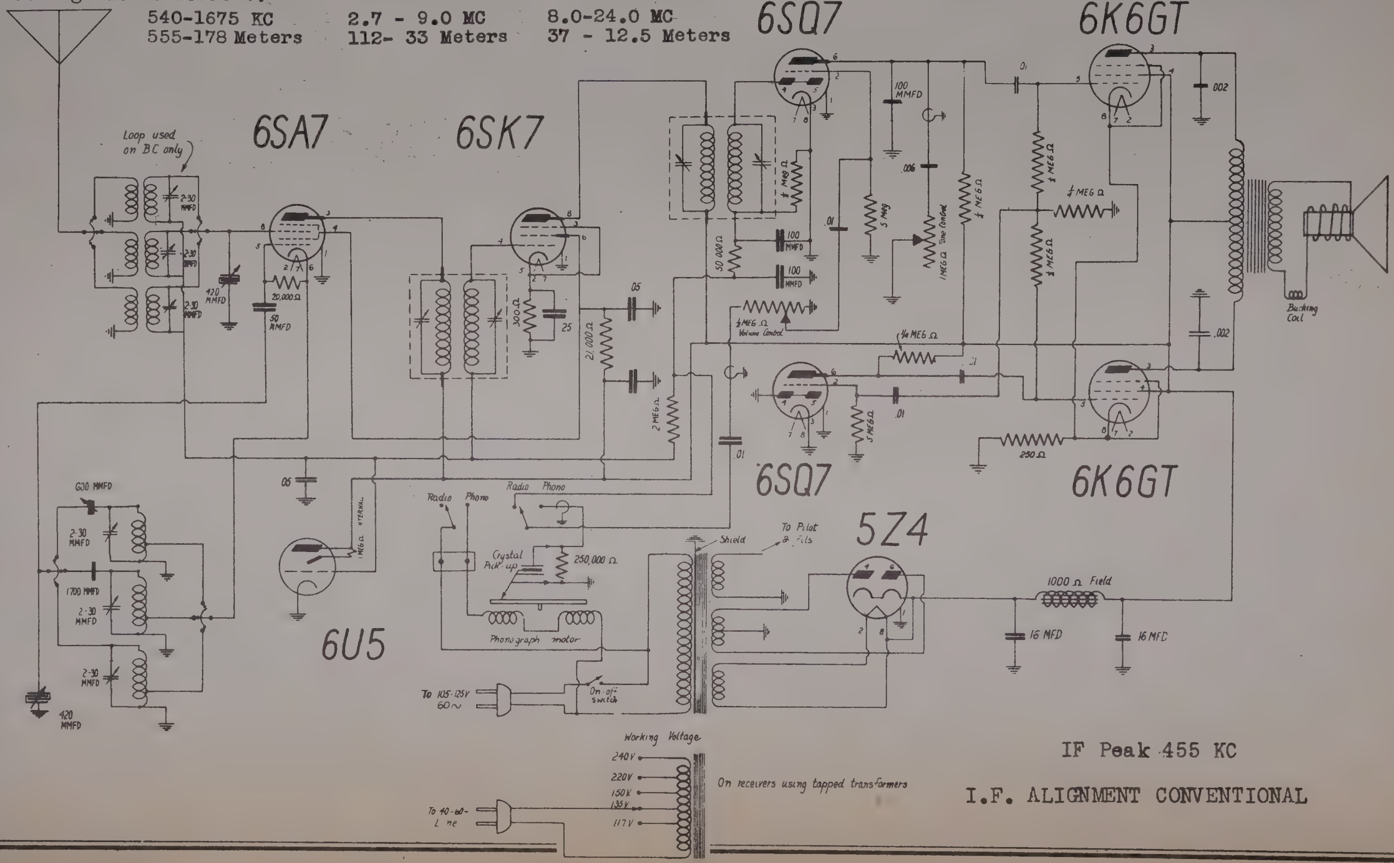
MODELS 814, 815, 816, 817

This model is a radio phonograph combination which operates on alternating current. It has full automatic volume control on all bands. The receivers with multi-tap transformers will operate on **117** V., 135 V., 150 V., 220 V., or 240 V., 40-60 cycles A.C. Those that do not have multi-tap transformers will operate on **117**- volts, 60 cycles A.C. unless otherwise specified. A large slide rule instrument type dial with a high ratio tuning mechanism has been incorporated in order to make station tuning easy and accurate. An antenna loop which makes the use of an outside aerial unnecessary is also featured in these receivers. Provisions have been made for attaching a television unit to the receiver. The range coverage is as follows:

540-1675 KC	2.7 - 9.0 MC	8.0-24.0 MC
555-178 Meters	112- 33 Meters	37 - 12.5 Meters

6SA7	oscillator and first detector
6SK7	intermediate frequency amplifier
6SQ7	second detector, A.V.C. and first audio
6SQ7	phase inverter
6K6GT	power output
5Z4	rectifier
6U5	tuning indicator

FOR OTHER DATA SEE INDEX



IF Peak 455 KC

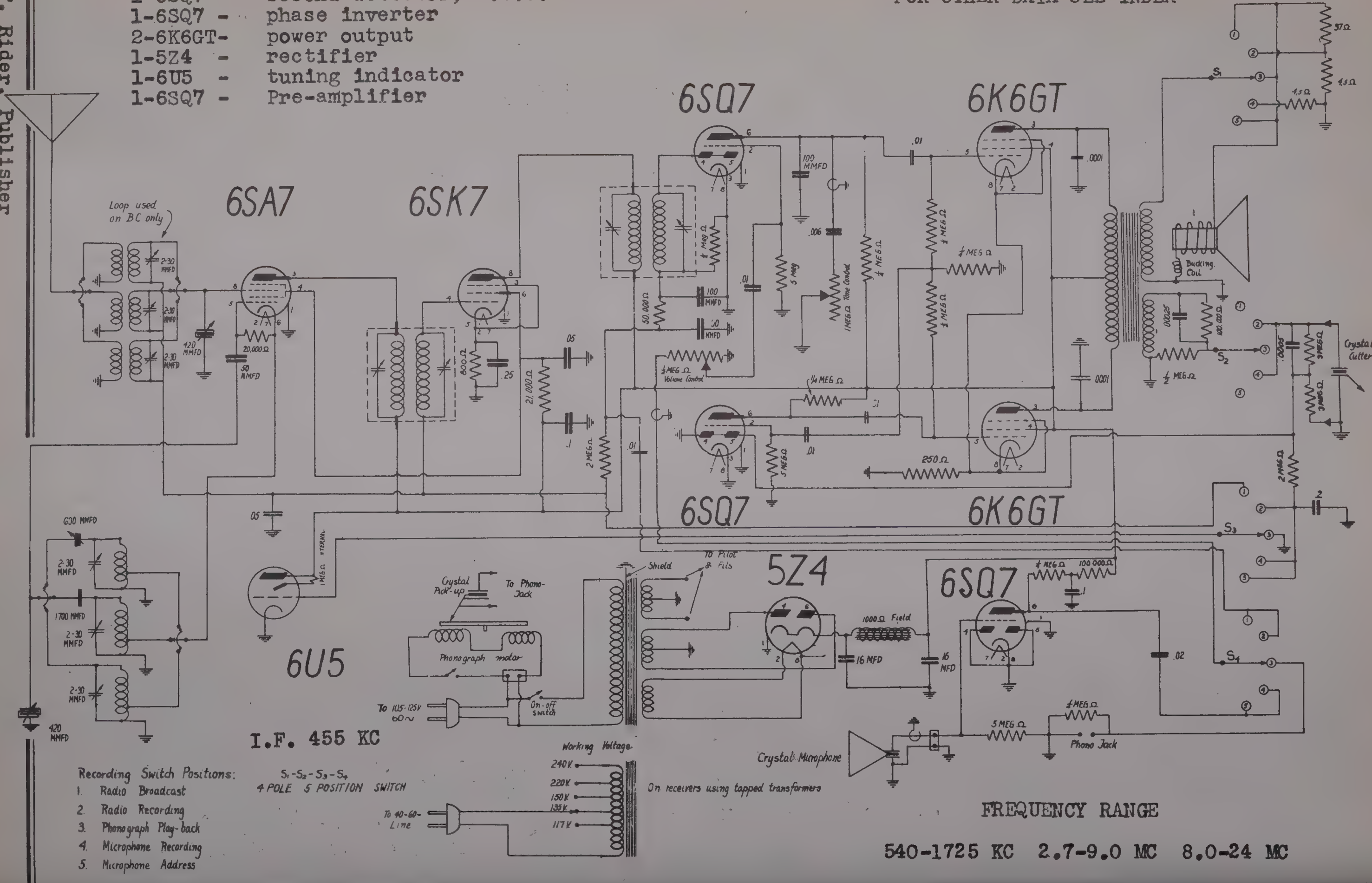
I.F. ALIGNMENT CONVENTIONAL

MODELS 906,907,908

DEWALD RADIO MFG. CORP.

1-6SA7 -	oscillator and first detector
1-6SK7 -	intermediate frequency amplifier
1-6SQ7 -	second detector, A.V.C. and first audio
1-6SQ7 -	phase inverter
2-6K6GT-	power output
1-5Z4 -	rectifier
1-6U5 -	tuning indicator
1-6SQ7 -	Pre-amplifier

FOR OTHER DATA SEE INDEX



I.F. 455 KC

Recording Switch Positions:
1. Radio Broadcast
2. Radio Recording
3. Phonograph Play-back
4. Microphone Recording
5. Microphone Address

S1-S2-S3-S4
4 POLE 5 POSITION SWITCH

FREQUENCY RANGE

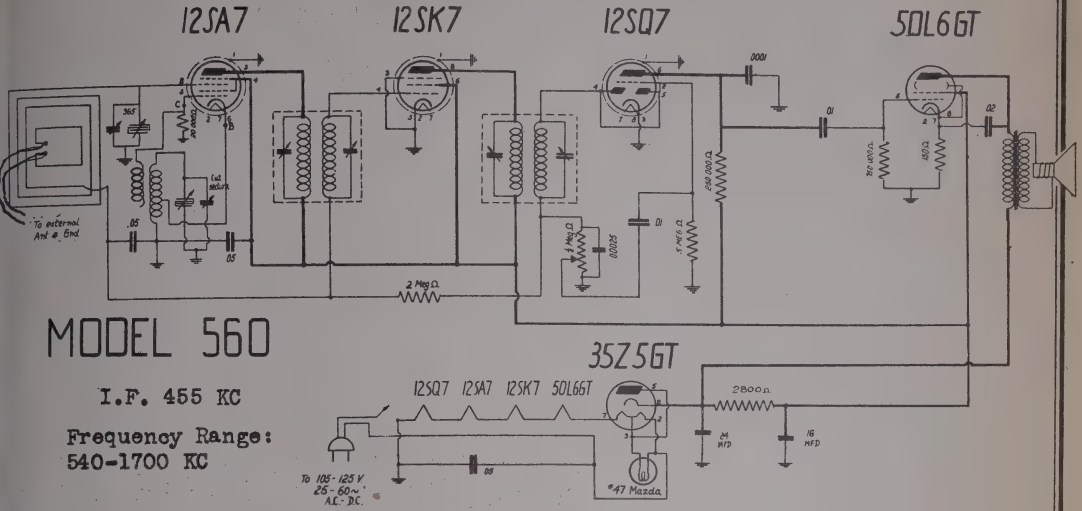
540-1725 KC 2.7-9.0 MC 8.0-24 MC

©John F. Rider, Publisher

DeWALD RADIO MFG. CORP.

MODELS 814,815,816,817
MODELS 906,907,908
MODEL 560

This model is a five tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 540-1700 kilocycles. The receiver has been designed to operate on 105-125 volts, 25-60 cycles A.C.-D.C. unless otherwise specified.



MODEL 560

I.F. 455 KC

Frequency Range:
540-1700 KC

MODEL 560

ALIGNMENT: Attach the hot side of signal generator to one of the flexible antenna loop leads. Connect the ground side to the other flexible lead. Adjust signal generator to 455 kc and peak I.F. trimmer screws for maximum signal. Adjust receiver dial and generator to 1500 kc peak the variable condenser trimmer screws for maximum gain.

MODELS 906,907,908, MODELS 814,815,816,817

I.F.ALIGNMENT

Attach the antenna lead of the signal generator to the antenna lead of the receiver. Connect the ground side of the generator to the ground lead of the set. Turn the wave band switch knob of the receiver to broadcast position. Attach an output meter or resonance indicator across the primary leads of the speaker or across the voice coil terminals. Adjust the signal generator to 455 K.C. Have the volume control in the maximum position. Peak the I.F. adjusting screws to maximum output. Do not use a greater generator signal than is necessary to obtain a good output meter reading. For location of first and second I.F. transformers, see the tube layout diagram.

BROADCAST ALIGNMENT

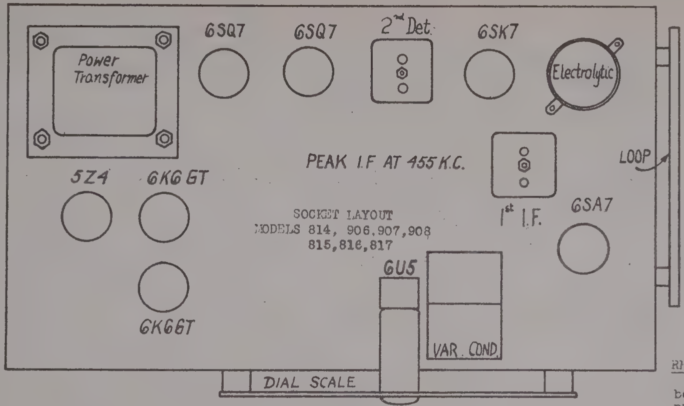
Keep the receiver in the broadcast position. Set the signal generator to 1500 KC. and adjust the broadcast oscillator coil trimmer screw until the signal from the generator is heard. Peak the broadcast antenna loop trimmer for maximum output. Tune the receiver and signal generator to 600 KC. Adjust the broadcast padder for maximum output. The variable condenser should be "rocked" during this operation.

SHORT WAVE ALIGNMENT

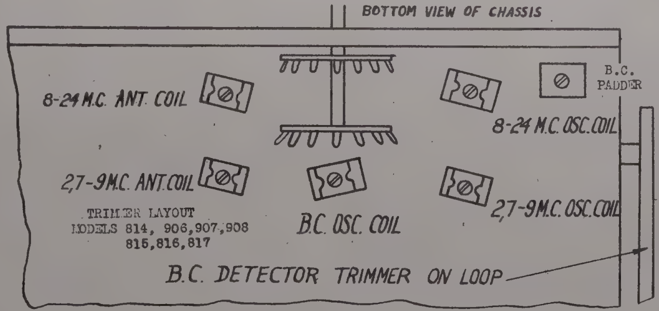
To calibrate the 2.7-9.0 M.C. band, turn the wave band switch to this range. Adjust the receiver dial and signal generator to 8.0 megacycles. Turn the oscillator coil trimmer screw until the generator signal is heard. Peak the detector coil trimmer for maximum output. The low frequency is automatically adjusted by a fixed calibrated padder. To calibrate the 8.0 - 24.0 M.C. band, turn the wave band switch to this range. Adjust the receiver and signal generator to 22.0 megacycles and proceed adjusting the trimmers as for the 2.7-9.0 M.C. band.

MODELS 814,815,816,817
MODELS 906,907,908

DEWALD RADIO MFG. CORP.



SOCKET LAYOUT
MODELS 814, 906,907,908
815,816,817



TRIMMER LAYOUT
MODELS 814, 906,907,908
815,816,817

NOTES ON RECORDING   MODELS 906,907,908

Before attempting to cut any records, it is important to observe the following precautions.

1. Records up to 10 inches in diameter may be cut.
2. A proper cutting stylus must be used in the cutting head.
3. Insert the cutting stylus into the head so that the flat portion of it will face the knurled thumb screw.
4. Tighten the cutting stylus in position by means of the knurled screw.
5. Great care must be exercised whenever moving the cutting arm. It should be raised to an angle of about 45 degrees before moving it along the horizontal plane, in order to avoid injury to the feed mechanism.
6. To check the adjustment of the cutting stylus, place a blank record on the turntable. Then bring the cutting head over the record and let it rest on the face of the record. If the cutting head is properly adjusted, it will be in a plane parallel to the record surface and the stylus perpendicular to it. This condition is obtained only when the nose of the recording arm is adjusted to the correct height of ¼ inch above the record surface.
7. Whenever the recording arm is not being used, it should always be returned to its normal horizontal position to the right of the turntable. NEVER ALLOW THE CUTTING STYLUS TO REST ON THE TURNTABLE.
8. A new cutting stylus will cut dozens of records satisfactorily before being dulled so that replacement is necessary.
9. Some record blanks are made of inflammable material. Do not bring the thread material cut from the record near a flame, or have it come in contact with a hot object.

RECORD CUTTING PROCEDURE

Favorite radio programs may be easily recorded. Records may also be made of a person or group talking, singing, or playing instruments. The procedure for either type of recording is essentially the same. To make records of radio programs, the five point selector switch knob should be in the RADIO RECORDING position. When making microphone recordings the switch knob should be in the MICROPHONE RECORDING position, and the plug at the end of the microphone cable inserted in the microphone socket. The microphone should be held at a distance of 6 to 18 inches away from the sound.

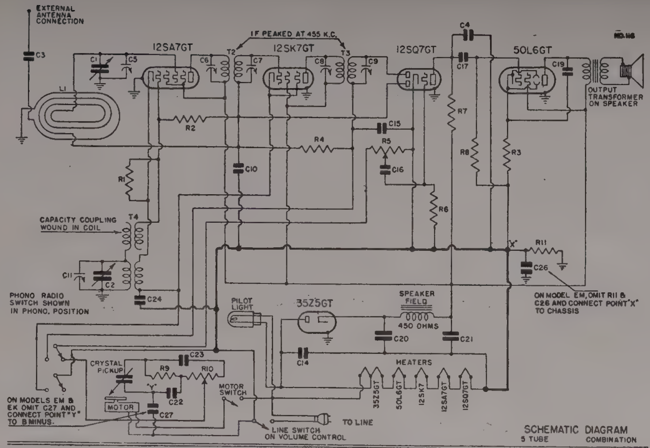
Place the record blank on the turntable allowing the spring pin to come up through one of the small holes on the record. Snap the toggle switch to the "on" position. Before starting to cut the record, whether it be radio or microphone recording, the volume control must be adjusted so that the record will be properly cut. The correct adjustment can be made by watching the tuning eye located in the middle of the dial. Components in the circuit have been so chosen to permit the "eye" to close just before the recorded volume becomes great enough to cause overcutting into adjacent grooves on the record. For this reason, it is necessary to adjust the control so that the "eye" just closes when recording. It may be necessary to regulate the volume during the cutting because of variations of signal input to the receiver.

Raise the cutting head so that it is at about 45 degrees angle with the turntable. Bring it over the record until the cutting stylus is about 1/8 inch in from the edge of the record. Slowly lower the cutting arm onto the face of the disc. From now on, the cutting is done automatically. However, as the grooves are being cut threads will appear on the record surface. These threads should be brushed off occasionally. When the record is finished, the depth of cut may be observed by holding it in such a position that a light is reflected from the grooves. If the depth of cut is correct, the grooves will appear to be about as wide as the space between them. The cut may also be checked by noting the quality of the thread being cut. It should not be coarse and stiff, nor light and fluffy.

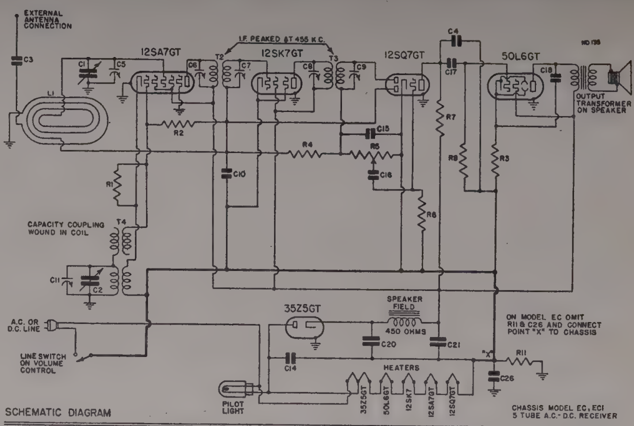
Should the cut be unsatisfactory, it may be due to a dulled cutting stylus or improper adjustment of the recording arm. The depth of cut may be regulated by an adjustment of the flat head screw on the top of the recording arm. Turning the screw to the left (counterclockwise) decreases the depth of cut. Turning the screw to the right (clockwise) increase the depth of cut.

©John F. Rider, Publisher

EMERSON RADIO & PHONOGRAPH CORP. Chassis EC, EC1, EK, EM, EM1



SCHEMATIC DIAGRAM FOR MODELS EK, EM AND EM1



SCHEMATIC DIAGRAM FOR MODELS EC AND EC1

MODELS: EC-296, EC-301, EC-314, EC-315, EC-327, EC-336, EC-347, EC-353 and EC-366

CHASSIS MODEL: EC

COMBINATION RADIO AND PHONOGRAPH

MODELS: EM-345, EM-346 and EM-382
(For operation on A.C. only)

EM2-345, EM2-346 and EM2-382
(For operation on A.C. or D.C.)

CHASSIS MODEL: EM

MODEL: EK-377 and EK-403
(For operation on A.C. only)

EK2-377
(For operation on A.C. or D.C.)

CHASSIS MODEL: EK

If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re aligned.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

FREQUENCY RANGE: 540-1600 kc.

Models below listed under reexamination service of Underwriters' Laboratories, Inc.

MODELS: EC1-296, EC1-301, EC1-314, EC1-315, EC1-327, EC1-336, EC1-347, EC1-353 and EC1-366

CHASSIS MODEL: EC1

COMBINATION RADIO AND PHONOGRAPH

MODELS: EM1-345 and EM1-346
(For operation on A.C. only)

EM3-345 and EM3-346
(For operation on A.C. or D.C.)

CHASSIS MODEL: EM1

—EC-EK-EM—S1
—S2

1—12SA7GT, pentagrid oscillator-modulator
1—12SK7GT, first i-f amplifier
1—12SQ7GT, diode detector, a-f amplifier, a.v.c.
1—50L6GT, beam power output
1—35Z5GT, half-wave rectifier.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

30 watts for receiver
20 watts for a.c. motor
30 watts for a.c.-d.c. motor.

The receivers used in all models are of the a.c.-d.c. type. The motors in the A.C. ONLY type combinations will operate only if used on alternating current and will be damaged if connected to direct current.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

L1	Loop antenna assembly (EM)
L1	Loop antenna assembly (EK)
L1	Loop antenna assembly (EC).
T4	Oscillator coil (EC1, EM and EK)
T4	Oscillator coil (EC).
T2	Double-tuned 455 kc first i-f transformer.
T3	Double-tuned 455 kc second i-f transformer
R1	20,000 ohm ¼ watt carbon resistor.
R3	140 ohm ½ watt wire-wound resistor
R4	3 megohm ¼ watt carbon resistor.
R5	Volume control .5 megohm with line switch
R6, R2	15 megohm ¼ watt carbon resistor.
R7, R8	500,000 ohm ¼ watt carbon resistor.
R11	200,000 ohm ¼ watt carbon resistor.
C1, C2	Two-gang variable condenser (EM)
C1, C2	Two-gang variable condenser (EC).
C3, C16	0.002 mf, 600 volt tubular condenser.
C4, C15	0.0002 mf, 600 volt tubular or mica condenser
C5, C11	Trimmers, part of variable condenser.
C6, C7, C8, C9	Trimmers, part of i-f transformers.
C10, C27	0.05 mf, 200 volt tubular condenser.
C14	0.05 mf, 400 volt tubular condenser.
C17, C18	0.02 mf, 400 volt tubular condenser.
C19	0.03 mf, 400 volt tubular condenser (EM) (see production change no. 2)
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (EM1 and EM3).
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (EC).
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (EM, EM2 and EK)
C24	0.1 mf, 200 volt tubular condenser.
C26	0.2 mf, 200 volt tubular condenser.
R9	3 megohm ¼ watt carbon resistor.
R10	Tone control .5 megohm with motor line switch (EK).
R10	Tone control .5 megohm with motor line switch (EM1)
R10	Tone control .5 megohm with motor line switch (EM)
C22	0.001 mf, 600 volt tubular condenser.
C23	0.00054 mf, 600 volt tubular or mica condenser.
C25	0.01 mf, 400 volt tubular condenser (for a.c.-d.c. motors only)

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

color coding of the i-f transformer leads
Grid—green
Grid return—black
Plate—blue
B plus—red

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

DIAL CORD REPLACEMENT

For chassis using the narrow "V" shaped notch in the drive pulley use a half turn of cord, part number 6RZ-870. For chassis using the drive pulley with a broad "U" shaped groove, use a turn and a half of cord, part number 7BZ-867A. Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

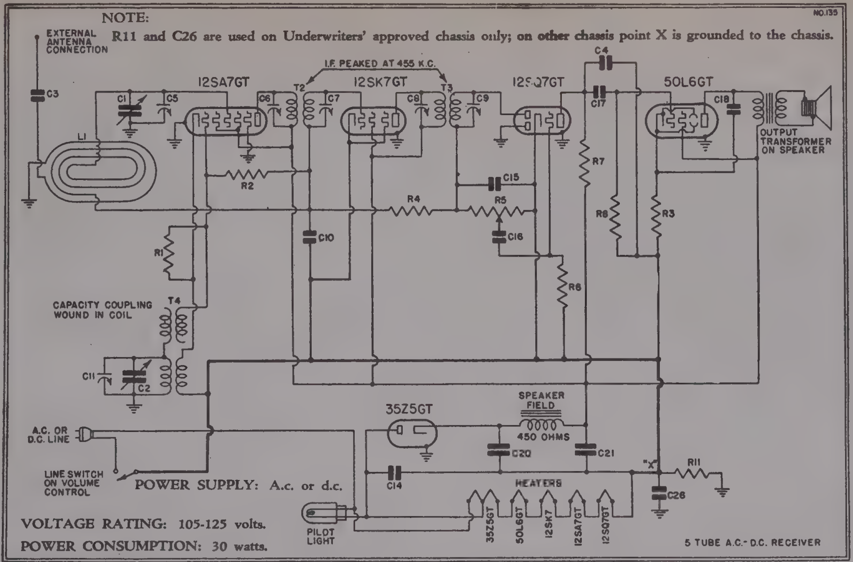
If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

PRODUCTION CHANGES

1. EM chassis which use Motor, part numbers 6JPM-46, 6JPM-46A or 6JPM-53A may use part number 8CPM-64 for replacement.
2. EK chassis use C19, .05 mf, 400 volt condenser.
3. Model EM-382 uses Motor 8CPM-64C.

MODEL FG-330
Chassis FG
MODEL FC-400
Chassis FC

EMERSON RADIO & PHONOGRAPH CORP.



NOTE:
R11 and C26 are used on Underwriters' approved chassis only; on **other** chassis point X is grounded to the chassis.

POWER SUPPLY: A.c. or d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

VOLTAGE ANALYSIS

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

DIAL CORD REPLACEMENT

Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

L1	Loop antenna assembly (FC)
L1	Loop antenna assembly (FG)
T4	Oscillator coil
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer
R1	20,000 ohm ¼ watt carbon resistor
R3	140 ohm ½ watt wire-wound resistor
R4	3 megohm ¼ watt carbon resistor
R5	Volume control .5 megohm with line switch (FC)
R5	Volume control .5 megohm with line switch (FG)
R6, R2	15 megohm ¼ watt carbon resistor
R7, R8	500,000 ohm ¼ watt carbon resistor
R11	200,000 ohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser (FC)
C1, C2	Two-gang variable condenser (FG)
C3, C16	0.002 mf, 600 volt tubular condenser
C4, C15	0.002 mf, 600 volt tubular condenser
C5, C11	Trimmers, part of variable condenser
C6, C7, C8, C9	Trimmers, part of variable condenser
C10, C27	0.05 mf, 200 volt tubular condenser
C14	0.05 mf, 400 volt tubular
C17, C18	0.02 mf, 400 volt tubular condenser
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (FC)
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (FG)
C24	0.1 mf, 200 volt tubular condenser
C26	0.2 mf, 200 volt tubular condenser
7BS-409	5" dynamic speaker

R-f Alignment

—FC,FG-S1

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

MODEL: FC-400
CHASSIS MODEL: FC

MODEL: FG-330
CHASSIS MODEL: FG

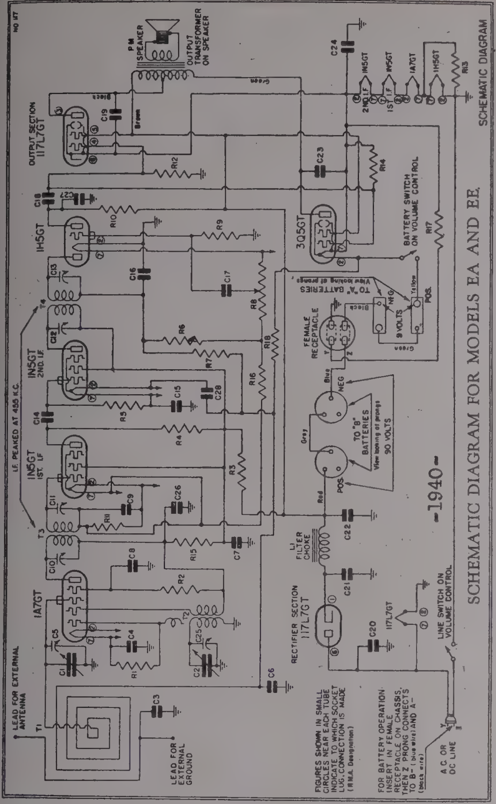
TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1600 kc.

12SA7GT, pentagrid oscillator-modulator
12SK7GT, first i-f amplifier
12SQ7GT, diode detector, a-f amplifier, a.v.c.
50L6GT, beam power output
35Z5GT, half-wave rectifier.

EMERSON RADIO & PHONOGRAPH CORP.

Chassis EA, EE,
EB, EW

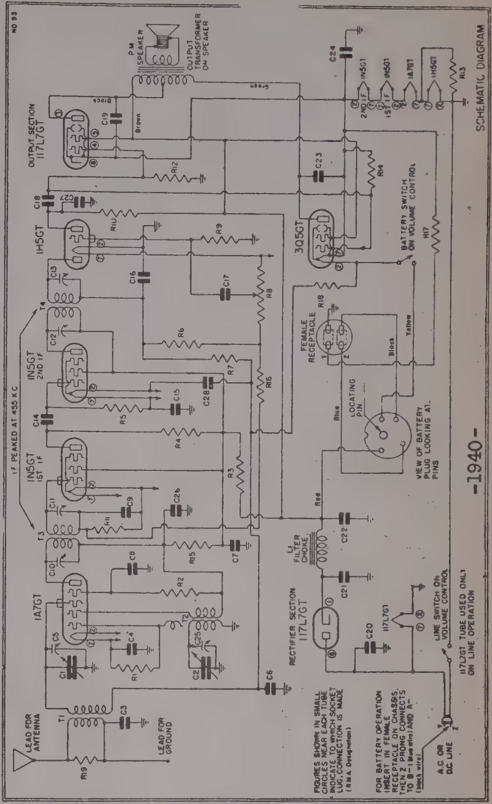

OUTPUT SECTION 117L7GT
P M SPEAKER
OUTPUT TRANSFORMER ON SPEAKER
1H5GT
1N5GT 2ND. I.F.
1N5GT 1ST. I.F.
1A7GT
3Q5GT
I.F. PEAKED AT 455 K.C.
LEAD FOR EXTERNAL ANTENNA
LEAD FOR EXTERNAL GROUND
RECTIFIER SECTION 117L7GT
L1 FILTER CHOKE
FEMALE RECEPTACLE
TO "A" BATTERIES (View looking at prongs)
9 VOLTS
TO "B" BATTERIES (View looking at prongs) 90 VOLTS
BATTERY SWITCH ON VOLUME CONTROL
LINE SWITCH ON VOLUME CONTROL
A.C. OR D.C. LINE
SCHEMATIC DIAGRAM

FIGURES SHOWN IN SMALL CIRCLES NEAR EACH TUBE INDICATE TO WHICH SOCKET LUG, CONNECTION IS MADE (R.M.A. Designation)

FOR BATTERY OPERATION INSERT IN FEMALE RECEPTACLE ON CHASSIS, THEN Z PRONG CONNECTS TO B− (blue wire) AND A− (black wire)

-1940-

SCHEMATIC DIAGRAM FOR MODELS EA AND EE.

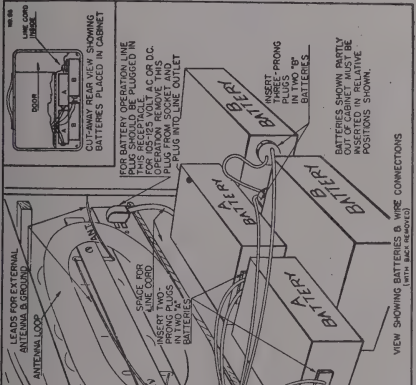


FIGURES SHOWN IN SMALL CIRCLES NEAR EACH TUBE INDICATE TO WHICH SOCKET LUG, CONNECTION IS MADE (R.M.A. Designation)

FOR BATTERY OPERATION INSERT IN FEMALE RECEPTACLE ON CHASSIS, THEN Z PRONG CONNECTS TO B− (Blue wire) AND A− (black wire)

-1940-

SCHEMATIC DIAGRAM FOR MODEL EB AND EW

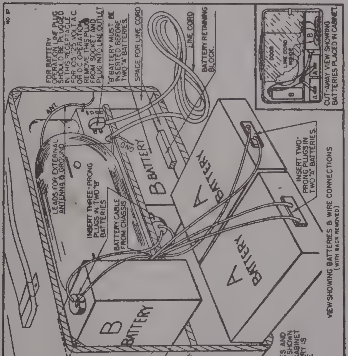

LINE CORD INSIDE
DOOR
CUT-AWAY REAR VIEW SHOWING BATTERIES PLACED IN CABINET
A BATTERY
B BATTERY
LEADS FOR EXTERNAL ANTENNA & GROUND
ANTENNA LOOP
ANT.
GND
SPACE FOR LINE CORD
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES

FOR BATTERY OPERATION LINE PLUG SHOULD BE PLUGGED IN THIS RECEPTACLE. FOR 105-125 VOLT A.C. OR D.C. OPERATION REMOVE THIS PLUG FROM SOCKET AND PLUG INTO LINE OUTLET

BATTERIES SHOWN PARTLY OUT OF CABINET MUST BE INSERTED IN RELATIVE POSITIONS SHOWN.

VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)

FOR MODEL EA-312, 338, 339, 385, 389 AND 390


LEADS FOR EXTERNAL ANTENNA & GROUND
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES
BATTERY CABLE FROM CHASSIS
SPACE FOR LINE CORD
LINE CORD
BATTERY RETAINING BLOCK
CUT-AWAY VIEW SHOWING BATTERIES PLACED IN CABINET
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES
A BATTERY
B BATTERY
CHASSIS MOUNTING SHELF
ANT.
GND

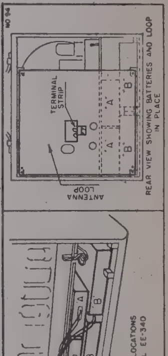
FOR BATTERY OPERATION LINE PLUG SHOULD BE PLUGGED IN THIS RECEPTACLE. FOR 105-125 VOLT A.C. OR D.C. OPERATION REMOVE THIS PLUG FROM SOCKET AND PLUG INTO LINE OUTLET

"B" BATTERY MUST BE INSERTED BEFORE TWO "A" BATTERIES

TWO "A" BATTERIES AND ONE "B" BATTERY SHOWN PARTLY OUT OF CABINET. OTHER "B" BATTERY IS SHOWN IN PLACE

VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)

FOR MODEL EA-357


TERMINAL STRIP
ANTENNA LOOP
'A'
'B'
REAR VIEW SHOWING BATTERIES AND LOOP IN PLACE
BATTERY LOCATIONS FOR MODEL EE-340
A
B

FOR MODEL EE-340

In some 340 cabinets, the A batteries face the left end. See the diagram on the cabinet back.

TYPE: Universal (battery, a.c.-d.c.) superheterodyne.

FREQUENCY RANGE: 540-1600 kc.

POWER SUPPLY: Battery, a.c. or d.c.

VOLTAGE RATING: (Line operation) 105-125 volts, a.c.-d.c.

POWER CONSUMPTION: (Line operation) 30 watts

CURRENT DRAIN: (Battery operation)	"A" battery 0.05 amp. "B" battery 0.01 amp.

Chassis EA, EE
EB, EW

EMERSON RADIO & PHONOGRAPH CORP.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the front section of the variable condenser.

In Models EA and EE the loop antenna acts as the antenna coil. The trimmer for the loop is on the rear section of the variable condenser.

In Model EB the antenna coil is mounted to the speaker frame.

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is at the right of the variable condenser and the diode i-f transformer is to the left of the variable condenser. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

I-f Alignment

Swing variable condenser to minimum capacity position.
Feed 455 kc to the grid of the 1A7GT tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the radiating loop. A portion of the outside turn of the loop may then be swung to either side of the center to give maximum response. Realign at 140.

Battery Installation

For Models 312, 338, 339, 385, 389 and 390.

To install and connect the batteries in this cabinet observe the following procedure:

1. Remove the back panel of the cabinet by taking out the screws.

2. Locate the battery cable coming from the receiver and identify the plugs on the cable ends.

3. Insert the three-prong plug on the battery cable into the two "B" batteries. Place the two batteries in the bottom of the cabinet with the plug-ends of the batteries facing each other. Push the batteries up against the front of the cabinet. The wood blocks at the rear corners and rear center of the cabinet serve to hold the "B" batteries in place.

4. Insert the two-prong plug on the battery cable into the two "A" batteries. Place the "A" batteries, one at a time, above the "B" batteries in the cabinet. The plug-ends of the "A" batteries should be facing to the left, as indicated in the illustration. Push the "A" batteries to the left, when placing them in the cabinet, in order to clear the small wood block in the front right-hand corner of the cabinet.

5. Replace the back panel of the cabinet and fasten it in place with the screws.

See diagrams for other models.

T1	Loop antenna assembly (EE-340)
T1	Loop antenna assembly (EE-390)
T1	Loop antenna assembly (EA)
	Antenna coil (EB, EW)
L1	Iron core filter choke.
T2	Oscillator coil
T3	Double-tuned 455 kc first i-f transformer..
T4	Double-tuned 455 kc diode i-f transformer (EA, EE)
T4	Double-tuned 455 kc diode i-f transformer (EB, EW)
R1, R6	50,000 ohm ¼ watt carbon resistor
R2	30,000 ohm ¼ watt carbon resistor
R3	500 ohm ¼ watt carbon resistor.
R4	25,000 ohm ¼ watt carbon resistor.
R5	100,000 ohm ¼ watt carbon resistor
R7, R14	3 megohm ¼ watt carbon resistor...
R8	Volume control with line and battery switch (500,000 ohms) (EA, EE, EB)..
R8	Volume control with line and battery switch (500,000 ohms) (EW)..
R9, R11	5 megohm ¼ watt carbon resistor
R10, R12	500,000 ohm ¼ watt carbon resistor
R13	330 ohm ¼ watt carbon resistor.. (see production change no. 1)
R15	1,000 ohm ¼ watt carbon resistor..
R17	1,200 ohm ¼ watt carbon resistor.. (see production change no. 1a)
R16, R18	15 megohm ¼ watt carbon resistor..
R19	10,000 ohm ¼ watt carbon resistor (EB, EW)
C1, C2	Two-gang variable condenser..
C3	0.002 mf, 600 volt tubular condenser
C6, C7, C9, C26	0.05 mf, 200 volt tubular condenser
C8, C18	0.02 mf, 400 volt tubular condenser
C10, C11, C12, C13	Trimmers, part of i-f transformers.
C14, C27	0.00022 mf, mica condenser...
C15, C4	0.25 mf, 100 volt tubular condenser...
C16	0.0002 mf, 600 volt tubular or mica condenser
C17	0.006 mf, 600 volt tubular condenser..
C19	0.003 mf, 600 volt tubular condenser.
C20	0.05 mf, 400 volt tubular condenser...
C21, C22	Dual 20 mf, 150 volt dry electrolytic condenser.
C23	0.01 mf, 400 volt tubular condenser (EA, EE, EB) (see production change no. 2)
C23	0.0005 mf, 600 volt tubular condenser (EW)
C24	40 mf, 25 volt dry electrolytic condenser
C25, C5	Trimmer, part of variable condenser.
C28	0.015 mf, 200 volt tubular condenser

The color coding of the battery cable is as follows:
Red—B plus, 90 volts
Blue—B minus
Yellow—A plus, 9 volts
Black—A minus

The color coding of the i-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
B plus—red

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 9.0 volts, "B" 90 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7GT	88	50	82	1.5
1N5GT, 1st i-f	50	88	—	1.5
1N5GT, 2nd i-f	88	88	—	1.5
1H5GT	27	—	—	1.5
3Q5GT	85	88	—	3.0
117L7GT (line operation only)	86	95	—	117

117L7GT rectifier cathode (Pin No. 1 (line operation only)—125 volts.

MODELS: EA-312, EA-338, EA-339, EA-357, EA-385 and EA-389

CHASSIS MODEL: EA

MODELS: EB-344 and EB-359

CHASSIS MODEL: EB

MODEL: EE-340 and EE-390

CHASSIS MODEL: EE

MODEL: EW-391

CHASSIS MODEL: EW

If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

A.C.-D.C. Operation: In portable models open the small door at the back of the cabinet. It is important that this small door be left open while operating the receiver on either a.c. or d.c. power. Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet. If the power supply is d.c. and the receiver does not operate at first, remove the plug from the wall outlet, turn it half way around and re-insert it in the outlet, thus obtaining the proper polarity.

Battery Operation: Important: Remove the line plug from the electrical outlet. Insert the plug into the receptacle at the rear of the receiver. This is important since the receiver will not operate from batteries with the plug out of the receptacle. The loose portion of the cord can then be coiled and placed in the cabinet.

Dial Cord Replacement

Dials which use the drive shaft pulley with a narrow "V" shaped groove use a half turn of drive cord, part no. 6RZ-870. Dials using the drive shaft pulley with a broad "U" shaped groove use a turn and a half of cord, part no. 7BZ-867A. The cord should be drawn snugly around the condenser pulley and knotted with no slack near the opening in the pulley groove, after which the spring may be hooked on. The dial face should bear against the fiber washer when finally assembled.

BATTERY COMPLEMENT

Type Battery	No. Req.	Eveready Part No.	Rayovac Part No.	Burgess Part No.
FOR MODELS EA, EE				
4½ volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	——	——
FOR MODELS EB, EW				
"A" and "B" Pack	1	——	——	3G6D60 (plug-in type)

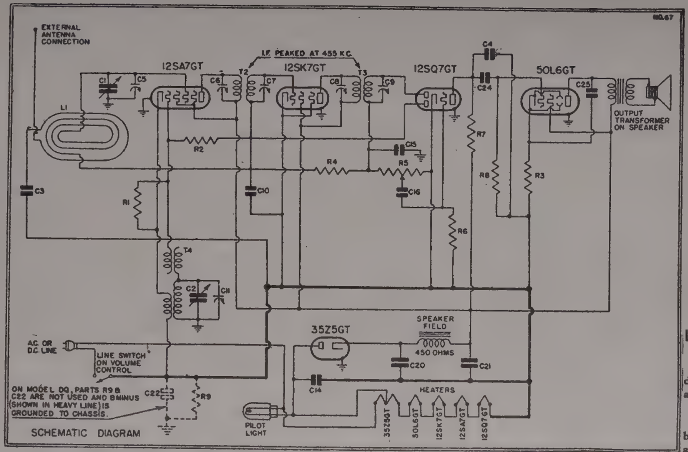
1—1A7GT, oscillator-modulator
1—1N5GT, 1st i-f amplifier
1—1N5GT, 2nd i-f amplifier
1—1H5GT, 2nd detector, a.v.c., a-f amplifier
1—3Q5GT, beam power output (battery operation)
1—117L7GT, beam power output and half-wave rectifier (line operation).

PRODUCTION CHANGES

1. EA chassis bearing serial numbers below 3,606, 650 use: (a) Resistor R17, 1000 ohms, part number PR-79. (b) Battery cable, part number 8AW-268.
2. EA chassis bearing serial numbers below 3,625,961 use C23, 0.001 mf, part number NNC-199 in place of 0.01 mf, part number KC-58.
3. EA chassis which use speaker, part number 6XS-424, may use 7JS-443 for replacement.
4. EA chassis which use electrolytic, part number 6JC-426D, may use 6JC-426E for replacement.
5. EE chassis which use electrolytic, part number 6ZC-460, may use 7FC-451 for replacement.

- EA, EB, EE, EW - S2

EMERSON RADIO & PHONOGRAPH CORP. Chassis DQ, DQ1, EH, EH1



SCHEMATIC DIAGRAM

L1	Loop antenna assembly
T4	Oscillator coil (DQ1, EH1)
T4	Oscillator coil (DQ, EH) (see prod. ch. No. 1)
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer
R1	20,000 ohm ¼ watt carbon resistor
R3	140 ohm ½ watt wire-wound resistor
R4	3 megohm ¼ watt carbon resistor
R5	Volume control .5 megohm with line switch (DQ-DQ1)
R5	Volume control .5 megohm with line switch (EH, EH1)
R6, R2	15 megohm ¼ watt carbon resistor
R7, R8	500,000 ohm ¼ watt carbon resistor
R9	200,000 ohm ¼ watt carbon resistor (DQ1, EH1)
C1, C2	Two-gang variable condenser (DQ-DQ1) Two-gang variable condenser (EH, EH1)
C5, C11	Trimmers, part of variable condenser.
C6, C7, C8, C9	Trimmers, part of i-f transformers.
C10	0.1 mf, 200 volt tubular condenser
C14	0.05 mf, 400 volt tubular condenser
C15, C4	0.0002 mf, 600 volt tubular or mica condenser
C16, C3	0.002 mf, 600 volt tubular condenser
C25	0.01 mf, 400 volt tubular condenser (see production change no. 3)
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (see production change no. 2)
C22	0.2 mf, 200 volt tubular condenser (DQ1, EH1)
C24	0.02 mf, 400 volt tubular condenser
7KS-446	6½" dynamic speaker (DQ1)
7KS-446A	6½" dynamic speaker (DQ) (see prod. ch. no. 2).
8HS-490	8" dynamic speaker (EH)
8HS-490A	8" dynamic speaker (EH1)

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—bleck	B plus—red

MODELS: DQ-333, DQ-334, DQ-351 and DQ-398

CHASSIS MODEL: DQ

MODEL: EH-342

CHASSIS MODEL: EH

MODELS: DQ1-333 and DQ1-334

CHASSIS MODEL: DQ1

MODEL: EH1-342

CHASSIS MODEL: EH1

Listed under Re-examination Service of Underwriters' Laboratories, Inc.

TYPE: Single-band Superheterodyne.

FREQUENCY RANGE: 540-1600 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

- 1—12SA7GT, pentagrid oscillator-modulator
- 1—12SK7GT, first i-f amplifier
- 1—12SQ7GT, diode detector, a-f amplifier, a.v.c.
- 1—50L6GT, beam power output
- 1—35Z5GT, half-wave rectifier.

POWER SUPPLY: a.c. or d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

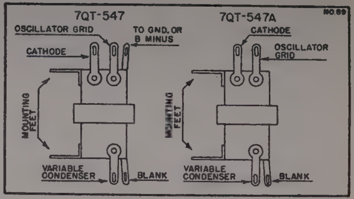
The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

DIAL CORD REPLACEMENT

Chassis which have the dial drive shaft pulley with a narrow "V" cut use a half turn of dial cord, part number 6RZ-870. Chassis which have the dial drive shaft pulley with a wide groove use one and a half turns of dial cord, part number 7BZ-867A. The cord should be drawn snugly around the condenser pulley and knotted with no slack, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.



Oscillator Coils—See Production Change No. 1

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug. This lug is easily identified by the connection of the green lead to the loop.

R-f Alignment

Set the dial pointer at 140. Set the signal generator at 1400 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 140. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 140.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

VOLTAGE ANALYSIS

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

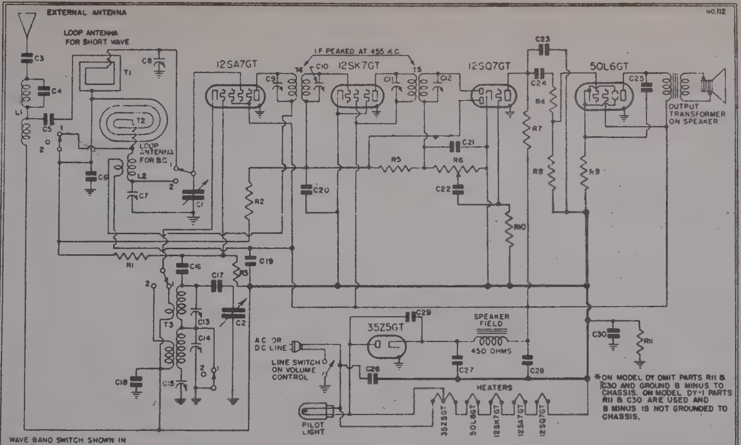
PRODUCTION CHANGES

—DQ, DQ1, EH—S2 1. Chassis DQ uses both type oscillator coils listed above. For correct lug connections see Figure on next page. Notice on 7QT-547 the low end of the coil returns to a lug which is connected to chassis on DQ and to B minus on DQ1. On coil 7QT-547 the low end of the coil returns to the mounting foot.

—DQ, DQ1, EH—S1 2. DQ chassis using (a) speaker 6QS-387 may use 7KS-446A for replacement. (b) electrolytic 6JC-466AU may use 6JC-426F for replacement.

3. EH, EH1 chassis use C25—.02 mf, 400 volt condenser.

Chassis DY, DY1 EMERSON RADIO & PHONOGRAPH CORP.



WAVE BAND SWITCH SHOWN IN SHORT WAVE POSITION
POSITION NO 1 SHORT WAVE
NO 2 BROADCAST

Note: On Model DY1, line switch returns to B minus instead of chassis.

*ON MODEL DY OMIT PARTS R11 & C30 AND GROUND B MINUS TO CHASSIS. ON MODEL DY-1 PARTS R11 & C30 ARE USED AND B MINUS IS NOT GROUNDED TO CHASSIS.

SCHEMATIC DIAGRAM
*CHASSIS MODEL DY & DY-1
5 TUBE A C D C RECEIVER

MODELS: DY-337
DY-349
DY-351

CHASSIS MODEL: DY

MODELS: DY1-337
DY1-349
DY1-351

CHASSIS MODEL: DY1
(Listed under reexamination service of Underwriters' Laboratories, Inc.)

TYPE: Two-band superheterodyne.

FREQUENCY RANGES:
540-1600 kc.
2.5-6.5 mc.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The loop antenna acts as the broadcast antenna coil. The short-wave antenna coil is the larger of the two coils mounted on the loop.

The trimmers for the antenna coils (loops) for both bands are located on a dual strip fastened to the loop board. The innermost trimmer is for short-wave and outermost trimmer for broadcast.

The oscillator coil is located underneath the chassis, just below the variable condenser. The trimmers for both bands are mounted on a dual strip beneath the first i-f transformer. The short-wave trimmer is the one farthest from the mounting foot.

PRODUCTION CHANGES

1. Chassis which use C27, C28—6JC-426B, may use 6JC-426H for replacement.
2. Chassis using speaker 7YS-476 may use 6MS-395 for replacement.
3. Chassis bearing serial number above 4,083,550 use 7YT-552B loading coil.
4. Chassis bearing serial number above 4,083,550 use 7YW-249B loop antenna assembly.

L1	Antenna choke and 455 kc wave-trap (DY1)
L1	Antenna choke and 455 kc wave-trap (DY)
L2	Broadcast loop antenna loading coil (see production change No. 3)
T1, T2	Two-band loop antenna assembly (see production change No. 4).
T3	Two-band oscillator coil
T4	Double-tuned 455 kc first i-f transformer
T5	Double-tuned 455 kc second i-f transformer
R1, R10	15 megohm ¼ watt carbon resistor
R2, R11	200,000 ohm ¼ watt carbon resistor
R3	20,000 ohm ¼ watt carbon resistor
R4	50,000 ohm ¼ watt carbon resistor
R5	2 megohm ¼ watt carbon resistor
R6	Volume control .5 megohm with line switch
R7, R8	500,000 ohm ¼ watt carbon resistor
R9	140 ohm, ½ watt wire-wound resistor
C1, C2	Two-gang variable condenser
C3	0.006 mf, 600 volt tubular condenser
C4	0.001 mf, part of L1, wave-trap assembly
C5, C19	0.02 mf, 200 volt tubular condenser
C6	0.0025 mf mica condenser
C7, C8	Trimmers, part of loop antenna assembly.
C9, C10, C11, C12	Trimmers, part of i-f transformers.
C13, C14	Dual trimmer assembly
C15	Single adjustable padding condenser
C16	0.00022 mf mica condenser
C17	0.00114 mf mica condenser (coded 0.0011 mf)
C18	0.01 mf, 400 volt tubular condenser
C20	0.1 mf, 200 volt tubular condenser
C21, C23	0.0002 mf, 600 volt tubular or mica condenser
C22	0.002 mf, 600 volt tubular condenser
C24	0.02 mf. 400 volt tubular condenser

—DY-DY1—S1

—DY-DY1—S2

7YS-476A	5" dynamic speaker (DY1)
7YS-476	5" dynamic speaker (DY)
7YS-477	Wave-band switch

C27, C28	Dual 20 mf, 150 volt dry electrolytic condenser
C29	0.01 mf, 600 volt tubular condenser
C30	0.2 mf, 200 volt tubular condenser
C25	0.03 mf, 400 volt tubular condenser
C26	0.05 mf, 400 volt tubular condenser

TYPE OF TUBES:
12SA7GT, pentagrid oscillator-modulator
12SK7GT, first i-f amplifier
12SQ7GT, diode detector, a-f amplifier, a.v.c.
50L6GT, beam power output
35Z5GT, half-wave rectifier.

POWER SUPPLY: a.c. or d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

DIAL CORD REPLACEMENT

Use a half turn of cord, part number 7BZ-867A. Draw the cord snugly around the condenser pulley and knot with no slack, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip to the stator lug. This lug is easily identified by the connection of the green lead to the loop.

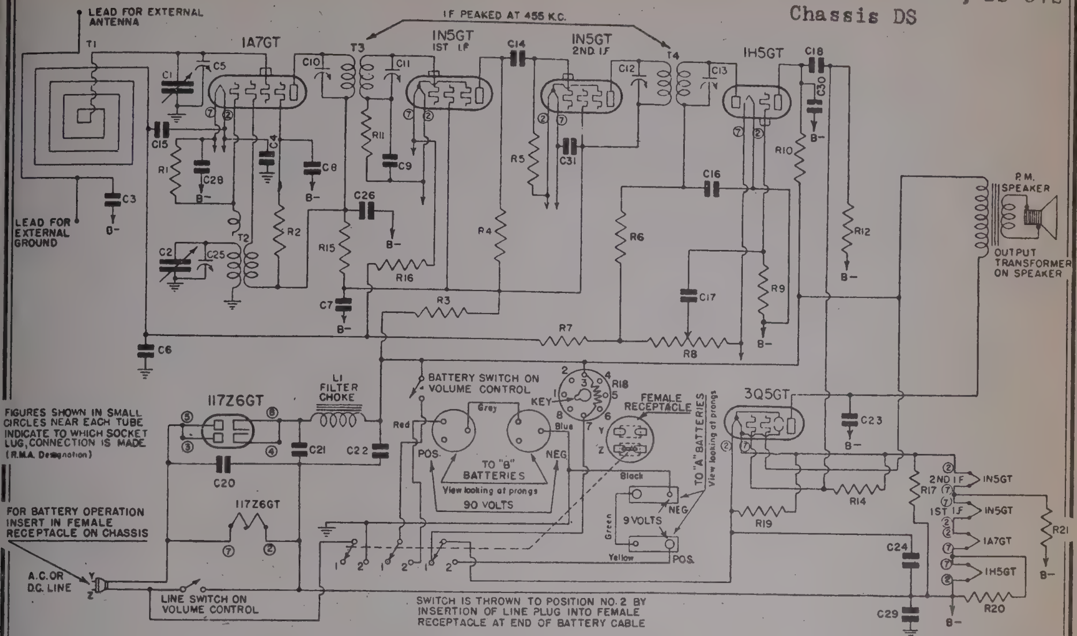
R-f Alignment

Rotate the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer at 6 megacycles and feed 6 megacycles from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from the loop antenna and advance the output of the generator until a deflection is obtained on the output meter. Adjust first the short-wave oscillator trimmer (farthest from mounting foot, beneath the chassis) and then the antenna trimmer (innermost trimmer of dual trimmer strip on loop board) for maximum response.

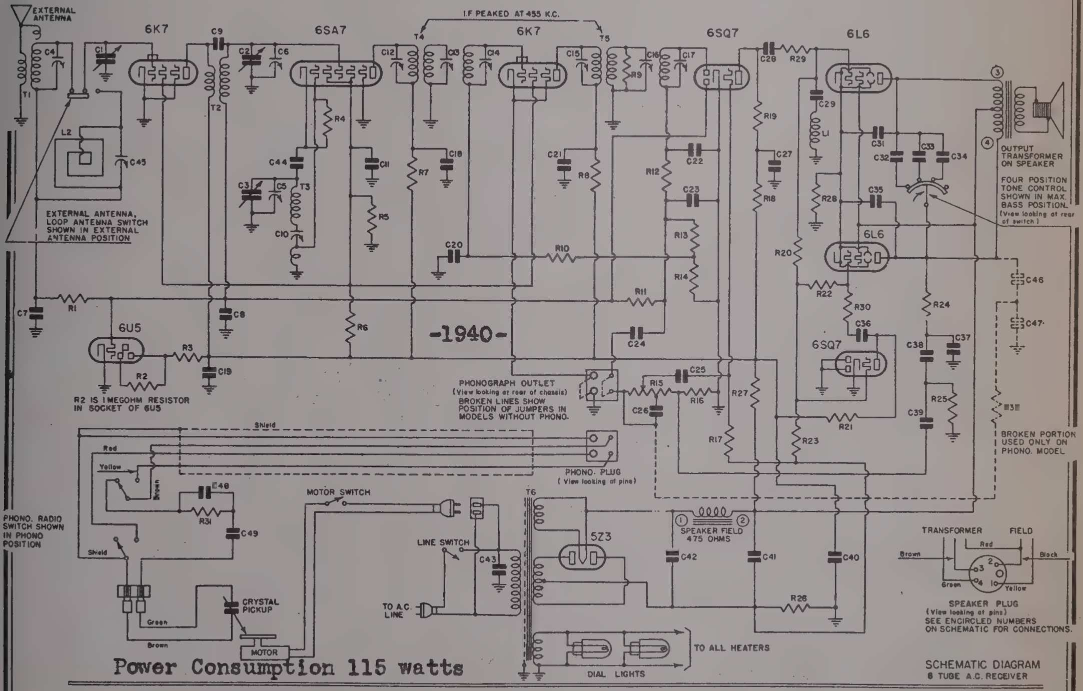
Without changing the above set-up, rotate the band-switch clockwise to the broadcast position, set the dial pointer at 150 and feed 1500 kc into the radiating loop. Adjust first the broadcast oscillator trimmer (closest to mounting foot, beneath the chassis), and then the antenna trimmer (outermost of dual trimmer on the loop) for maximum response. Rotate the dial to 60, feed 600 kc into the radiating loop and adjust the broadcast series padder (mounted on the rear wall) for maximum response while rocking the variable back and forth. Repeat alignment at 1500 kc.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL EA1-341
Chassis EA1
MODELS DS-365, DS-372
Chassis DS


LEAD FOR EXTERNAL ANTENNA
T1
1A7GT
I.F. PEAKED AT 455 K.C.
1N5GT 1ST I.F.
1N5GT 2ND I.F.
1H5GT
T2
T3
T4
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C20 C21 C22 C23 C24 C25 C26 C28 C29 C30 C31
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R14 R15 R16 R17 R18 R19 R20 R21
LEAD FOR EXTERNAL GROUND
B-
P.M. SPEAKER
OUTPUT TRANSFORMER ON SPEAKER
117Z6GT
L1 FILTER CHOKE
BATTERY SWITCH ON VOLUME CONTROL
KEY
FEMALE RECEPTACLE
TO "A" BATTERIES
View looking at prongs
3Q5GT
FIGURES SHOWN IN SMALL CIRCLES NEAR EACH TUBE INDICATE TO WHICH SOCKET LUG, CONNECTION IS MADE (R.M.A. Designation)
Grey
Red
Blue
POS.
NEG.
TO "B" BATTERIES
View looking at prongs
90 VOLTS
Black
Green
9 VOLTS
Yellow
NEG
POS.
FOR BATTERY OPERATION INSERT IN FEMALE RECEPTACLE ON CHASSIS
A.C. OR D.C. LINE
LINE SWITCH ON VOLUME CONTROL
SWITCH IS THROWN TO POSITION NO. 2 BY INSERTION OF LINE PLUG INTO FEMALE RECEPTACLE AT END OF BATTERY CABLE
2ND I.F. 1N5GT
1ST I.F. 1N5GT
1A7GT
1H5GT

MODEL: EA1-341 CHASSIS MODEL: EA1 TYPE: Universal (Battery, A.C.-D.C.). Superheterodyne.


EXTERNAL ANTENNA
6K7
6SA7
I.F. PEAKED AT 455 K.C.
6K7
6SQ7
6L6
T1 T2 T3 T4 T5
L1 L2
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C31 C32 C33 C34 C35 C36 C37 C38 C39 C40 C41 C42 C43 C44 C45 C46 C47 C48 C49
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32
EXTERNAL ANTENNA, LOOP ANTENNA SWITCH SHOWN IN EXTERNAL ANTENNA POSITION
OUTPUT TRANSFORMER ON SPEAKER
FOUR POSITION TONE CONTROL SHOWN IN MAX. BASS POSITION. (View looking at rear of switch)
6L6
-1940-
6U5
R2 IS 1 MEGOHM RESISTOR IN SOCKET OF 6U5
6SQ7
PHONOGRAPH OUTLET (View looking at rear of chassis) BROKEN LINES SHOW POSITION OF JUMPERS IN MODELS WITHOUT PHONO.
BROKEN PORTION USED ONLY ON PHONO. MODEL
Shield
Red
Yellow
Brown
PHONO. PLUG (View looking at pins)
PHONO. RADIO SWITCH SHOWN IN PHONO POSITION
Shield
MOTOR SWITCH
LINE SWITCH
TO A.C. LINE
T6
5Z3
SPEAKER FIELD 475 OHMS
CRYSTAL PICKUP
Green
Brown
MOTOR
TO ALL HEATERS
DIAL LIGHTS
TRANSFORMER FIELD
Red
Brown
Black
Green
Yellow
SPEAKER PLUG (View looking at pins) SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS.
SCHEMATIC DIAGRAM 8 TUBE A.C. RECEIVER

Power Consumption 115 watts

PHONOGRAPH OUTLET IS AS SHOWN WHEN CHASSIS IS UPSIDE DOWN

MODELS: DS-365 DS-372 CHASSIS MODEL: DS TYPE: Single-band superheterodyne.

©John F. Rider, Publisher

MODEL EA1-341
Chassis EA1
MODELS DS-365, DS-372
Chassis DS

EMERSON RADIO & PHONOGRAPH CORP.

EA1-341

TYPE OF TUBES
1A7GT, oscillator-modulator
1N5GT, 1st i-f amplifier
1N5GT, 2nd i-f amplifier
1H5GT, 2nd detector, a.v.c., a-f amplifier
3Q5GT, beam power output (battery operation)
117Z6GT, rectifier (line operation)

PARTS

T1	Loop antenna assembly
L1	Iron core filter choke
T2	Oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc diode i-f transformer
R1, R6	50,000 ohm ¼ watt carbon resistor
R2	30,000 ohm ¼ watt carbon resistor
R3	500 ohm ¼ watt carbon resistor
R4	25,000 ohm ¼ watt carbon resistor
R5	200,000 ohm ¼ watt carbon resistor
R7, R14	3 megohm ¼ watt carbon resistor
R8	Volume control with line and battery switch (500,000 ohms)
R9, R11	5 megohm ¼ watt carbon resistor
R10, R12	500,000 ohm ¼ watt carbon resistor
R15	1000 ohm ¼ watt carbon resistor
R17	1000 ohm 2 watt wire-wound resistor
R16	15 megohm ¼ watt carbon resistor
R18	Plug-in ballast resistor
R19	1500 ohm 2 watt wire-wound resistor
R20, R21	1000 ohm ½ watt carbon resistor
C1, C2	Two-gang variable condenser
C3	0.002 mf, 600 volt tubular condenser
C6, C7, C9, C15, C26, C28, C31	0.05 mf, 200 volt tubular condenser
C8, C18	0.02 mf, 400 volt tubular condenser
C10, C11, C12, C13	Trimmers, part of i-f transformers.
C14, C16	0.0002 mf, 600 volt tubular or mica condenser
C17	0.006 mf, 600 volt tubular condenser
C20	0.05 mf, 400 volt tubular condenser
C21, C22	Dual 20 mf, 150 volt dry electrolytic condenser.
C23	0.01 mf, 400 volt tubular condenser
C24	40 mf, 135 volt dry electrolytic condenser
C25, C5	Trimmer, part of variable condenser.
C29, C4	0.1 mf, 200 volt tubular condenser
C30	0.0004 mf, 600 volt tubular or mica condenser.
7JS-444	Door switch (for DJ-311)
8AS-500	5" permanent magnet dynamic speaker
7JS-472	Line-battery switch

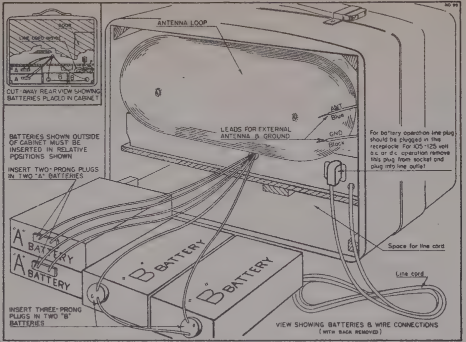
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 9.0 volts, "B" 90 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7GT	88	50	82	1.5
1N5GT, 1st i-f	50	88	—	1.5
1N5GT, 2nd i-f	88	88	—	1.5
1H5GT	27	—	—	1.5
3Q5GT		88	—	3.0

117Z6GT rectifier cathode (Pin No. 8 and 4) (line operation only—125 volts. Filament—117 volts.

If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.


NO 99
DOOR
LINE CORD INSIDE
A
A
B
B
CUT-AWAY REAR VIEW SHOWING BATTERIES PLACED IN CABINET
BATTERIES SHOWN OUTSIDE OF CABINET MUST BE INSERTED IN RELATIVE POSITIONS SHOWN
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES
ANTENNA LOOP
LEADS FOR EXTERNAL ANTENNA & GROUND
ANT
Blue
GND
Black
For battery operation line plug should be plugged in this receptacle For 105-125 volt a.c. or d.c. operation remove this plug from socket and plug into line outlet
"A" BATTERY
"A" BATTERY
"B" BATTERY
"B" BATTERY
Space for line cord
Line cord
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES
VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)

I-f Alignment

Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7GT tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 140. Set the dial at 60 and feed 600 kc to the radiating loop. A portion of the outside turn of the loop may then be swung to either side of the center to give maximum response. Realign at 140.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the front section of the variable condenser.

The loop antenna acts as the antenna coil. The trimmer for the loop is on the rear section of the variable condenser.

The first i-f transformer is located on the top of the chassis behind the variable condenser. The trimmers can be reached through holes in the top of the can. The diode i-f transformer is mounted on the rear wall beneath the chassis. The trimmers can be reached through holes in the rear of the chassis.

POWER SUPPLY:
Battery, A.C. or D.C.

VOLTAGE RATING:
(Line operation) 105-125 volts, a.c.-d.c.

POWER CONSUMPTION:
(Line operation) 30 watts.

CURRENT DRAIN:
(Battery operation)
"A" battery 0.05 amp. at 9 volts.
"B" battery 0.01 amp. at 90 volts.

CHASSIS EA1
MODEL EA1-341

color coding of the i-f transformer leads
Grid—green
Grid return—black
Plate—blue
B plus—red

color coding of the battery cable
Yellow—A plus, 9 volts
Black—A minus
Red—B plus, 90 volts
Blue—B minus

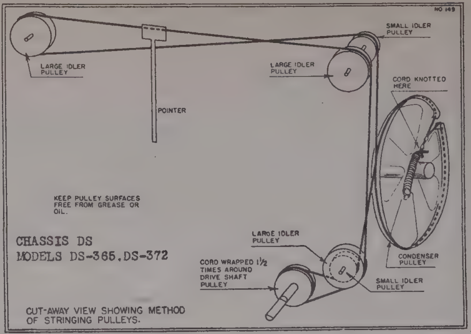
A.C.-D.C. Operation: Open the small door at the back of the cabinet. It is important that this small door be left open while operating the receiver on either a.c. or d.c. power. Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet.

Battery Operation: Important—Remove the line plug from the electrical outlet. Insert the plug into the receptacle at the rear of the receiver. This is important since the receiver will not operate from batteries with the plug out of the receptacle.

FREQUENCY RANGE: 540-1600 kc. —EA1-81

DS-365 DS-372

The switch located at the rear of the chassis is provided to allow the use of either the enclosed loop antenna or an external antenna. Push the switch to the left for use of external antenna.



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

PARTS

R1, R12, R29, R30	50,000 ohm ¼ watt carbon resistor.
R2	1 megohm resistor in 6U5 tube socket.
R3	20,000 ohm 1 watt carbon resistor.
R4	20,000 ohm ¼ watt carbon resistor
R5	40,000 ohm ½ watt carbon resistor
R6	15,000 ohm 2 watt carbon resistor.
R7, R8	1000 ohm ¼ watt carbon resistor.
R9	190,000 ohm resistor, part of T6
R10, R11	3 megohm ¼ watt carbon resistor
R13	200,000 ohm ¼ watt carbon resistor.
R14, R18, R19, R21	100,000 ohm ¼ watt carbon resistor.
R15	Volume control, 1.2 megohm, double tapped, with line switch
R16	75 ohm ½ watt wire-wound resistor.
R17	2 megohm ¼ watt carbon resistor
R20, R22, R23	250,000 ohm ¼ watt carbon resistor
R24	10,000 ohm 2 watt carbon resistor.
R25	3500 ohm ½ watt carbon resistor
R26	11 ohm ½ watt wire-wound resistor.
R27	1500 ohm 2 watt carbon resistor.
R28	180 ohm 3 watt carbon resistor
C1, C2, C3	Three-gang variable condenser
C4	Trimmer, part of T1
C5, C6	Trimmers, part of variable condenser
C7, C8, C20	0.05 mf, 200 volt tubular condenser
C9	0.000,008 mf mica condenser
C10	Single adjustable padding condenser; range—300 to 600 mmf
C11, C19, C27, C28	0.1 mf, 400 volt tubular condenser.
C12, C13, C14, C15, C16, C17	Trimmers, part of i-f transformers
C18, C21, C36	0.05 mf, 400 volt tubular condenser.
C22, C26	0.00011 mf mica condenser
C23	0.00006 mf mica condenser
C24, C25	0.01 mf, 400 volt tubular condenser
C29	0.0014 mf mica condenser, part of L1
C31, C35	0.003 mf, 600 volt tubular condenser.
C32	0.1 mf, 600 volt tubular condenser
C33	0.05 mf, 400 volt tubular condenser
C34	0.015 mf, 600 volt tubular condenser. (See production change No. 1)
C37	0.08 mf, 600 volt tubular condenser.
C38	0.04 mf, 400 volt tubular condenser.
C39	0.5 mf, 200 volt tubular condenser
C40, C4	16 mf, 400 volt dry electrolytic condenser.
C42	30 mf, 450 volt wet electrolytic condenser 30 mf, 450 volt fabricated plate electrolytic condenser
C43	0.01 mf, 400 volt molded condenser.

PRODUCTION CHANGE

1. In DS-372 condenser C34 is 0.01 mf, 600 volt,

T1	Antenna coil
T2	Interstage coil
T3	Loop antenna (365 cabinet)
T3	Loop antenna (372 cabinet)
T4	Oscillator coil
T5	First i-f transformer
T6	Second i-f transformer
T7	Power transformer
L1	10 K.C. filter choke.
R31	2 megohm ¼ watt carbon resistor
R32	20 megohm ¼ watt carbon resistor
C46	0.0011 mf mica condenser
C47	0.006 mf, 600 volt tubular condenser
C48	0.00011 mf mica condenser
C49	0.001 mf, 400 volt tubular condenser

POWER SUPPLY: A.C. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 115 watts.

—DS—S1

TYPE OF TUBES:
6K7GT, r-f amplifier
6SA7GT, oscillator-modulator
6K7GT, i-f amplifier
6SQ7GT, diode detector, audio amplifier and a.v.c.
6SQ7GT, phase inverter
6L6G, push-pull power output
5Z3, full-wave rectifier
In addition, a 6U5 electron-ray tuning indicator is used.

FREQUENCY RANGE:
540-1650 kc (555-182 meters)

color coding of the power transformer
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

color coding of the i-f transformers
Grid—green Plate—blue
B plus—red Grid return—black

AUTOMATIC RECORD CHANGER

Controls and Moving Mechanism

INDEX AND RECORD REJECT LEVER.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions: "MANUAL," "12," "10" and "REJECT." When you desire to change record selections manually, this lever should be set in the "MANUAL" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "REJECT" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "MANUAL" position when not actually playing records automatically.

TURNTABLE SWITCH.—The switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, set the switch to the "ON" position. To stop the turntable, set the switch to the "OFF" position.

PICKUP AND TOP-LOADING NEEDLE SOCKET.—The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm to the right of the small extension post and the pickup over the polished needle gauge plate. The pickup must be in this position to insert a needle.

The pickup support plate with extension post, gauge plate and box holder is at the front of the motorboard on the right. The box slides in and out at the back for emptying, and is held secure by a spring piece on the bottom.

To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

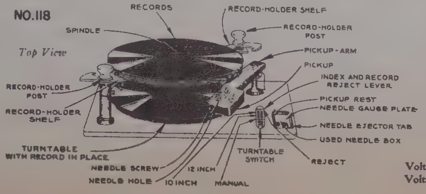
To change a needle, place pickup in rest position, loosen needle screw and push pickup to the right to drop the used needle into the box below. Then with pickup against extension post insert a new needle as described above.

RECORD HOLDER SHELVES.—To place a record on the turntable or to remove records, raise the record holder shelves by lifting the knobs, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves back into position.

To Insert Needle

The pickup must be over the needle gauge plate to insert or change needles. To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at the top so that it drops down against the needle gauge plate and then tighten up the needle screw. The extending tab on the needle gauge plate operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above. The used needle box may be taken out and emptied by first lifting the pickup off its rest and allowing it to float between the rest and the turntable. Then tilt the box upwards at the front and lift out. To replace the box, tilt it upwards at front and lower it into the hole with the lug on the back of the box in the slot in the motorboard. Slide the lug under the motorboard and push the box in place. Replace the pickup on its rest.

NO.118



SPECIAL PRECAUTIONS

The following precautions are of the utmost importance and should be carefully observed:

1. Do not handle or move manually the pickup or any part of the mechanism while it is going through the record-changing operation.

2. Do not use force in handling the mechanism at any time.

3. Warped or thick records should not be used for automatic operation.

4. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.

5. During automatic operation, the needle is fed automatically into the starting groove of the next record. If the needle fails to enter the starting groove, this is an indication that the cabinet is not level. Raise the right-hand side of the cabinet, by inserting several thin spacers beneath it on that side. If the needle slides over a few grooves, raise the left-hand side of the cabinet in a similar fashion.

6. Never leave pickup with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pickup is in the rest position over needle gauge plate.

7. This instrument is not recommended for playing 10 inch and 12 inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pick-up will come down in position for a 10 inch record and repeat the playing on a 10 inch diameter unless the turntable switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.

Manual Operation

1. Proceed as in steps 1, 2 and 3 under Automatic Operation.

2. Place record on turntable with desired selection upwards.

3. Set Index and Record Reject Lever to "Manual" position. The lever should be kept in this position when not actually playing records automatically.

4. Turn the motor on. Lift the pickup and gently lower it on the record. 5. Adjust the volume to the desired level.

Automatic Operation

1. Turn the receiver "on" in the usual way, as explained above.

2. Rotate the phono-radio switch knob counter-clockwise to the phonograph position. Wait about a minute for the tubes in the receiver to warm up.

3. See that the pickup is over the needle gauge plate with needle properly in place. If not, complete a cycle as follows: Throw the turntable switch "on." The turntable will start to revolve and the cycle of motion on the pickup arm will follow through. When the pickup arm comes down (and it can be moved by hand) the cycle is completed. Turn off the turntable switch.

4. The Index and Record Reject Lever is located near the right front corner of the motorboard. With this lever at "Manual" position, place the series of records (up to eight 10-inch or seven 12-inch records) on the record holder posts. This is shown in the illustration.

5. Set the Index and Record Reject Lever to the proper position. With this lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position. To reject a record being played, or to start the record changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "Reject" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. When playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record.

6. Throw the turntable switch to the "on" position. The turntable should start to revolve.

7. When turntable has attained speed, push the Index and Record Reject Lever to the "Reject" position. The first record will drop on the turntable and the pickup will move into position on the record.

8. Adjust to the desired volume by means of the regular receiver volume control.

9. Close the cabinet lid to eliminate normal mechanical noises due to needle vibration.

The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with pickup over needle gauge plate. The record player is then ready for reloading, or for manual operation.

MODEL DS-365,DS-372 CHASSIS DS

ADJUSTMENTS

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna or a .0002 mf condenser for aligning the antenna coil.

Always use as weak a test signal as possible during alignment.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave the trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Heaters
6K7GT	245	70	0	6.3
6SA7GT	245	70	0	6.3
6K7GT	235	70	0	6.3
6SQ7GT (det.)	125	—	0	6.3
6SQ7GT (P.I.)	150	—	0	6.3
6L6 (2)	275	285	18.5	6.3

Voltage drop across field—65 volts.
Voltage at 5Z3 filament to ground—350 volts.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

I-f Alignment

Push the switch at the rear of the chassis to "external antenna" and feed 455 kc through a .01 mf condenser to the grid of the 6K7 i-f tube. Unscrew the copper colored screw of the second i-f transformer as far as possible and then align the other trimmers of this transformer for maximum response. Shift the input to the grid of the 6SA7 (clip input to stator lug of right end section of variable condenser) and repeat the same procedure on the first i-f transformer. Do not disturb the alignment of the second i-f transformer. Feed the signal again to the 6K7GT i-f tube, shunt the primary and secondary of the second i-f transformer with 25,000 ohm resistors, and adjust the tertiary (copper color) trimmer for maximum response. Again feed the grid of the 6SA7, shunt the primary and secondary of the first i-f transformer with resistors and then, without removing the shunting resistors from the second transformer, adjust the first transformer tertiary for maximum response. Do not disturb the alignment of any of the second i-f trimmers. Remove the resistors and sweep the signal generator through the band. The response should be quite flat with a slight peak in the middle, with a band width of about 10-12 kilocycles.

Visual alignment may be used in which case a similar procedure should be followed except that it will be unnecessary to shunt the transformers with resistors. With either method of adjustment, however, the alignment should be repeated until a satisfactory, broad response curve is obtained or the fidelity of reception will be seriously impaired.

R-f Alignment

With the switch at the rear of the chassis in the position marked "external antenna" set the pointer at 60 and feed 600 kc to the external antenna lead through a standard dummy antenna or a 0.0002 mf mica condenser. Adjust the series padder (located at the left of the variable condenser, on the top of the chassis) for maximum response. Move the pointer to 160, feed 1600 kc and align first the oscillator trimmer (right end condenser section) and then the interstage and antenna trimmers (see preceding for location) for maximum response. Return to 600 kc and adjust the series padder (while rocking the variable back and forth) for maximum response. Realign at 1600 kc.

To align the loop, set the dial pointer at 160. Set the signal generator at 1600 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter and then adjust trimmer on loop for maximum response.

Location of Coils and Trimmers

The two triple-tuned i-f transformers are mounted in cans on the top of the chassis. The trimmers are available through holes in the tops of the cans. The copper colored screw is for the tertiary coil. The first i-f transformer is the one at the left side of the chassis.

The broadcast antenna coil is the open coil on the top of the chassis between the 6SA7G and the 6K7GT i-f tube. The trimmer for the coil is mounted on top of the coil.

The interstage coil is the larger of the two coils underneath the chassis. Its trimmer is located on the right end section of the variable condenser.

The oscillator coil is the smaller of the two coils underneath the chassis. Its trimmer is located on the center section of the variable condenser.

The trimmer for the loop is mounted on the loop board.

MODELS
DS-365, DS-372
CHASSIS DS

EMERSON RADIO & PHONOGRAPH CORP.

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is 075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

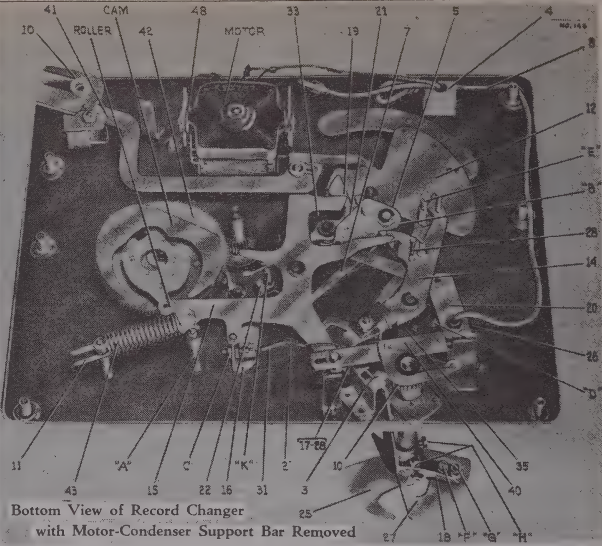
The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

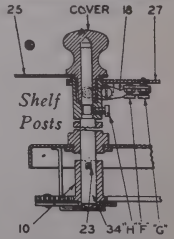
1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".

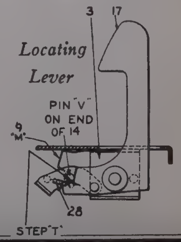


Bottom View of Record Changer
with Motor-Condenser Support Bar Removed

AUTOMATIC RECORD CHANGER

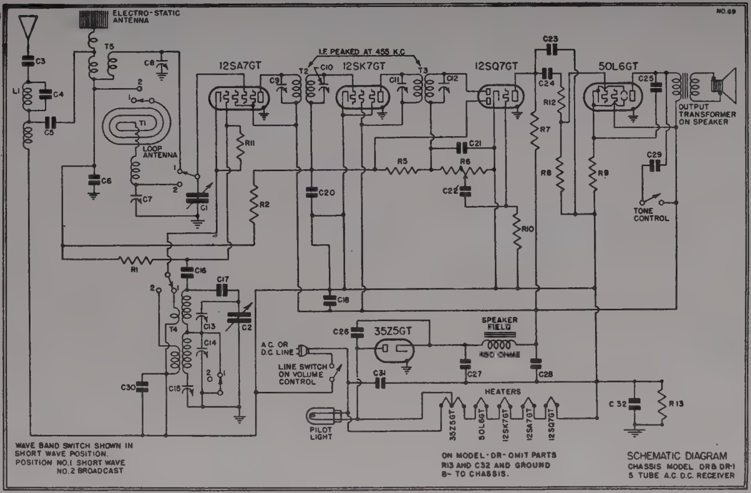
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective;
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H"
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring





EMERSON RADIO & PHONOGRAPH CORP.

Chassis DR, DR1



SCHEMATIC DIAGRAM
CHASSIS MODEL DR & DR-1
5 TUBE A.C. D.C. RECEIVER

MODELS: DR-343
DR-348
DR-349
DR-350
DR-352

CHASSIS MODEL: DR

MODELS: DR1-343
DR1-348
DR1-350
DR1-352

CHASSIS MODEL: DR 1

Listed under Re-examination Service
of Underwriters' Laboratories, Inc.

TYPE: Two band superheterodyne.

FREQUENCY RANGES:
540-1600 kc.
5.8- 18.3 mc.

DIAL CORD REPLACEMENT

Use a half turn of cord, part number 7BZ-867A. Draw the cord snugly around the condenser pulley and knot with no slack, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The loop antenna acts as the broadcast antenna coil. The short-wave antenna coil is the larger of the two coils mounted on the loop frame.

The trimmers for the antenna coils for both bands are located on a dual strip behind the variable condenser. The upper trimmer is for broadcast, and lower for short-wave.

The oscillator coil is located underneath the chassis, just below the variable condenser. The trimmers for both bands are mounted on a dual strip beneath the first i-f transformer. The short-wave trimmer is the one closest to the mounting foot.

L1	Antenna choke and 455 kc wave-trap
T1	Loop antenna assembly
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer.
T4	Two-band oscillator coil
T5	Short-wave antenna coil
R1, R10	15 megohm ¼ watt carbon resistor
R2, R13	200,000 ohm ¼ watt carbon resistor
R7, R8	500,000 ohm ¼ watt carbon resistor
R5	3 megohm ¼ watt carbon resistor
R6	Volume control .5 megohm with line switch
R9	140 ohm, ½ watt wire-wound resistor
R11	20,000 ohm ¼ watt carbon resistor
R12	50,000 ohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser
C3	0.006 mf, 600 volt tubular condenser
C4	0.001 mf, part of L1, wave-trap assembly
C5, C18	0.02 mf, 200 volt tubular condenser (see production change no. 1).
C6	0.0025 mf mica condenser
C7, C8	Dual trimmer assembly
C9, C10, C11, C12	Trimmers, part of i-f transformers.
C13, C14	Dual trimmer assembly
C15	Single adjustable padding condenser
C16	0.00011 mf mica condenser
C17	0.0016 mf mica condenser.
C20, C29	0.05 mf, 200 volt tubular condenser
C21, C23	0.0002 mf, 600 volt tubular or mica condenser
C22	0.002 mf, 600 volt tubular condenser
C24	0.02 mf, 400 volt tubular condenser
C25	0.03 mf, 400 volt tubular condenser

—DR-S1 —DR-S2

POWER SUPPLY: a.c. or d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

TYPE OF TUBES:

12SA7GT, pentagrid oscillator-modulator
12SK7GT, first i-f amplifier
12SQ7GT, diode detector, a-f amplifier, a.v.c.
50L6GT, beam power output
35Z5GT, half-wave rectifier.

C26	0.01 mf, 600 volt tubular condenser
C27, C28	Multiple dry electrolytic condenser, 150 volt. C27—20 mf; C28—40 mf.
C30	0.01 mf, 400 volt tubular condenser
C31	0.05 mf, 400 volt tubular condenser
C32	0.2 mf, 200 volt tubular condenser
7RS-452	6½" dynamic speaker
7RS-450	Wave-band switch
7RS-451	Tone control switch

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

VOLTAGE ANALYSIS

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 3,630,550 use C5 and C8—0.015 mf, 400 volt tubular condenser.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug. This lug is easily identified by the connection of the green lead to the loop.

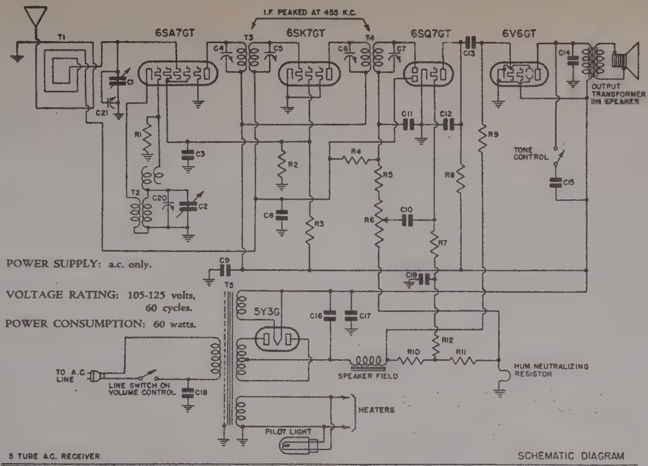
R-f Alignment

Rotate the wave band switch counter-clockwise to the short-wave position. Set the dial pointer at 16 megacycles and feed 16 megacycles from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from the electrostatic antenna and advance the output of the generator until a deflection is obtained on the output meter. Adjust first the short-wave oscillator trimmer (closest to mounting foot—beneath the chassis) and then the antenna trimmer (lower of dual trimmer behind the variable) for maximum response.

Without changing the above set up, rotate the band switch clockwise to the broadcast position, set the dial pointer at 150 and feed 1500 kc into the radiating loop. Adjust first the broadcast oscillator trimmer (farthest from mounting foot—beneath the chassis), and then the antenna trimmer (upper of dual trimmer behind the variable) for maximum response. Rotate the dial to 60, feed 600 kc into the radiating loop and adjust the broadcast series padder (mounted on the rear wall) for maximum response while rocking the variable back and forth. Repeat alignment at 1500 kc.

MODEL ED-354
Chassis ED

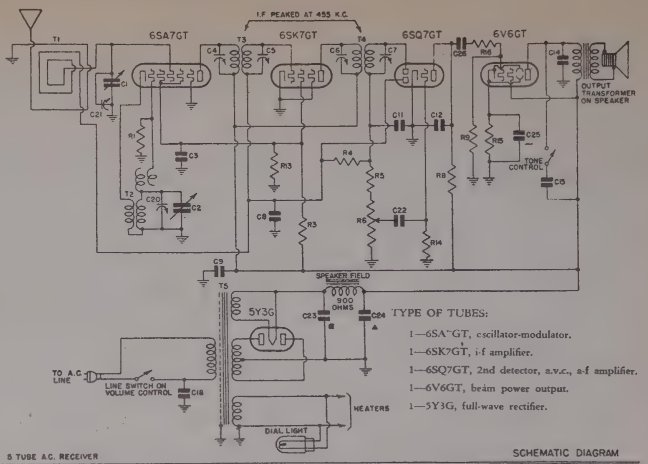
EMERSON RADIO & PHONOGRAPH CORP.



POWER SUPPLY: a.c. only.

VOLTAGE RATING: 105-125 volts, 60 cycles.

POWER CONSUMPTION: 60 watts.



TYPE OF TUBES:

1—6SA7GT, oscillator-modulator.
1—6SK7GT, i-f amplifier.
1—6SQ7GT, 2nd detector, a.v.c., a-f amplifier.
1—6V6GT, beam power output.
1—5Y3G, full-wave rectifier.

SCHEMATIC DIAGRAM FOR CHASSIS BEARING SERIAL NUMBERS BELOW 3,816,700

T1	8DW-278	Loop antenna assembly (see production change No. 1f)
T2	8DT-572	Oscillator coil (see production change No. 1a)
T3	7QT-548B	Double-tuned 455 kc first i-f transformer
T4	8AT-555A	Double-tuned 455 kc second i-f transformer
T5	8DT-554	Power transformer, 117 volts, 60 cycles.
R1	LR-60	20,000 ohm ¼ watt carbon resistor.
R2	3BR-247	40,000 ohm ¼ watt carbon resistor
R3	8DR-397	15,000 ohm 3 watt carbon resistor
R4, R7	HR-42U	2 megohm ¼ watt carbon resistor
R5	OR-73U	25,000 ohm ¼ watt carbon resistor
R6	6GR-352	Volume control, .25 megohm, with line switch
R8	KR-55	250,000 ohm ¼ watt carbon resistor
R9, R12	KR-56	500,000 ohm ¼ watt carbon resistor
R10	8DR-396	180 ohm 1 watt wire-wound resistor
R11	3RR-266	23 ohm ⅜ watt wire-wound resistor
R13	3LR-265	40,000 ohm ½ watt carbon resistor
R14	3RR-275	10 megohm ¼ watt carbon resistor
R15	8GR-421	240 ohm 1 watt
R16	KR-53	50,000 ohm ¼ watt carbon resistor
C1, C2	8DC-492	Two-gang variable condenser (see production change No. 1b)
C3, C13	LC-64	0.05 mf, 400 volt tubular condenser
C4, C5, C6, C7		Trimmers, part of i-f transformers
C8	BC-12	0.05 mf, 200 volt tubular condenser
C9	EEC-132	0.1 mf, 400 volt tubular condenser
C10	HC-34	0.006 mf, 600 volt tubular condenser
C11, C12	5AC-384	0.0002 mf, 600 volt tubular or mica condenser.
C14	8DC-493	0.005 mf, 1000 volt tubular condenser
C15, C26	LC-65	0.02 mf, 400 volt tubular condenser
C16	7AC-443	16 mf, 450 volt dry electrolytic condenser
C17	7AC-444	16 mf, 400 volt dry electrolytic condenser (see production change No. 2)
C18	3LC-297A	0.01 mf, 400 volt molded condenser
C19	5AC-388	0.25 mf, 100 volt tubular condenser
C20, C21		Trimmers, part of variable condenser
C22	3HC-274	0.002 mf, 600 volt tubular condenser
C23, C24, C25	8DC-522	Multiple dry electrolytic condenser. C23—15 mf, 400 volt. C24—15 mf, 350 volt. C25—20 mf. 25 volt
	8DS-486	8" dynamic speaker
	3ES-256J	Tone control switch

—ED-81 —ED-82

VOLTAGE ANALYSIS

Voltage from transformer center tap to ground—85 volts (negative).

Voltage across resistor R10 and R11—15 volts (negative).

Always use as weak a test signal as possible when aligning the receiver.

An output meter should be used across the voice coil or output transformer for observing maximum response.

The color coding of the power transformer is as follows:

Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

color coding of the i-f transformers

Grid—green	Plate—blue
B plus—red	Grid return—black

PRODUCTION CHANGES

1. ED chassis bearing serial numbers below 3,8137,750 use.
   - (a) 8DT-565—Oscillator coil
   - (b) 6SC-438—Variable condenser
   - (c) 6GC-430—Dual trimmer strip in place of trimmers on variable.
   - (d) 2NC-231A—Adjustable series padding condenser
   - (e) 8DD-116—Dial face
   - (f) 8DW-272—Loop antenna
2. ED chasses which use wet second electrolytic, C17, part No. 3SC-303 or 3XC-329 may use dry electrolytic 7AC-444 for replacement.

SCHEMATIC DIAGRAM FOR CHASSIS BEARING SERIAL NUMBERS ABOVE 3,816,700

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	255	85	0	6.3 ac.
6SK7GT	255	85	0	6.3 ac.
6SQ7GT	110	—	0	6.3 ac.
6V6GT	245	255	0	6.3 ac.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck behind the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis. The trimmers are accessible through holes in the back of the chassis.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

MODEL: ED-354

CHASSIS MODEL: ED

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 530-1650 kc.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 6SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 6SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

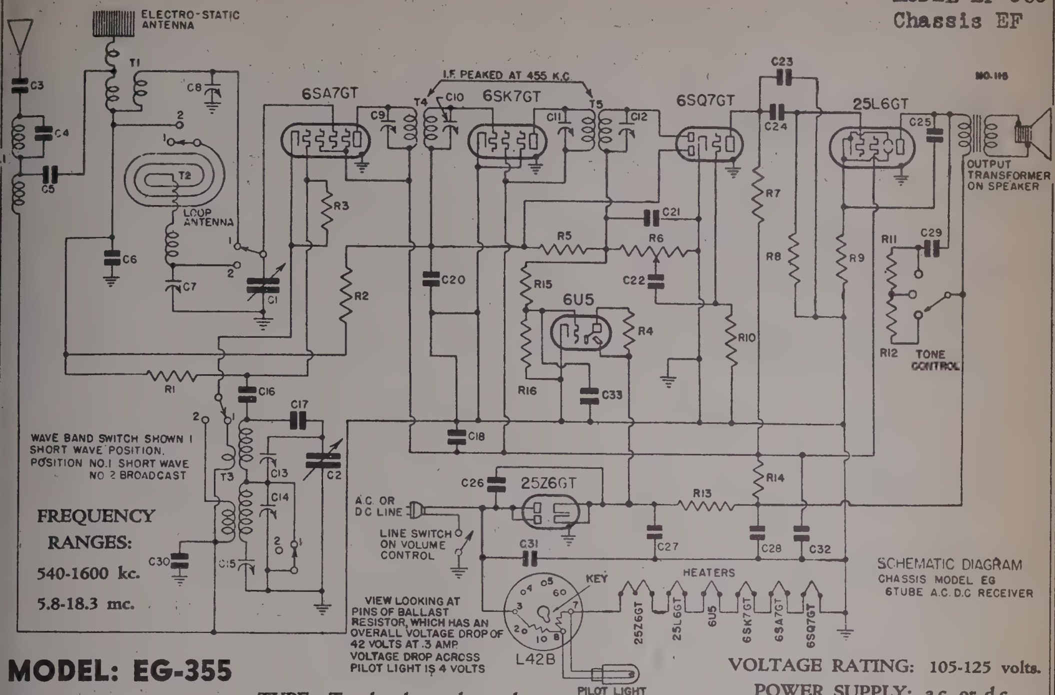
R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 150. Set the pointer at 60 and feed 600 kc to the radiating loop. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL EG-355
Chassis EG
MODEL EF-363
Chassis EF



WAVE BAND SWITCH SHOWN I SHORT WAVE POSITION. POSITION NO. 1 SHORT WAVE NO 2 BROADCAST

VIEW LOOKING AT PINS OF BALLAST RESISTOR, WHICH HAS AN OVERALL VOLTAGE DROP OF 42 VOLTS AT .3 AMP. VOLTAGE DROP ACROSS PILOT LIGHT IS 4 VOLTS

FREQUENCY RANGES:
540-1600 kc.
5.8-18.3 mc.

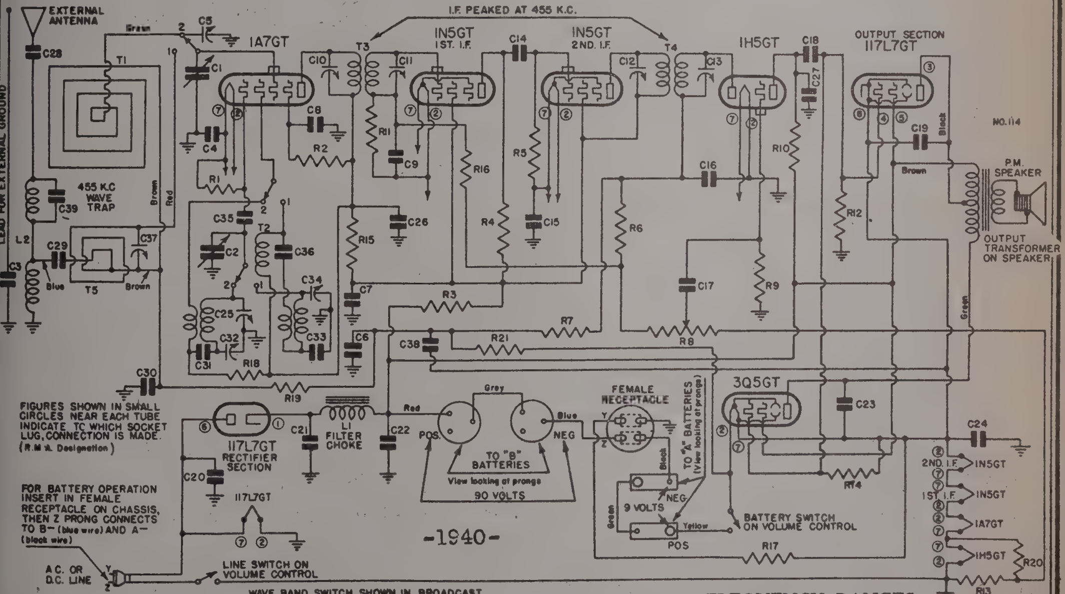
SCHEMATIC DIAGRAM
CHASSIS MODEL EG
6TUBE A.C. D.C RECEIVER

MODEL: EG-355

CHASSIS MODEL: EG

TYPE: Two-band superheterodyne.

VOLTAGE RATING: 105-125 volts.
POWER SUPPLY: a.c. or d.c.
POWER CONSUMPTION: 45 watts.



FIGURES SHOWN IN SMALL CIRCLES NEAR EACH TUBE INDICATE TO WHICH SOCKET LUG, CONNECTION IS MADE. (R.M.A. Designation)

FOR BATTERY OPERATION INSERT IN FEMALE RECEPTACLE ON CHASSIS, THEN Z PRONG CONNECTS TO B− (blue wire) AND A− (black wire)

-1940-

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION POSITION NO. 1 SHORT WAVE NO 2 BROADCAST

MODEL: EF-363

CHASSIS MODEL: EF

Two-band Universal (Battery, A.C.-D.C.) Superheterodyne.

FREQUENCY RANGES:
540-1600 kc.
5.8-18.3 mc.

MODEL EG-355
Chassis EG
MODEL EF-363
Chassis EF

EMERSON RADIO & PHONOGRAPH CORP.

MODEL: EG-355

CHASSIS MODEL: EG

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The loop antenna acts as the broadcast antenna coil. The short-wave antenna coil is the larger of the two coils mounted on the loop board. The trimmers for the antenna coils for both bands are located on a dual strip behind the variable condenser. The upper trimmer is for broadcast and lower, for short-wave.

The oscillator coil is located underneath the chassis, just below the variable condenser. The trimmers for both bands are mounted on a dual strip beneath the first i-f transformer. The short-wave trimmer is the one closest to the mounting foot.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 6SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 6SA7 tube is connected to the stator lug of the rear variable condenser section.

R-f Alignment

Rotate the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer at 16 megacycles and feed 16 megacycles from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from the electrostatic antenna and advance the output of the generator until a deflection is obtained on the output meter. Adjust first the short-wave oscillator trimmer (closest to mounting foot, beneath the chassis) and then the antenna trimmer (lower of dual trimmer, behind the variable) for maximum response.

Without changing the above set-up, rotate the band-switch clockwise to the broadcast position, set the dial pointer at 150 and feed 1500 kc into the radiating loop. Adjust first the broadcast oscillator trimmer (farthest from mounting foot, beneath the chassis) and then the antenna trimmer (upper of dual trimmer, behind the variable) for maximum response. Rotate the dial to 60, feed 600 kc into the radiating loop and adjust the broadcast series padder (on the rear flange of the chassis) for maximum response while rocking the variable back and forth. Repeat alignment at 1500 kc.

DIAL CORD REPLACEMENT

Chassis which have the dial drive shaft pulley with a wide groove use one and a half turns of dial cord, part number 7BZ-867A. The cord should be drawn snugly around the condenser pulley and knotted with no slack, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

L1	Antenna choke and 455 kc wave trap
T1	Short-wave antenna coil
T2	Broadcast loop antenna assembly
T3	Two-band oscillator coil
T4	Double-tuned 455 kc first i-f transformer
T5	Double-tuned 455 kc second i-f transformer
R1, R10	15 megohm ¼ watt carbon resistor.
R2	200,000 ohm ¼ watt carbon resistor.
R3	20,000 ohm ¼ watt carbon resistor
R4	1 megohm ¼ watt carbon resistor (in indicator socket)
R5	3 megohm ¼ watt carbon resistor.
R6	Volume control .5 megohm with line switch
R7, R8	500,000 ohm ¼ watt carbon resistor.
R9	140 ohm ½ watt wire-wound resistor
R11	4000 ohm ¼ watt carbon resistor.
R12	1500 ohm ½ watt carbon resistor
R13	175 ohm 1 watt metallized resistor
R14	740 ohm 1 watt wire-wound resistor
R15	5 megohm ¼ watt carbon resistor
R16	10 megohm ¼ watt carbon resistor
	Plug-in ballast resistor...
C1, C2	Two-gang variable condenser.
C3	0.006 mf, 600 volt tubular condenser.
C4	0.001 mf mica condenser, part of 455 kc wave-trap.
C5, C18	.02 mf, 200 volt tubular condenser
C6	0.0025 mf mica condenser.
C7, C8	Dual trimmer assembly....
C9, C10, C11, C12	Trimmer, part of i-f transformer
C13, C14	Dual trimmer assembly
C15	Single adjustable padding condenser
C16	0.00011 mf mica condenser
C17	0.0016 mf mica condenser
C20, C33	0.05 mf, 200 volt tubular condenser.
C21, C23	0.0002 mf, 600 volt tubular or mica condenser
C22	0.002 mf, 600 volt tubular condenser.
C24	0.02 mf, 400 volt tubular condenser.
C25, C30	0.01 mf, 400 volt tubular condenser.
C26	0.01 mf, 600 volt tubular condenser.
C27, C28	Multiple 20-40 mf, 150 volt dry electrolytic condenser: C27—20 mf; C28—40 mf.
C29	0.1 mf, 200 volt tubular condenser.
C31	0.05 mf, 400 volt tubular condenser.
C32	40 mf, 135 volt dry electrolytic condenser

TYPE OF TUBES:

6SA7GT, pentagrid oscillator-modulator
6SK7GT, first i-f amplifier
6SQ7GT, diode detector, a-f amplifier, a.v.c.
25L6GT, beam power output
25Z6GT, rectifier. TUNING INDICATOR: 6U5 Electron Ray.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given

VOLTAGE ANALYSIS

Voltage at 25Z6 cathode—128 volts.
Voltage across pilot light—4.5 volts.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	100	100	0	6
6SK7GT	100	88	0	6
6SQ7GT	40	—	0	6
25L6GT	112	100	5.6	25

—EG—S1 , —EG—S2

MODEL: EF-363

CHASSIS MODEL: EF

L1	Iron core filter choke
L2	Antenna choke and 455 kc wave trap
T1	Broadcast loop antenna
T2	Two-band oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc diode i-f transformer
T5	Short-wave loop antenna.
R1	200,000 ohm ¼ watt carbon resistor
R2	30,000 ohm ¼ watt carbon resistor
R3	500 ohm ¼ watt carbon resistor
R4	25,000 ohm ¼ watt carbon resistor.
R5, R19	100,000 ohm ¼ watt carbon resistor
R6	50,000 ohm ¼ watt carbon resistor.
R7, R14	3 megohm ¼ watt carbon resistor.
R8	Volume control, 500,000 ohm with double pole line switch.
R9, R11	5 megohm ¼ watt carbon resistor.
R10, R12	500,000 ohm ¼ watt carbon resistor
R13, R20	160 ohm ¼ watt carbon resistor
R15	1000 ohm ¼ watt carbon resistor.
R16, R21	15 megohm ¼ watt carbon resistor
R17	1200 ohm ¼ watt carbon resistor
R18	15,000 ohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser.
C3	0.002 mf, 600 volt tubular condenser
C4, C15	0.25 mf, 100 volt tubular condenser.
C5, C37	Dual antenna trimmer strip..
C6, C7, C9, C26	0.05 mf, 200 volt tubular condenser
C8, C31	0.02 mf, 200 volt tubular condenser
C10, C11, C12, C13	Trimmers, part of i-f transformers.
C14, C16	0.00022 mf mica condenser.
C17, C28	0.006 mf, 600 volt tubular condenser.
C18	0.02 mf, 400 volt tubular condenser.
C19	0.003 mf, 600 volt tubular condenser.
C20	0.05 mf, 400 volt tubular condenser.
C21, C22	Multiple dry electrolytic condenser: C21—20 mf, 150 volt; C22—40 mf, 150 volt.
C23	0.01 mf, 400 volt tubular condenser.
C24	40 mf, 25 volt dry electrolytic condenser
C25, C34	Dual oscillator trimmer strip.
C27	0.0002 mf, 600 volt tubular condenser
C29	0.1 mf, 200 volt tubular condenser
C30	0.0025 mf mica condenser....
C32	Single adjustable padding condenser, 300-600 mmf
C33	0.00185 mf mica condenser (coded 0.0019)
C35	0.00011 mf mica condenser
C36	0.0001 mf mica condenser...
C38	0.015 mf, 400 volt tubular condenser..
7JS-443	6½" permanent magnet dynamic speaker..
8FS-479	Wave band switch
8AW-268	Battery cable

Location of Coils and Trimmer Adjustments

The two-band oscillator coil is located beneath the chassis underneath the variable condenser. The trimmer for the short-wave oscillator is close to the foot of the dual trimmer strip beneath the chassis. The trimmer farthest from the foot is for broadcast.

The large loop antenna acts as the antenna coil for broadcast and the smaller loop for short-wave.

The trimmer for short-wave is the one closer to the foot of the dual trimmer strip behind the variable condenser. The trimmer farthest from the foot is for broadcast.

The broadcast series padding condenser is mounted on the inside rear wall of the chassis and can be reached from the rear of the chassis.

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is at the right of the variable condenser and the diode i-f transformer is to the left of the variable condenser. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

I-f Alignment

With the band switch in the broadcast (clockwise) position swing the variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7GT tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

(Short-Wave)

With the band switch in the short-wave (counter-clockwise) position, set the dial pointer at 16. Feed 16,000 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver short-wave loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. Adjust first the oscillator trimmer, then the antenna trimmer for maximum response.

(Broadcast)

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver broadcast loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer, then the antenna trimmer for maximum response.

Feed 600 kc, into radiating loop, tune in near 60 and adjust series padder, while rocking the variable back and forth, for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 9.0 volts, "B" 90 volts.

TYPE OF TUBES:

1A7GT, oscillator-modulator
1N5GT, 1st i-f amplifier
1N5GT, 2nd i-f amplifier
1H5GT, 2nd detector, a.v.c., a-f amplifier
3Q5GT, beam power output (battery operation)
117L7GT, beam power output and half-wave rectifier (line operation)

Tube	Plate	Screen	Osc. Plate	Fil.
1A7GT	88	50	82	1.5
1N5GT, 1st i-f	50	88	—	1.5
1N5GT, 2nd i-f	88	88	—	1.5
1H5GT	27	—	—	1.5
3Q5GT	85	88	—	3.0
117L7GT (line operation only)	86	95	—	117

117L7GT rectifier cathode (Pin No. 1) (line operation only)—125 volts.

Battery Operation: Important—Remove the line plug from the electrical outlet. Insert the plug into the recetpacle at the rear of the receiver. This is important since the receiver will not operate from batteries with the plug out of the receptacle. The loose portion of the cord can then be coiled and placed in the cabinet underneath the shelf.

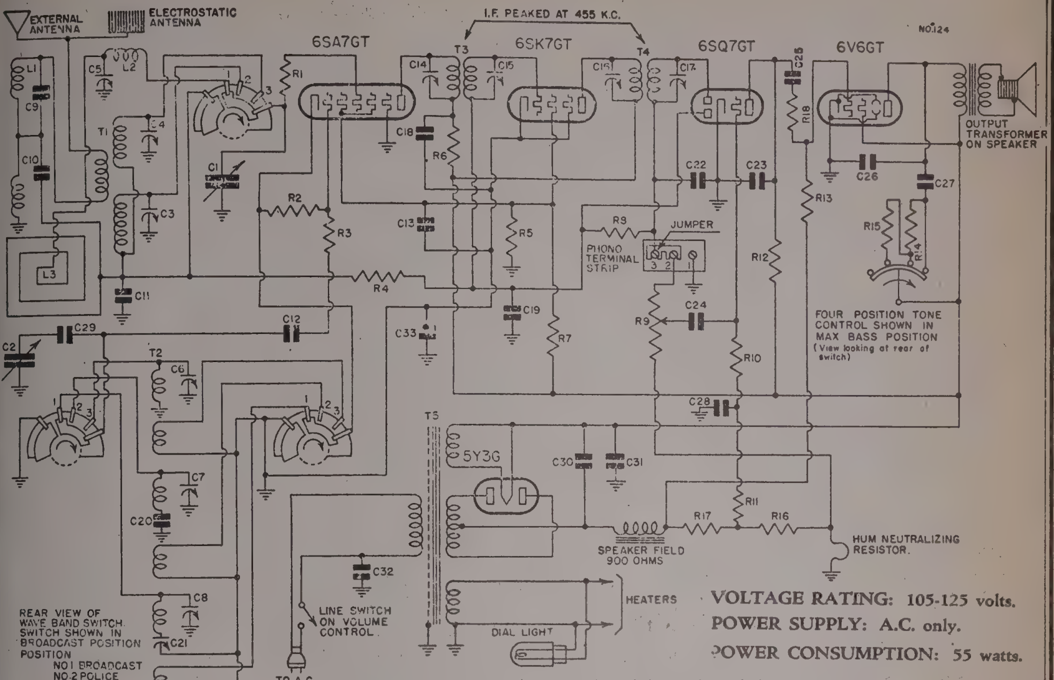
A.C.-D.C. Operation: Open the small door at the back of the cabinet. It is important that this small door be left open while operating the receiver on either a.c. or d.c. power. Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet.

POWER SUPPLY: Battery, A.C. or D.C.
POWER CONSUMPTION: (Line operation) 30 watts.
VOLTAGE RATING: (Line operation) 105-125 volts, a.c.-d.c.

CURRENT DRAIN: —EF-S1 —EF—S2
(Battery operation) "A" battery 0.05 amp.
"B" battery 0.01 amp.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL DX-356
Chassis DX

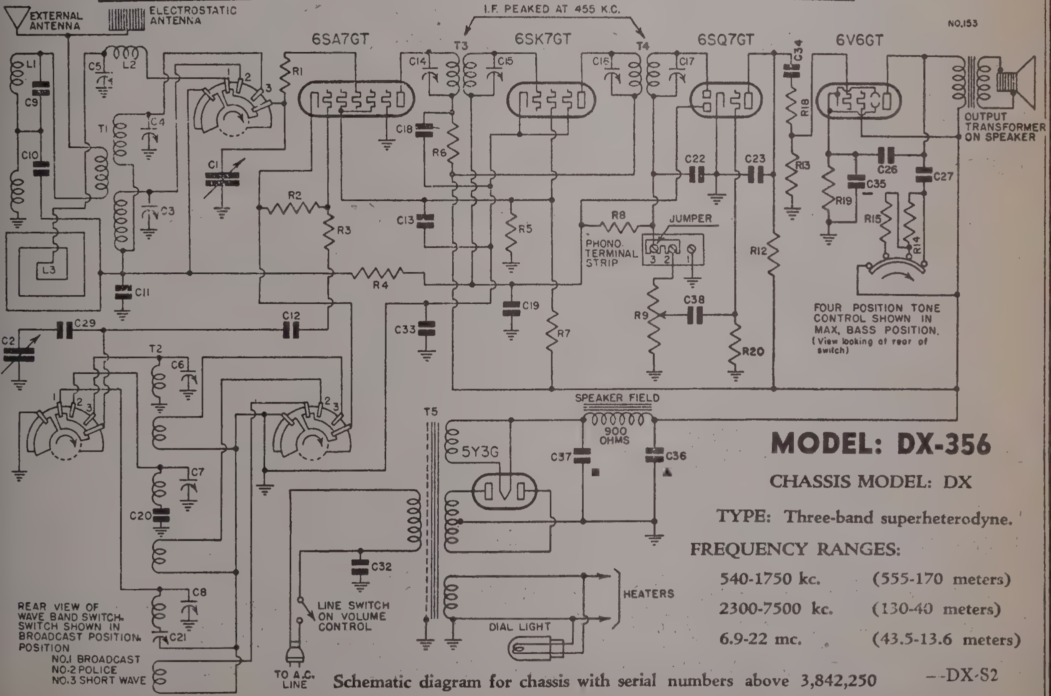


VOLTAGE RATING: 105-125 volts.

POWER SUPPLY: A.C. only.

POWER CONSUMPTION: 55 watts.

Schematic diagram for chassis with serial numbers below 3,842,250



MODEL: DX-356

CHASSIS MODEL: DX

TYPE: Three-band superheterodyne.

FREQUENCY RANGES:

540-1750 kc.	(555-170 meters)
2300-7500 kc.	(130-40 meters)
6.9-22 mc.	(43.5-13.6 meters)

Schematic diagram for chassis with serial numbers above 3,842,250

--DX-S2

MODEL DX-356
Chassis DX

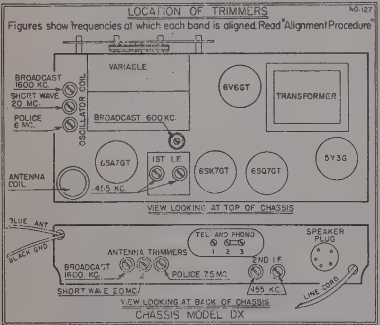
EMERSON RADIO & PHONOGRAPH CORP.

PARTS LIST

L1, C9	Antenna choke and 455 kc fixed wave-trap.....
L2	Broadcast antenna loading coil..........
L3	Broadcast loop antenna assembly..........
T1	Police and short-wave antenna coil..........
T2	Three-band oscillator coil..........
T3	Double-tuned 455 kc first i-f transformer..........
T4	Double-tuned 455 kc second i-f transformer....
T5	Power transformer ....
R1, R3	100 ohm ¼ watt carbon resistor..........
R2	20,000 ohm ¼ watt carbon resistor..........
R4	100,000 ohm ¼ watt carbon resistor..........
R5	40,000 ohm ¼ watt carbon resistor..........
R6	1000 ohm ¼ watt carbon resistor..........
R7	15,000 ohm 3 watt carbon resistor..........
R8, R10	2 megohm ¼ watt carbon resistor..........
R9	Volume control, .25 megohm with line switch.
R11, R13	.5 megohm ¼ watt carbon resistor..........
R12	.25 megohm ¼ watt carbon resistor..........
R14	2500 ohm ¼ watt carbon resistor..........
R15	5000 ohm ¼ watt carbon resistor..........
R16	23 ohm ½ watt wire-wound resistor..........
R17	180 ohm 1 watt wire-wound resistor..........
R18	50,000 ohm ¼ watt carbon resistor..........
R19	240 ohm 1 watt wire-wound resistor..........
R20	10 megohm ¼ watt carbon resistor..........
C1, C2	Two-gang variable condenser..........
C3, C4, C5	Tripple trimmer strip for antenna circuits..........
C6, C7, C8	Trimmers, part of oscillator coil.
C9	0.001 mf condenser, part of 455 kc wave-trap.
C10, C33	0.01 mf, 400 volt tubular condenser..........
C11	0.0025 mf, mica condenser..........
C12	0.00011 mf, mica condenser..........
C13	0.1 mf, 400 volt tubular condenser..........
C14, C15, C16, C17	Trimmers, part of i-f transformers.
C18, C25, C27	0.05 mf, 400 volt tubular condenser..........
C19	0.05 mf, 200 volt tubular condenser..........
C20	0.0022 mf, mica condenser..........
C21	Single adjustable padding condenser. Range: 150-300 mmf.
C22, C23	0.00022 mf, mica condenser..........
C24, C26	0.006 mf, 600 volt tubular condenser..........
C28	0.25 mf, 100 volt tubular condenser..........
C29	0.002 mf, mica condenser..........
C30	16 mf, 400 volt dry electrolytic condenser..........
C31	16 mf, 400 volt dry electrolytic condenser..........
C32	0.01 mf, 400 volt molded condenser..........
C34	0.02 mf, 400 volt tubular condenser..........
C35, C36, C37	Multiple dry electrolytic condenser: C35—20 mf, 25 volt; C36—15 mf, 350 volt; C37—15 mf, 400 volt.
C38	0.002 mf, 600 volt tubular condenser..........
8DS-486	8" dynamic speaker..........
7XS-511	Wave-band switch ....
8GS-485A	Tone-control switch ....

PRODUCTION CHANGE

1. Chassis bearing serial numbers below 3,842,250 use second i-f transformer, part number 8AT-55A.



The outlet marked "Television" at rear of the chassis may be used with any "Television Attachment" which is designed to feed audio frequencies to a separate amplifier. Detailed instruction for such a connection is given with any "Television Attachment."

The adjustable padding condenser for the broadcast band is mounted on the top of the chassis, with the screw adjustment accessible in the top of the chassis. The police and short-wave bands have fixed padders, C20 and C29 on the schematic. When replacing these fixed padders be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600, 6500 and 20,000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a dummy antenna for aligning the police and short-wave bands. A .0001 mf condenser in series with a 400 ohm carbon resistor may be used for the police band dummy antenna. For the short-wave band a 400 ohm carbon resistor may be used.

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave the trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

In aligning antenna trimmers on the high frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc through a 0.02 mf paper condenser, to the grid of the 6SA7 tube. The input may be fed to the stator lug of the front condenser section. Adjust the four i-f trimmers for maximum response.

Broadcast Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial pointer at 160 and feed 1600 kc from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna and advance the output of the generator until a deflection is obtained on the output meter. Adjust first the oscillator coil trimmer then the antenna trimmer for maximum response. Reset the pointer at 60, feed 1600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

Set the wave-band switch at the police band (central) position and the pointer at 6.5. Feed 6500 kc to the antenna (using a 400 ohm dummy antenna) and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. The police band padder is fixed and therefore requires no adjustment.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

The color coding of the i-f transformers is as follows:
Grid—green
B plus—red
Plate—blue
Grid return—black

The color coding of the power transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	250	85	0	6.3 ac.
6K7GT	250	85	0	6.3 ac.
6SQ7GT	125	—	0	6.3 ac.
6V6GT	235	250	*0	6.3 ac.

Voltage across resistors R16 and R17—15 volts (negative).

*Chassis bearing serial numbers above 3,842,250 should measure 12 volts.

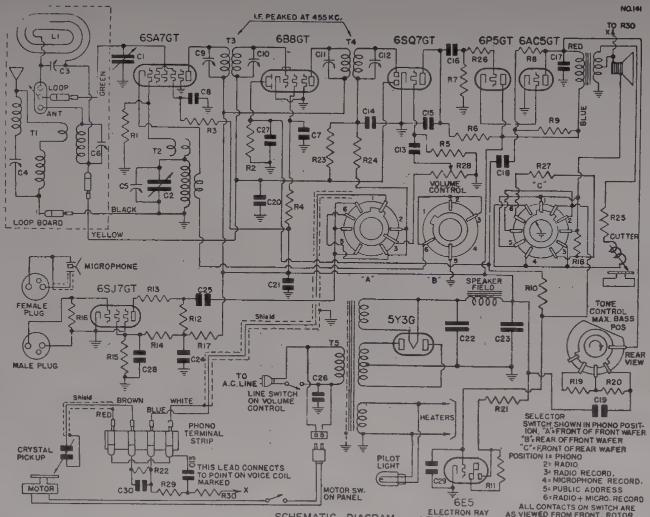
Voltage from power transformer center tap to ground
(red and yellow lead)—87 volts (negative).

DX-356 CHASSIS DX

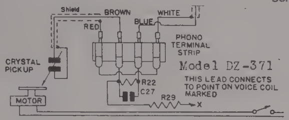
TYPE OF TUBES:
1—6SA7GT, pentagrid converter
1—6SK7GT, i-f amplifier
1—6SQ7GT, diode detector, audio amplifier and a.v.c.
1—6V6GT, power output
1—5Y3G, full-wave rectifier.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL DV-364
Chassis DV
MODEL DZ-371
Chassis DZ



SCHEMATIC DIAGRAM



Model DZ-371

T1	Antenna coil with 455 kc wave-trap..
T2	Oscillator coil ..
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc second i-f transformer
T5	Power transformer
T6	Speaker transformer
L1	Loop antenna ....
R1	20,000 ohm ¼ watt carbon resistor.
R2	500,000 ohm ¼ watt carbon resistor.
R3	20,000 ohm 2 watt carbon resistor.
R4	100,000 ohm ½ watt carbon resistor
R5, R16	10 megohm ¼ watt carbon resistor.
R6	200,000 ohm ¼ watt carbon resistor
R7, R10 R14, R26,	1 megohm ¼ watt carbon resistor.
R9, R30	60,000 ohm ¼ watt carbon resistor
R8	560,000 ohm ¼ watt carbon resistor
R11	1 megohm resistor in 6U5 socket..
R12, R13, R15, R17	250,000 ohm ¼ watt carbon resistor.
R18	45 ohms ½ watt wire-wound resistor
R19	15,000 ohm ½ watt carbon resistor
R20	1500 ohm 1 watt carbon resistor..
R21	20,000 ohm 1 watt carbon resistor.
R22, R23	3 megohm ¼ watt carbon resistor...
R24	50,000 ohm ¼ watt carbon resistor
R25	3 ohm ½ watt wire-wound resistor.
R26	100,000 ohm ¼ watt carbon resistor
R27	50 ohm ¼ watt carbon resistor
R28	Volume control 500,000 ohms with line switch.

R29 (for DV) 1 meg., 1/4 w. resistor
R29 (for DZ) 2 meg. 1/4 w. resistor

C1, C2	Two-gang variable condenser...
C3, C6	Trimmers, part of loop antenna.
C4	Trimmer, part of 455 kc wave-trap assembly.
C5	Trimmer, part of variable condenser.
C7, C8, C18, C19	0.05 mf, 400 volt tubular condenser.
C9, C10, C11, C12	Trimmers, part of i-f transformers.
C13	0.004 mf, 600 volt tubular condenser.
C14	0.00011 mf mica condenser....
C15	0.00006 mf mica condenser................
C16	0.02 mf, 400 volt tubular condenser..
C17	0.001 mf, 1000 volt tubular condenser.
C20, *C28	0.1 mf, 200 volt tubular condenser..
C21	0.1 mf, 400 volt tubular condenser..............
C22, C23	Dual 16 mf, 450 volt dry electrolytic condenser
C24	0.5 mf, 400 volt tubular condenser.
C25	0.01 mf, 400 volt tubular condenser.
C26	0.01 mf, 400 volt molded condenser..
C27	0.0002 mf, 600 volt tubular or mica condenser
C29	0.25 mf, 100 volt tubular condenser
C30	0.00022 mf mica condenser.

FREQUENCY RANGES:

540-1600 kc —DV-S1
555-187 meters.

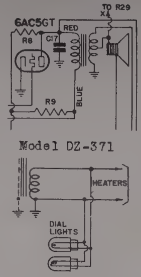
POWER CONSUMPTION: —DV-S2

60 watts for radio. —DZ-S1

95 watts for recorder and radio.

95 watts for changer and radio (DZ-371)

A ground is necessary if the microphone is to be used for recording or public address. Use the conventional method of grounding to a water pipe or steam radiator. Connect the ground to the flexible black lead emerging from the rear of the loop antenna board.



Model DZ-371

Early DZ receivers use Microphone, part number 7VC-484

I-f and Wave-Trap Alignment

Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 6SA7GT tube. Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna lead (using a standard dummy antenna) and adjust the 455 kc wave-trap for minimum response. (See General Notes, No. 5.)

Note: The grid of the 6SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

R-f Alignment

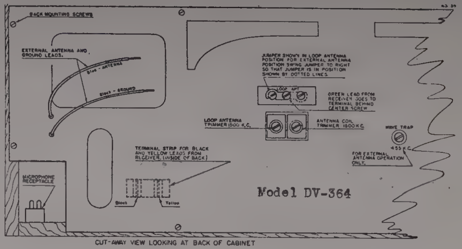
(LOOP ALIGNMENT)

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (located on the dual strip on the loop) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

Antenna Coil Alignment

With the link in the "antenna" position feed 1500 kc from the signal generator to the blue antenna lead through a standard dummy antenna or a 0.0002 mf mica condenser. Align the oscillator as above and then the antenna trimmer (on dual strip) for maximum response.


BACK MOUNTING SCREWS
EXTERNAL ANTENNA AND GROUND LEADS.
Blue - Antenna
Black - Ground
JUMPER SHOWN IN LOOP ANTENNA POSITION FOR EXTERNAL ANTENNA POSITION SWING JUMPER TO RIGHT SO THAT JUMPER IS IN POSITION SHOWN BY DOTTED LINES.
LOOP ANT
GREEN LEAD FROM RECEIVER GOES TO TERMINAL BEHIND CENTER SCREW
LOOP ANTENNA TRIMMER 1500 K.C.
ANTENNA COIL TRIMMER 1500 K.C.
WAVE TRAP 455 K.C.
FOR EXTERNAL ANTENNA OPERATION ONLY.
TERMINAL STRIP FOR BLACK AND YELLOW LEADS FROM RECEIVER (INSIDE OF BACK)
MICROPHONE RECEPTACLE
Black
Yellow

Model DV-364

CUT-AWAY VIEW LOOKING AT BACK OF CABINET

Location of Coils and Trimmer Adjustments

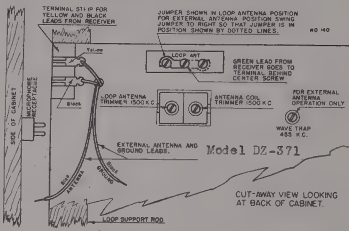
The first i-f transformer is mounted on top of the chassis deck behind the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted beneath the chassis. The trimmers are accessible through holes in the rear of the chassis.

The oscillator coil is mounted underneath the chassis. The oscillator trimming condenser is located on the front section of the variable condenser.

The 455 kc wave-trap and its trimmer are mounted on the loop board. The trimmer is accessible through a hole in the board. See the figure on previous page.

The trimmers for the antenna coil and loop winding are mounted on a dual trimmer strip on the loop board. See the figure on previous page for the location and identification of the antenna trimmers and loop connecting leads.


TERMINAL STRIP FOR YELLOW AND BLACK LEADS FROM RECEIVER
JUMPER SHOWN IN LOOP ANTENNA POSITION FOR EXTERNAL ANTENNA POSITION SWING JUMPER TO RIGHT SO THAT JUMPER IS IN POSITION SHOWN BY DOTTED LINES.
NO 140
Yellow
Black
LOOP ANT
GREEN LEAD FROM RECEIVER GOES TO TERMINAL BEHIND CENTER SCREW
LOOP ANTENNA TRIMMER 1500 K C
ANTENNA COIL TRIMMER 1500 K C
FOR EXTERNAL ANTENNA OPERATION ONLY
WAVE TRAP 455 K.C.
EXTERNAL ANTENNA AND GROUND LEADS.
SIDE OF CABINET
MICROPHONE RECEPTACLE
Blue
ANTENNA
GROUND
LOOP SUPPORT ROD

Model DZ-371

CUT-AWAY VIEW LOOKING AT BACK OF CABINET.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	240	90	0	6.3 a.c.
6B8GT	240	75	0	6.3 a.c.
6SQ7GT	100	—	0	6.3 a.c.
6SJ7GT	*25	*15	0	6.3 a.c.
6P5GT	240	—	12	6.3 a.c.
6AC5GT	230	—	0	6.3 a.c.

Voltage at 5Y3G filament to ground—315 volts.
Voltage across speaker field—75 volts.

Late DZ chassis use 5Y4G rectifier
Voltage at 5Y4G filament to ground—315 volts.

*Actual operating voltages cannot be measured because of high resistance in circuit.

MODEL DV-364
Chassis DV
MODEL DZ-371
Chassis DZ

EMERSON RADIO & PHONOGRAPH CORP.

MODEL EV-384
Chassis EV

Models DV-364, DZ-371, EV-384

OPERATING THE RECORDING MECHANISM

Chassis DV, DZ, EV

General Recording Instructions

In the "Radio Recording" position, recordings can be made of any program which can be tuned in with sufficient clarity and volume. If the station is too weak or if man-made or atmospheric static is strong the noise level on the recording will be sufficient to make the results quite unsatisfactory.

While the radio program is being recorded it can be heard faintly from the loudspeaker. This arrangement is made so that the operator can select any part of a program for recording by listening to the loudspeaker.

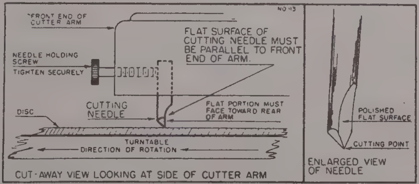
When the phono-radio-recorder switch is in the "Microphone Recording" position records can be made only by means of the microphone furnished with the unit. The microphone may be attached by plugging into the receptacle mounted on the inside of the cabinet wall, near the loop antenna. It is of great importance that an external ground be connected to the chassis if microphone recordings are to be made, otherwise hum pickup may make the recordings unusable.

When the phono-radio-recorder knob indicates "Radio + Microphone Recording" the microphone may be used to inject local speech or music with the radio program being recorded. Since the recording level for radio must be controlled by the volume control, the microphone recording level should be adjusted by moving the microphone stand closer to or farther from the person speaking. The proper level can be set by first adjusting the volume control for radio recording level. Then without changing the volume control setting switch over to microphone recording position where the distance of the speaker from the microphone should be determined for proper cutting level. Switching back to Radio-Microphone Recording now allows the combined sounds to be recorded at their proper levels.

Recording Level

The "Electron Ray" indicator on the tuning panel is furnished to indicate the "level" at which the record is cut. It will be noticed that when the selector switch is in the recording position the indicator will flicker open and partly closed. The volume control should slowly be increased until the indicator just closes on the loudest passages of music or voice being recorded. The two fluorescent portions of the indicator should never overlap.

If a recording is being made using the microphone, the speaker should first read or speak a few lines in the tone of voice and at the distance from the microphone that he will use during recording. This will enable the operator to preset the volume control so that the first few words will not be recorded either too loudly or too softly.



CUT-AWAY VIEW LOOKING AT SIDE OF CUTTER ARM

Cutting the Record

1. The illustration above indicates the correct position of the cutting needle in the cutting arm. It is important to note that the polished flat portion of the needle is parallel to the front end of the cutting arm and that it faces toward the rear. Be sure the needle is tightened as firmly as possible.

2. Turn the selector switch to the type of recording desired. Be sure the tone control switch is in the treble position, clockwise.

3. Place a recording blank on the turntable so that the retractable driving pin in the turntable engages one of the holes in the blank. This is necessary to prevent the blank from slipping during recording.

4. Start the motor and allow the turntable to come up to speed.

5. Raise the recording arm from its rest position and move it inward toward the record, placing the cutting needle approximately ⅛ inch from the outer edge of the blank.

A lead screw underneath the sub-panel will then drive the cutter arm slowly across the blank and the needle will cut a continuously spiral groove until such a time as the operator lifts the recorder arm and replaces it in its rest position at the side of the turntable. During the time that the needle is recording, a fine thread will be cut from the record itself and this thread will pile up toward the center of the blank. Remove this thread continually with a "soft" brush while the record is being cut. Considerable care must be taken that the operator does not tangle it around the cutting needle, nor slow up the turntable by touching it with his hands since either one will make for poor recordings.

Be sure to turn the motor off before attempting to remove the recorded blank. The recorded blank may be played back at any time after the recorder arm has been returned to the rest position.

CAUTION: Never stall the turntable by hand; this turntable is weighted for use in recording and it will acquire an appreciable time to come to rest.

Chassis DV and EV

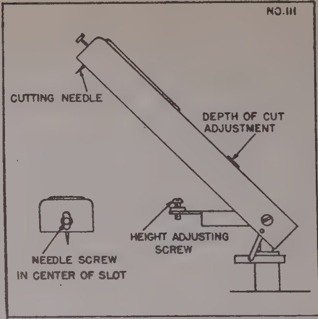
Recording Adjustments

The following adjustments should be carefully noted. Examine the recording arm to locate the controls indicated and to become familiar with their use. In general, it is unnecessary to move either the height or pressure adjustment unless a recording blank other than the type furnished by Emerson is used or the cutting needle shows great wear or has been replaced.

Two adjustments are provided on the recorder arm: arm height and needle pressure.

Recorder Arm Height

The height of the recorder arm can be varied by means of the slotted screw which is located on the bracket just beneath the cutting arm. In order to make this adjustment, it is necessary to insert a cutting needle, and, with the motor turned OFF and a record blank on the turntable, place the recorder arm in the cutting position. Now lift the cutting arm, turn the height adjusting screw and lower the arm to the record. When properly adjusted, the needle screw should be approximately centered in the slot at the front of the arm, when the needle is resting on the record. Tighten the lock nut to prevent the screw from moving. See figure at right.



Cutting the Record

1. The illustration above indicates the correct position of the cutting needle in the cutting arm. It is important to note that the polished flat portion of the needle is parallel to the front end of the cutting arm and that it faces toward the rear. Be sure the needle is tightened as firmly as possible.

3. Place a recording blank on the turntable so that the retractable driving pin in the turntable engages one of the holes in the blank. This is necessary to prevent the blank from slipping during recording.

4. Start the motor and allow the turntable to come up to speed.

Note: The two cutting arm pivot screws (item P—see back page) should be screwed down firmly. If they should become loose the recording may be cut unevenly.

Chassis DZ only

Recording Adjustments

The following adjustments should be carefully noted. Examine the recording arm to locate the controls indicated and to become familiar with their use. In general, it is unnecessary to move either the height or pressure adjustment unless a recording blank other than the type furnished by Emerson is used or the cutting needle shows great wear or has been replaced.

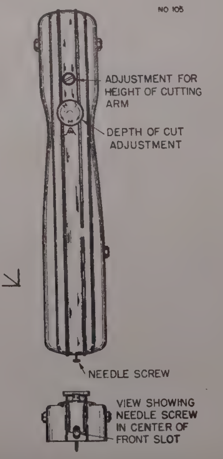
Recorder Arm Height

Two adjustments are provided on the recorder arm: arm height and needle pressure.

The height of the recorder arm can be varied by means of the slotted screw head which is on the top of the arm and toward the back, approximately flush with the surface. In order to make this adjustment, it is necessary to insert a cutting needle, and, with the motor turned OFF and a record blank on the turntable, place the recorder arm in the cutting position. Now raise or lower the recorder arm by means of the above mentioned adjustment until the needle screw is approximately "centered" in the slot at the front end of the recorder arm.

Pressure Adjustment

The pressure on the cutting needle is controlled by the chrome-plated knob on the top of the recorder arm. This knob has engraved upon it the letters "L, M, and H" indicating Light, Medium and Heavy pressures and provides an easy means of compensating for different types of needles, or blanks, or for the wearing of a cutting needle after it is used. In general, the machine is properly set at the factory so that it will cut the average record correctly. Any adjustment of this knob is dependend upon the factors discussed under "Recording Technique." Once the proper adjustment of this knob has been determined, its position should be permanently marked with ink or by scratching a thin line with a sharp instrument. Thus, if by accident, the knob should be turned off adjustment, it may be reset to the proper position without repeating a trial recording.


NO 105
ADJUSTMENT FOR HEIGHT OF CUTTING ARM
DEPTH OF CUT ADJUSTMENT
NEEDLE SCREW
VIEW SHOWING NEEDLE SCREW IN CENTER OF FRONT SLOT

RECORDER ADJUSTMENTS

Make no adjustments unless repeated tests show that adjustment is absolutely necessary

1. FUNCTION OF MANUAL CONTROL BUTTON AND RELATIVE PARTS.

When Manual Control Button (Item 84, Fig. 4) is moved to the Manual Play-Back recording position, it moves the Manual Control Slide (Item 102, Fig. 1) which in turn moves Clutch Lock Slide (Item 103, Fig. 1) into a position which prevents Engagement Clutch Cam Assembly (Item 79, Fig. 2) from rotating. When Engagement Clutch Cam Assembly is in the above mentioned position and is not free to rotate, the Changer will not go into its changing cycle.

Also when the Manual Control Button is in the above mentioned position, the Manual Control Slide has moved the Locator Lock Slide (Item 106, Fig. 1) into a position where it engages the Tone Arm Locator & Bushing Assembly (Item 12, Fig. 1) and prevents same from bearing against Tone Arm Lever Assembly (Item 19, Fig. 1) allowing the Tone Arm to swing freely without hindrance and without setting Changer into its changing cycle. When the Manual Control is in the automatic position the Changer will function normally as an automatic record changer.

2. POSSIBLE MECHANICAL CAUSES OF POOR RECORDINGS.

(a) Threads from record cuttings getting down onto Rubber Idler Drive Wheel (Item 83, Fig. 4) and between drive wheel and motor pulley. This will cause very bad speed variation of the turntable and, of course, will result in very inferior recording. Cuttings may also wrap around motor shaft and cause motor to slow down or stop.

To remove the record cuttings, the turntable should be lifted by applying an even lifting force at opposite edges of the turntable while the turntable spindle is gently tapped downward on its top end, and the record cuttings then removed. The Rubber Idler Drive Wheel should be taken off; this can be accomplished by unsnapping the small snap cotter ring and slipping Rubber Idler Drive Wheel off its shaft, after which all reocrd cuttings can be removed.

NOTE: It is very important that no grease or oil be gotten on the surface of the Rubber Idler Drive Wheel.

(b) Tight Pivot Bearings: Check Cartridge Pivot Screw (Item 108, Fig. 4) for binding. Also Recording Arm Pivot Screw (Item 107, Fig. 4) and Traverse Arm Pivot Screws (Item 101, Fig. 2). These bearings should all be free, but have no looseness or play.

If the Pivot Screw (Item 108, Fig. 4) of the Cutter Cartridge is tight, the Cutter Cartridge cannot follow a slight up and down variation of the record or turntable. A record cut in this manner will, when played back, have a high scratch level, rough cutting and a tendency for the needle to jump from one groove to another.

(c) Damaged Rubber Idler Drive Wheel (Item 83, Fig. 4). Rubber Idler Drive Wheel may have become damaged by:

1. Allowing oil or grease to come in contact with same.

2. By allowing turntable to drop and cut into the outside surface of the Rubber Idler Drive Wheel.

3. Stopping the turntable by hand while the motor is running will cause a flat spot on the surface of the Rubber Idler Drive Wheel.

NOTE: If the Rubber Idler Drive Wheel has been damaged in any of the above mentioned ways, it should be replaced with a new one.

(d) Vibration Reaching The Recorder While A Blank Is Being Recorded: It is very important the floor or the surface upon which the Recorder rests remain quiet as any vibration such as people walking across the floor or shaking of the instrument in which the Recorder is mounted will seriously effect the quality of the finished recording.

(e) Recorder Not Level: It is very important that the Recorder is standing level. This can be checked by placing a small level on the turntable and checking same in two positions at right angles to each other and then leveling Instrument in which Recorder is mounted.

(f) Bent Or Damaged Turntable Spindle: If the Turntable Spindle (Item 59, Fig. 4) has been bent in shipment, or by someone exerting a heavy pressure on one side, it should be replaced with a new one. A bent Turntable Spindle will cause the surface of the Turntable to move up and down while it is turning and, of course, will seriously effect the quality of both recording and play-back.

NOTE: When removing the Turntable an even upward lifting force should be applied at opposite edges of the Turntable while Turntable Spindle is gently tapped downward on its top end.

(g) Record Cutting Causing A Bind Between Turntable Spindle (Item 59, Fig. 4) And Its Bearing: It is very important that all record cuttings are removed from Turntable Spindle and its bearing.

(h) Tension On Rubber Idler Wheel (Item 83, Fig. 4) Too Great: If the tension on the Rubber Idler Drive Wheel is too great, this will result in a "wow" or a rumble in the recording. To decrease the tension on Rubber Idler Drive Wheeel, loosen the screw holding the lug which is located beneath the Rubber Idler Drive Wheel and turn it slightly in a clockwise direction. This will reduce the spring tension on the Rubber Idler Drive Wheel. When the spring tension is correct, the spring will be approximately at right angles to the lug.

(i) Tension On Rubber Idler Drive Wheel (Item 83, Fig. 4) Too Weak: This will cause very bad speed variation. Turntable will slow down and then speed up as audio current of varying intensity reaches the cutter cartridge.

MODEL DZ-371
Chassis DZ

EMERSON RADIO & PHONOGRAPH CORP.

RECORD CHANGER ADJUSTMENTS

The following is detailed information for adjusting the Record Changer Mechanism. Do not make any adjustments before reading the instructions carefully.

1. PICKUP DOES NOT INDEX PROPERLY ON TEN-INCH OR TWELVE-INCH RECORDS.

(a) Adjustment for correct indexing of 10-inch records:

1. Swing tone arm outward until tone arm lever assembly (Item 19, Fig. 1) latches with tone arm latch lever (Item 18, Fig. 1) which is held to tone arm shaft (Item 77, Fig. 1) by two set-screws.

2. Make sure these set-screws are tight and that there is a slight play between the tone arm lever assembly and the panel (Item 5, Fig. 1. This will give proper clearance at ball race assembly (Item 74, Fig. 3).

The tone arm lever assembly (Item 19, Fig. 1) is held against tone arm latch lever (Item 18, Fig. 1) by the tension of tone arm locator lever spring (Item 16, Fig. 1).

3. Next loosen the clamping screw in the Swivel Bracket Assembly (Item 46, Fig. 3).

4. Now move tone arm until its outside edge is ⅛" from the outside edge of the panel (Item 5, Fig. 1) and retighten screw securely.

2. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE AT END OF RECORD.

(a) Worn or Damaged Stop Groove: If the stop groove in the record is worn out or damaged, discard such a record.

(b) Cut-off Adjustment May Be Incorrect: The Record Changer should go into its changing cycle when the needle enters the stop groove and has traveled to within a distance of 1⅞" from the center of the turntable shaft.

If the Record Changer does not go into its changing cycle when the needle has reached the above mentioned distance, the Tone Arm Trip Lever Shoe (Item 23, Fig. 1) should be moved toward the outside edge of the panel. To do this, it is necessary to loosen the thumb nut (Item 22, Fig. 1) and then retighten after adjustment has been made.

If the Record Changer goes into its changing cycle before the needle has reached a distance of 1⅞" from the center of the turntable, the Tone Arm Trip Lever Shoe should be moved inward toward the center of the Record Changer.

3. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE WHEN SWITCH KNOB IS TURNED ON.

When the switch is turned to "ON" the Record Changer should start its changing cycle. If it does not, the following points should be checked.

1. Make sure motor is running.

2. Check Trip Rod (Item 32, Fig. 1), to make sure it releases Trip Lever Assembly (Item 20, Fig. 1) from Engagement Clutch Cam Assembly (Item 79, Fig. 2) when Switch Knob is being turned on. If Trip Lever Assembly is not released, Trip Rod should be shortened by bending until Trip Lever clears Engagement Clutch Cam Assembly, when Switch Knob is turned.

3. Make sure that Clutch Reset Pawl (Item 40, Fig. 2) clears Drive Link Assembly (Item 31, Fig. 1).

4. RECORD CHANGER CONTINUES TO REPEAT ITS CHANGING CYCLE WITHOUT PLAYING RECORDS.

(a) Trip Lever Assembly (Item 20, Fig. 1) does not latch in Engagement Clutch Cam Assembly (Item 79, Fig. 2) which may be due to causes listed below:

1. Trip Rod (Item 32, Fig. 1) may be bent so that it is too short, holding Trip Lever Assembly from contacting Engagement Clutch Cam Assembly.

2. Springs (Item 24 or 35, Fig. 1) may be disconnected.

5. NO SOUND WHEN NEEDLE IS ON MOVING RECORD.

1. Muting Switch (Item 26, Fig. 1) may be out of adjustment. The contacts of this switch should be open whenever its long blade is not resting on the shoe of the Engagement Clutch Cam Assembly (Item 79, Fig. 2). If the contacts remain closed after the long blade has left the shoe, they should be adjusted by bending until there is a separation of approximately 1/32".

Switch should be checked to make sure contacts are closed when long blade is resting on the shoe of the Engagement Clutch Cam Assembly.

2. The lugs on the Muting Switch may have been bent together.

3. Pickup cartridge in Tone Arm may have been damaged or may be defective.

6. TONE ARM ADJUSTMENTS FOR 12" RECORDS.

1. Turn both Control Knobs until the arrows marked "12" are pointing toward the center of the turntable.

2. Place a 12" record on the turntable.

3. Start Record Changer and note where needle contacts record. Correct contacting is about ⅛" from the outside edge of record.

4. Set Rod (Item 56, Fig. 3) is operated by Selector Arm (Item 61, Fig. 4). The 12" Set Link (Item 10, Fig. 1) operates as a stop when Record Changer is set for 12" records. When Tone Arm Locator Assembly (Item 12, Fig. 1) contacts 12" Set Link the Tone Arm should be in the correct position to play a 12" record.

If at this point, the position of Tone Arm is incorrect, loosen the screw which holds the Tone Arm Locator Shoe 12" (Item 14, Fig. 1) and move in either direction as required and tighten screw.

7. TONE ARM ADJUSTMENTS FOR 10" RECORDS.

1. Turn both knobs until the arrows marked "10" are pointing toward the center of the turntable.

2. Place a 10" record on the turntable and start Record Changer.

3. Note where needle contacts record. Correct contacting is about ⅛" from the outside edge of record. If contacting of needle is not correct as mentioned, loosen the screw which holds Tone Arm Locator Shoe 10" (Item 15, Fig. 1) and slide shoe in or out as required, then tighten screw.

8. TONE ARM HEIGHT ADJUSTMENTS.

Set the Record Changer for 10" records, turn Switch to "ON" and allow Record Changer to go through a changing cycle with no record on the turntable. The clearance between Turntable and the bottom surface of the Tone Arm should be approximately ⅛". Usually this clearance can be obtained by adjusting the Tone Arm Adjustment Screw (Item 70, Fig. 3). It is well to check the following points before making any adjustment.

Check clearance between Roller (Item 51, Fig. 3) and Selector Crank Shaft Assembly (Item 7, Fig. 1). There should be approximately 1/32" clearance at this point. If the clearance is greater, it would be due to the pressure on the Spring Washer (Item 50, Fig. 3) being too great. This will prevent the Tone Arm Lifter Reset Spring (Item 82, Fig. 3) from returning the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) sufficiently. To relieve the pressure on the Spring Washer, lower the Selector Shaft Collar (Item 6, Fig. 1) slightly.

9. TONE ARM LOWERS ON RECORD TOO SUDDENLY.

If the Tone Arm lowers too suddenly, the Spring Washer (Item 50, Fig. 3) which is located between the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) and Selector Shaft Crank Assembly Post (Item 7, Fig. 1) is not under sufficient pressure. The set-screws in the Selector Shaft Collar (Item 6, Fig. 1) should be loosened and the Selector Shaft Collar pressed upward slightly and set-screws tightened.

10. LUBRICATION.

(a) Motor: The motor is equipped with oil-less bearing and requires no lubrication.

(b) Turntable Spindle Bearings: Are lubricated at the factory and do not require any lubrication for one year. After one year they should be oiled with 1 or 2 drops of a light grade oil.

The top bearing can be oiled by lifting off turntable. Make sure when replacing turntable to see that pin in Turntable Spindle slips into slot on bottom surface of turntable hub and also care should be taken not to injure Rubber Idler Drive Wheel.

Never, under any circumstance, allow oil to come in contact with Rubber Idler Drive Wheel.

(c) Squeak Due To Records Rubbing On Turntable Spindle: This can be eliminated by gently lining up the stack of records.

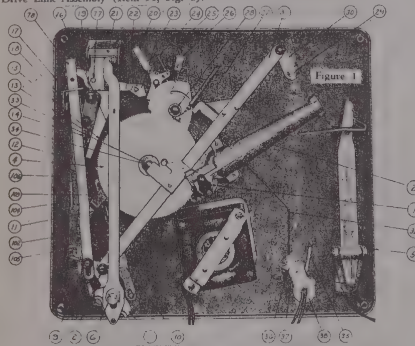


Figure 1

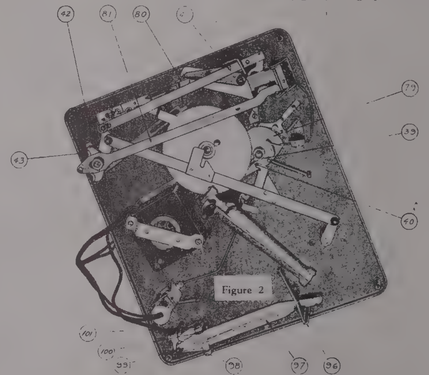


Figure 2

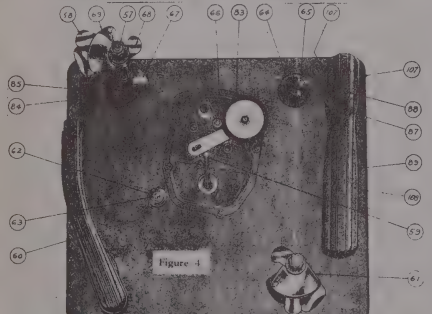


Figure 4

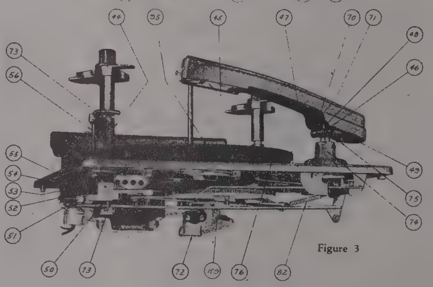
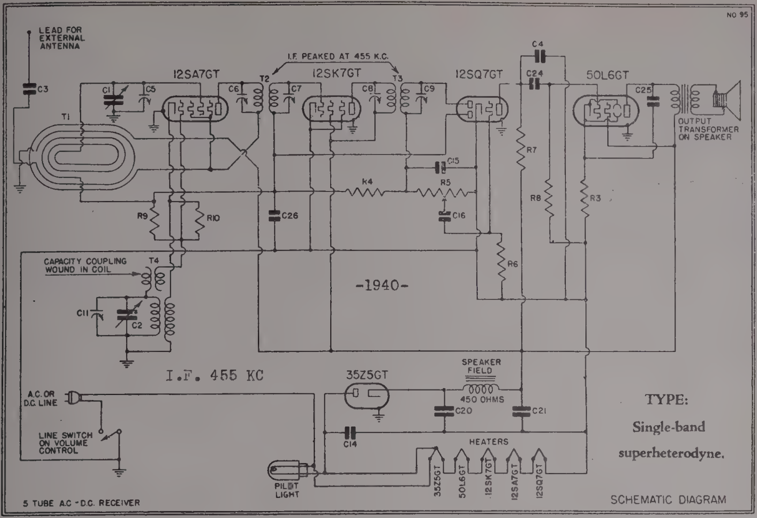


Figure 3

MODELS EP-367,
EP-375, EP-381,
EP-405, EP-406,
Chassis EP

EMERSON RADIO & PHONOGRAPH CORP.

MODELS
EL-360, EL-361,
EL-362. EL-373
Chassis EL



MODELS: EL-360, EL-361, EL-362 and EL-373

CHASSIS MODEL: EL

MODELS: EP-367, EP-375, EP-381, EP-405, EP-406

CHASSIS MODEL: EP

POWER SUPPLY: A.C. or D.C.
POWER CONSUMPTION: 30 watts.
VOLTAGE RATING: 105-125 volts.

T1	Loop antenna assembly (see prod. ch. No. 2)
T4	Oscillator coil (EL).
T4	Oscillator coil
T2	Double-tuned 455 kc first i-f transformer (EL)..
T2	Double-tuned 455 kc first i-f transformer (EP)......
T3	Double-tuned 455 kc second i-f transformer (EL)
T3	Double-tuned 455 kc second i-f transformer (EP)
R2, R9	15 megohm ¼ watt carbon resistor...
R3	140 ohm ½ watt wire-wound resistor.
R4	3 megohm ¼ watt carbon resistor......
R5	Volume control .5 megohm with line switch (EL)
R5	Volume control .5 megohm with line switch (EP)
R7, R8	500,000 ohm ¼ watt carbon resistor.
R10	20,000 ohm ¼ watt carbon resistor....
C1, C2	Two-gang variable condenser (EL)..
C1, C2	Two-gang variable condenser (EP).
C3, C16	0.002 mf, 600 volt tubular condenser....
C4	0.0004 mf, 600 volt tubular or mica condenser..
C15	0.00022 mf mica condenser....
C5, C11	Trimmers, part of variable condenser.
C6, C7, C8, C9	Trimmers, part of i-f transformers.
C14	0.05 mf, 400 volt tubular condenser.
C24	0.02 mf, 400 volt tubular condenser..
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (EL)
C20, C21	Dual 20 mf, 150 volt dry electrolytic condenser (EP)
C25	0.01 mf, 400 volt tubular condenser.
C26	0.1 mf, 200 volt tubular condenser.
8LS-493	4" dynamic speaker (EL) (see prod. ch. No. 1)
6WS-403C	4" dynamic speaker (EP).

PRODUCTION CHANGES

1. Chassis using speakers 6JS-368 or 6WS-403 may use 8LS-493 for replacement.
2. a. EP chassis bearing serial number above 4,133,831 use 8PW-324 loop antenna.
   b. Model EP-405 uses 8PW-332 loop antenna.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the left of the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis to the right of the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. In Model EL the trimmer on the front section is for the antenna coil (loop). In Model EP the trimmer on the rear section is for the antenna coil (loop). The oscillator coil is located directly beneath the speaker.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7GT tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. The grid of the 12SA7GT tube may be reached by clipping the input lead to the stator lug of the antenna section.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop about 12 inches away from and parallel to the receiver loop antenna. Advance the input to the loop until a satisfactory deflection is obtained on the output meter. Adjust first the oscillator trimmer then the antenna trimmer for maximum response. If the loop antenna has been replaced it may be necessary to retrack the loop inductance. With the dial set at 60 feed 600 kc to the antenna lead. A portion of the outside may be swung to either side of the center to give maximum response. Repeat the trimmer alignment at 140.

FREQUENCY RANGE: 540-1600 kc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	88	88	0	12
12SK7GT	88	88	0	12
12SQ7GT	30	—	0	12
50L6GT	82	88	5.6	50

—EL-EP—52

Voltage at 35Z5 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

color coding of the i-f transformer leads

Grid—green Plate—blue
Grid return—black B plus—red

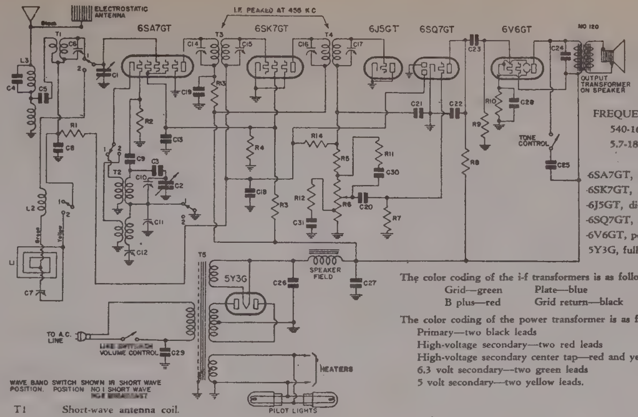
If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.

TYPE OF TUBES:

1—12SA7GT, pentagrid oscillator-modulator
1—12SK7GT, first i-f amplifier
1—12SQ7GT, diode detector, a-f amplifier, a.v.c.
1—50L6GT, beam power output
1—35Z5GT, half-wave rectifier.

MODELS EQ-368,
EQ-410
Chassis EQ

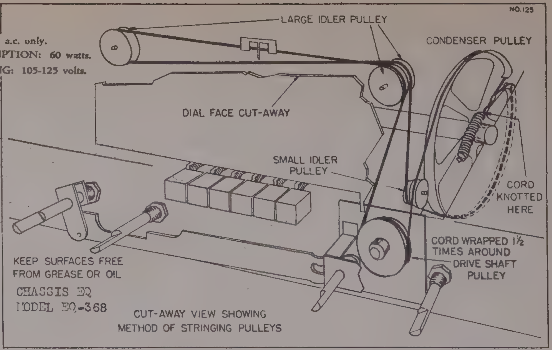
EMERSON RADIO & PHONOGRAPH CORP.



POWER SUPPLY: a.c. only.
POWER CONSUMPTION: 60 watts.
VOLTAGE RATING: 105-125 volts.

FREQUENCY RANGES:
540-1650 kc.
5.7-18.3 mc.

6SA7GT, oscillator-modulator
6SK7GT, i-f amplifier
6J5GT, diode detector, a.v.c.
6SQ7GT, audio amplifier
6V6GT, power output
5Y3G, full-wave rectifier.



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS

The color coding of the i-f transformers is as follows:

Grid—green	Plate—blue
B plus—red	Grid return—black

The color coding of the power transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

T1	Short-wave antenna coil.
T2	Two-band oscillator coil .
T3	Double-tuned 455 kc first i-f transformer.
T4	Double-tuned 455 kc second i-f transformer
T5	Power transformer
L1	Broadcast loop antenna
L2	Broadcast antenna loading coil.
L3	Antenna choke and 455 kc wave-trap
R1	100,000 ohm ¼ watt carbon resistor
R2	20,000 ohm ¼ watt carbon resistor.
R3	15,000 ohm 3 watt carbon resistor.
R4	40,000 ohm ¼ watt carbon resistor
R5	25,000 ohm ¼ watt carbon resistor.
R6	Volume control .5 megohm with line switch
R7	10 megohm ¼ watt carbon resistor
R8	250,000 ohm ¼ watt carbon resistor
R9, R11	500,000 ohm ¼ watt carbon resistor
R10	240 ohm 1 watt wire-wound resistor
R12	10,000 ohm ¼ watt carbon resistor
R13	1000 ohm ¼ watt carbon resistor.
R14	2 megohm ¼ watt carbon resistor.
C1, C2	Six-button tuning unit with two-gang variable condenser

C4	0.001 mf mica condenser—Part of L3
C5	0.01 mf, 400 volt tubular condenser.
C6	Trimmer, part of T1
C7	Trimmer, part of L1
C8	0.003 mf mica condenser.
C9	0.00011 mf mica condenser.
C10, C11	Dual oscillator trimming condenser.
C12	Single adjustable padding condenser
C13, C19	0.1 mf, 400 volt tubular condenser.
C14, C15, C16, C17	Trimmers, part of i-f transformers
C18	0.05 mf, 200 volt tubular condenser.
C20	0.002 mf, 600 volt tubular condenser
C21, C22	0.0002 mf, 600 volt tubular or mica condenser
C23, C25	0.02 mf, 400 volt tubular condenser.
C24, C31	0.005 mf, 400 volt tubular condenser
C26, C27, C28	Multiple dry electrolytic condenser. C26, 15 mf—450 volt; C27, 15 mf—350 volt; C28, 20 mf—25 volt
C28	0.01 mf, 400 volt molded condenser
C30	0.00005 mf mica condenser
C3	0.002 mf mica condenser.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	252	85	0	6.3 a.c.
6SK7GT	260	85	0	6.3 a.c.
6J5GT	0	—	0	6.3 a.c.
6SQ7GT	110	—	0	6.3 a.c.
6V6GT	245	260	14	6.3 a.c.

EQ-410
MODEL: EQ-368
CHASSIS MODEL: EQ

Voltage at 5Y3G filament to ground—330 volts.
Voltage across speaker field—70 volts.

—EQ-S1

PREADJUSTMENT OF PUSHBUTTONS FOR AUTOMATIC TUNING

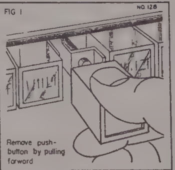


FIG 1

Remove push-button by pulling forward

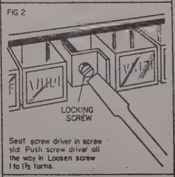


FIG 2

Seat screw driver in screw slot Push screw driver all the way in Loosen screw 1 to 1½ turns.

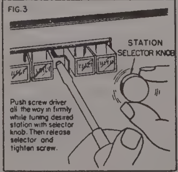


FIG.3

Push screw driver all the way in firmly while tuning desired station with selector knob. Then release selector and tighten screw.

Rotate the wave-band switch to the broadcast position, clockwise. Select six nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

1. Grasp the button firmly and remove it from its shaft by pulling straight out. See Fig. 1.

2. Insert a screwdriver into the slot of the locking screw. Press in and loosen the screw 1 to 1½ turns. See Fig. 2.

3. With the screwdriver seated in the screw slot, press the screw in as far as possible. Hold it in firmly with one hand and tune in the desired station with the other hand by pressing in and rotating the selector knob. See Fig. 3.

4. Release the selector knob and tighten screw firmly.

5. Check the adjustment by turning well past the station, using the selector knob, and then pushing in the button shaft. The station should come back in again clearly and with maximum volume.

After the adjustment is tested, check to see that the locking screw is tightened firmly. Replace the button on its shaft.

—BQ-S2

Location of Coils and Trimmer Adjustments

The first i-f transformer is the shorter and second i-f the taller of the two cans mounted on the left side of the chassis. The trimmers for both are accessible through holes in the tops of the cans.

The short-wave antenna coil is mounted just to the left of the variable condenser in front of the 6SA7GT tube. Its trimmer is mounted on the coil. The loop acts as the broadcast antenna coil. Its trimmer is accessible through a hole in the loop support board.

The oscillator coil for both bands is located beneath the chassis. Trimmers for both oscillators are mounted on a dual strip on the front center wall of the chassis. The left-hand trimmer is for short-wave and the right-hand trimmer for broadcast.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 6SA7 tube. Adjust the four i-f trimmers for maximum response. (The grid of the 6SA7 is connected to the stator of the antenna (center) section of the variable condenser.)

Short-Wave Alignment

(Short-wave alignment should precede broadcast alignment.) Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 18 and feed 18,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

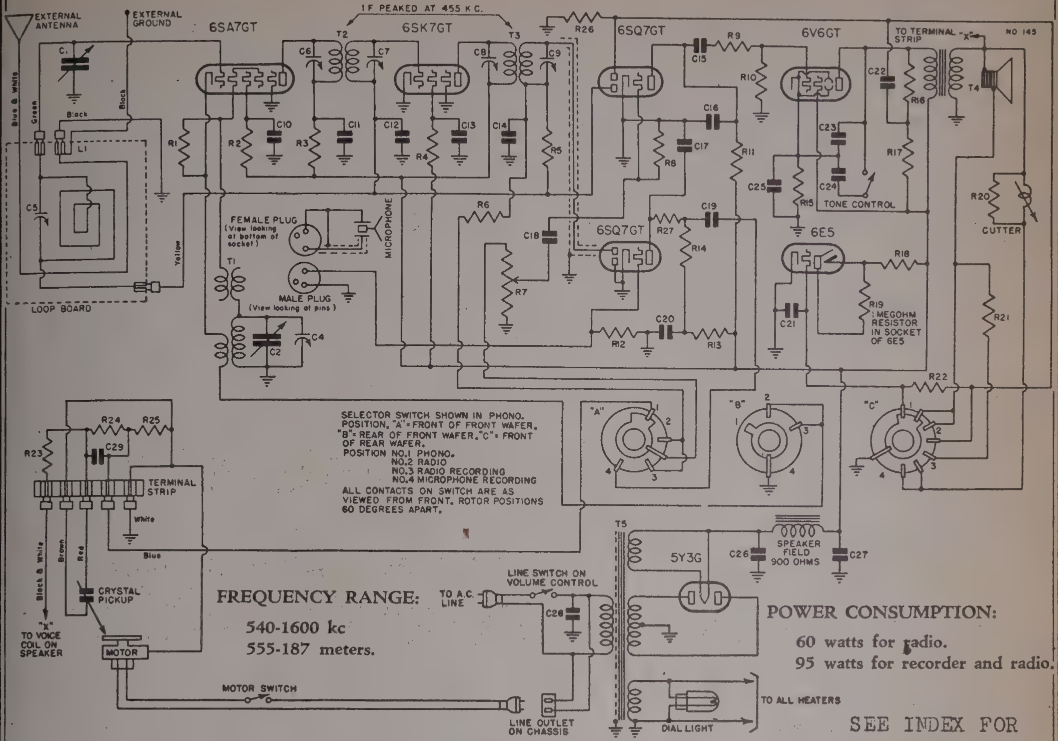
Broadcast Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the loop trimmer for maximum response. Reset the pointer at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure. (The broadcast padder is located on top of the chassis to the left of the variable condenser.)

The adjustable padding condenser for the broadcast band is mounted on the top of the chassis near the short-wave antenna coil. The short-wave band has a fixed padder, C3 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

EMERSON RADIO & PHONOGRAPH CORP.

MODEL EV-384
Chassis EV



SELECTOR SWITCH SHOWN IN PHONO. POSITION. "A" = FRONT OF FRONT WAFER. "B" = REAR OF FRONT WAFER. "C" = FRONT OF REAR WAFER.
POSITION NO.1 PHONO.
NO.2 RADIO
NO.3 RADIO RECORDING
NO.4 MICROPHONE RECORDING
ALL CONTACTS ON SWITCH ARE AS VIEWED FROM FRONT. ROTOR POSITIONS 60 DEGREES APART.

FREQUENCY RANGE:
540-1600 kc
555-187 meters.

POWER CONSUMPTION:
60 watts for radio.
95 watts for recorder and radio.

SEE INDEX FOR PHONO RECORDER DATA

TYPE: Portable single-band superheterodyne and phonograph recorder.

The color coding of the i-f transformers is as follows:

Grid—green	Plate—blue
B plus—red	Grid return—black

TYPE OF TUBES:

1—6SA7GT, oscillator-modulator
1—6SK7GT, i-f amplifier
†1—6SQ7GT, diode detector, microphone preamplifier and a.v.c.
1—6SQ7GT, audio amplifier
1—6V6GT, beam power output
1—5Y3G, full-wave rectifier

In addition, a 6E5 electron ray recording level indicator is used.

The color coding of the power transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

A ground is necessary if the microphone is to be used for recording. Use the conventional method of grounding to a water pipe or steam radiator. Connect the ground to the flexible black lead emerging from the motor board.

VOLTAGE ANALYSIS

Voltage at 5Y3G filament to ground—325 volts.
Voltage across speaker field—70 volts.
***Actual operating voltages cannot be measured because of high resistance in circuit.**
†This tube is located in corner of chassis.

POWER SUPPLY: a.c. only. 60 cycle.

VOLTAGE RATING: 105-125 volts.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	252	80	0	6.3 a.c.
6SK7GT	255	67	0	6.3 a.c.
6SQ7GT	100	—	0	6.3 a.c.
†6SQ7GT	*48	—	0	6.3 a.c.
6V6GT	247	255	12	6.3 a.c.

MODEL: EV-384

CHASSIS MODEL: EV

—EV—S1

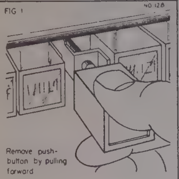
MODEL EV-384
Chassis EV
MODELS ER-369, ER-370
Chassis ER

EMERSON RADIO & PHONOGRAPH CORP.

MODELS: ER-369 and ER-370 CHASSIS MODEL: ER

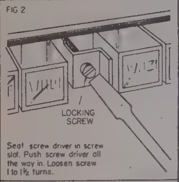
PREADJUSTMENT OF PUSHBUTTONS FOR AUTOMATIC TUNING

FIG 1



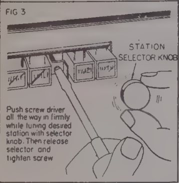
Remove push-button by pulling forward

FIG 2



Seat screw driver in screw slot. Push screw driver all the way in. Loosen screw 1 to 1½ turns.

FIG 3



Push screw driver all the way in firmly while tuning desired station with selector knob. Then release selector and tighten screw

Rotate the wave-band switch to the broadcast position, clockwise. Select six nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

1. Grasp the button firmly and remove it from its shaft by pulling straight out. See Fig. 1.

2. Insert a screwdriver into the slot of the locking screw. Press in and loosen the screw 1 to 1½ turns. See Fig. 2.

3. With the screwdriver seated in the screw slot, press the screw in as far as possible. Hold it in firmly with one hand and tune in the desired station with the other hand by pressing in and rotating the selector knob. See Fig. 3.

4. Release the selector knob and tighten screw firmly.

5. Check the adjustment by turning well past the station, using the selector knob, and then pushing in the button shaft. The station should come back in again clearly and with maximum volume.

After the adjustment is tested, check to see that the locking screw is tightened firmly. Replace the button on its shaft.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 6SA7 tube. Clip input to stator lug of middle variable condenser section. Adjust the four i-f trimmers for maximum response.

Broadcast Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the antenna coil trimmer for maximum response. Reset the pointer at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

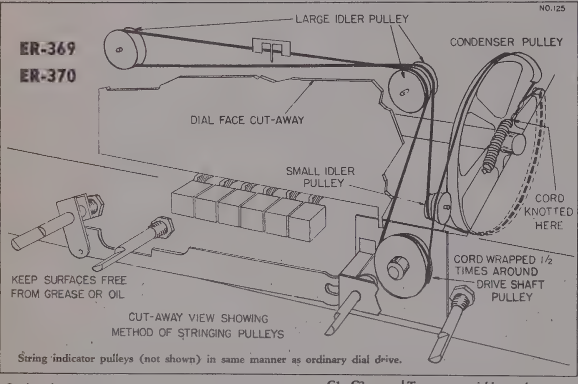
Set the wave-band switch at the police band (central) position and the pointer at 7.0. Feed 7000 kc to the antenna (using the dummy described above). Adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

Use a dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser in series with a 400 ohm carbon resistor for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

The adjustable padding condenser for the broadcast band is located on the top of the chassis near the 6SQ7 tube. The short-wave and police padders are fixed mica condensers. When replacing, be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the coils may not track.



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS

String indicator pulleys (not shown) in same manner as ordinary dial drive.

On broadcast reception only, to tune in a station manually, the station selector knob must be pressed in while it is rotated.

T1	Police and short-wave antenna coil
T2	Three-band oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc second i-f transformer
T5	Power transformer
L1	Antenna choke and 455 kc wave-trap
L2	Broadcast loop antenna
L3	Broadcast antenna loading coil
R1	20,000 ohm ¼ watt carbon resistor
R2	50 ohm ¼ watt carbon resistor
R3	40,000 ohm ½ watt carbon resistor
R4	1,000 ohm ¼ watt carbon resistor
R5, R13	100,000 ohm ¼ watt carbon resistor
R6	15,000 ohm 3 watt carbon resistor
R7	2 megohm ¼ watt carbon resistor
R8, R16, R18	250,000 ohm ¼ watt carbon resistor
R9	20,000 ohm 1 watt carbon resistor
R10	1 megohm ¼ watt carbon resistor (in 6U5 socket)
R11	Volume control 2.5 megohm with line switch tapped at .4 meg. and 50,000 ohms
R12	15,000 ohm ¼ watt carbon resistor
R14	50,000 ohm ¼ watt carbon resistor
R15	15 megohms ¼ watt carbon resistor
R17, R19, R20	500,000 ohm ¼ watt carbon resistor
R21	25,000 ohm ¼ watt carbon resistor
R22	1,000 ohm 1 watt carbon resistor
R23	3 megohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser (complete with 6 push button assembly)
C7	0.01 mf, 400 volt tubular condenser
C8	0.001 mf mica condenser (part of L1)
C3, C13	0.003 mf mica condenser
C4, C5	Dual trimmer strip
C6	Loop antenna trimming condenser.
C9	0.002 mf mica condenser
C10, C11, C12	Trimmer, part of oscillator coil.
C14	Single adjustable padding condenser Range: 400-700 mmf
C15, C24, C30	0.00011 mf mica condenser
C16, C23	0.1 mf, 400 volt tubular condenser
C17, C18, C19, C20	Trimmers, part of i-f transformers.
C21, C34, C35	0.05 mf, 400 volt tubular condenser
C22, C41	0.05 mf, 200 volt tubular condenser
C25	0.00006 mf mica condenser
C26, C28	0.02 mf, 400 volt tubular condenser
C27, C29, C32, C36	0.002 mf, 600 volt tubular condenser
C31, C33	0.005 mf, 400 volt tubular condenser
C37, C38, C39	Triple 15 mf dry electrolytic condenser. C37—250 volt; C38 and C39—400 volt
C40	0.01 mf, 400 volt molded condenser
R24	3 megohm ¼ watt carbon resistor
R25	2 megohm ¼ watt carbon resistor
R26	1,000 ohm ¼ watt carbon resistor
C42	0.0005 mf mica condenser

MODEL: EV-384 CHASSIS MODEL: EV

T1	Oscillator coil
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer.
T4	Output transformer
T5	Power transformer
L1	Loop antenna assembly
R1	20,000 ohm ¼ watt carbon resistor
R2	20,000 ohm 2 watt carbon resistor
R3	1000 ¼ watt carbon resistor
R4	100,000 ohm ½ watt carbon resistor
R5, R24	3 megohm ¼ watt carbon resistor
R6, R9, R17	50,000 ohm ¼ watt carbon resistor
R7	Volume control .5 megohm with line switch
R8, R12	10 megohm ¼ watt carbon resistor
R10, R26	500,000 ohm ¼ watt carbon resistor
R11	200,000 ohm ¼ watt carbon resistor
R13, R14, R25, R27	250,000 ohm ¼ watt carbon resistor
R15	240 ohm 1 watt wire-wound resistor
R16	560,000 ohm ¼ watt carbon resistor
R18	20,000 ohm 1 watt carbon resistor
R19	1 megohm resistor in 6E5 socket
R20	23 ohm ½ watt wire-wound resistor
R21	45 ohm ½ watt wire-wound resistor
R22	1 megohm ¼ watt carbon resistor
R23	2 megohm ¼ watt carbon resistor
R24	3 megohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser
C4	Oscillator trimmer, on variable condenser.
C5	Antenna trimmer, part of loop assembly.
C6, C7, C8, C9	Trimmers, part of i-f transformers.
C10, C13, C22	0.05 mf, 400 volt tubular condenser
C11	0.1 mf, 400 volt tubular condenser
C12	0.05 mf, 200 volt tubular condenser
C14	0.00011 mf, mica condenser
C15	0.02 mf, 400 volt tubular condenser
C16	0.00006 mf, mica condenser
C17	0.00022 mf, mica condenser
C18	0.002 mf, 600 volt tubular condenser
C19	0.01 mf, 400 volt tubular condenser
C20	0.5 mf, 400 volt tubular condenser
C21	0.25 mf, 100 volt tubular condenser
C23	0.005 mf, 1000 volt tubular condenser
C24	0.035 mf, 1000 volt tubular condenser
C25, C26, C27	Multiple dry electrolytic condenser C25—20 mf, 25 volt; C26—15 mf, 450 volt; C27—15 mf, 350 volt.
C28	0.01 mf, 400 volt molded condenser
C29	0.000026 mf mica condenser

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck behind the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted beneath the chassis. The trimmers are accesible through holes in the rear of the chassis.

The oscillator coil is mounted underneath the chassis. The oscillator trimming condenser is located on the front section of the variable condenser.

The trimmer for the loop winding is mounted on the loop board. It is accessible through a hole in the rear of the cabinet and should be trimmed when the chassis is mounted in its position.

I-f Alignment

Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 6SA7GT tube. Adjust the four i-f trimmers for maximum response.

Note: The grid of the 6SA7 tube is connected to the stator lug of the rear variable condenser section. Connection may be made with a test clip.

R-f Alignment (LOOP ALIGNMENT)

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (located on the loop board) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

Radio

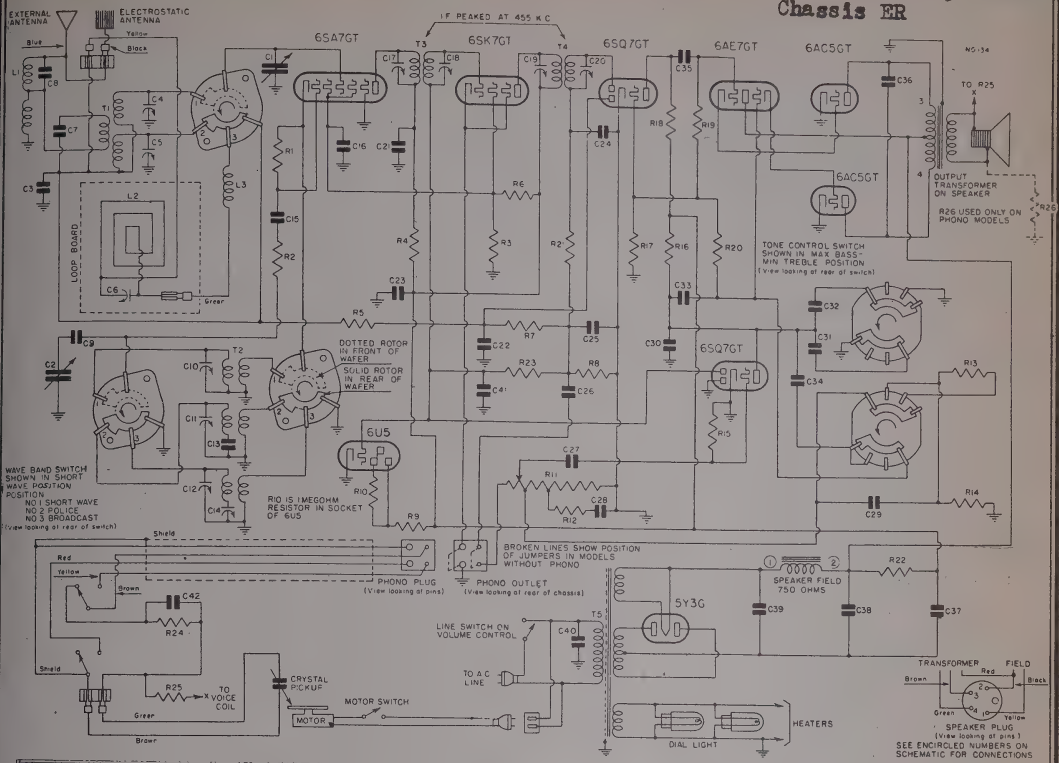
With the selector switch in "Radio" position the receiver can be used as any ordinary radio. The electron ray indicator near the top of the panel is a level indicator for recording and is not intended for use as a tuning indicator.

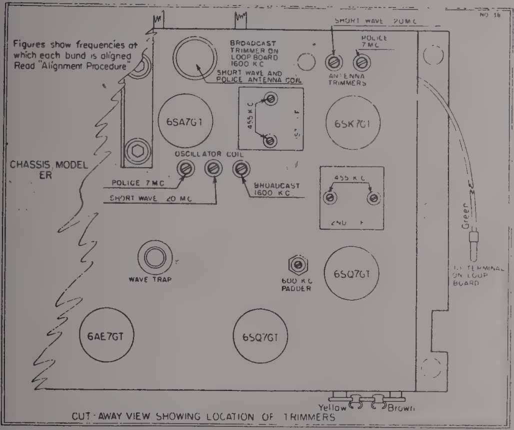
Phonograph Operation

With the selector switch in the "Phonograph" position the receiver may be used as to reproduce records up to 12". Never use the cutting needle in the reproducing pick-up since this will immediately ruin the records.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS
ER-369, ER-370
Chassis ER


EXTERNAL ANTENNA
ELECTROSTATIC ANTENNA
Blue
Yellow
Black
I F PEAKED AT 455 K C
6SA7GT
6SK7GT
6SQ7GT
6AE7GT
6AC5GT
T3
T4
C1
C17
C18
C19
C20
C35
C36
L1
C8
T1
C4
C5
C7
C3
L2
L3
C16
C21
C24
R18
R19
R1
R6
TO R25
OUTPUT TRANSFORMER ON SPEAKER
R26 USED ONLY ON PHONO MODELS
R26
6AC5GT
LOOP BOARD
C6
Green
C15
R2
R4
R3
R21
R17
R16
R20
TONE CONTROL SWITCH SHOWN IN MAX BASS-MIN TREBLE POSITION (View looking at rear of switch)
C23
C33
C32
C31
R5
R7
C25
C22
C30
6SQ7GT
C9
C2
T2
C10
DOTTED ROTOR IN FRONT OF WAFER
SOLID ROTOR IN REAR OF WAFER
R23
R8
C41
C26
C34
R13
C11
C13
6U5
R15
C27
R11
WAVE BAND SWITCH SHOWN IN SHORT WAVE POSITION
POSITION
NO 1 SHORT WAVE
NO 2 POLICE
NO 3 BROADCAST
(View looking at rear of switch)
C12
C14
R10 IS 1MEGOHM RESISTOR IN SOCKET OF 6U5
R10
R9
C28
R12
R14
C29
Shield
Red
Yellow
Brown
PHONO PLUG (View looking at pins)
PHONO OUTLET (View looking at rear of chassis)
BROKEN LINES SHOW POSITION OF JUMPERS IN MODELS WITHOUT PHONO
SPEAKER FIELD 750 OHMS
R22
C42
R24
5Y3G
C39
C38
C37
LINE SWITCH ON VOLUME CONTROL
C40
T5
Shield
R25
TO VOICE COIL
CRYSTAL PICKUP
TO A C LINE
Green
MOTOR SWITCH
MOTOR
Brown
HEATERS
DIAL LIGHT
TRANSFORMER
FIELD
Red
Brown
Black
Green
Yellow
SPEAKER PLUG (View looking at pins)
SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS



CUT-AWAY VIEW SHOWING LOCATION OF TRIMMERS

VOLTAGE RATING: 105-125 volts.
POWER SUPPLY: A.C. only.
POWER CONSUMPTION:

85 watts for receiver.
120 watts for combination.

FREQUENCY RANGES:

540-1630 kc.
2.3-7.5 mc.
6.9-22.3 mc.

6SA7GT, oscillator-modulator
6SK7GT, i-f amplifier
6SQ7GT, diode detector, audio amplifier and a.v.c.
6SQ7GT, audio amplifier
6AE7GT, audio amplifier
6AC5G, power output
5Y3G, full-wave rectifier.

6U5 electron-ray tuning indicator.

VOLTAGE ANALYSIS

Voltage at 5Y3 filament to ground—345 volts.
Voltage drop across speaker field—90 volts.
†Same voltage for each tube.
*Same voltage for both cathodes.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

MODELS: ER-369 and ER-370

CHASSIS MODEL: ER

—ER-S1 —ER-S2

Tube	Plate	Screen	Cathode	Fil.
6SA7GT	235	72	0	6.3
6SK7GT	235	72	0	6.3
†6SQ7GT	75	—	0	6.3
*6AE7GT	255	—	12	6.3
†6AC5GT	245	—	0	6.3

RECORD CHANGER ADJUSTMENTS

1. PICKUP DOES NOT INDEX PROPERLY ON TEN-INCH OR TWELVE-INCH RECORDS.

(a) Adjustment for correct indexing of 10-inch records:

1. Swing tone arm outward until tone arm lever assembly (Item 19, Fig. 1) latches with tone arm latch lever (Item 18, Fig. 1) which is held to tone arm shaft (Item 77, Fig. 1) by two set-screws.

2. Make sure these set-screws are tight and that there is a slight play between the tone arm lever assembly and the panel (Item 5, Fig. 1. This will give proper clearance at ball race assembly (Item 74, Fig. 3).

The tone arm lever assembly (Item 19, Fig. 1) is held against tone arm latch lever (Item 18, Fig. 1) by the tension of tone arm locator lever spring (Item 16, Fig. 1).

3. Next loosen the clamping screw in the Swivel Bracket Assembly (Item 46, Fig. 3).

4. Now move tone arm (Item 60, Fig. 4) until its outside edge is ⅛″ from the outside edge of the panel (Item 5, Fig. 1) and retighten screw securely.

2. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE AT END OF RECORD.

(a) Worn or Damaged Stop Groove: If the stop groove in the record is worn out or damaged, discard such a record.

(b) Cut-off Adjustment May Be Incorrect: The Record Changer should go into its changing cycle when the needle enters the stop groove and has traveled to within a distance of 1⅞″ from the center of the turntable shaft.

If the Record Changer does not go into its changing cycle when the needle has reached the above mentioned distance, the Tone Arm Trip Lever Shoe (Item 23, Fig. 1) should be moved toward the outside edge of the panel. To do this, it is necessary to loosen the thumb nut (Item 22, Fig. 1) and then retighten after adjustment has been made.

If the Record Changer goes into its changing cycle before the needle has reached a distance of 1⅞″ from the center of the turntable, the Tone Arm Trip Lever Shoe should be moved inward toward the center of the Record Changer.

3. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE WHEN SWITCH KNOB IS TURNED ON.

When the switch is turned to "ON" the Record Changer should start its changing cycle. If it does not, the following points should be checked.

1. Make sure motor is running.

2. Check Trip Rod (Item 32, Fig. 1), to make sure it releases Trip Lever Assembly (Item 20, Fig. 1) from Engagement Clutch Cam Assembly (Item 79, Fig. 2) when Switch Knob is being turned on. If Trip Lever Assembly is not released, Trip Rod should be shortened by bending until Trip Lever clears Engagement Clutch Cam Assembly, when Switch Knob is turned.

3. Make sure that Clutch Reset Pawl (Item 40, Fig. 2) clears Drive Link Assembly (Item 31, Fig. 1).

4. RECORD CHANGER CONTINUES TO REPEAT ITS CHANGING CYCLE WITHOUT PLAYING RECORDS.

(a) Trip Lever Assembly (Item 20, Fig. 1) does not latch in Engagement Clutch Cam Assembly (Item 79, Fig. 2) which may be due to causes listed below:

1. Trip Rod (Item 32, Fig. 1) may be bent so that it is too short, holding Trip Lever Assembly from contacting Engagement Clutch Cam Assembly.

2. Springs (Item 24 or 35, Fig. 1) may be disconnected.

5. NO SOUND WHEN NEEDLE IS ON MOVING RECORD.

1. Muting Switch (Item 26, Fig. 1) may be out of adjustment. The contacts of this switch should be open whenever its long blade is not resting on the shoe of the Engagement Clutch Cam Assembly (Item 79, Fig. 2). If the contacts remain closed after the long blade has left the shoe, they should be adjusted by bending until there is a separation of approximately 1/32″.

Switch should be checked to make sure contacts are closed when long blade is resting on the shoe of the Engagement Clutch Cam Assembly.

2. The lugs on the Muting Switch may have been bent together.

3. Pickup cartridge in Tone Arm may have been damaged or may be defective.

6. TONE ARM ADJUSTMENTS FOR 12″ RECORDS.

1. Turn both Control Knobs until the arrows marked "12" are pointing toward the center of the turntable.

2. Place a 12″ record on the turntable.

3. Start Record Changer and note where needle contacts record. Correct contacting is about ⅛″ from the outside edge of record.

4. Set Rod (Item 56, Fig. 3) is operated by Selector Arm (Item 61, Fig. 4). The 12″ Set Link (Item 10, Fig. 1) operates as a stop when Record Changer is set for 12″ records. When Tone Arm Locator Assembly (Item 12, Fig. 1) contacts 12″ Set Link the Tone Arm should be in the correct position to play a 12″ record.

If at this point, the position of Tone Arm is incorrect, loosen the screw which holds the Tone Arm Locator Shoe 12″ (Item 14, Fig. 1) and move in either direction as required and tighten screw.

7. TONE ARM ADJUSTMENTS FOR 10″ RECORDS.

1. Turn both knobs until the arrows marked "10" are pointing toward the center of the turntable.

2. Place a 10″ record on the turntable and start Record Changer.

3. Note where needle contacts record. Correct contacting is about ⅛″ from the outside edge of record. If contacting of needle is not correct as mentioned, loosen the screw which holds Tone Arm Locator Shoe 10″ (Item 15, Fig. 1) and slide shoe in or out as required, then tighten screw.

8. TONE ARM HEIGHT ADJUSTMENTS.

Set the Record Changer for 10″ records, turn Switch to "ON" and allow Record Changer to go through a changing cycle with no record on the turntable. The clearance between Turntable and the bottom surface of the Tone Arm should be approximately ⅛″. Usually this clearance can be obtained by adjusting the Tone Arm Adjustment Screw (Item 70, Fig. 3). It is well to check the following points before making any adjustment.

Check clearance between Roller (Item 51, Fig. 3) and Selector Crank Shaft Assembly (Item 7, Fig. 1). There should be approximately 1/32″ clearance at this point. If the clearance is greater, it would be due to the pressure on the Spring Washer (Item 50, Fig. 3) being too great. This will prevent the Tone Arm Lifter Reset Spring (Item 82, Fig. 3) from returning the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) sufficiently. To relieve the pressure on the Spring Washer, lower the Selector Shaft Collar (Item 6, Fig. 1) slightly.

9. TONE ARM LOWERS ON RECORD TOO SUDDENLY.

If the Tone Arm lowers too suddenly, the Spring Washer (Item 50, Fig. 3) which is located between the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) and Selector Shaft Crank Assembly Post (Item 7, Fig. 1) is not under sufficient pressure. The set-screws in the Selector Shaft Collar (Item 6, Fig. 1) should be loosened and the Selector Shaft Collar pressed upward slightly and set-screws tightened.

10. LUBRICATION.

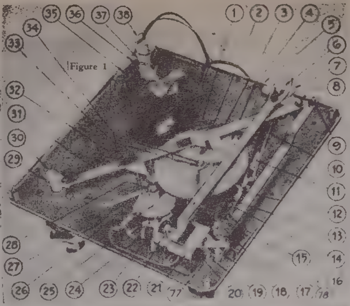
(a) Motor: The motor is equipped with oil-less bearing and requires no lubrication.

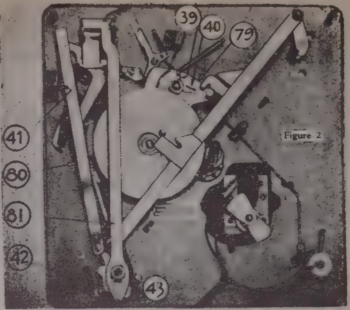
(b) Turntable Spindle Bearings: Are lubricated at the factory and do not require any lubrication for one year. After one year they should be oiled with 1 or 2 drops of a light grade oil.

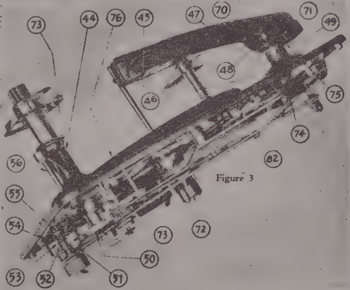
The top bearing can be oiled by lifting off turntable. Make sure when replacing turntable to see that pin in Turntable Spindle slips into slot on bottom surface of turntable hub and also care should be taken not to injure Rubber Idler Drive Wheel.

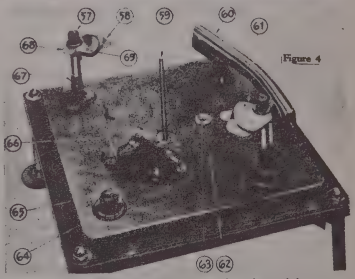
Never, under any circumstance, allow oil to come in contact with Rubber Idler Drive Wheel.

(c) Squeak Due To Records Rubbing On Turntable Spindle: This can be eliminated by gently lining up the stack of records.









Automatic Phonograph Operation

1. Turn the radio on in the regular manner and then rotate the radio-phono switch to the phonograph position, counter-clockwise.

2. The selector arms on the record holder posts are free to rotate when the posts are lifted by means of the control knobs. (See Fig. 5) For 10″ records lift the posts and rotate until the 10″ arrows on the arms point to the center of the turntable. For 12″ records, rotate the posts so that the 12″ arrows point to the center of the turntable. Both posts must be set for the same size record.

3. Two Emerson Multi-Playing phonograph needles are supplied with each combination. Each of these needles is good for 25 playings with high quality of reproduction and minimum record wear. Insert one of these needles all the way in the tone arm, fastening it securely by means of the small set-screw provided. It is important, once a needle has been removed from the tone arm, that it never be reinserted in the tone arm.

4. Check to see that the selector arms are set correctly for the size record to be played and load the records over the motor spindle so that they rest on top of the selector arms. Be sure the records are all of one size. Up to fourteen 10-inch records or ten 12-inch records may be used at one loading. It is not necessary to place a record on the turntable.

5. Turn the switch knob on the metal panel to the "on" position. The turntable should start to revolve.

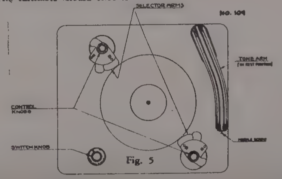


Fig. 5

6. The first record should drop into place and the tone arm should swing into place on the record. If it does not, push the switch knob down once.

7. To reject a record at any time, all that is necessary is to push down on the switch knob.

8. The volume should be adjusted to the desired level by means of the regular receiver volume control.

9. During operation, the cabinet lid should be closed to eliminate mechanical noises due to needle vibration.

10. The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycles before the switch is turned off. Then lift the pickup, swing the arm to the rgiht beyond the edge of the record and lower it.

11. Grasp each post by its knob and rotate until the record holder arms are clear of the turntable. (See Fig. 6.) The records may then be removed

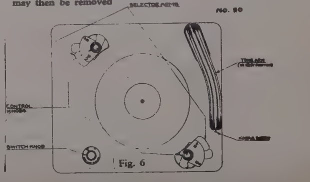
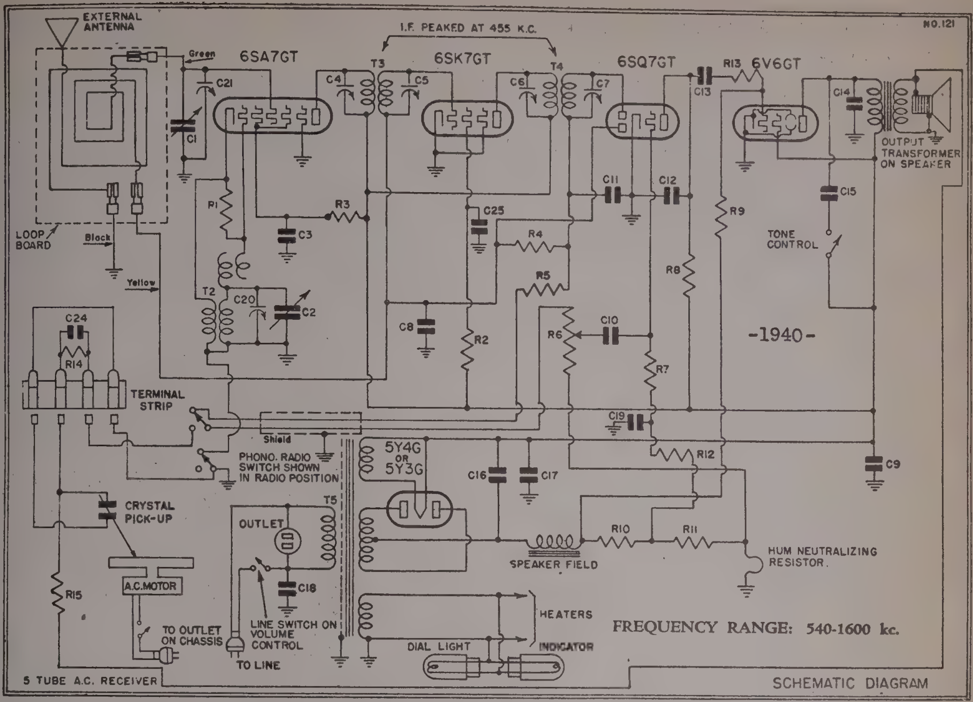


Fig. 6

EMERSON RADIO & PHONOGRAPH CORP.

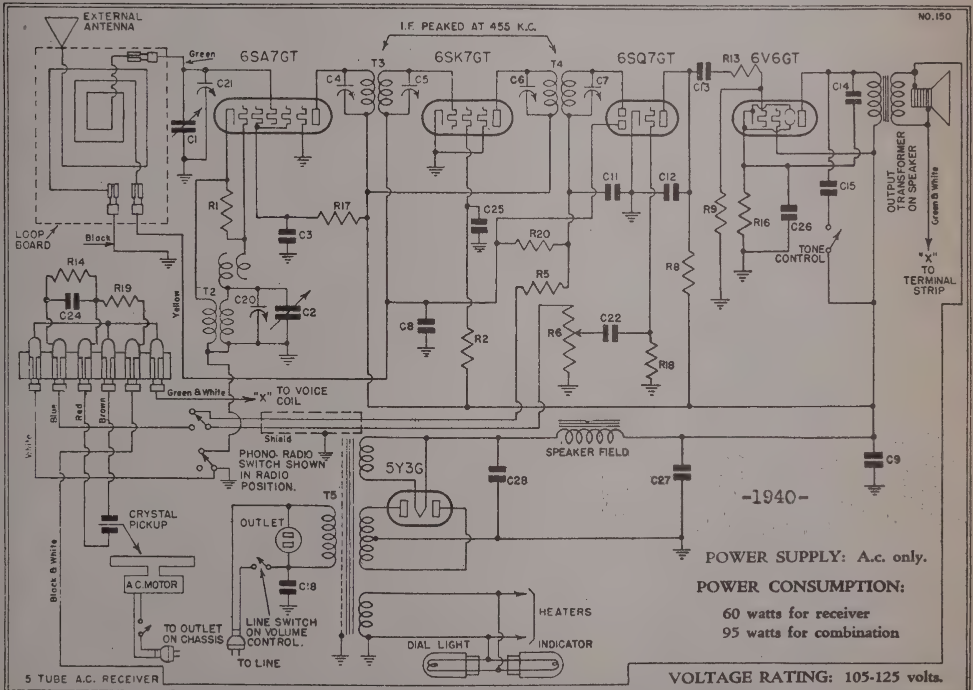
MODELS ES-374, ES-397
Chassis ES



-1940-

FREQUENCY RANGE: 540-1600 kc.

SCHEMATIC DIAGRAM No. 1



-1940-

POWER SUPPLY: A.c. only.

POWER CONSUMPTION:

60 watts for receiver
95 watts for combination

VOLTAGE RATING: 105-125 volts.

SCHEMATIC DIAGRAM No. 2

MODELS
ES-374, ES-397
Chassis ES

EMERSON RADIO & PHONOGRAPH CORP.

T1	Loop antenna assembly
T2	Oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc second i-f transformer.
T5	Power transformer
R1	20,000 ohm ¼ watt carbon resistor
R2	20,000 ohm 3 watt carbon resistor (see prod. change no 1a)
R3	100,000 ohm ½ watt carbon resistor
R4	3 megohm ¼ watt carbon resistor
R5	25,000 ohm ¼ watt carbon resistor
R6	Volume control .25 megohm with line switch
R7, R14, R15	2 megohm ¼ watt carbon resistor
R[illegible]	250,000 ohm ¼ watt carbon resistor
R9, R12	500,000 ohm ¼ watt carbon resistor (see prod. change no. 1b)
R10	180 ohm 1 watt wire-wound resistor (see prod. change no. 1a)
R11	23 ohm ½ watt wire-wound resistor (see prod. change no. 1a)
R13	50,000 ohm ¼ watt carbon resistor
R16	240 ohm 1 watt wire-wound resistor
R17	20,000 ohm 2 watt carbon resistor
R18	15 megohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser (see prod. change no. 1a)
C3, C25	0.05 mf, 400 volt tubular condenser
C4, C5, C6, C7	Trimmers, part of i-f transformers.
C8	0.05 mf, 200 volt tubular condenser
C9	0.1 mf, 400 volt tubular condenser
C10	0.006 mf, 600 volt tubular condenser (see prod. change no. 1c)
C11, C12	0.0002 mf, 600 volt tubular or mica condenser
C14	0.005 mf, 1000 volt tubular condenser
C13, C15	0.02 mf, 400 volt tubular condenser
C16	16 mf, 450 volt dry electrolytic condenser
C17	16 mf, 400 volt dry electrolytic condenser
C18	0.01 mf, 400 volt tubular condenser
C19	0.25 mf, 100 volt tubular condenser (see prod. change no. 1c)
C20	Trimmer, part of loop antenna assembly.
C21	Trimmer, part of variable condenser.
C23	0.002 mf, 600 volt tubular condenser
C24	0.00006 mf mica condenser
C26, C27, C28	Multiple dry electrolytic condenser C26—20 mf, 25 volt; C27—15 mf, 350 volt; C28—16 mf, 400 volt (see prod. change no. 1e)
TTS-111V	Phono-radio switch
3ES-256J	Tone control switch
8SS-519	12" dynamic speaker

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 300 volt scale.

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Fil.
6SA7	255	100	0	6.3 a.c.
6SK7	255	85	0	6.3 a.c.
6SQ7GT	110	—	0	6.3 a.c.
6V6	245	255	*12	6.3 a.c.

*6V6 cathode voltage is zero on chassis below 3,923,600.

In chassis below 3,923,600

Voltage from power transformer center tap to ground—85 volts (negative).

Voltage across resistors R10 and R11—15 volts (negative).

In chassis above 3,923,600:

Voltage across field—70 volts

Voltage at 5Y3 filament to ground—325

PRODUCTION CHANGES

1 For chassis bearing serial numbers above 3,923,600
- (a) This part is not used. (refer to schematic diagram no. 2)
- (b) Resistor R12—.5 megohm is not used.
- (c) Condenser C10—.006 mf; C19—.25 mf; are not used.
- (d) This variable condenser is used. Chassis below 3,923,600 use 8SC-507.
- (e) This electrolytic is used. Chassis below 3,923,600 use:
  C16—7AC-443—16 mf, 450 volt
  C17—7AC-444—16 mf, 400 volt

MODELS: ES-374 and ES-397

CHASSIS MODEL: ES

TYPE OF TUBES:
- 1—6SA7GT, oscillator-modulator
- 1—6SK7GT, i-f amplifier
- 1—6SQ7GT, diode detector, audio amplifier and a.v.c.
- 1—6V6GT, power output
- 1—5Y3G, full-wave rectifier.
  Chassis below 3,923,600 use 5Y3G or 5Y4G

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck behind the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis. The trimmers are accessible through holes in the rear of the chassis.

The oscillator coil is mounted underneath the chassis. The oscillator trimmer is located on the front variable condenser section.

The loop antenna acts as the antenna coil. Its trimmer is mounted on the loop board.

FOR AUTOMATIC RECORD CHANGER ADJUSTMENTS SEE INDEX

Automatic Record Changer

This record changer is provided with two trip mechanisms so that automatic changing can be secured from records with the conventional Eccentric Center Groove or with records lacking the Eccentric Center Groove, but which are recorded sufficiently near the center so that the Positive Trip comes into operation.

1. THE RATCHET TRIP

The Ratchet Trip requires no adjustment, as its range of operation is greater than that of any standard records.

2. THE POSITIVE TRIP

The Positive Trip can be adjusted to operate at a definite point from the center spindle in the following manner: Remove the button covering the hole on the left side of the pick-up arm. Using a small screw-driver rotate the screw-head appearing thru this hole. (Caution: This screw can be rotated only one-half turn or 180 degrees. Therefore, slight adjustments are all that should be required.) A slight turn to the right or in a clockwise direction makes the trip operative earlier in the playing cycle or farther from the center of the record. Turning this screw slightly to the left or in a counter-clockwise direction causes the positive trip to set later in the playing cycle or nearer to the center of the record. The exact adjustment can be determined only by playing a record with its last groove located at the desired distance from its center.

3. TONE ARM DROP POINT

This record changer is provided with an adjustment controlling the position at which the Tone Arm is dropped on the outer edge of the record. This adjustment has a constant relationship for 10- or 12-inch records. Therefore, one adjustment on either diameter of record is sufficient. To make this adjustment, remove the button on the right side of the pick-up arm and with a small screw-driver, rotate the exposed screw-head slightly. (Caution: This screw also can be rotated only one-half turn or 180 degrees. Therefore, slight adjustments are all that should be required.) Turning to the right or in a clockwise direction causes the needle to drop farther from the edge of the record. Turning to the left or counter-clockwise direction causes the needle to drop nearer the edge of the record. The proper position for the needle to drop is approximately ⅛" from the edge of the record and in the blank space at this point; that is, in the space at the edge of the record where there are no grooves.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 6SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Note: The grid of the 6SA7 tube is connected to the stator lug of the rear variable condenser section.

R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows: Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

---

4. TONE ARM LIFT

This record changer is designed so that the pickup will start at the proper position on the top record of twelve 10-inch records on the turntable. This is based upon the use of a needle which is inserted with approximately 5/16" protruding from the underside of the tone arm. Adjustment for this is readily available by lifting the tone arm to its maximum position. Turning the hexagon headed screw thus exposed on the underside of the tone arm makes the adjustment. Turning the screw to the left or counter-clockwise raises the operating position of the tone arm and turning the screw to the right, or clockwise, lowers its position.

Refer to the diagram at the right and become familiar with the parts to be handled during automatic phonograph operation. To play any series of records proceed as follows:

1. Turn the radio on in the regular manner and then rotate the radio-phono switch to the phonograph position, counter-clockwise.

2. The record holder posts are free to rotate when the posts are lifted. Turn both posts until they snap into a locked position.

3. Insert a needle all the way in the tone arm, fastening it securely by means of the small set-screw provided. It is important, once a needle has been removed from the tone arm, that it never be reinserted in the tone arm.

4. Load the records over the motor spindle so that they rest on top of the record platforms. Up to twelve 10-inch records or ten 12-inch records may be used at one loading. It is not necessary to place a record on the turntable.

5. Move the Control Button to "Rej" (reject) position and release. The turntable should start to revolve.

6. The first record should drop into place and the tone arm should swing into place on the record.

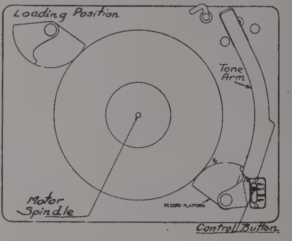
7. To reject a record at any time, all that is necessary is to push the control button to "Rej."

8. The volume should be adjusted to the desired level by means of the regular receiver volume control.

9. During operation, the cabinet lid should be closed to eliminate mechanical noises due to needle vibration.

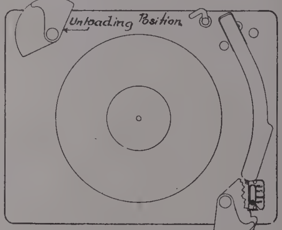
10. The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycles before the switch is turned off. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it.

11. Lift each post and rotate until the record platforms are clear of the turntable. The records may then be removed.



Manual Operation

First lift the record holder posts upward and turn them so that no portion of them overhangs the Record Turntable. Place the record over the Center Spindle. Push the Control Button to the first or Manual position and place the Tone Arm in the Starting Groove. When the record has been played thru, return the Tone Arm to its rest position and the Control Button to its "Off" position.



SPECIAL PRECAUTIONS

The following precautions are of the utmost importance and should be carefully observed:

1. Do not handle or move manually the pickup or any part of the mechanism while it is going through the record-changing operation.

2. Do not use force in handling the mechanism at any time.

3. Off-standard thickness or warped records should not be used for automatic operation.

4. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.

5. Never leave tone arm with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pickup is in the rest position.

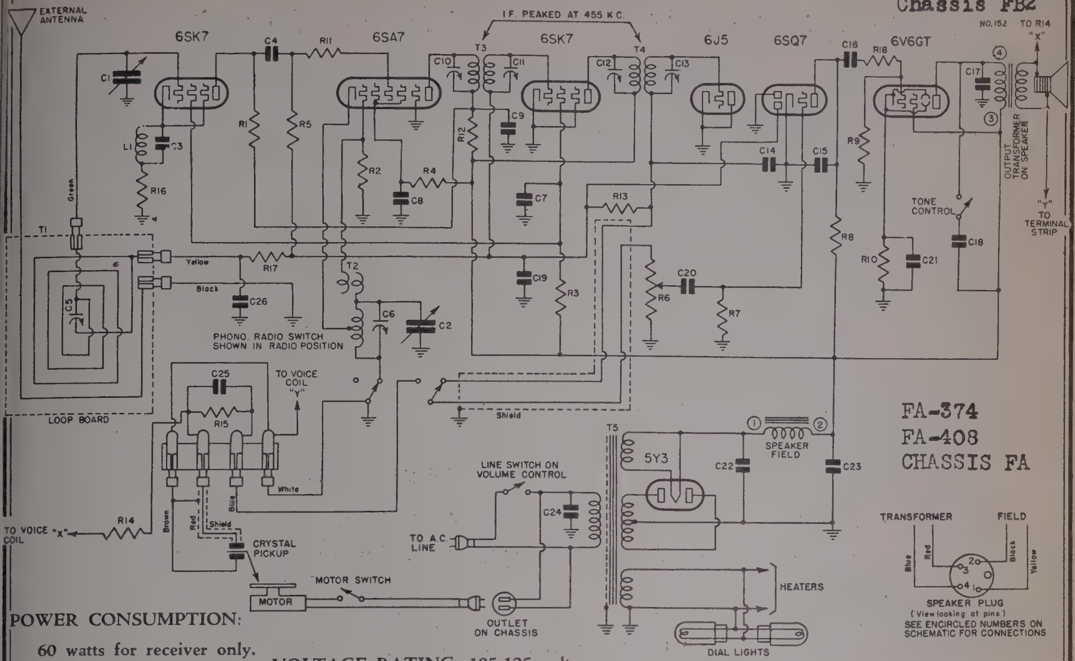
6. For playing ten or more records at one set-up, as with this changer, no attempt should be made to use ordinary steel or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well.

7. This instrument is not recommended for playing 10-inch and 12-inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS FA-374, FA-408
Chassis FA

MODEL FB2-374
Chassis FB2



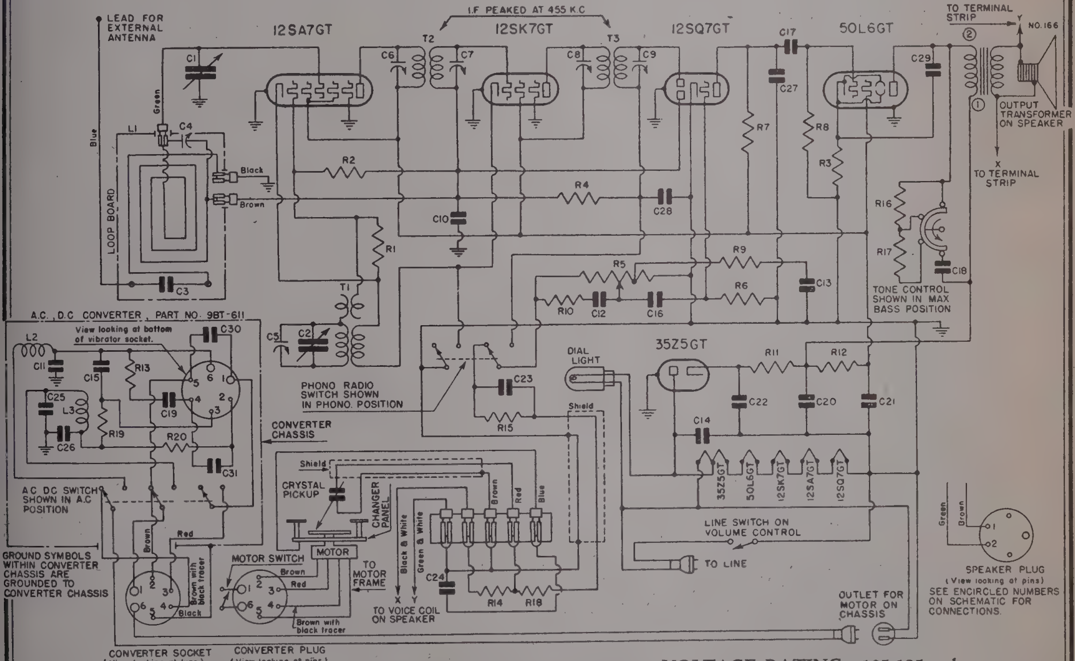
POWER CONSUMPTION:

60 watts for receiver only.
95 watts for combination.

VOLTAGE RATING: 105-125 volts.

FREQUENCY RANGE: 540-1600 kc.

FOR RECORD-CHANGER DATA, SEE INDEX


LEAD FOR EXTERNAL ANTENNA
I.F. PEAKED AT 455 K.C.
12SA7GT
T2
12SK7GT
T3
12SQ7GT
C17
50L6GT
TO TERMINAL STRIP "Y"
NO.166
C1
C6
C7
C8
C9
C29
C27
Green
Blue
L1
C4
Black
Brown
LOOP BOARD
R2
R4
R7
R8
R3
OUTPUT TRANSFORMER ON SPEAKER
X TO TERMINAL STRIP
C10
C28
R16
R17
C18
R1
R9
R5
R6
C13
C3
R10
C12
C16
TONE CONTROL SHOWN IN MAX BASS POSITION
T1
A.C., D.C. CONVERTER, PART NO. 9BT-611
View looking at bottom of vibrator socket.
L2
C30
C11
C15
R13
C5
C2
C25
L3
C19
R19
R20
C26
C31
C23
PHONO RADIO SWITCH SHOWN IN PHONO. POSITION
R15
DIAL LIGHT
35Z5GT
R11
R12
C22
C20
C21
Shield
C14
CONVERTER CHASSIS
AC DC SWITCH SHOWN IN A.C. POSITION
CRYSTAL PICKUP
CHANGER PANEL
35Z5GT
50L6GT
12SK7GT
12SA7GT
12SQ7GT
LINE SWITCH ON VOLUME CONTROL
TO LINE
GROUND SYMBOLS WITHIN CONVERTER CHASSIS ARE GROUNDED TO CONVERTER CHASSIS
Red
MOTOR SWITCH
MOTOR
TO MOTOR FRAME
Black & White
Green & White
C24
R14
R18
TO VOICE COIL ON SPEAKER
Brown with black tracer
Black
CONVERTER SOCKET (View looking at lugs)
CONVERTER PLUG (View looking at pins)
OUTLET FOR MOTOR ON CHASSIS
SPEAKER PLUG (View looking at pins)
SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS.

VOLTAGE RATING: 105-125 volts.

MODEL: FB2-374

CHASSIS MODEL: FB2

FREQUENCY RANGE: 540-1630 kc.

MODEL FB2-374
Chassis FB2
MODELS FA*374, FA-408
Chassis FA

EMERSON RADIO & PHONOGRAPH CORP.

MODELS FA-374, FA-408 CHASSIS MODEL FA

L1, C3	455 kc wave-trap
T1	Loop antenna assembly
T2	Oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc second i-f transformer
T5	Power transformer
R1	10,000 ohm 1 watt carbon resistor
R2	20,000 ohm ¼ watt carbon resistor
R3	40,000 ohm 1 watt carbon resistor
R4	30,000 ohm 2 watt carbon resistor
R5, R11	25,000 ohm ¼ watt carbon resistor
R6	Volume control .5 megohm with line switch
R7	10 megohm ¼ watt carbon resistor
R8, R9	500,000 ohm ¼ watt carbon resistor
R10	260 ohm 1 watt carbon resistor
R12	1000 ohm ¼ watt carbon resistor
R13	3 megohm ¼ watt carbon resistor
R14, R15	2 megohm ¼ watt carbon resistor
C1, C2	Two-gang variable condenser
C3	Part of 9AT-602 wave-trap.
C4	0.00022 mf mica condenser
C5	Antenna trimmer, part of loop antenna assembly
C6	Oscillator trimmer, part of variable condenser.
C7, C8, C9	0.05 mf, 400 volt tubular condenser
C10, C11, C12, C13	Trimmers, part of i-f transformers.
C14, C15	0.0002 mf, 600 volt tubular or mica condenser
C16	0.02 mf, 400 volt tubular condenser
C17	0.005 mf, 1000 volt tubular condenser
C18	0.024 mf, 400 volt tubular condenser
C19	0.05 mf, 200 volt tubular condenser
C20	0.002 mf, 600 volt tubular condenser
C21	20 mf, 25 volt dry electrolytic condenser
C22	16 mf, 450 volt dry electrolytic condenser
C23	16 mf, 400 volt dry electrolytic condenser
C24	0.01 mf, 400 volt molded condenser
C25	0.00006 mf mica condenser

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck behind the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis. The trimmers are accessible through holes in the rear of the chassis.

The oscillator coil is mounted underneath the chassis. The oscillator trimmer is located on the front variable condenser section.

The loop antenna acts as the antenna coil. Its trimmer is mounted on the loop board.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 6SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Heater
6SK7GT	184	80	1.25	6.3
6SA7GT	249	74	0	6.3
6SK7GT	254	80	0	6.3
6SQ7GT	67	—	0	6.3
6V6GT	240	25.5	13	6.3

Voltage at rectifier filament—330 volts.

Voltage drop across speaker field—85 volts.

The color coding of the i-f transformers is as follows:

Grid—green	Plate—blue
B plus—red	Grid return—black

The color coding of the power transformer is as follows:
Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

TYPE OF TUBES:

1—6SK7GT, r-f amplifier
1—6SA7GT, triode-hexode oscillator-modulator
1—6SK7GT, i-f amplifier
1—6SQ7GT, audio amplifier
1—6J5GT, diode detector and a.v.c.
1—6V6GT, power output
1—5Y3G, full-wave rectifier

—FA—S1

MODEL: FB2-374

CHASSIS MODEL: FB2

L1	Loop antenna assembly
L2, L3	R-f choke
T1	Oscillator coil
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer
R1	20,000 ohm ¼ watt carbon resistor
R2, R6	15 megohm ¼ watt carbon resistor
R3	140 ohm ½ watt wire-wound resistor
R4	3 megohm ¼ watt carbon resistor
R5	Volume control .5 megohm with line switch, tapped at 160,000 ohms.
R7, R8, R10	500,000 ohm ¼ watt carbon resistor
R9	40,000 ohm ¼ watt carbon resistor
R11	175 ohm 1 watt metallized resistor
R12	750 ohm 1 watt wire-wound resistor
R13	220 ohm ½ watt wire-wound resistor
R14	1 megohm ¼ watt carbon resistor
R15	2 megohm ¼ watt carbon resistor
R16	1,000 ohm ½ watt carbon resistor
R17	4,000 ohm ¼ watt carbon resistor
R18	10,000 ohm ¼ watt carbon resistor
R19	25 ohm 5 watt wire-wound resistor
R20	2,200 ohm 2 watt wire-wound resistor
C1, C2	Two-gang variable condenser
C3, C13, C16	0.002 mf, 600 volt tubular condenser
C4	Trimmer, part of loop antenna assembly
C5	Trimmer, part of variable condenser
C6, C7, C8, C9	Trimmers, part of i-f transformers
C10, C19, C31	0.1 mf, 200 volt tubular condenser
C11, C14	0.05 mf, 400 volt tubular condenser
C12, C27, C28	0.00011 mf mica condenser
C15	0.5 mf, 200 volt tubular condenser
C17	0.02 mf, 400 volt tubular condenser
C18	0.15 mf, 200 volt tubular condenser
C20, C21, C22	Multiple dry electrolytic condenser 150 volt. C20—40 mf; C21, C22—20 mf.
C23	0.00006 mf mica condenser
C24	0.05 mf, 200 volt tubular condenser
C25	0.01 mf, 400 volt tubular condenser
C26	0.1 mf, 400 volt tubular condenser
C29	0.005 mf, 600 volt tubular condenser
C30	7.0 mf, 200 volt tubular condenser

TYPE OF TUBES:

1—12SA7GT, pentagrid oscillator-modulator
1—12SK7GT, first i-f amplifier
1—12SQ7GT, diode detector, a-f amplifier, a.v.c.
1—50L6GT, beam power output
1—35Z5GT, half-wave rectifier.

DIAL CORD REPLACEMENT

Use a turn and a half of cord, part number 7BZ-867A. Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The loop antenna trimmer is mounted on the loop assembly. The oscillator trimmer is mounted on the front section of the variable condenser.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f traimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug. This lug is easily identified by the connection of the green lead to the loop.

R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on the loop assembly) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.

POWER SUPPLY:

A.c. or d.c. Caution—This combination is equipped with an a.c.-d.c. switch for the motor. Before plugging line cord in electric outlet make certain that the switch is in the position corresponding to the house supply. The set was shipped with the switch in the D.C. position. The switch is the red lever located on the small chassis which is to the right of the speaker when viewed from the rear. To change position of switch, remove locking screw from red switch lever, throw switch to desired position and replace locking screw.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Voltage at 35Z5 cathode—115 volts.
Voltage across pilot light—4.5 volts.

POWER CONSUMPTION:
30 watts for receiver.
20 watts for phono motor.

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	85	85	0	12
12SK7GT	85	85	0	12
12SQ7GT	25	—	0	12
50L6GT	98	85	5.0	50

—FB2-S1

EMERSON RADIO & PHONOGRAPH CORP.

MODEL EJ-378
Chassis EJ
MODEL ET-383
Chassis ET

The receivers used in all models are of the a.c.-d.c. type. The motors in the A.C. ONLY type combinations will operate only if used on alternating current and will be damaged if connected to direct current.

The motor board on later models has been drilled to allow the installation of the Emerson D.C. to A.C. Converter. See separate Service Notes for the Converter, part no. 8MT-374.
ON NEXT PAGE

L1	Loop antenna assembly (EJ)
L1	Loop antenna assembly (ET)
T1	Oscillator coil (EJ)
T1	Oscillator coil (ET)
T2	Double-tuned 455 kc first i-f transformer
T3	Double-tuned 455 kc second i-f transformer
R1	20,000 ohm ¼ watt carbon resistor
R3	140 ohm ½ watt wire-wound resistor
R4	3 megohm ¼ watt carbon resistor
R5	Volume control .5 megohm with line switch (ET)
R5	Volume control .5 megohm with line switch (EJ)
R6, R2	15 megohm ¼ watt carbon resistor
R7, R8, R20	500,000 ohm ¼ watt carbon resistor
R9	40,000 ohm ¼ watt carbon resistor
R10, R18	250,000 ohm ¼ watt carbon resistor
R11	175 ohm 1 watt metallized resistor
R12	750 ohm 1 watt wire-wound resistor
R13	1,000 ohm ¼ watt carbon resistor
R14	1 megohm ¼ watt carbon resistor
R15	2 megohm ¼ watt carbon resistor
R16	1000 ohm ½ watt carbon resistor (ET)
R17	2200 ohm ¼ watt carbon resistor (ET)
R19	Tone control .5 megohm (EJ)
C1, C2	Two-gang variable condenser (ET)
C1, C2	Two-gang variable condenser (EJ)
C3, C16, C13	0.002 mf, 600 volt tubular condenser
C4, C15, C25	0.0002 mf, 600 volt tubular or mica condenser
C5, C11	Trimmers, part of variable condenser.
C6, C7, C8, C9	Trimmers, part of i-f transformers.
C10	0.1 mf, 200 volt tubular condenser
C12, C27, C28	0.00011 mf mica condenser
C14	0.05 mf, 400 volt tubular condenser
C17	0.02 mf, 400 volt tubular condenser
C18	0.15 mf, 200 volt tubular condenser
C24	0.05 mf, 200 volt tubular condenser
C19	0.01 mf, 400 volt tubular condenser
C20, C21, C22	Multiple dry electrolytic condenser, 150 volt. C20—40 mf; C21, C22—20 mf.
C23	0.00006 mf mica condenser
C26	0.001 mf, 600 volt tubular condenser (EJ)
C29	0.005 mf, 600 volt tubular condenser

FREQUENCY RANGE: 540-1630 kc.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

30 watts for receiver
20 watts for a.c. motor.

POWER SUPPLY:

A.c. or d.c. (for receivers using Emerson D.C. to A.C. Converter on phono motors)
A.c. only (for models so designated).

DIAL CORD REPLACEMENT

Use a turn and a half of cord, part number 7BZ-867A. Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley. The dial face should bear against the fibre washer when finally assembled.

8JS-522	6½" permanent magnet dynamic speaker (EJ)
8GS-487	8" permanent magnet dynamic speaker (ET)
8GS-485	Tone control switch
6XS-432	Phono-radio switch (ET)
6VS-445	Phono-radio switch (EJ)
6VG-24	Rubber needle cup
8TPM-68	Rim drive motor, 117 volt, 60 cycle, a.c. (ET)
8CPM-64F	Rim drive motor, 117 volt, 60 cycle, a.c. (EJ)
4XC-418B	Crystal pick-up (ET)
4XC-418A	Crystal pick-up (EJ)
8JS-523	Automatic stop switch

VOLTAGE

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given

Tube	Plate	Screen	Cathode	Fil.
12SA7GT	85	85	0	12
12SK7GT	85	85	0	12
12SQ7GT	25	—	0	12
50L6GT	98	85	5.0	50

Voltage at 35Z5 cathode—115 volts.
Voltage across pilot light—4.5 volts.

—EJ, ET—S2

TYPE OF TUBES:

12SA7GT, pentagrid oscillator-modulator
12SK7GT, first i-f amplifier
12SQ7GT, diode detector, a-f amplifier, a.v.c.
50L6GT, beam power output
35Z5GT, half-wave rectifier.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

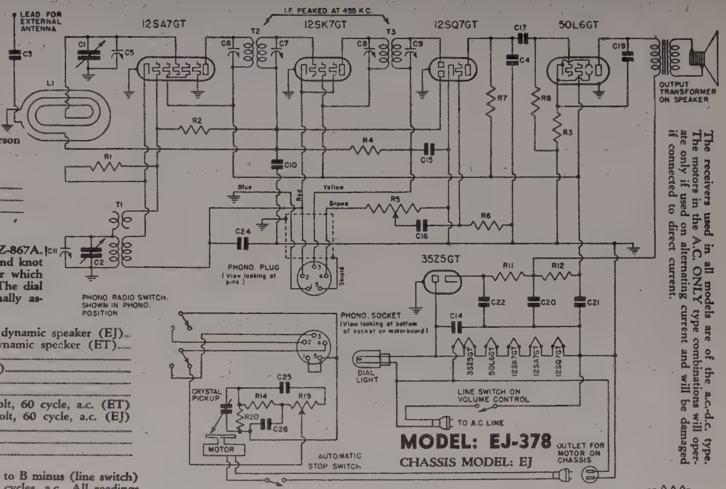
Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f traimmers for maximum response.

Note: The grid of the 12SA7 tube is connected to the lower stator lug of the rear variable condenser section. Connection may be made with a test clip to the upper stator lug. This lug is easily identified by the connection of the green lead to the loop.

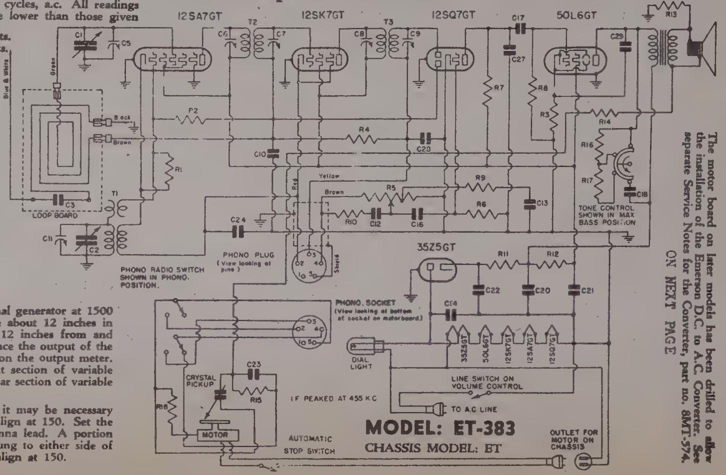
R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about 12 inches in diameter. Hold this radiating loop about 12 inches from and parallel to the receiver loop antenna. Advance the output of the signal generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on front section of variable condenser) then the antenna trimmer (on rear section of variable condenser) for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance as follows. Align at 150. Set the pointer at 60 and feed 600 kc to the antenna lead. A portion of the outside turn of the loop may be swung to either side of the center to give maximum response. Realign at 150.


LEAD FOR EXTERNAL ANTENNA
I.F. PEAKED AT 455 K.C.
12SA7GT
12SK7GT
12SQ7GT
50L6GT
35Z5GT
OUTPUT TRANSFORMER ON SPEAKER
PHONO PLUG (View looking at pins)
PHONO RADIO SWITCH. SHOWN IN PHONO. POSITION
PHONO. SOCKET (View looking at bottom of socket on motorboard)
DIAL LIGHT
LINE SWITCH ON VOLUME CONTROL
TO A.C. LINE
CRYSTAL PICKUP
MOTOR
AUTOMATIC STOP SWITCH
OUTLET FOR MOTOR ON CHASSIS
Blue
Yellow
Brown
Red
Shield

MODEL: EJ-378
CHASSIS MODEL: EJ

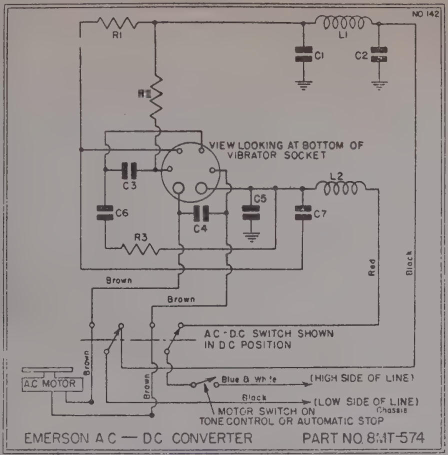

LEAD FOR EXTERNAL ANTENNA
Green
Blue & White
Black
Brown
LOOP BOARD
12SA7GT
12SK7GT
12SQ7GT
50L6GT
35Z5GT
TONE CONTROL SHOWN IN MAX BASS POSITION
PHONO PLUG (View looking at pins)
PHONO RADIO SWITCH SHOWN IN PHONO. POSITION.
PHONO. SOCKET (View looking at bottom of socket on motorboard)
DIAL LIGHT
LINE SWITCH ON VOLUME CONTROL
TO A.C LINE
I.F. PEAKED AT 455 K.C.
CRYSTAL PICKUP
MOTOR
AUTOMATIC STOP SWITCH
OUTLET FOR MOTOR ON CHASSIS
Yellow
Brown

MODEL: ET-383
CHASSIS MODEL: ET

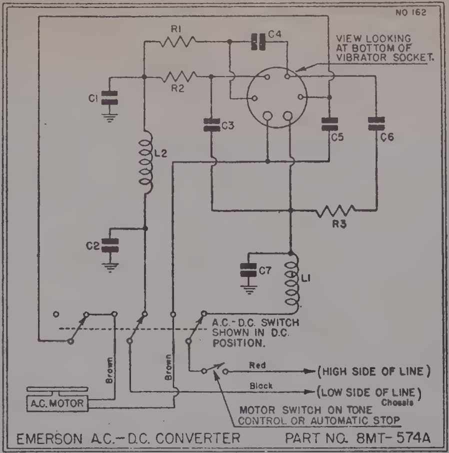
©John F. Rider, Publisher

MODEL 8MT-574
Converter

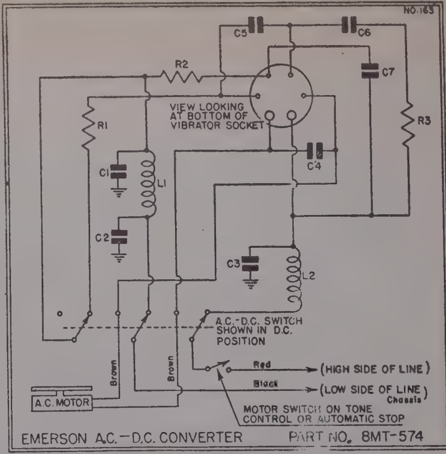
EMERSON RADIO & PHONOGRAPH CORP.


NO 142
R1
R2
L1
L2
C1
C2
C3
C4
C5
C6
C7
R3
VIEW LOOKING AT BOTTOM OF VIBRATOR SOCKET
Brown
Red
Black
AC-DC SWITCH SHOWN IN DC POSITION
Blue & White
(HIGH SIDE OF LINE)
(LOW SIDE OF LINE) Chassis
A.C MOTOR
MOTOR SWITCH ON TONE CONTROL OR AUTOMATIC STOP
EMERSON A C — DC CONVERTER
PART NO. 8MT-574

Schematic for converter having separate AC-DC toggle switch


NO 162
R1
R2
R3
C1
C2
C3
C4
C5
C6
C7
L1
L2
VIEW LOOKING AT BOTTOM OF VIBRATOR SOCKET.
A.C.-D.C. SWITCH SHOWN IN D.C. POSITION.
Brown
Red
Black
(HIGH SIDE OF LINE)
(LOW SIDE OF LINE) Chassis
A.C. MOTOR
MOTOR SWITCH ON TONE CONTROL OR AUTOMATIC STOP
EMERSON A.C.—D.C. CONVERTER
PART NO. 8MT-574A

Schematic for latest series converter having A.C.-D.C. switch mounted on unit


NO.163
C5
C6
C7
R2
R1
R3
C1
L1
C4
C2
C3
L2
VIEW LOOKING AT BOTTOM OF VIBRATOR SOCKET
A.C.-D.C. SWITCH SHOWN IN D.C. POSITION
Brown
Red
Black
(HIGH SIDE OF LINE)
(LOW SIDE OF LINE) Chassis
A.C. MOTOR
MOTOR SWITCH ON TONE CONTROL OR AUTOMATIC STOP
EMERSON A.C.—D.C. CONVERTER
PART NO. 8MT-574

Schematic for converter having AC-DC switch mounted on unit

L1, L2	Line r-f filter choke...
R1	25 ohm 5 watt metal-clad resistor......
R2	2,200 ohm 2 watt wire-wound resistor.
R3	220 ohm 1 watt wire-wound resistor...
C1	0.1 mf, 400 volt tubular condenser.......
C2	0.01 mf, 400 volt tubular condenser..
C3, C6	0.1 mf, 200 volt tubular condenser....
C4	3 mf, 200 volt paper condenser...........
C5	0.05 mf, 400 volt tubular condenser
C7	0.5 mf, 200 volt "A" condenser..
	A.C-D.C. toggle switch (used on early models)
	A.C.-D.C. wafer switch (used on late models).
	Vibrator 117 volt, d.c. to a.c.

TYPE: Synchronous vibrator.

INPUT VOLTAGE: 105-125 volts.

INPUT CURRENT: D.C. only.

OUTPUT VOLTAGE: 105-125 volts.

OUTPUT CURRENT: A.C. only.

CAPACITY: 20 watts (maximum).

(For converters with a.c.-d.c. switch mounted on converter chassis.)

1. a. Disconnect two black motor leads; one from the motor switch and one from the chassis.

b. Solder each of the two black motor leads to the brown leads emerging from the converter.

c. Solder the red lead to the motor switch.

d. Solder the black wire to the receiver chassis.

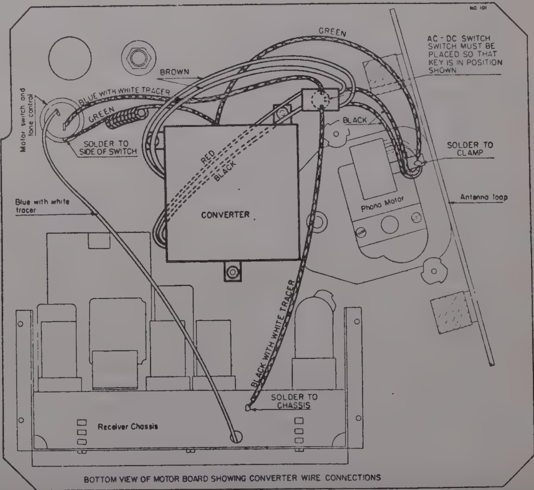
e. Solder one green lead to the clamp on the phono motor; grounding the other green lead to some point in the ground circuit will reduce vibrator hash.

f. Unit is shipped with a.c.-d.c. switch on converter in d.c. position.

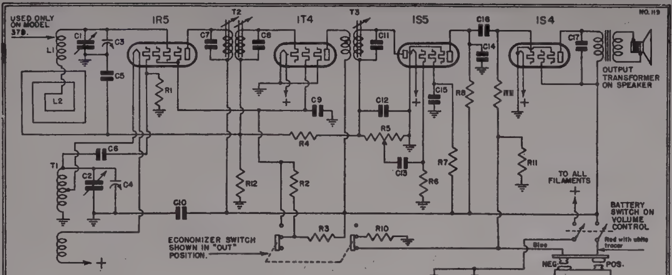
The converter should not be turned on when phono-radio switch is in the radio position, as the vibrator noise will make the receiver unusable.

At no time should the a.c.-d.c. switch be thrown to the a.c. position when the line switch is plugged into a d.c. outlet.

IMPORTANT: Do not plug receiver into house outlet until having first ascertained that this supply is d.c. If house supply is a.c., remove lever-switch clamp and push switch to a.c. position. Always see that switch is in position corresponding to house supply (a.c. or d.c.). Replace clamp over switch after any change in switch position.



Cut showing installation on EM-345 and EM-346 motorboards.



VOLTAGE RATING:

"A" Battery—1.5 volts

"B" Battery—67.5 volts.

CURRENT DRAIN:

"A" Battery—0.25 amp.

"B" Battery—0.0075 amp with Battery Saver "OUT"
0.0055 amp with Battery Saver "IN"

L1	Iron core loading coil (379)	R7, R9	3 megohm ¼ watt carbon resistor
L2	Shoulder strap loop assembly (379)	R8	1 megohm ¼ watt carbon resistor
L2	Loop antenna (380)	R10	2200 ohm ¼ watt carbon resistor
T1	Oscillator coil	R11	1800 ohm ¼ watt carbon resistor
T2	Iron core double-tuned 455 kc first i-f transformer	C1, C2	Two-gang variable condenser
T3	Iron core single-tuned 455 kc second i-f transformer.	C3, C4	Trimmers, part of variable condenser.
R1	100,000 ohm ¼ watt carbon resistor	C5, C9, C15	0.02 mf, 200 volt tubular condenser
R2	5,000 ohm ¼ watt carbon resistor	C6, C12, C14	0.00011 mf mica condenser
R3	10,000 ohm ¼ watt carbon resistor	C7, C8, C11	Fixed trimming condensers, contained inside i-f cans.
R4, R12	5 megohm ¼ watt carbon resistor	C10	10 mf, 100 volt dry electrolytic condenser
R5	Volume control 1.5 megohm with double pole battery switch.	C13	0.002 mf, 600 volt tubular condenser
R6	10 megohm ¼ watt carbon resistor	C16, C17	0.001 mf, 600 volt tubular condenser

PRODUCTION CHANGE

1. On all models, except early ones, R12 is removed.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 67.5 volts. All readings except filaments were taken on the 250 volt scale, with battery saver "out."

Bias for the 1S4 tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.5 volts with battery saver "out" or 9.4 volts with battery saver "in."

*The operating voltage of this tube cannot be measured because of the high resistor in the circuit.

Tube	Plate	Screen	Osc. Plate	Fil.
1R5	57	60	57	1.5
1T4	57	60	—	1.5
1S5	*5	*3	—	1.5
1S4	55	60	—	1.5

—DU-S1

—DU-S2

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Type Battery	Number Required	Manufacturer's Part No.
1½ volt "A"	2	Standard "D" size (1$\frac{5}{16}$" diameter) flashlight cell
67½ volt "B"	1	Eveready "Mini-max" No. 467

MODEL: DU-379 and DU-380

CHASSIS MODEL: DU

Location of Coils and Trimmer Adjustments

DU-379, DU-380

The first i-f transformer is located in the bottom outer edge of the chassis behind the lower flashlight cell. The brass screws which protrude from either end of the can are the core adjustment for trimming the transformer. The second i-f transformer is located between the 1T4 and 1S5 tubes. The single trimming core screw extends from the end of the can.

The oscillator coil is located inside the chassis, beside the variable condenser. Trimmer for the oscillator is located on the lower section of the variable condenser.

The loop antenna acts as the antenna coil. Trimmer for the loop is located on the upper section of the variable condenser.

TYPE: Single-band (battery operated) superheterodyne.

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

The color coding of the battery cable is as follows:
Red—B plus, 90 volts Blue—B minus.

If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

The receiver has a self-contained antenna and does not require additional antenna or ground connection. Model DU-379 has the loop antenna contained in the shoulder strap. If it is not worn around the shoulder it is important that the strap be stretched out into a loop of about the same width as the cabinet.

When Model DU-379 is worn about the shoulders, the correct position of the antenna may be found by the wearer turning through a quarter circle as mentioned below.

The self-contained loop antenna in Model DU-380 operates at maximum efficiency when its position is at right angles to the broadcasting source. It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

I-f Alignment

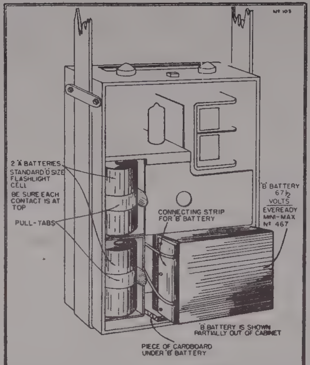
DU-379, DU-380

Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1R5 tube through a 0.01 mf condenser. Adjust the three i-f trimmer core screws for maximum response. (Clip the i-f input to the stator lug of the upper variable condenser section.)

R-f Alignment

Set the dial pointer at 150. Set the signal generator at 1500 kc and feed its output into a loop of wire about one foot in diameter. Hold this radiating loop about one foot away from and parallel to the receiver loop antenna. Advance the output of the generator until deflection is obtained on the output meter. Adjust first the oscillator trimmer (on lower section of variable condenser) then the antenna trimmer (on upper section of variable condenser) for maximum response.


Nº 105
2 "A" BATTERIES STANDARD "D" SIZE FLASHLIGHT CELL
BE SURE EACH CONTACT IS AT TOP
PULL-TABS
CONNECTING STRIP FOR "B" BATTERY
"B" BATTERY 67½ VOLTS EVEREADY MINI-MAX Nº 467
"B" BATTERY IS SHOWN PARTIALLY OUT OF CABINET
PIECE OF CARDBOARD UNDER "B" BATTERY

CABINET VIEWED FROM REAR WITH BACK REMOVED

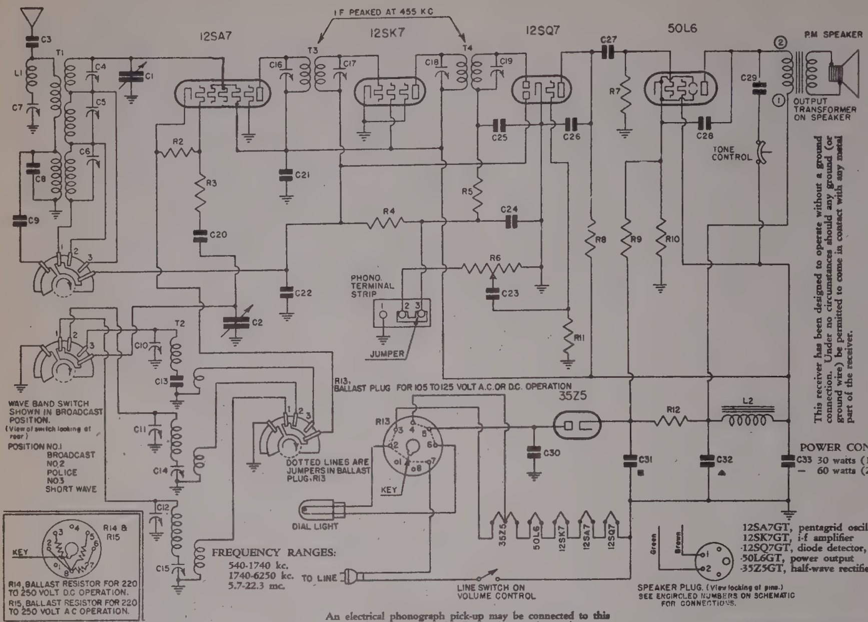
BATTERY INSTALLATION

To install and connect the batteries in this cabinet observe the following procedure:

1. Remove the back panel of the cabinet by taking out the screw.
2. Examine the battery cable coming from the receiver and identify the fasteners on the terminal strip.
3. With the "B" battery out of the cabinet, snap the two fasteners on the terminal strip into the two "B" battery snap fasteners.
4. Place the "B" battery into the cabinet as shown in diagram. Slide the two "pull-tabs" over the flashlight cells and then push the cells into the two compartments shown in the diagram with the brass center-contact at the top.
5. Replace the back panel of the cabinet and fasten it in place with the screw.

MODEL EX-386
Chassis EX

EMERSON RADIO & PHONOGRAPH CORP.


I F PEAKED AT 455 KC
12SA7
12SK7
12SQ7
50L6
P.M SPEAKER
OUTPUT TRANSFORMER ON SPEAKER
TONE CONTROL
C3
T1
L1
C7
C4
C5
C6
C8
C9
C1
C2
T3
T4
C16
C17
C18
C19
C27
C29
R7
C25
C26
C28
R2
R3
C21
C20
R4
R5
C24
R6
C23
C22
R8
R9
R10
R11
PHONO. TERMINAL STRIP
JUMPER
T2
C10
C13
C11
C14
C12
C15
WAVE BAND SWITCH SHOWN IN BROADCAST POSITION.
(View of switch looking at rear)
POSITION NO.1 BROADCAST
NO.2 POLICE
NO.3 SHORT WAVE
R13, BALLAST PLUG FOR 105 TO 125 VOLT A.C. OR D.C. OPERATION
R13
KEY
DOTTED LINES ARE JUMPERS IN BALLAST PLUG, R13
DIAL LIGHT
35Z5
R12
L2
C30
C31
C32
C33
35Z5
50L6
12SK7
12SA7
12SQ7
TO LINE
LINE SWITCH ON VOLUME CONTROL
R14 & R15
KEY
R14, BALLAST RESISTOR FOR 220 TO 250 VOLT D.C OPERATION.
R15, BALLAST RESISTOR FOR 220 TO 250 VOLT A C OPERATION.
Green
Brown
SPEAKER PLUG. (View looking at pins.)
SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS.

FREQUENCY RANGES:
540-1740 kc.
1740-6250 kc.
5.7-22.3 mc.

This receiver has been designed to operate without a ground connection. Under no circumstances should any ground (or ground wire) be permitted to come in contact with any metal part of the receiver.

POWER SUPPLY: A.C. or D. C., 105-125 volts with shorting plug, Part No. 8XR-432
D.C. 220-250 volts with ballast resistor, Part No. 8XR-433
A.C. 220-250 volts with ballast resistor, Part No. 8XR-434

POWER CONSUMPTION:
30 watts (105-125 volts)
60 watts (220-250 volts)

12SA7GT, pentagrid oscillator-modulator
12SK7GT, i-f amplifier
12SQ7GT, diode detector, audio amplifier and a.v.c.
50L6GT, power output
35Z5GT, half-wave rectifier

L1	Adjustable 455 kc wave-trap
L2	Filter choke
T1	Three-band antenna coil
T2	Three-band oscillator coil
T3	Double-tuned 455 kc first i-f transformer
T4	Double-tuned 455 kc second i-f transformer
R2	20,000 ohm ¼ watt carbon resistor
R3	50 ohm ¼ watt carbon resistor
R4	3 megohm ¼ watt carbon resistor
R5	5000 ohm ¼ watt carbon resistor
R6	Volume control .5 megohm with line switch
R7	500,000 ohm ¼ watt carbon resistor
R8	250,000 ohm ¼ watt carbon resistor
R9	20,000 ohm 1 watt carbon resistor
R10	140 ohm 1 watt wire-wound resistor
R11	15 megohm ¼ watt carbon resistor
R12	75 ohm 1 watt wire-wound resistor
R13	Shorting plug for 105-125 volt a.c. or d.c. operation
R14	Ballast resistor for 220-250 volt d.c. operation
R15	Ballast resistor for 220-250 volt a.c. operation
C1, C2	Two-gang variable condenser
C3	0.01 mf, 400 volt tubular condenser
C4, C5, C6	Trimmers, part of antenna coil assembly
C7	Trimmer, part of 455 kc wave-trap
C13	0.0034 mf, mica condenser
C14	Single adjustable padding condenser (Range: 750-1500 mmf.)
C15	Single adjustable padding condenser (Range: 300-600 mmf.)
C16, C17	Trimmers, part of first i-f transformer
C18, C19	Trimmers, part of second i-f transformer
C20, C25	0.00011 mf, mica condenser
C21	0.1 mf, 200 volt tubular condenser
C22, C29	0.05 mf, 200 volt tubular condenser
C23	0.002 mf, 600 volt tubular condenser
C24	0.00006 mf, mica condenser
C25	0.00011 mf, mica condenser
C26	0.00022 mf, mica condenser
C27	0.02 mf, 400 volt tubular condenser
C28	0.024 mf, 400 volt tubular condenser
C30	0.05 mf, 400 volt tubular condenser
C31, C32, C33	Three section dry electrolytic condenser. C31, C32—40 mf, 150 volt C33—20 mf, 150 volt

An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to the receiver may be made at the "phono" terminal strip which is located on the rear wall of the receiver chassis.

Remove the link connecting two of the terminals on the phono strip. The switch should be wired to the pick-up and terminal strip so that in the phonograph position the switch should short terminals 1 and 3 and at the same time connect the high side of the pick-up to a lead from terminal 2. (The ground side of the pick-up may be permanently wired to terminal 1.) When the switch is in the radio position terminals 2 and 3 should be shorted together and the pick-up disconnected from terminal 2.

ADJUSTMENTS

The adjustable padding condensers for the broadcast and police bands are mounted on the top of the chassis with the screw adjustment accessible through holes in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

The set's oscillator is higher in frequency than the signal on all three bands, so images should be observed on the low frequency side of the signals.

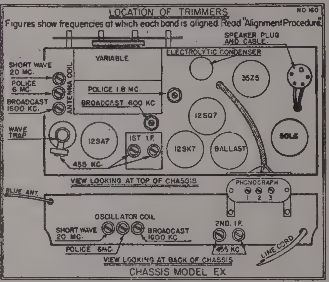
Use a dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

In aligning antenna trimmers on the high frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid of the 12SA7 tube. Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna (using a standard dummy antenna) and adjust the 455 kc wave-trap for minimum response.



Broadcast Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the pointer at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the pointer to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the antenna coil trimmer for maximum response. Reset the pointer at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure. (The broadcast padder is located beneath the chassis to the left of the variable condenser.)

Police Alignment

Set the wave-band switch at the police band (central) position and the pointer at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police band series padder for maximum response. Move the pointer to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condensers while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure. The police band padder is located beneath the chassis behind the variable condenser.)

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the pointer to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the antenna coil trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Voltage at 35Z5 cathode—115 volts.

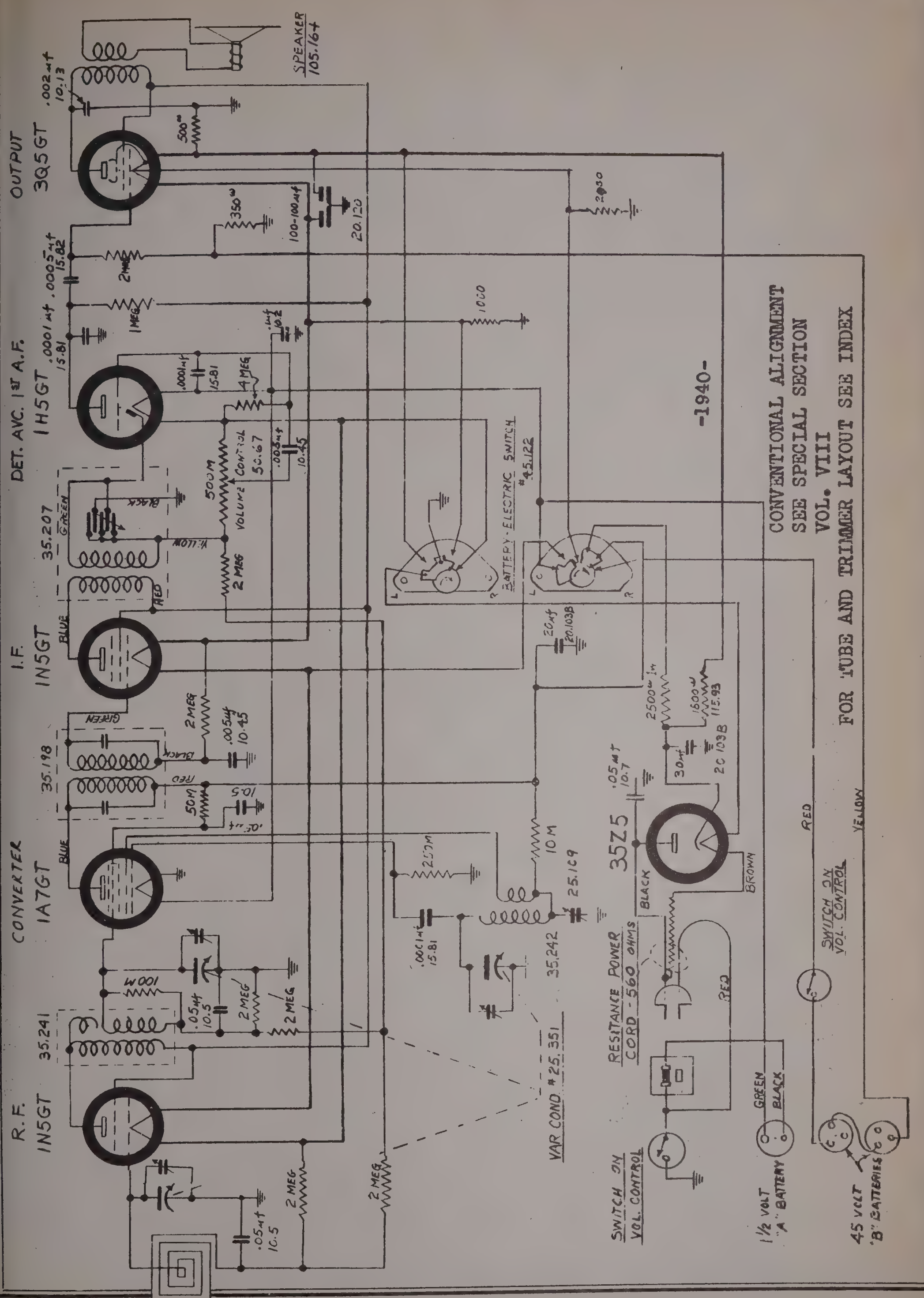
Tube	Plate	Screen	Cathode	Fil.
12SA7GT	100	100	0	12
12SK7GT	100	100	0	12
12SQ7GT	45	—	0	12
50L6GT	97	100	6.2	50

MODEL: EX-386 —EX—S1

CHASSIS MODEL: EX

MODEL P23

FADA RADIO & ELECTRIC CO

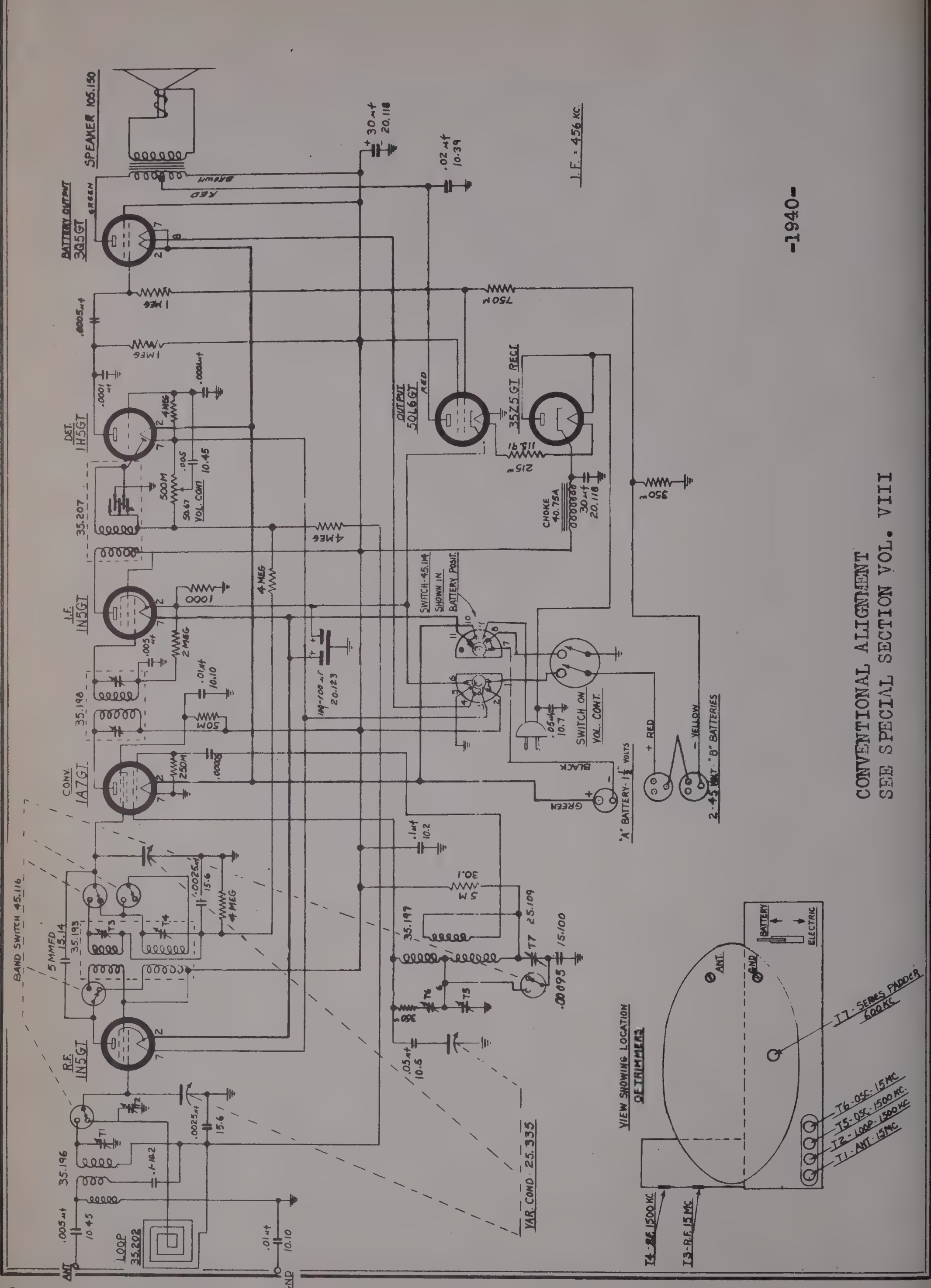


-1940-

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL. VIII
FOR TUBE AND TRIMMER LAYOUT SEE INDEX

MODEL P24

FADA RADIO & ELECTRIC CO

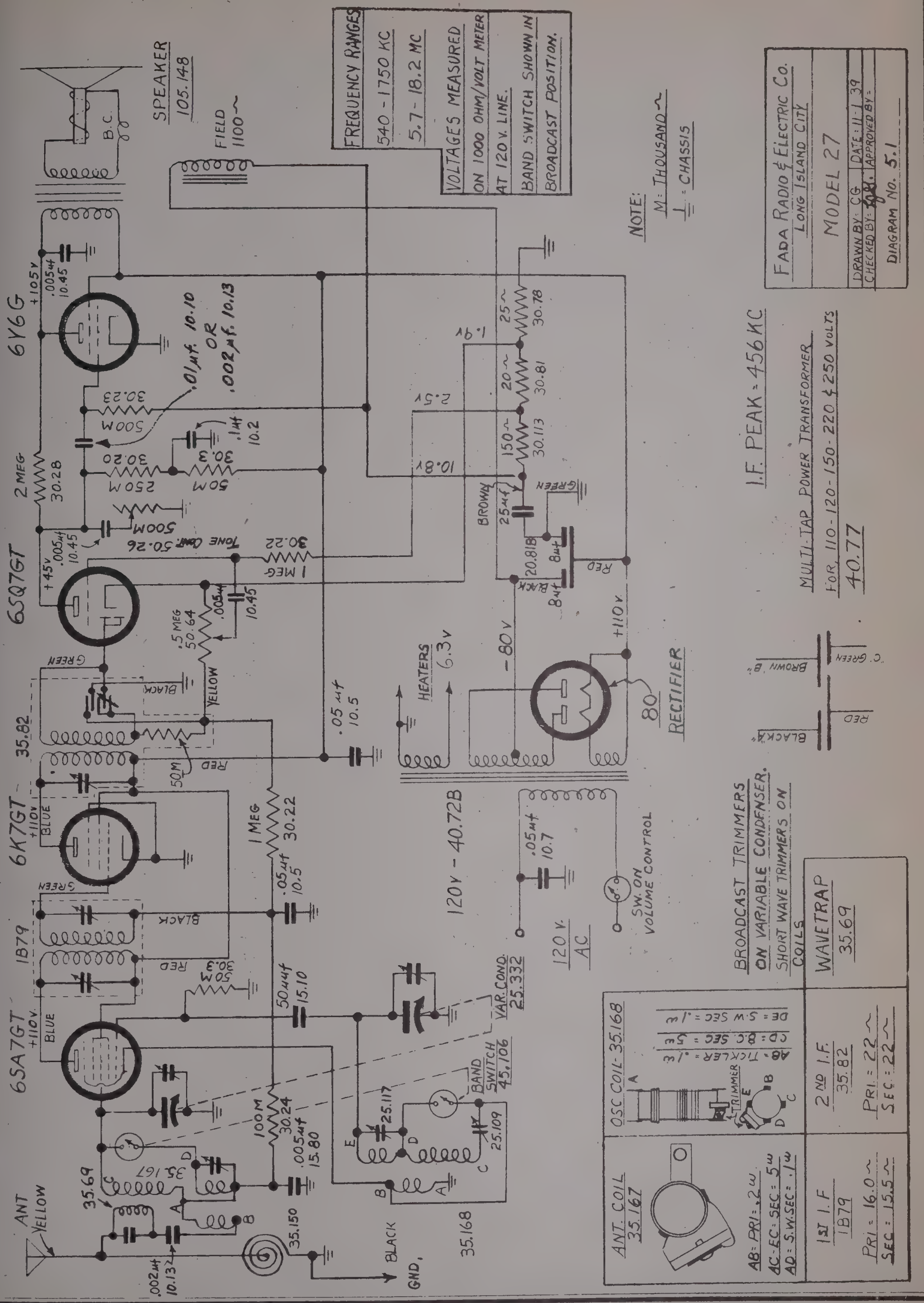


-1940-

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

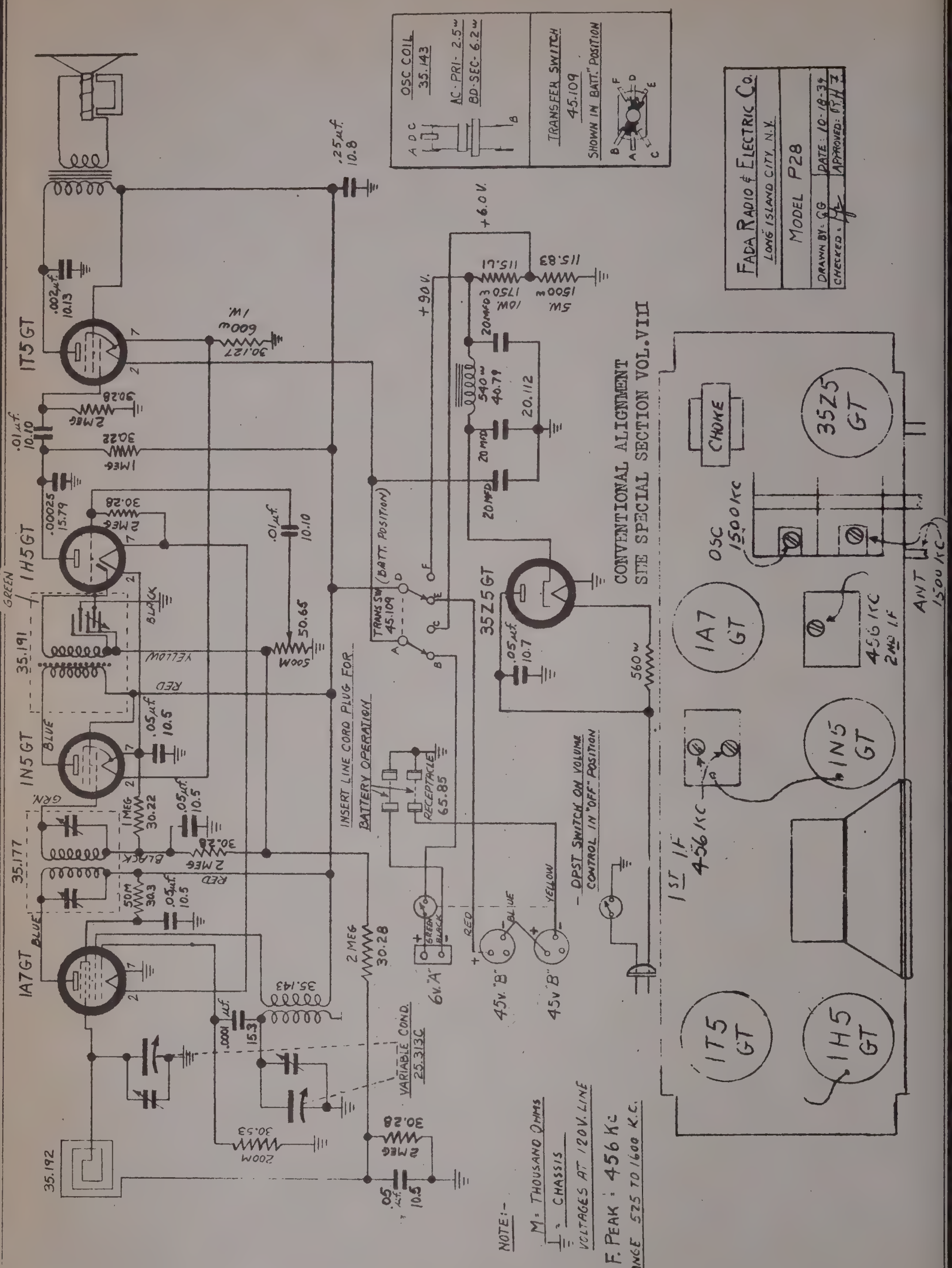
MODEL 27

FADA RADIO & ELECTRIC CO



MODEL P28

FADA RADIO & ELECTRIC CO

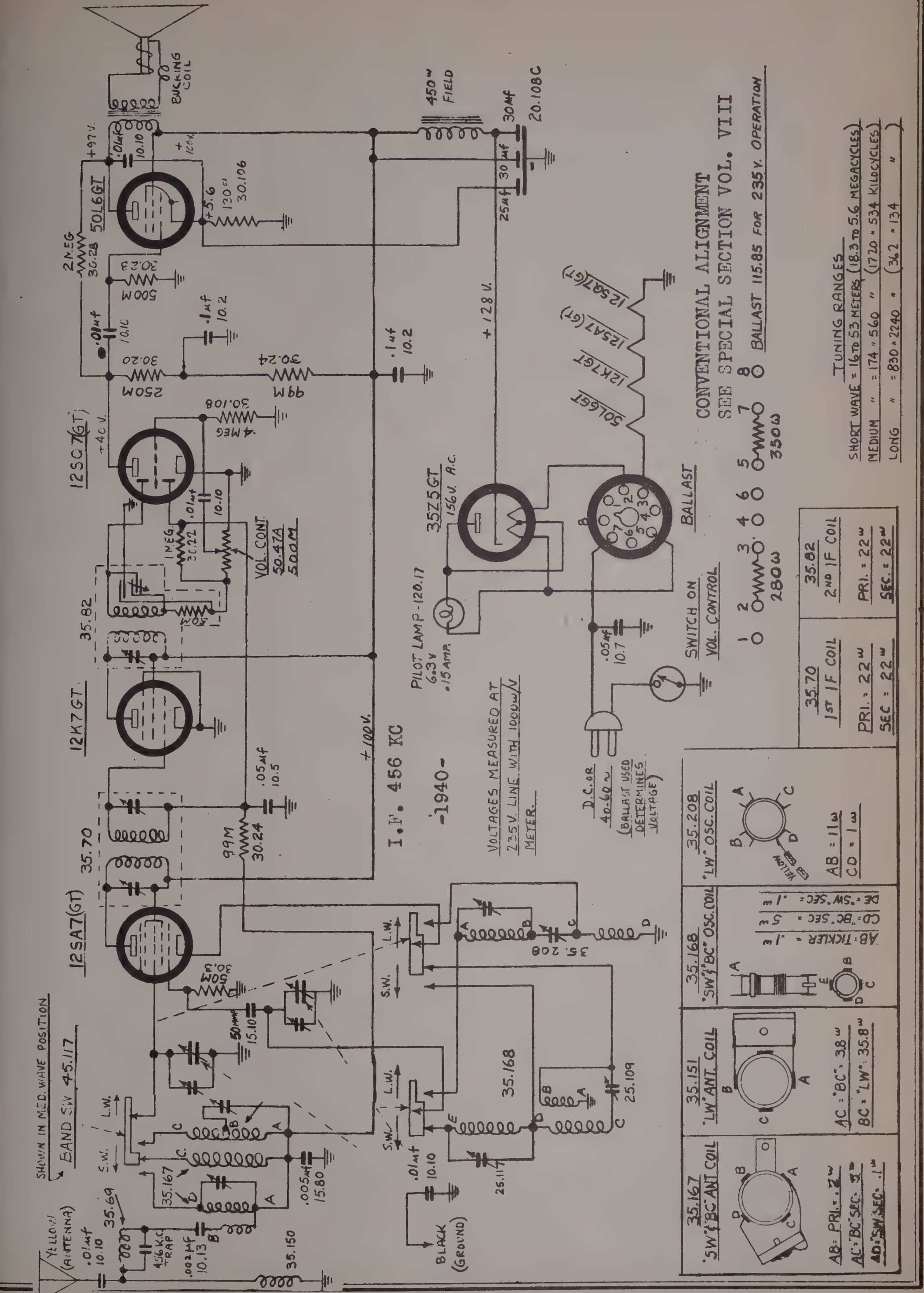


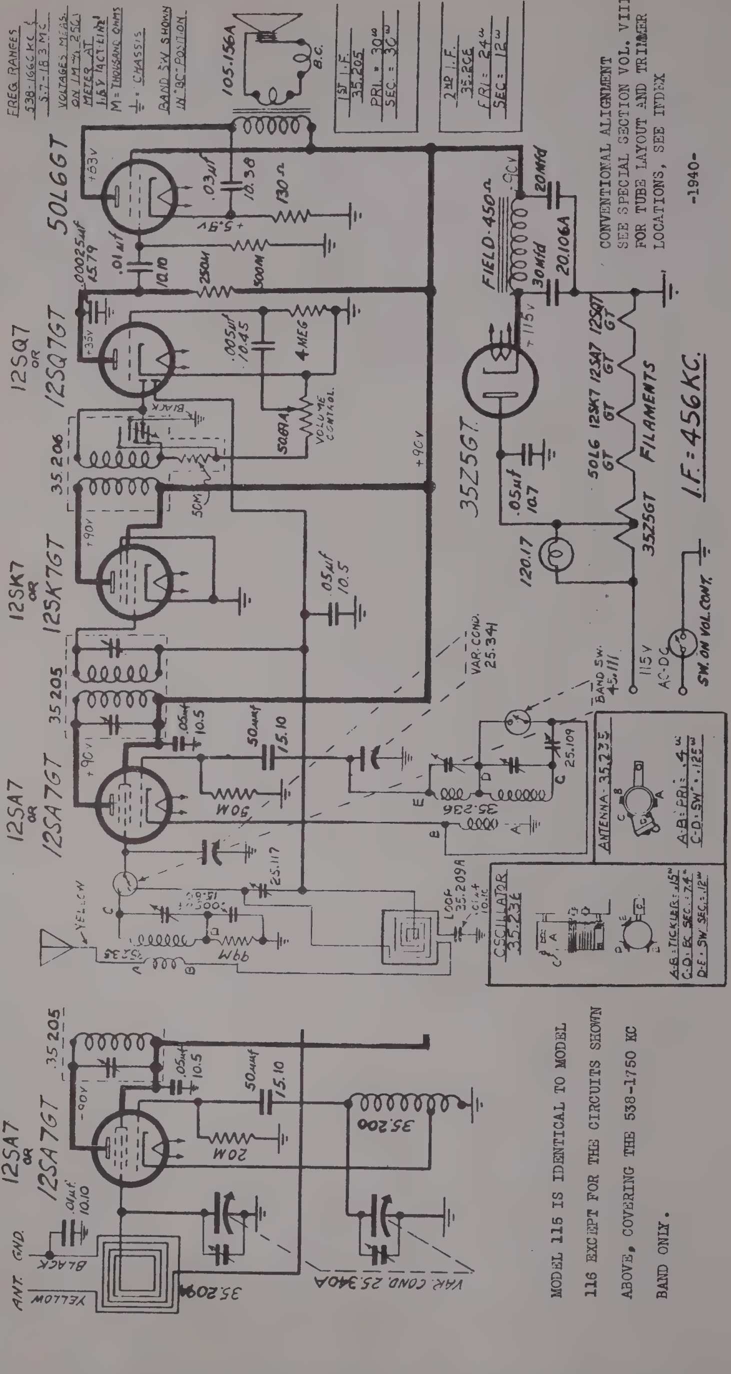
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

NOTE:-
M = THOUSAND OHMS
⏚ = CHASSIS
VOLTAGES AT 120V. LINE
I.F. PEAK: 456 KC
RANGE 525 TO 1600 K.C.

FADA RADIO & ELECTRIC CO

MODEL LW36





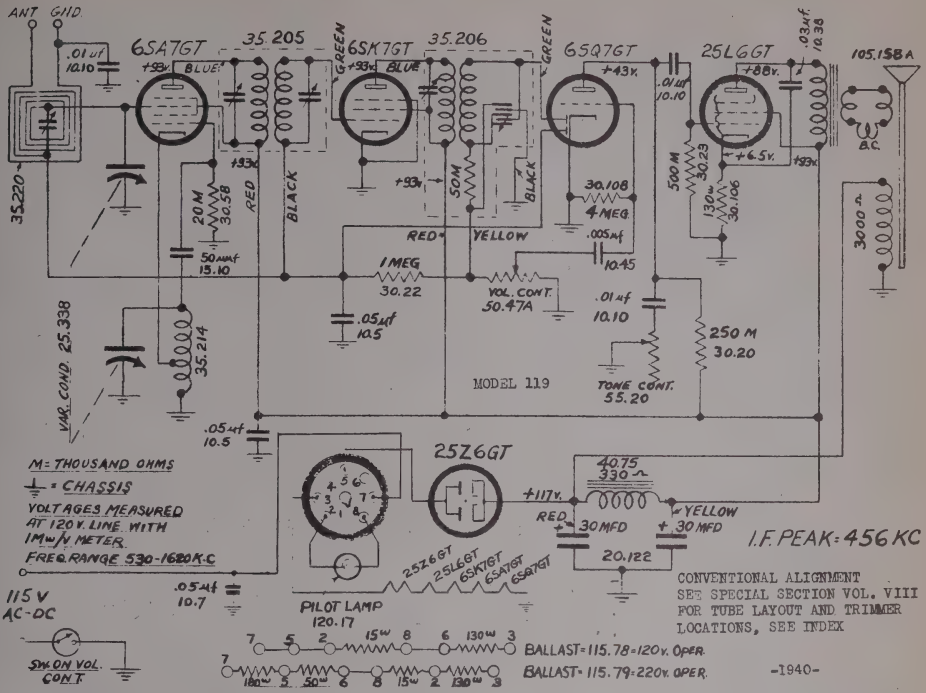
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII
FOR TUBE LAYOUT AND TRIMMER
LOCATIONS, SEE INDEX

-1940-

MODEL 115 IS IDENTICAL TO MODEL 116 EXCEPT FOR THE CIRCUITS SHOWN ABOVE, COVERING THE 538-1750 KC BAND ONLY.

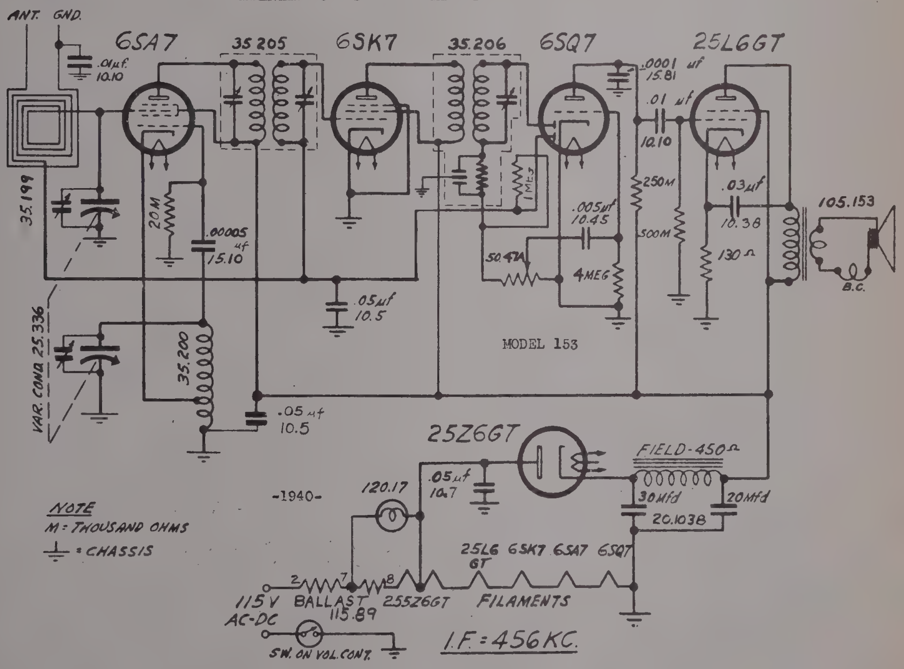
FADA RADIO & ELECTRIC CO

MODEL 119
MODEL 153



M = THOUSAND OHMS
⏚ = CHASSIS
VOLTAGES MEASURED AT 120 V. LINE WITH 1MΩ/V METER
FREQ. RANGE 530-1620 K.C.

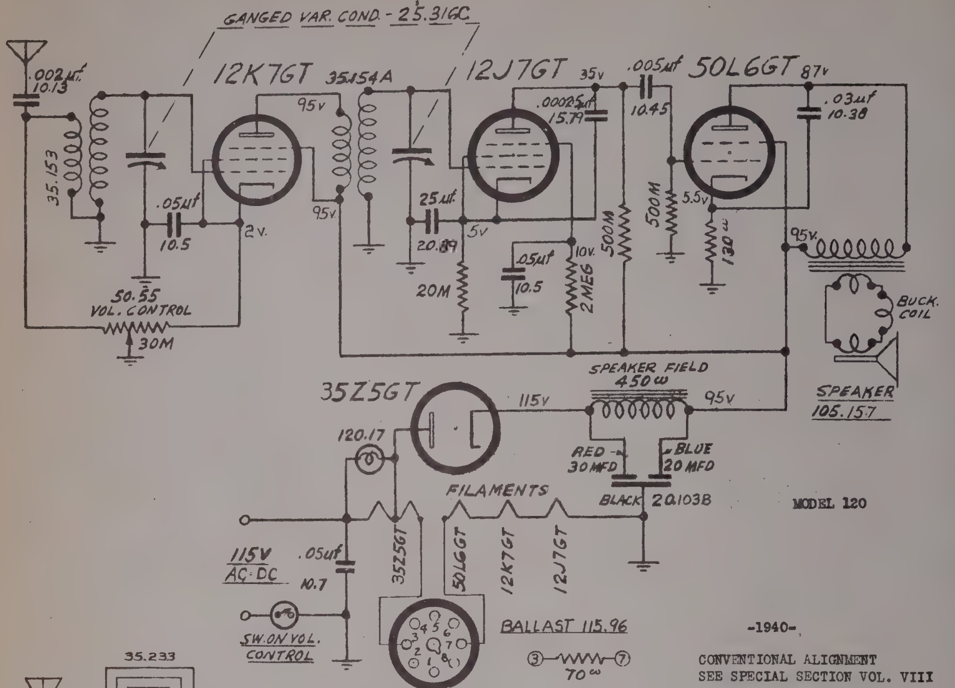
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII
FOR TUBE LAYOUT AND TRIMMER
LOCATIONS, SEE INDEX



NOTE
M = THOUSAND OHMS
⏚ = CHASSIS

MODEL 120
MODEL 137

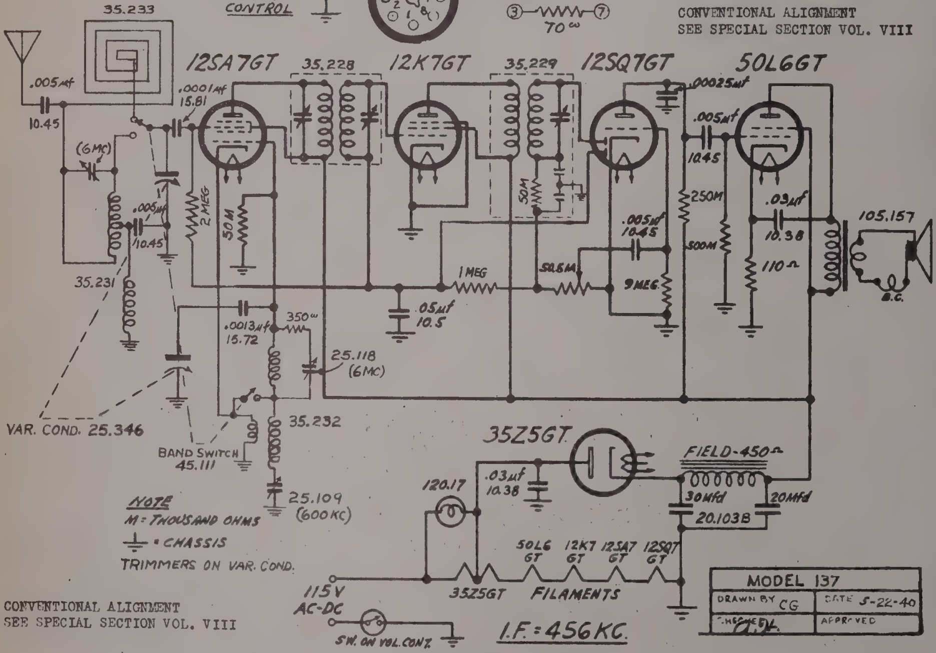
FADA RADIO & ELECTRIC CO



MODEL 120

-1940-

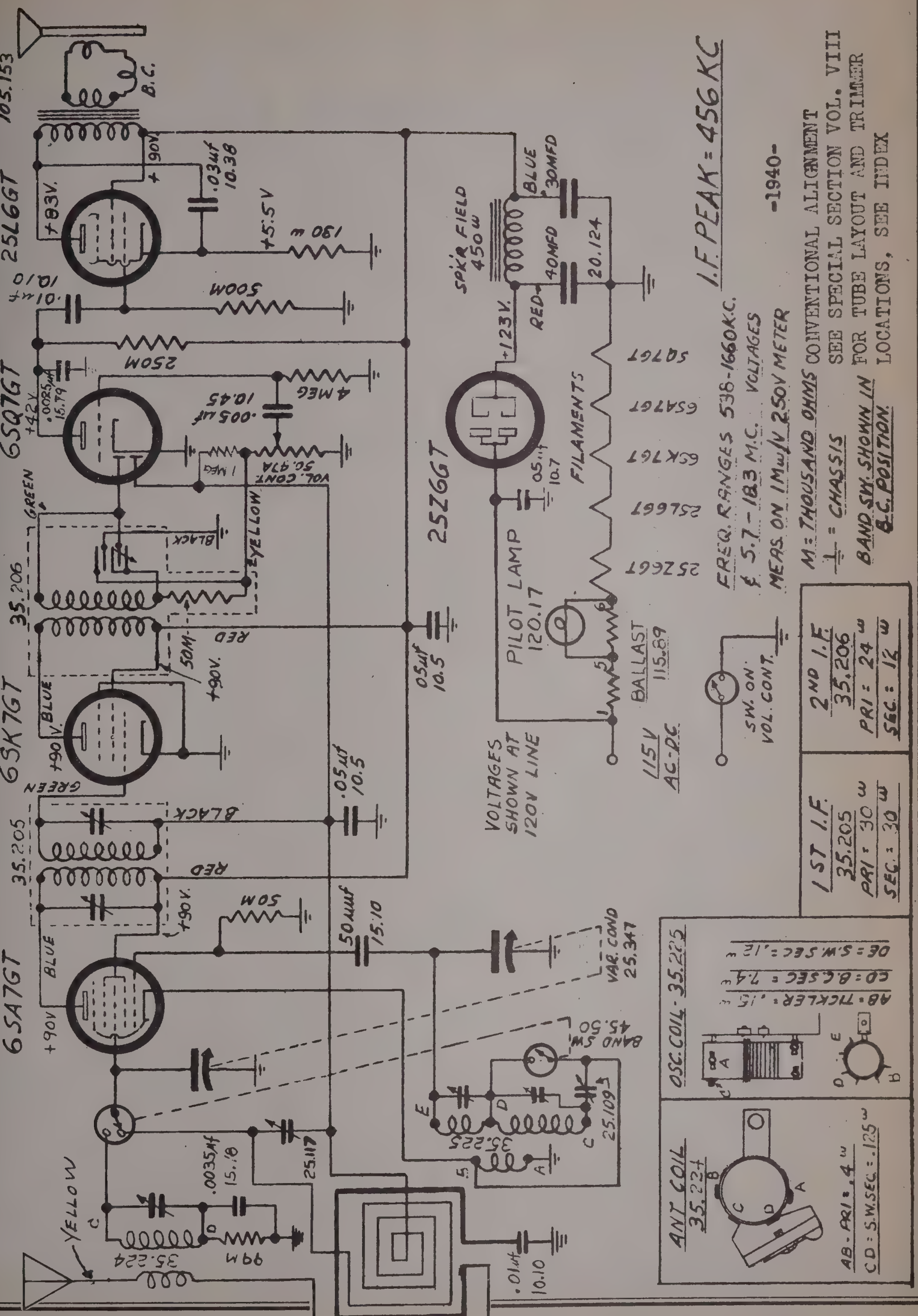
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

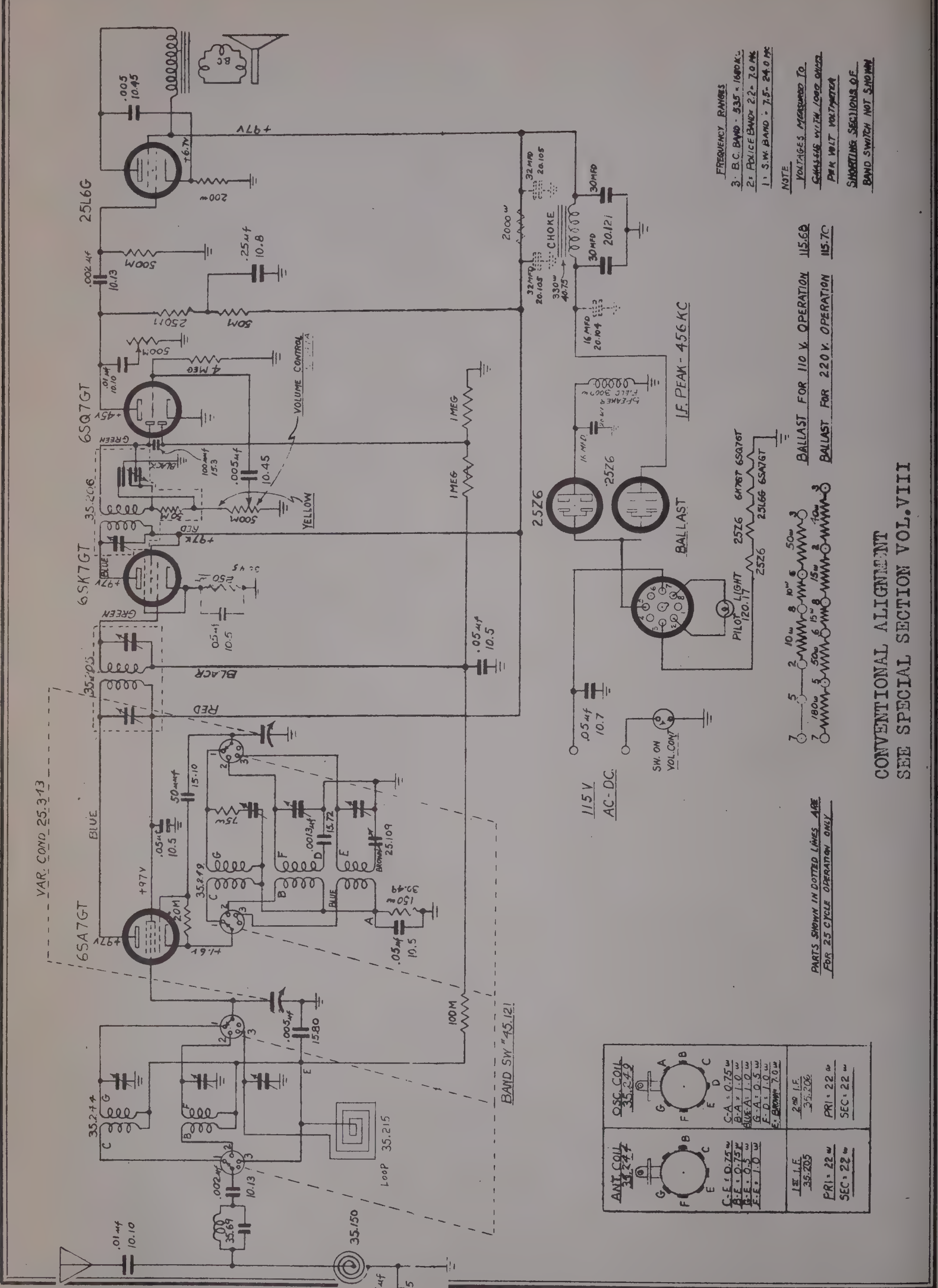
FADA RADIO & ELECTRIC CO

MODEL 154



MODEL 169

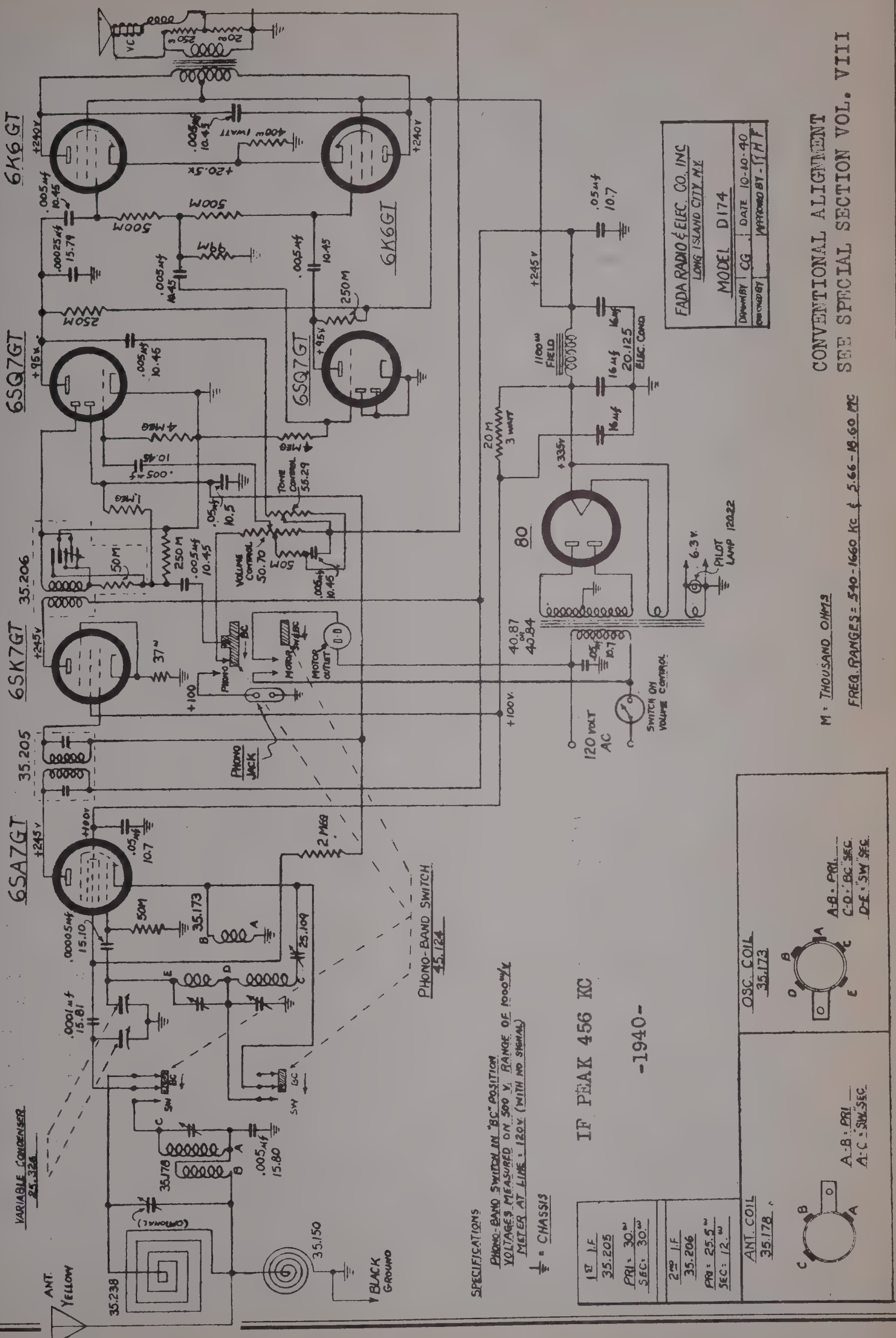
FADA RADIO & ELECTRIC CO



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

FADA RADIO & ELECTRIC CO

MODELS 174,D174,184



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

M = THOUSAND OHMS

FREQ. RANGES: 540-1660 KC & 5.66-18.60 MC

FADA RADIO & ELEC. CO., INC
LONG ISLAND CITY N.Y.
MODEL D174
DRAWN BY CG DATE 10-10-40
CHECKED BY APPROVED BY - GHF

IF PEAK 456 KC

-1940-

SPECIFICATIONS
PHONO-BAND SWITCH IN "BC" POSITION
VOLTAGES MEASURED ON 500 V. RANGE OF 1000Ω/V
METER AT LINE = 120V. (WITH NO SIGNAL)
⏚ = CHASSIS

1ST I.F. 35.205
PRI = 30"
SEC = 30"

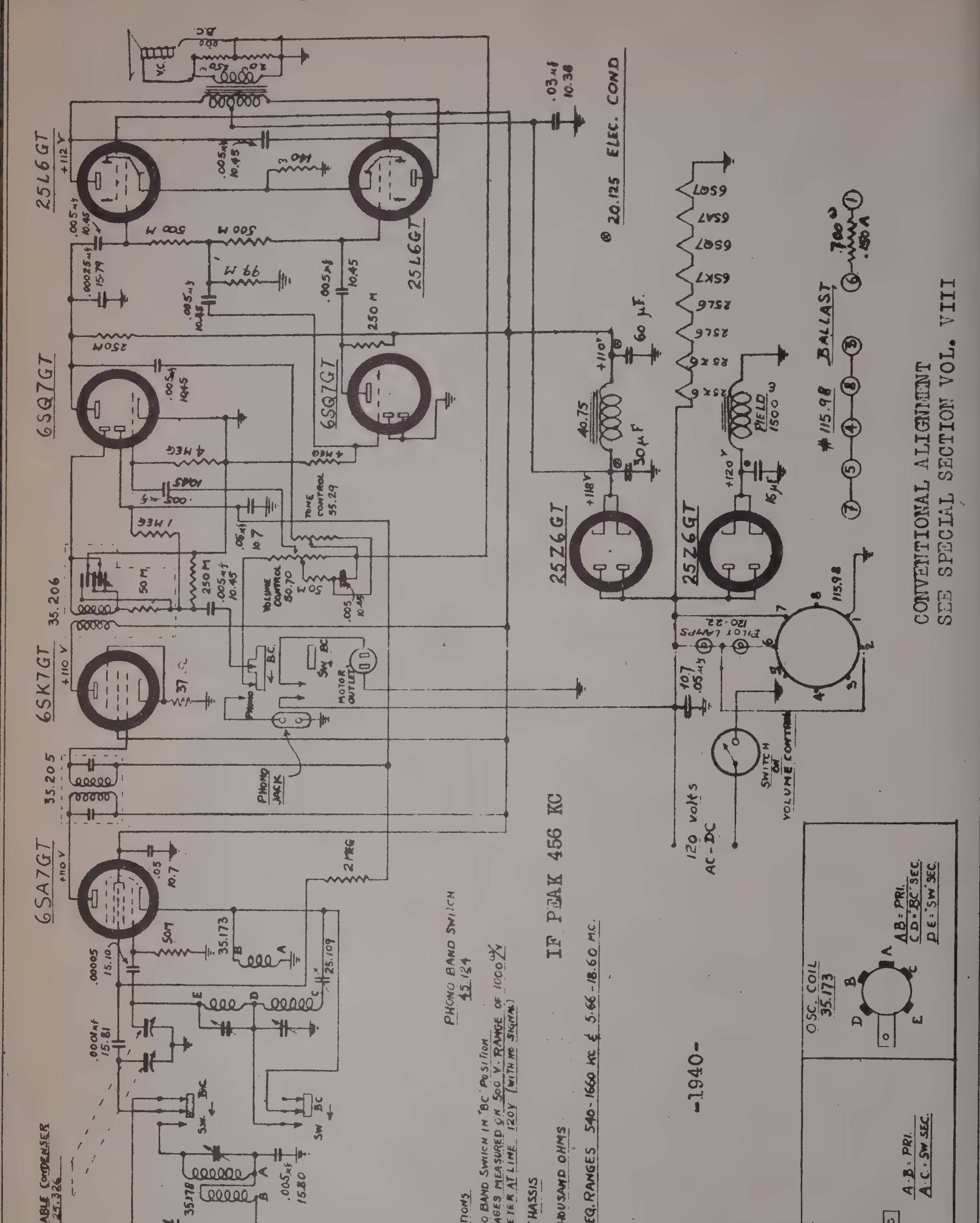
2ND I.F. 35.206
PRI = 25.5"
SEC = 12."

ANT. COIL 35.178
A-B = PRI
A-C = SW SEC.

OSC. COIL 35.173
A-B = PRI
C-D = BC SEC
D-E = SW SEC

MODEL D175

FADA RADIO & ELECTRIC CO



PHONO BAND SWITCH 45.124

SPECIFICATIONS

PHONO BAND SWITCH IN "BC" POSITION
VOLTAGES MEASURED ON 500 V. RANGE OF 1000 Ω/V METER AT LINE 120V (WITH NO SIGNAL)

⏚ = CHASSIS

M = THOUSAND OHMS

FREQ. RANGES 540-1660 KC & 5.66-18.60 MC.

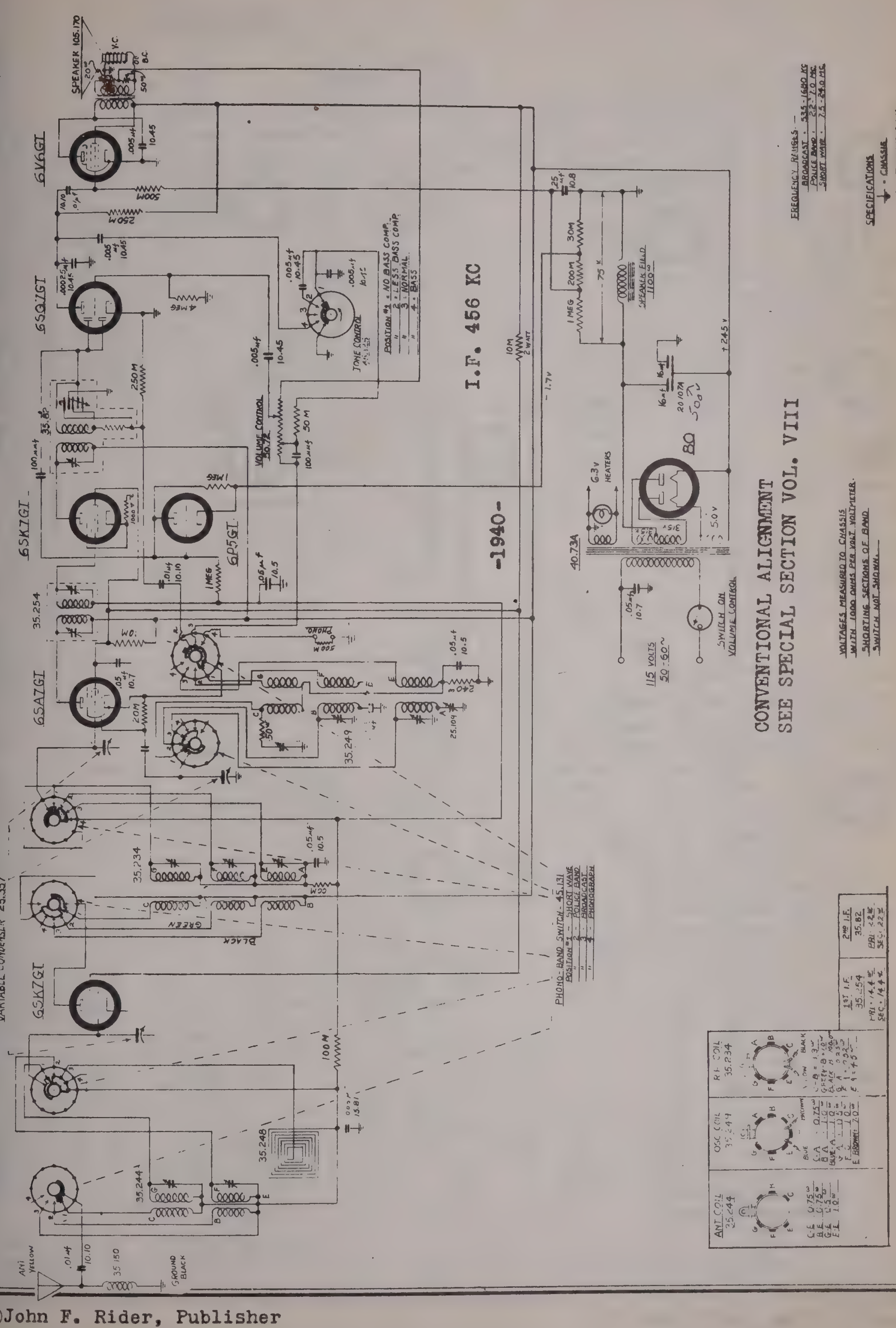
IF PEAK 456 KC

-1940-

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

FADA RADIO & ELECTRIC CO

MODEL 176



I.F. 456 KC

-1940-

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

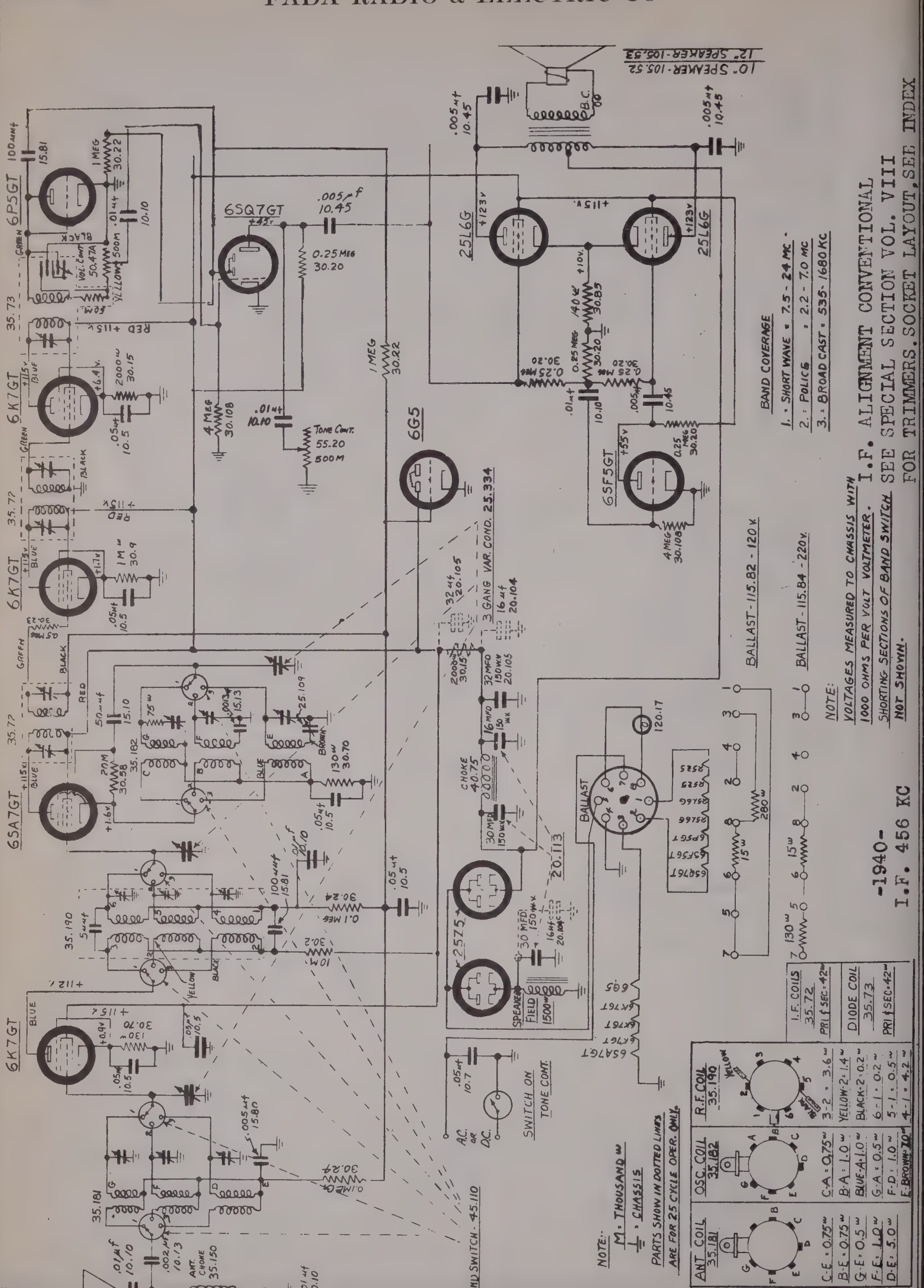
VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER.
SHORTING SECTIONS OF BAND SWITCH NOT SHOWN.

Use 500V Filter conds 450V peak when set cold start

©John F. Rider, Publisher

MODEL 913

FADA RADIO & ELECTRIC CO



BALLAST - 115.82 - 120 V.

BALLAST - 115.84 - 220 V.

BAND COVERAGE

1. = SHORT WAVE = 7.5 - 24 MC.
2. = POLICE = 2.2 - 7.0 MC
3. = BROAD CAST = 535 - 1680 KC

NOTE:
VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER.
SHORTING SECTIONS OF BAND SWITCH NOT SHOWN.

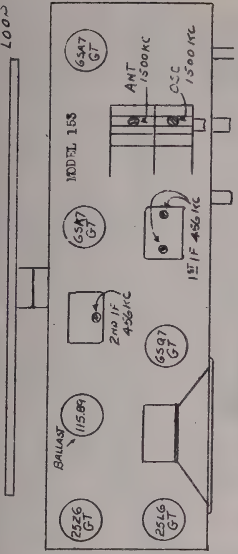
I.F. ALIGNMENT CONVENTIONAL SEE SPECIAL SECTION VOL. VIII FOR TRIMMERS. SOCKET LAYOUT, SEE INDEX

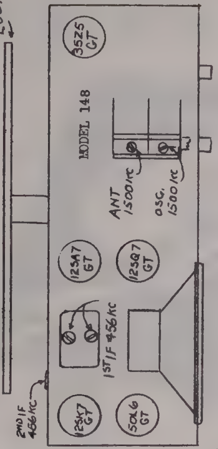
-1940-
I.F. 456 KC

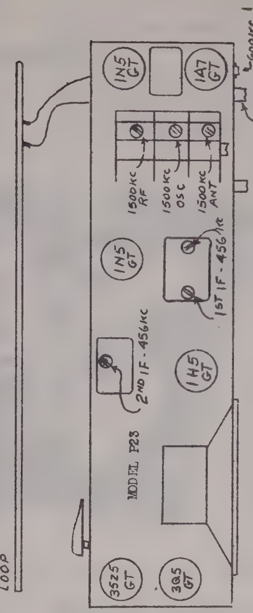
NOTE:
M = THOUSAND ω
⏚ = CHASSIS
PARTS SHOWN IN DOTTED LINES ARE FOR 25 CYCLE OPER. ONLY.

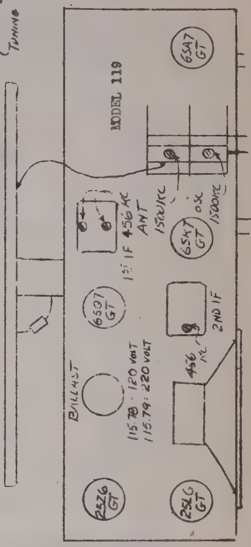
FADA RADIO & ELECTRIC CO

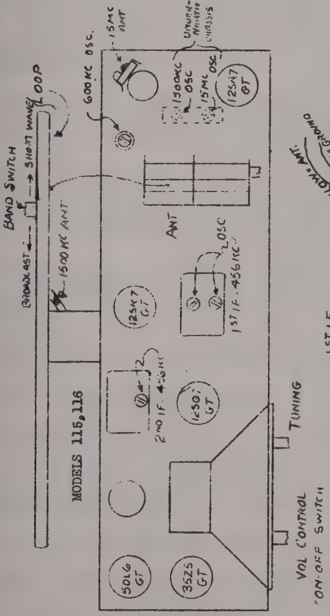
MODEL 148 MODEL P23
MODEL 153 MODEL 115
MODEL 154 MODEL 116
MODEL 913 MODEL 119

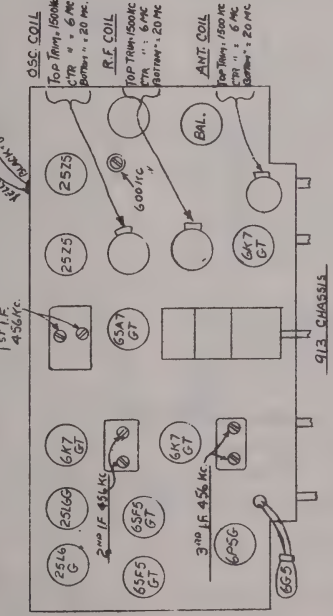


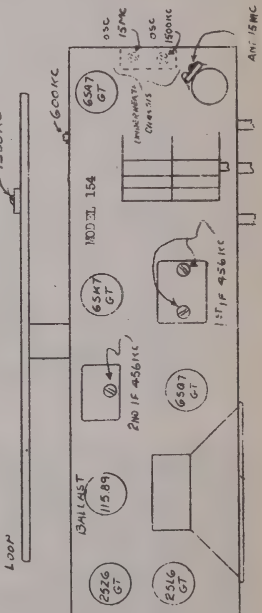












FADA RADIO & ELECTRIC CO

AC. Unit - Part No. 125.10

Automatic Record Changer

AC.-DC. Unit - Part No. 125.11

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

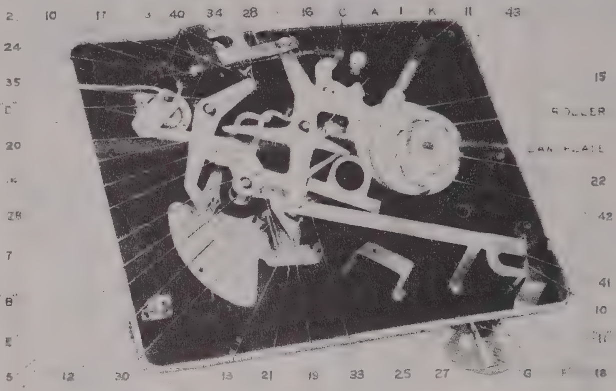
If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.



NOTE: Numbers refer to parts—letters refer to adjustments

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E."
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34."
12. On AC. - DC. Models only - Spindle loosens from motor. - To tighten: Remove turntable, hold governor of motor and tighten spindle.

FARNSWORTH TELEV. & RADIO CORP.

MODELS
BT20,BT22,BT61
BT63,BT66

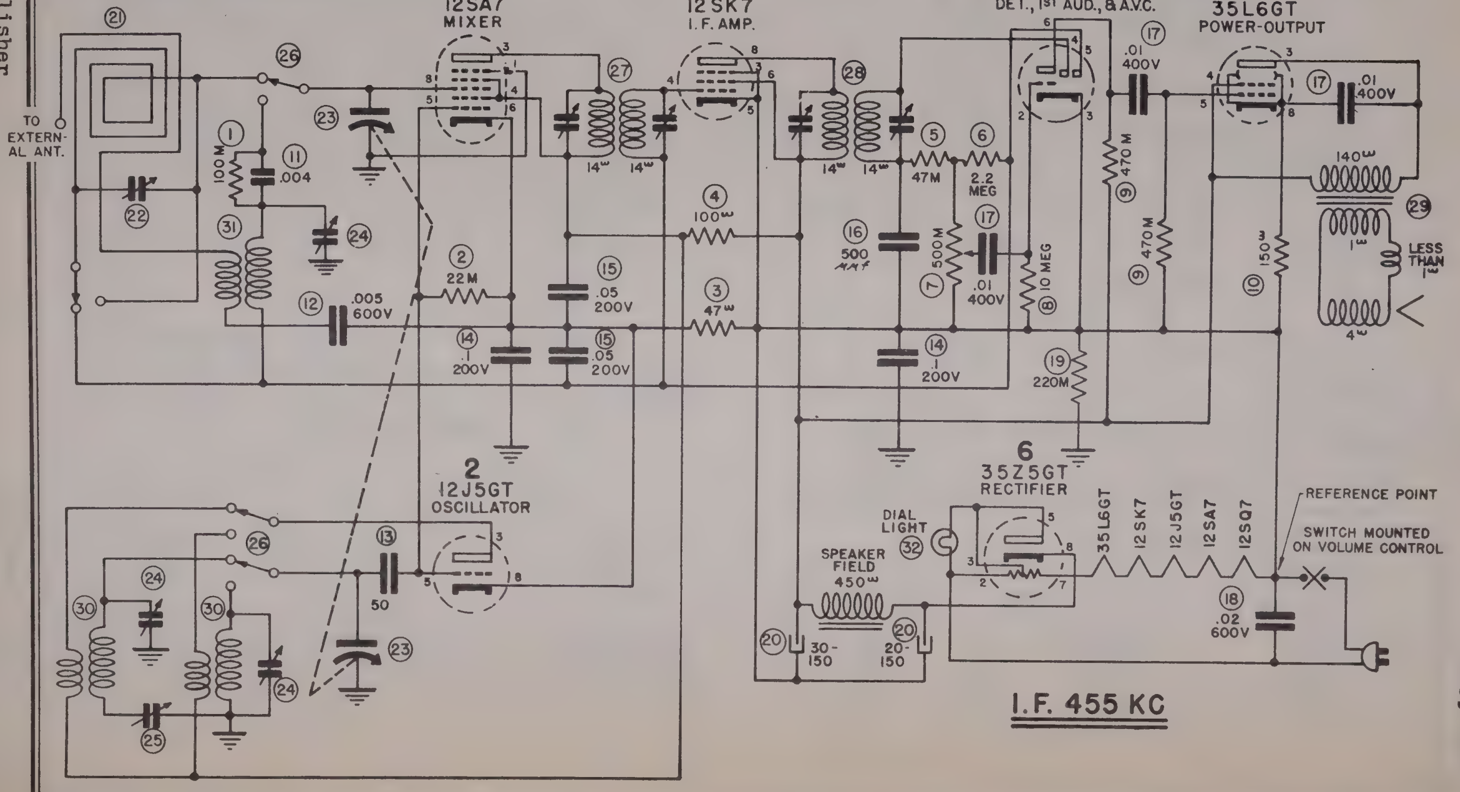
Pin	1 Voltage	1 Resistance	2 Voltage	2 Resistance	3 Voltage	3 Resistance	4 Voltage	4 Resistance	5 Voltage	5 Resistance	6 Voltage	6 Resistance
1.	0	220M	0	220M	0	220M	0	220M	0	220M	0	220M
2.	25AC	24ω	39AC	38ω	39AC	38ω	-.2 †	10MEG	53AC	50ω	125AC	115ω
3.	93	INF *	95	INF *	0	0	0	0	90	INF *	118AC	112ω
4.	95	INF *	.6	47ω	0	2.7MEG	0	.5MEG	95	INF *	125	INF *
5.	-6 †	22M	-6 †	22M	0	0	0	2.7MEG	0	470M	118AC	112ω
6.	.6	47ω	OPEN	INF	95	INF *	30 †	INF *	0	0	0	0
7.	12AC	12ω	25AC	24ω	53AC	50ω	0AC	0	90AC	90ω	90AC	90ω
8.	0	2.7MEG	0	47ω	93	INF *	12AC	12ω	5V	150ω	125	INF *

†: VOLTAGE READING WILL VARY WITH SENSITIVITY OF METER.

*: RESISTANCE WILL DEPEND ON CONDITION OF ELECTROLYTIC CONDENSER.

BOTTOM VIEW OF SOCKETS

PIN 3 OF TUBE #4 IS REFERENCE POINT FOR VOLTAGE & RESISTANCE.



I.F. 455 KC

BT63,BT66
MODELS BT52,BT53,BT54
BT55,BT56
MODELS BT20,BT22,BT61

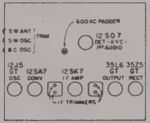
FARNSWORTH TELEV. & RADIO CORP.

When aligning the Short Wave Oscillator tighten the adjusting screw for maximum capacity and then loosen it until the first peak is reached. Do not use the signal heard at the lower capacity setting as in this receiver the oscillator works at a frequency lower than the one the R.F. is tuned to. If the loop is tuned to 18Mc the oscillator is tuned to 17,545Kc that is signal frequency minus I.F. frequency, instead of signal frequency plus I.F. frequency, or 18,455Kc as is customary.

Grid of 12SA7		Plate 12SA7	12 Gain
Plate of 12SA7		Grid 12SK7	Slight Loss
Grid of 12SK7	BT-20	Plate 12SK7	60 Gain
Plate of 12SK7	BT-22	Diode 12SQ7	25% Loss
Grid of 12SQ7	BT-61	Plate 12SQ7	30 Voltage Gain
Grid of 35L6GT	BT-63	Plate 35L6GT	5 Power Gain
	BT-66		

Oscillator Voltage 1500 Kc 8
Oscillator Voltage 600 Kc 10

Voltage Loss in Output Transformer 98½%.



TABULATION FOR ALIGNMENT

Steps	Dummy Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set volume control for maximum output.					
2	250 mmfd	455 Kc	Minimum	2nd I.F. Trimmers	Top of I.F. trans.	Maximum Output
3				1st I.F. Trimmers		
4		1720 Kc		B.C. Osc.* Trimmer	Nearest front of chassis	
5		1500 Kc	Strongest Sig. & rock gang	B.C. R.F. Trimmer	On loop antenna	
6		600 Kc		600 Kc Pad	Top of Chassis	
7	Check	1000 Kc				
8	400 ohms	18.1 Mc	Minimum	S.W. Osc.* Trimmer	Middle of three	
9		16 Mc	16 Mc	S.W. R.F.* Trimmer	Rear of three	

* These trimmers are on a strip of three at the right hand end of the chassis

PUSH BUTTON SET UP

(on BT-22 – BT-61 – BT-63 – BC-66)

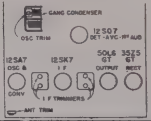
When the push buttons are lifted a screw is exposed. This screw should be loosened by one or two turns by a screwdriver. Tune in the desired station manually, then firmly press the button until it hits the stop, making certain the gang setting does not change. Again lift the push button and tighten the screw. Manually detune the set, press the button just set up. If the adjustment was properly made proceed with the remaining buttons.

Grid of 12SA7	BT-52	Plate 12SA7	15 Gain
Plate of 12SA7	BT-53	Grid 12SK7	1.3 Gain
Grid of 12SK7	BT-54	Plate 12SK7	60 Gain
Plate of 12SK7	BT-55	Diode 12SQ7	40% Loss
Grid of 12SQ7	BT-56	Plate of 12SQ7	30 Voltage Gain
Grid of 50L6GT		Plate 50L6GT	5 Power Gain

Oscillator Voltage 1500 Kc. – 6
Oscillator Voltage 600 Kc. – 7

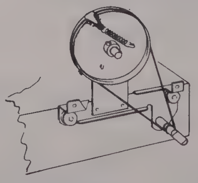
Voltage Loss in Output Transformer – 98½% Loss

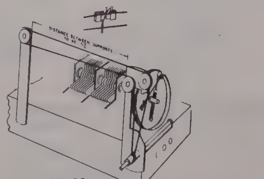
All Values Above Are Approximate



Steps	Connect High Side Of Generator To	Set Generator At	Set Gang At	Adjust The Following	Located	To Obtain
1.	Set volume control at maximum					
2.	Antenna lead with 250 mmf. in series	455 Kc.	A quiet point	2nd I. F. Transformer	See Fig. Top of Chassis	Maximum Output
3.				1st. I. F. Trimmers	See Fig. End of Chassis	
4.		1730 Kc.	Minimum Capacity	Oscillator Trimmer	Top of Gang Condenser	
5.		1400 Kc.	1400 Kc.	Antenna Trimmer		
6.		600 Kc.	600 Kc.	End Plates of Gang	See Fig. Rear Gang	
7.	Recheck all above adjustments					

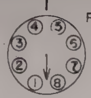
STRINGING DIAGRAM

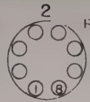

BT-52-53-54
BT-20

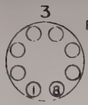


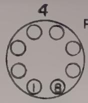
BT-22
BT-61
BT-63 BT-55-56
BC-66

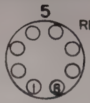
FARNSWORTH TELEV. & RADIO CORP. MODELS BT52,BT53,BT54 BT55,BT56









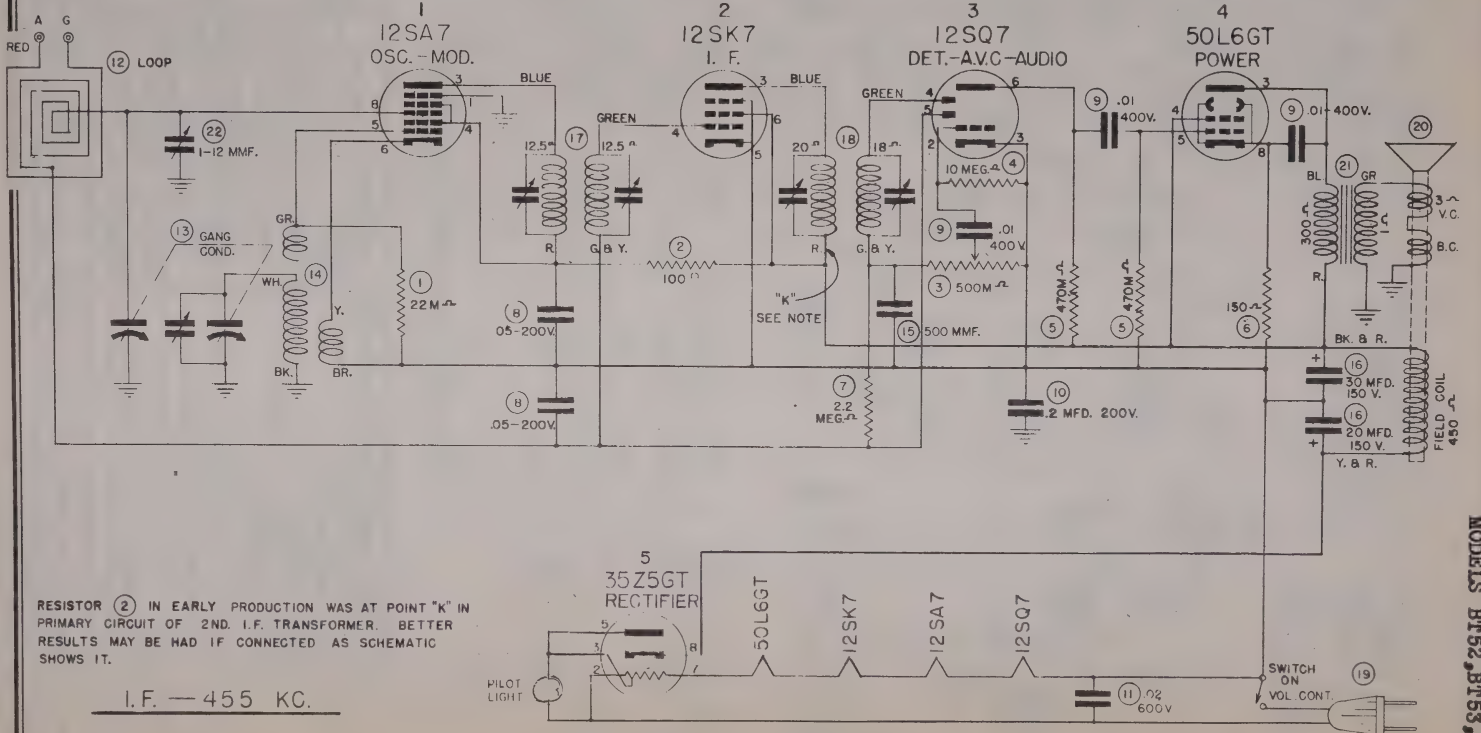


	1		2		3		4		5	
	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE	VOLTAGE	RESISTANCE
1.	0. D.C.	INF	0	0	0	INF.	0	INF.		INF.
2.	27 A.C.	25	27 A.C.	25	0.75	INF.	41 A.C.	45	125 A.C.	100
3.	+ 85	INF	0	0	0	0	+ 75	INF.	119 A.C.	100
4.	+ 85	INF.	-3.5	2.5 MEG.	-.35	450M	+ 85	INF.	+125	INF.
5.	- 8.5	25M	0	0	-.75	2.5 MEG.	0	550M	0	125
6.	0	0	+85	INF.	+ 52	INF.	0	0	0	0
7.	13 A.C.	15	41 A.C.	45	0 A.C. x	0	90 A.C.	75	90 A.C.	75
8.	-.75	INF.	+85	INF.	13 A.C.	15	+ 5.75	150	+120	INF.

*REFERENCE POINT FOR A.C. & D.C VOLTAGES AND RESISTANCE. MEASURE VOLTAGES WITH VOLTMETER HAVING RESISTANCE OF INFINITY OHMS PER VOLT.

BOTTOM VIEW OF SOCKETS

LINE VOLTAGE 125 V. A.C.

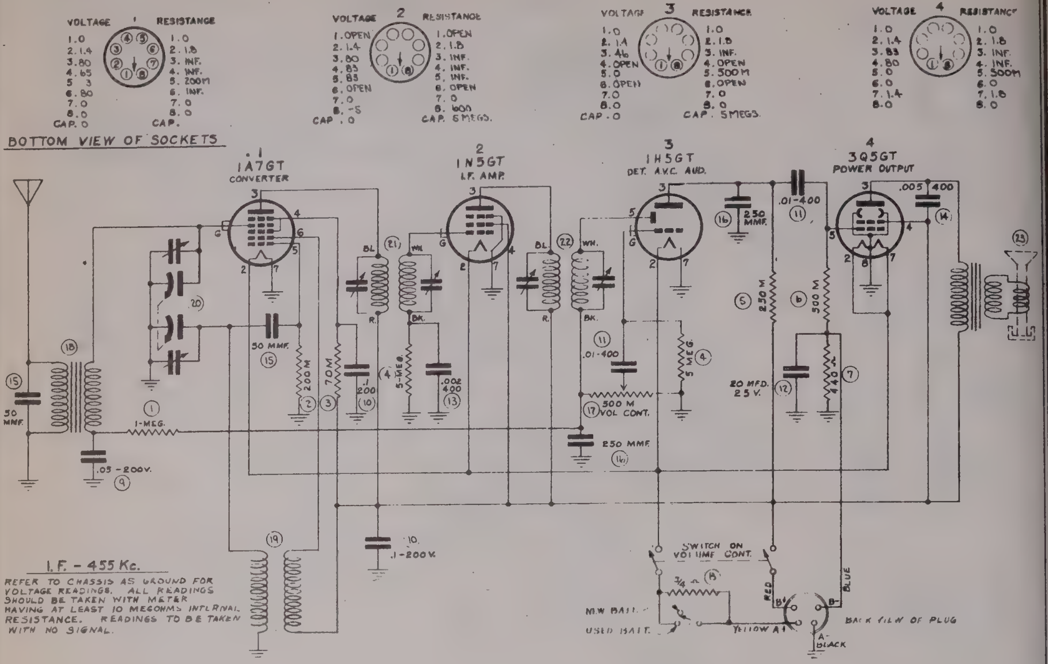


RESISTOR ② IN EARLY PRODUCTION WAS AT POINT "K" IN PRIMARY CIRCUIT OF 2ND. I.F. TRANSFORMER. BETTER RESULTS MAY BE HAD IF CONNECTED AS SCHEMATIC SHOWS IT.

I.F. — 455 KC.

SCHEMATIC - BT-52, BT-53, BT-54, BT-55 & BT-56

MODELS BT41,BC45 FARNSWORTH TELEV. & RADIO CORP.


VOLTAGE 1 RESISTANCE
1.0 2.1.4 3.80 4.65 5 3 6.80 7.0 8.0 CAP.0
1.0 2.1.8 3.INF. 4.INF. 5.200M 6.INF. 7.0 8.0 CAP.
VOLTAGE 2 RESISTANCE
1.OPEN 2.1.4 3.80 4.83 5.83 6.OPEN 7.0 8.-.5 CAP.0
1.OPEN 2.1.8 3.INF. 4.INF. 5.INF. 6.OPEN 7.0 8.600 CAP. 5MEGS.
VOLTAGE 3 RESISTANCE
1.0 2.1.4 3.46 4.OPEN 5.0 6.OPEN 7.0 8.0 CAP.0
1.0 2.1.8 3.INF. 4.OPEN 5.500M 6.OPEN 7.0 8.0 CAP. 5MEGS.
VOLTAGE 4 RESISTANCE
1.0 2.1.4 3.83 4.80 5.0 6.0 7.1.4 8.0
1.0 2.1.8 3.INF. 4.INF. 5.500M 6.0 7.1.8 8.0
BOTTOM VIEW OF SOCKETS
1 1A7GT CONVERTER
2 1N5GT I.F. AMP.
3 1H5GT DET. A.V.C. AUD.
4 3Q5GT POWER OUTPUT
G
BL WH. R. BK.
50 MMF.
1-MEG.
.05-200V.
50 MMF.
200 M
70 M
.1 200
5-MEG.
.002 400
.01-400
500 M VOL CONT.
250 MMF.
5 MEG
250 MMF.
.01-400
250 M
500 M
20 MFD. 25 V.
440
.005 400
.1-200V.
I.F. - 455 Kc.
REFER TO CHASSIS AS GROUND FOR VOLTAGE READINGS. ALL READINGS SHOULD BE TAKEN WITH METER HAVING AT LEAST 10 MEGOHMS INTERNAL RESISTANCE. READINGS TO BE TAKEN WITH NO SIGNAL.
SWITCH ON VOLUME CONT.
3/4 Ω
N.W. BATT.
USED BATT.
YELLOW A+
RED
BLUE
B+
B-
A- BLACK
BACK VIEW OF PLUG

To properly align this receiver, a signal generator calibrated at 455 Kc., 1400 Kc., and 1730 Kc., is required. The oscillator trimmer is nearest the front panel and the loop trimmer is directly behind it.

Any combination of one 1 1/2 volt "A" battery and two 45 volt "B" batteries that will fit in the receiver case will be satisfactory. Battery drain is .2 amp., at 1 1/2 volts and 9 ma., at 90 volts.

TABULATION FOR ALIGNMENT

Steps	Use in Series With Generator	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1.	.02 mfd. to Chassis Connect high side of Generator to grid cap of 1A7G tube.	455 Kc.	Quiet Point	2nd I.F. Trimmers 1st I.F. Trimmers	Top of I.F. Trans	Maximum Output
2.	250 M.M.F.	1730 Kc.	1730 Kc.	Oscillator Trimmer*	See Note Below	
3.	250 M.M.F.	1400 Kc.	1400 Kc. & Rock Gang	Loop Trimmer*		

* See preceding paragraph for location of trimmers.

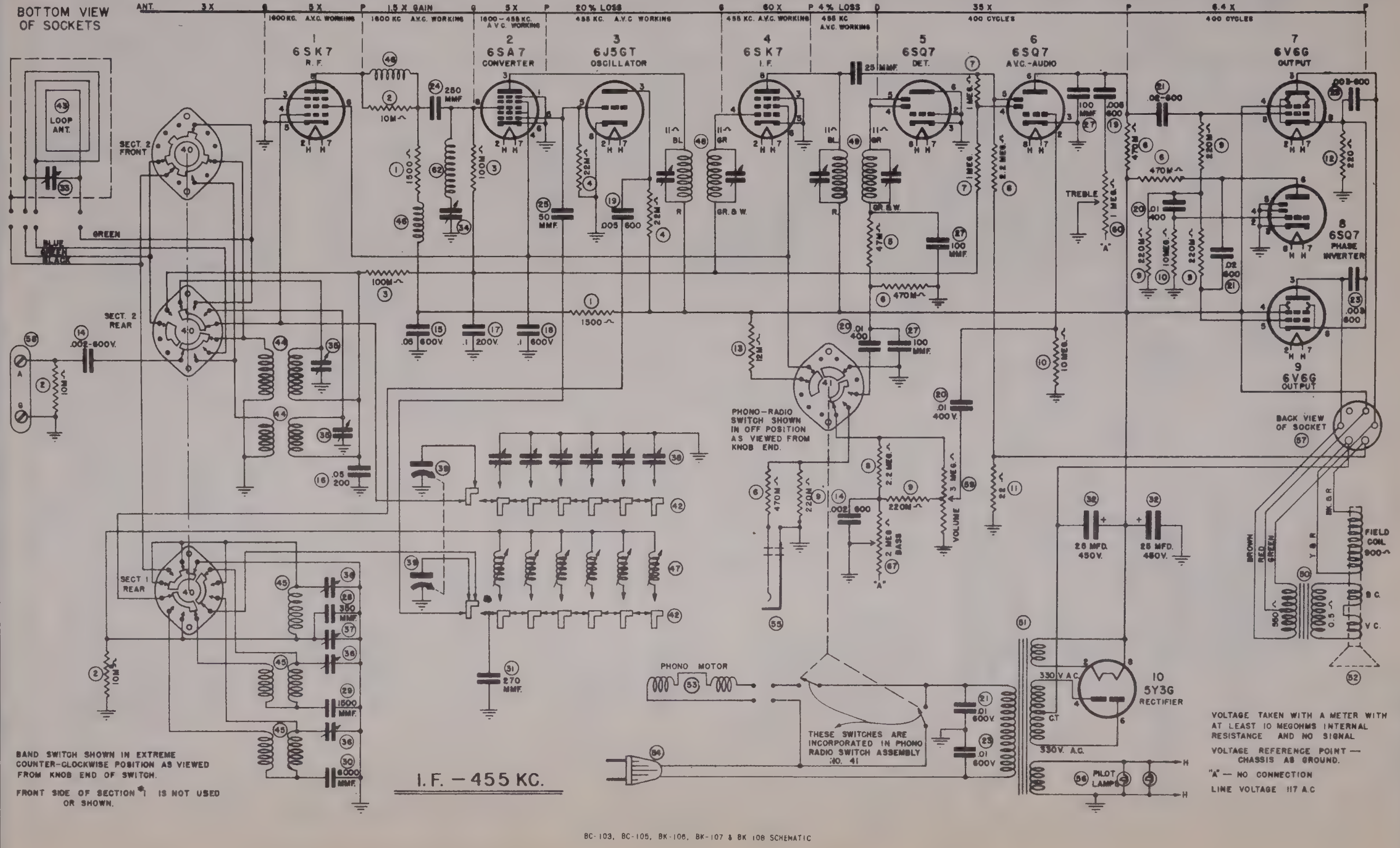
**Loop to consist of five to ten turns of insulated wire wound on a three to four inch form to be closely coupled to the loop antenna in the receiver.

FARNSWORTH TELEV. & RADIO CORP.

MODELS BC103, BC105
BK107, BK108, BK106

Pin	1 Voltage	1 Resistance	2 Voltage	2 Resistance	3 Voltage	3 Resistance	4 Voltage	4 Resistance	5 Voltage	5 Resistance	6 Voltage	6 Resistance	7&9 Voltage	7&9 Resistance	8 Voltage	8 Resistance	10 Voltage	10 Resistance
1.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	OPEN	OPEN
2.	0	0	0	0		0	A.C.	0	0	0	-.75	12.5 MEG.	A.C.	0	-.75	9.5 MEG.	225	INF.
3.	0	0	197	INF.	115	INF	0	0	0	0	0	0	217	INF	0	0	OPEN	OPEN
4.	0	2.2 MEG.	83	INF	OPEN	OPEN	-1.5	3 MEG.	-.5	580M	-1.75	2.2 MEG.	225	INF.	0	0	230	1100Ω
5.	0	0	-9	220M	—6 HF	210M	0	0	-.5	590M	-1.6	3 MEG.	0	480M	0	0	OPEN	OPEN
6.	82	INF.	0	0	224	INF.	80	INF.	0	0	80	INF.	0	240M	77	INF	230	1100Ω
7.	6.3 A.C.	.2Ω	6.3 A.C.	.2Ω	6.3 A.C.	.2Ω	6.3 A.C.	.2Ω	A.C.	.2Ω	A.C.	.2Ω	6.3 A.C.	.2Ω	A.C.	.2Ω	OPEN	OPEN
8.	196	INF	0	INF.	0	0	225		6.3 A.C.	0	6.3 A.C.	0	-12.5	220Ω	6.3 A.C.	0	225	INF

BOTTOM VIEW OF SOCKETS



BC-103, BC-105, BK-106, BK-107 & BK 108 SCHEMATIC

MODELS BC103,BC105
BK107,BK108 ,BK106

FARNSWORTH TELEV. & RADIO CORP.

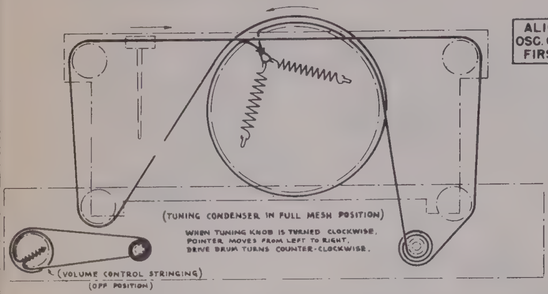
PUSH BUTTON SET UP

To prevent the buttons from being set up on the wrong stations a signal generator should be used.

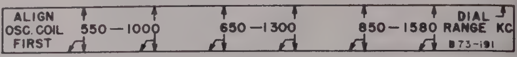
The button to the extreme right is the manual tuning button.

Adjust the lower screw (see fig.) first as this is the oscillator; then adjust the upper screw for maximum output.

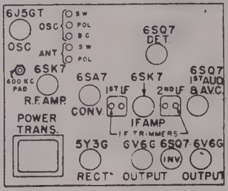
STRINGING DIAGRAM


(TUNING CONDENSER IN FULL MESH POSITION)
WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS COUNTER-CLOCKWISE.
(VOLUME CONTROL STRINGING)
(OFF POSITION)

BUTTON LAYOUT



OSCILLATOR TRIMMERS — BOTTOM ROW



Steps	In Series With Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1.	Set volume and tone controls at maximum					
2.	250 mmfd.	455 Kc.	Note A	2nd I.F. Trimmers	Top of I.F. Trans.	Max. Output
3.				1st I.F. Trimmers		
4.				Wave Trap Trimmer	Rear of Chassis	Min. Output
5.		1600 Kc.		Osc. B.C. Trimmer	On Loop	Maximum Output
6.		1500 Kc.	Note B	R.F. B.C. Trimmer		
7.		600 Kc.		600 Kc. Pad	See Fig.	
8.	Recheck 1500 Kc.					
9.	400 Ohms	5.4	Note A	Osc. Police Trimmer*		
10.		5 Mc.	Note B	R.F. Police Trimmer**		
11.	Check 1.8 Mc.					
12.	400 Ohms	18.1 Mc.	Note A	Osc. S.W. Trimmer*		
13.		16 Mc.	Note B	R.F.S.W. Trimmer**		
14.	Check 6 and 10 Mc.					

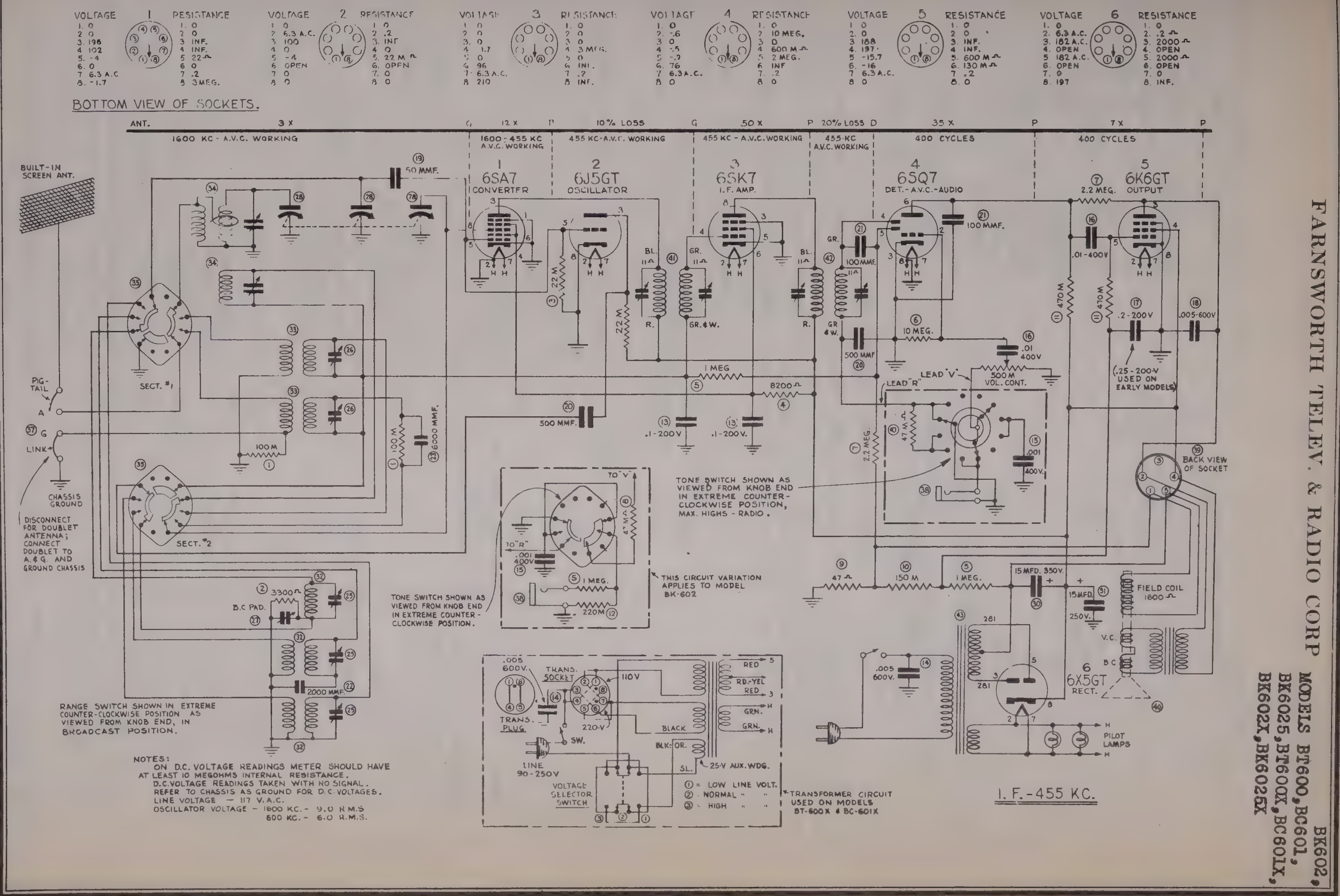
NOTE A. Set gang at minimum.
NOTE B. Strongest signal and rock gang.

*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.

**Tighten R.F. trimmer screw for maximum capacity, then unscrew until first peak is secured.

FARNSWORTH TELEV. & RADIO CORP

MODELS BT600,BC601, BK602, BK6025,BT600X,BC601X, BK602X,BK6025X



	1 VOLTAGE	1 RESISTANCE	2 VOLTAGE	2 RESISTANCE	3 VOLTAGE	3 RESISTANCE	4 VOLTAGE	4 RESISTANCE	5 VOLTAGE	5 RESISTANCE	6 VOLTAGE	6 RESISTANCE
1.	0	0	0	0	0	0	0	0	0	0	0	0
2.	0	0	6.3 A.C.	.2	0	0	-.6	10 MEG.	0	0	6.3 A.C.	.2 Ω
3.	196	INF.	100	INF	0	0	0	0	188	INF.	182 A.C.	2000 Ω
4.	102	INF.	0	0	1.7	3 MEG.	-.5	600 M Ω	197	INF.	OPEN	OPEN
5.	-4	22 Ω	-4	22 M Ω	0	0	-.2	2 MEG.	-15.7	600 M Ω	182 A.C.	2000 Ω
6.	0	0	OPEN	OPEN	96	INF.	76	INF	-16	130 M Ω	OPEN	OPEN
7.	6.3 A.C	.2	0	0	6.3 A.C.	.2	6.3 A.C.	.2	6.3 A.C.	.2	0	0
8.	-1.7	3 MEG.	0	0	210	INF.	0	0	0	0	197	INF.

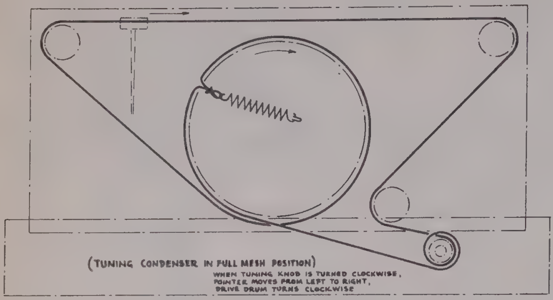
BOTTOM VIEW OF SOCKETS.

NOTES:
ON D.C. VOLTAGE READINGS METER SHOULD HAVE AT LEAST 10 MEGOHMS INTERNAL RESISTANCE.
D.C. VOLTAGE READINGS TAKEN WITH NO SIGNAL.
REFER TO CHASSIS AS GROUND FOR D.C. VOLTAGES.
LINE VOLTAGE — 117 V.A.C.
OSCILLATOR VOLTAGE - 1600 KC. - 9.0 R.M.S.
800 KC. - 6.0 R.M.S.

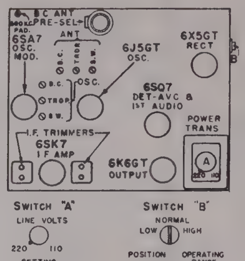
MODELS BT600,BC601,
BK6025,BT600X,BC601X,
BK602X,BK6025X BK602,

FARNSWORTH TELEV. & RADIO CORP.

STRINGING DIAGRAM


(TUNING CONDENSER IN FULL MESH POSITION)
WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE

CHASSIS LAYOUT



SETTING
110 VOLTS
220 VOLTS

POSITION	OPERATING RANGE
LOW	90 - 110
NORMAL	110 - 135
HIGH	135 - 165
LOW	200 - 225
NORMAL	225 - 250
HIGH	250 - 300

TABULATION FOR ALIGNMENT

Steps	In Series With Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1.	Set volume and tone controls at maximum					
2.	B.C. 250 mmfd.	455 Kc.	Note A	2nd I.F. Trimmers	Top of I.F. Trans.	Max. Output
3.				1st I.F. Trimmers		
4.						
5.		1900 Kc.		Osc. B.C. Trimmer	See Fig.	Maximum Output
6.		1500 Kc.	Note B	R.F. B.C. Trimmer Preselector Trimmer		
7.		600 Kc.		600 Kc. Pad		
8.	Recheck 1500 Kc.					
9.	Tropical Band 400 Ohms	7.0	Note A	Osc. Police Trimmer*		
10.		6.0	Note B	R.F. Police Trimmer**		
11.	Check 2.2 Mc.					
12.	S.W. 400 Ohms	22.0 Mc.	Note A	Osc. S.W. Trimmer*		
13.		18.0 Mc.	Note B	R.F.S.W. Trimmer**		
14.	Check 6 and 10 Mc.					

NOTE A. Set gang at minimum.
NOTE B. Strongest signal and rock gang.

*Tighten oscillator trimmer screw for maximum capacity, then unscrew until second peak is secured.

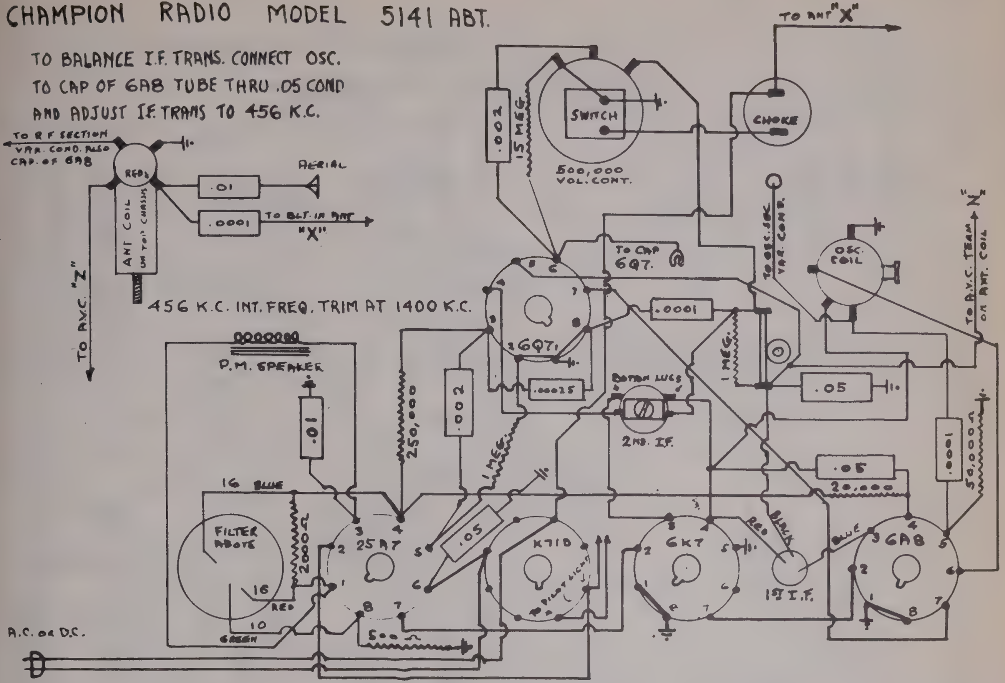
**Tighten R.F. Trimmer screw for maximum capacity, then unscrew until first peak is secured.

FERGUSON RADIO, INC.

MODEL 5141ABT
MODEL 6141A

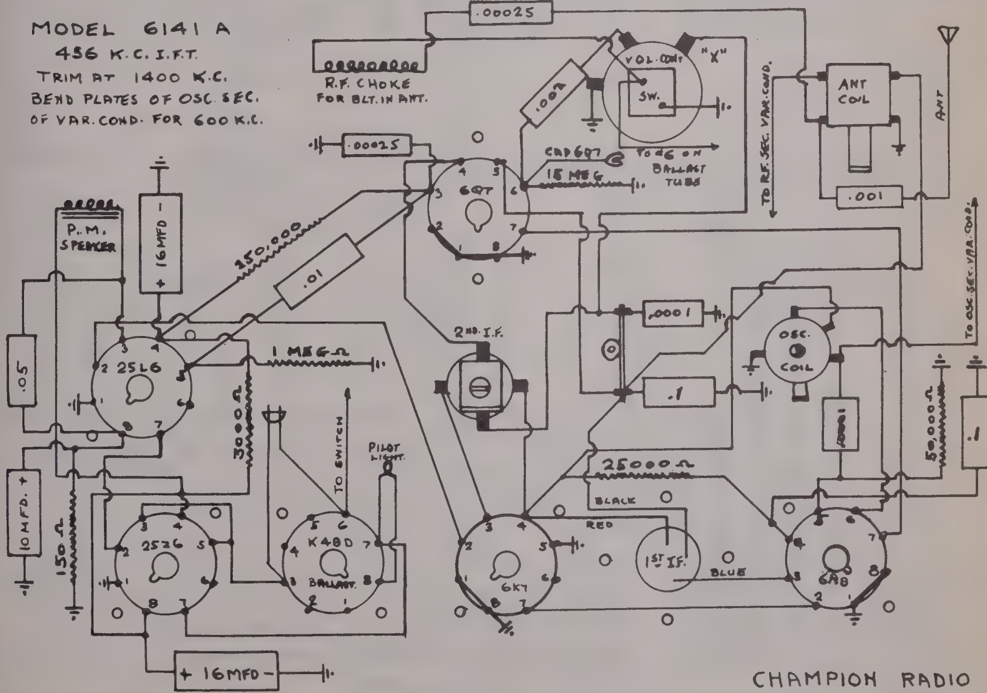
CHAMPION RADIO MODEL 5141 ABT.

TO BALANCE I.F. TRANS. CONNECT OSC. TO CAP OF 6A8 TUBE THRU .05 COND AND ADJUST I.F. TRANS TO 456 K.C.


456 K.C. INT. FREQ. TRIM AT 1400 K.C.

MODEL 6141 A

456 K.C. I.F.T.
TRIM AT 1400 K.C.
BEND PLATES OF OSC. SEC. OF VAR. COND. FOR 600 K.C.



CHAMPION RADIO

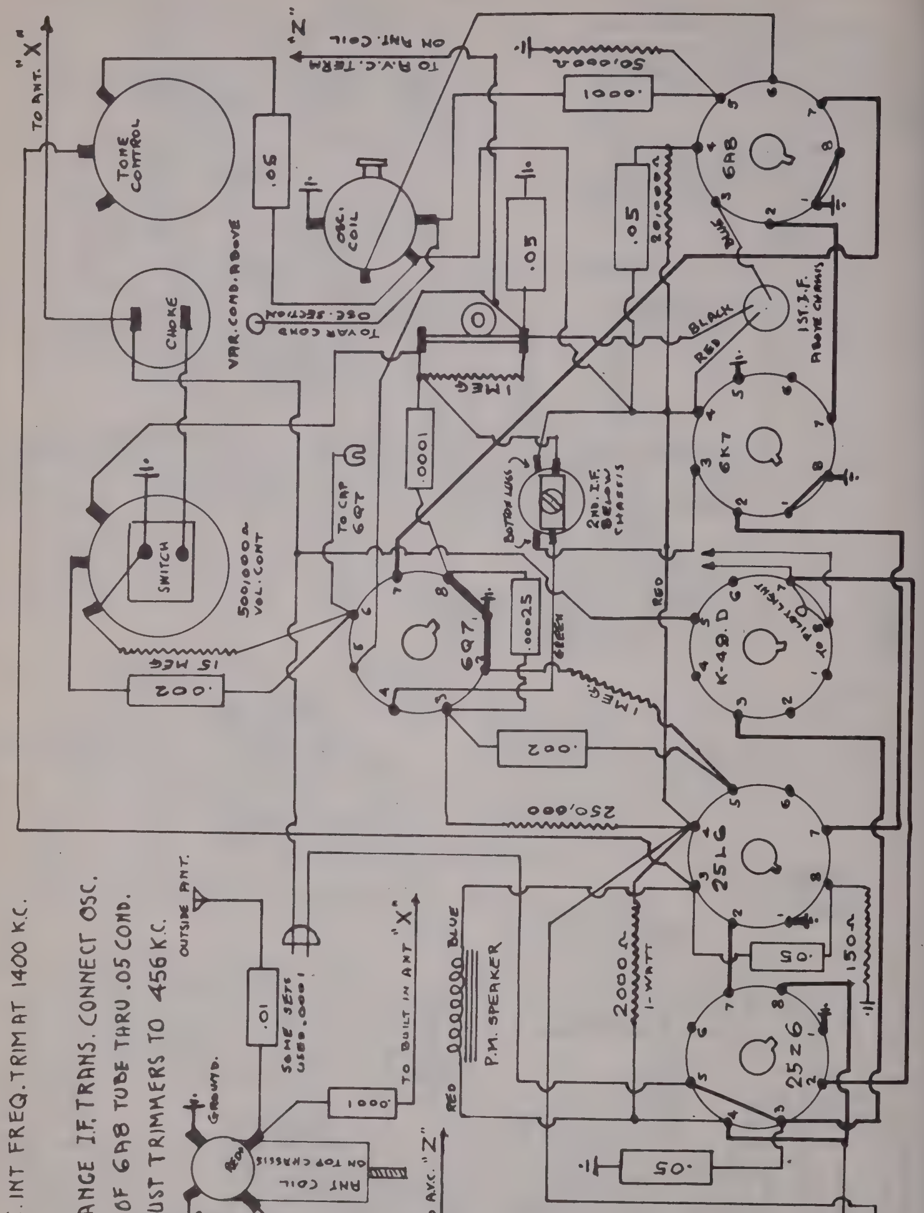
MODEL 6141ABT

FERGUSON RADIO, INC.

MODEL 6141 ABT CHAMPION RADIO

456 K.C. INT FREQ. TRIM AT 1400 K.C.

TO BALANCE I.F. TRANS. CONNECT OSC. TO CAP OF 6A8 TUBE THRU .05 COND. AND ADJUST TRIMMERS TO 456 K.C.



NOTE: BE SURE PROPER CONNECTIONS ARE MADE ON FILTER. TIE THE TWO TERMINALS MARKED ☐ ▷ TOGETHER AND CONNECT TO INPUT ON 25Z6 TUBE.

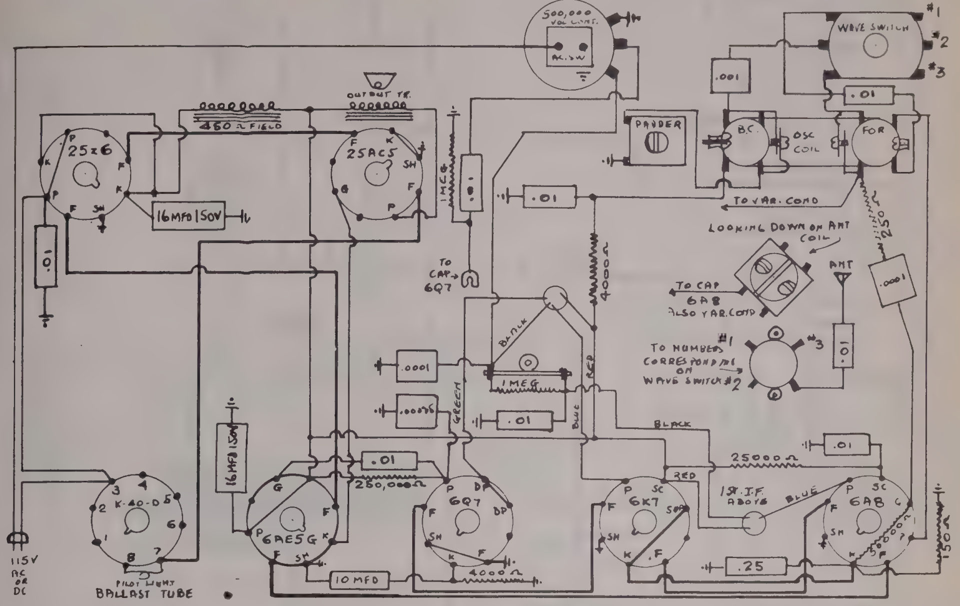
FERGUSON RADIO, INC.

MODEL 7339-A
MODEL 7339-T

MODEL 7339-A. CHAMPION RADIO
456 K.C. 3 BAND A.C. or D.C.

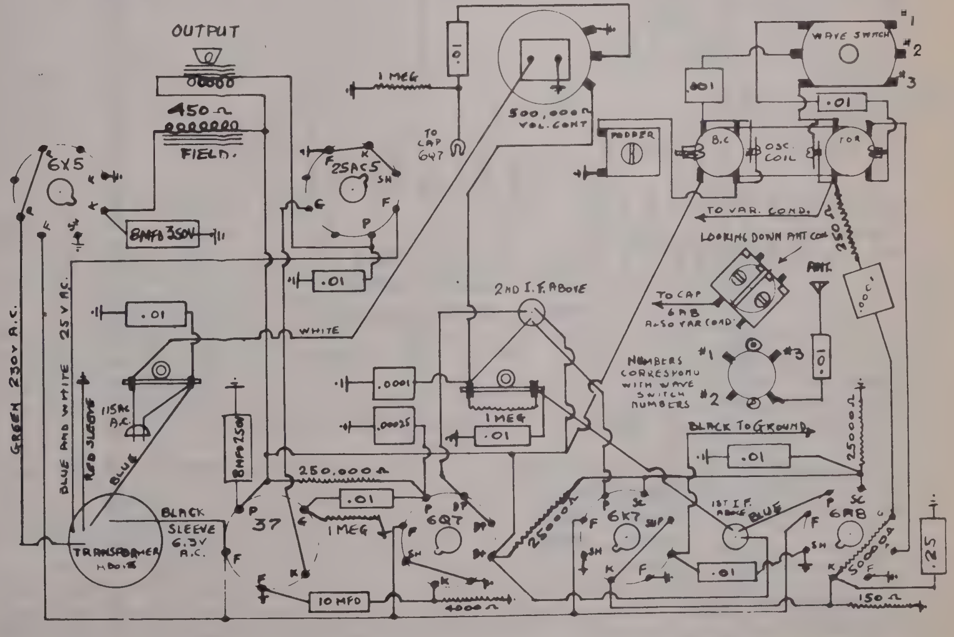
DO NOT GROUND CHASSIS.

ANT. COIL ABOVE.



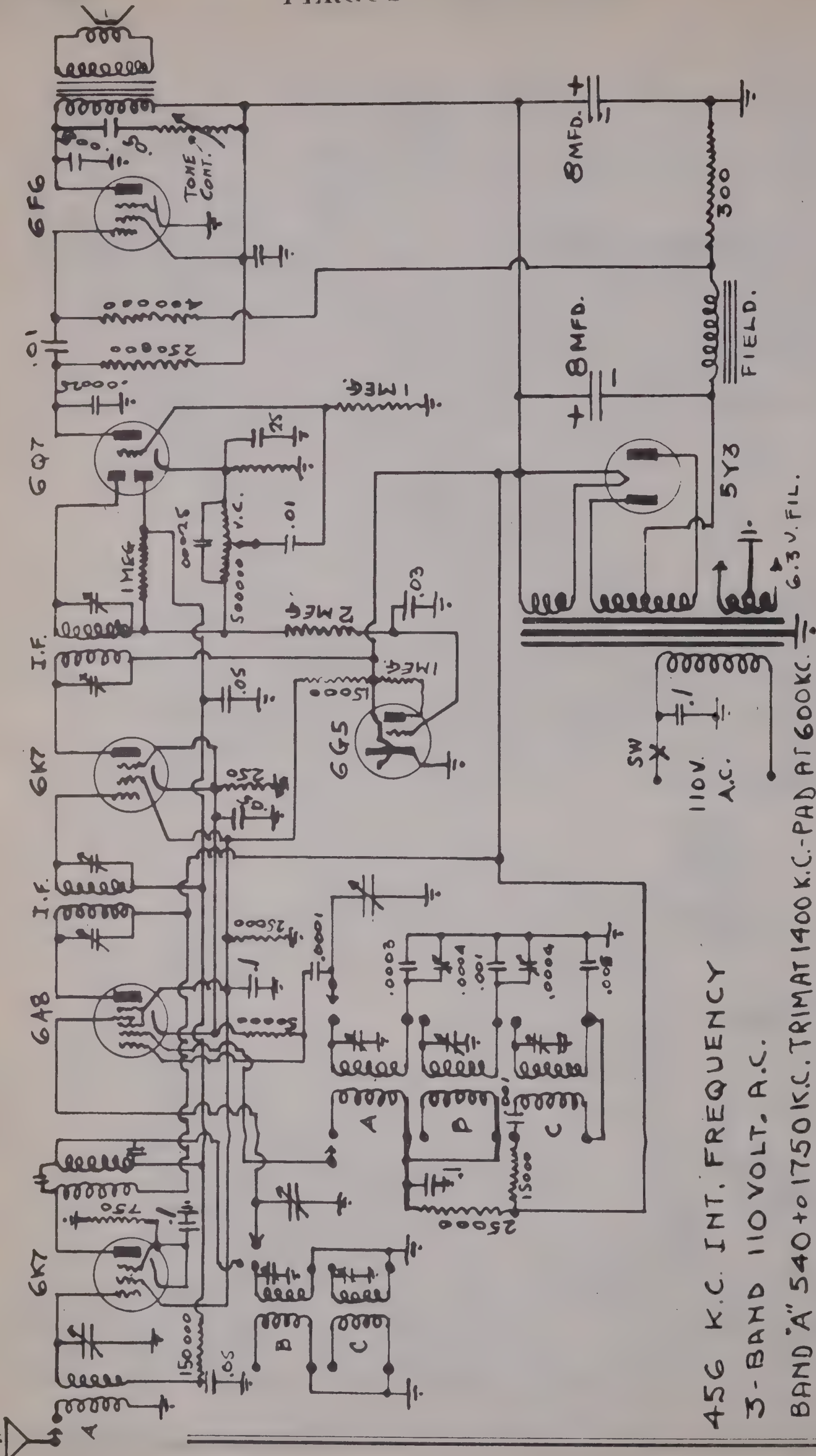
MODEL 7339T CHAMPION RADIO. A.C ONLY. 3 BAND 456 K.C. PAD AT 600 K.C. TRIM AT 1400 KC & 19 MC.
DO NOT GROUND CHASSIS.

ANT COIL ABOVE.



MODEL 7340TK

FERGUSON RADIO, INC.



MODEL 7340TK.

456 K.C. INT. FREQUENCY

3-BAND 110 VOLT. A.C.

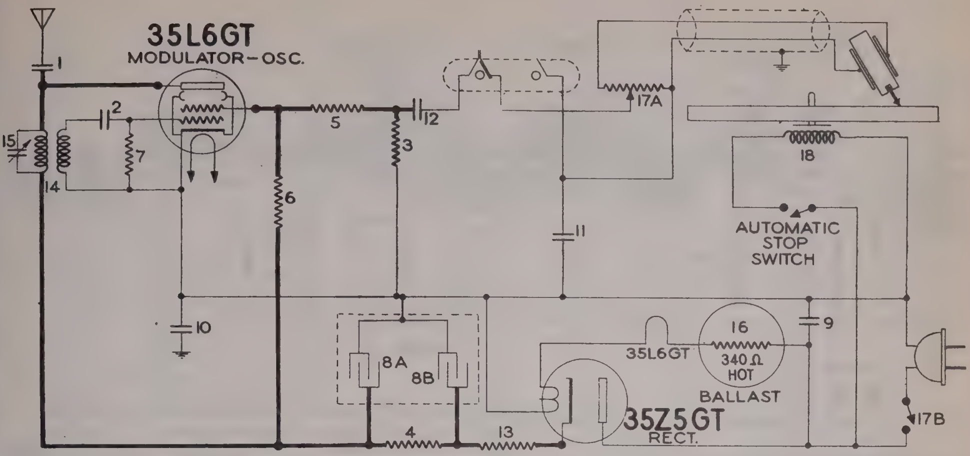
BAND "A" 540 to 1750 K.C. TRIM AT 1400 K.C.-PAD AT 600 K.C.

BAND "B" 1750 KC TO 5800 K.C.

BAND "C" 5.8 M.C. TO 18 M.C.

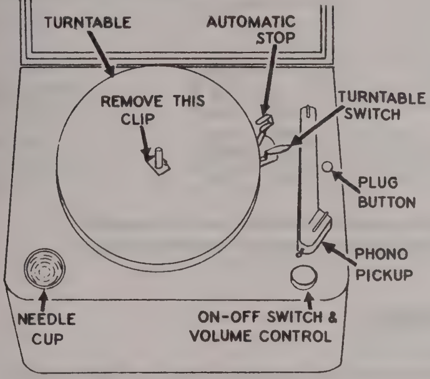
FIRESTONE TIRE & RUBBER CO.

MODEL S-7401-7

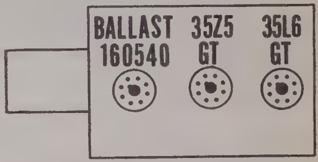


MICROPHONE CONNECTIONS

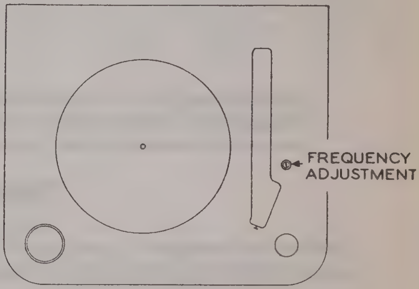
Provisions have been made so that a high impedance microphone may be connected to the record player. This will permit any sound picked up by the microphone to be heard through the radio receiver. The microphone cable should be equipped with standard ⅛" plugs which should be inserted into the holes in the plate marked "MICROPHONE" at the rear of the record player.



TUBE LOCATIONS



REAR OF CHASSIS



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2	83783	Condenser—mica, 110 mmfd.	.20
3	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
4	110569	Resistor—carbon 10,000 ohms ¼ watt	.12
5	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
6	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
7	116051	Resistor—insulated 33,000 ohms ¼ watt	.15
8A-8B	116470	Condenser—electrolytic 20-20 mfd. 150 volt	.95
9-10	116625	Condenser—.1 mfd. 600 volt	.25
11-12	116819	Condenser—.05 mfd. 600 volt	.20
13	118823	Resistor—1000 ohms 1 watt Wire Wound	.15
14	160499	Coil—oscillator	.26
15	160501	Condenser—tuning	.22
16	160540	Ballast tube	.60
17A-17B	160576	Volume control—250,000 ohms with switch	1.45
18	160603	Motor—less turntable	5.65

ALL D.C. VOLTAGES MEASURED TO B — (K on 35L6GT)

TUBE	FUNCTION	H	K	G	S	P
35L6GT	Oscillator Modulator	34 V. A.C.	0	—1	Note A	140
35Z5GT	Rectifier	34 V. A.C.	150	—	—	117 V. A.C.

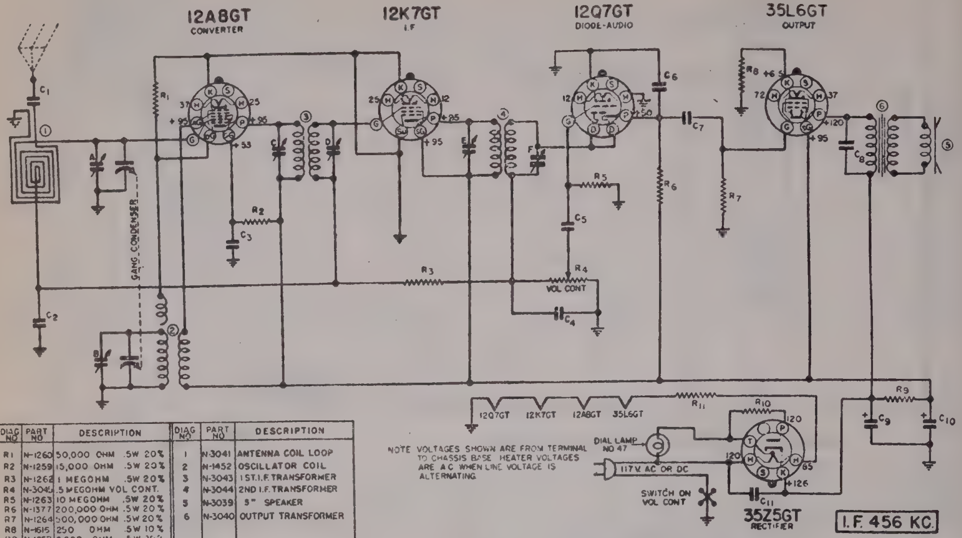
NOTE A: Voltage on the screen of the 35L6GT cannot be measured with the ordinary voltmeter because of the high resistance of resistor No. 6. Use a voltmeter of at least 1000 ohms per volt.

Set the receiver to be used with this record player, to some frequency between 540 and 750 KC which is clear and free from interfering stations. Remove the plug near the volume control on top of the record player. Using an insulated screwdriver turn the screw, located beneath this plug, until the signal from the record player is heard in the receiver. This will be heard as a reduction in noise as the signal comes in tune with the receiver. If a record is being played, the music or sound from it may be tuned in. If it is desired to change the frequency, set the receiver to the new frequency and turn the screw until the signal is heard. The fact that stations which are entirely absent during the day may be present at night with strong signals, should be kept in mind in choosing the frequency to be used. Always choose a frequency which is free from strong interference at all times, day or night.

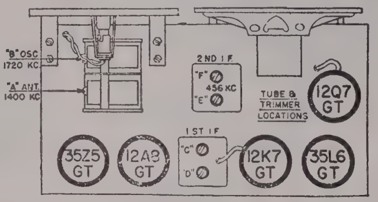
When the record player is located at some distance from the receiver, or under conditions when the signal from it is too weak, the coil of wire from the record player should be uncoiled enough to give a satisfactory signal. Under no conditions should more wire be uncoiled than is necessary for a reasonably strong signal in the receiver.

MODEL S-7403-5

FIRESTONE TIRE & RUBBER CO.



DIAG NO	PART NO	DESCRIPTION	DIAG NO	PART NO	DESCRIPTION
R1	N-1260	50,000 OHM .5W 20%	1	N-3041	ANTENNA COIL LOOP
R2	N-1259	15,000 OHM .5W 20%	2	N-1452	OSCILLATOR COIL
R3	N-1262	1 MEGOHM .5W 20%	3	N-3043	1ST. I.F. TRANSFORMER
R4	N-3045	.5 MEGOHM VOL CONT.	4	N-3044	2ND I.F. TRANSFORMER
R5	N-1263	10 MEGOHM .5W 20%	5	N-3039	5" SPEAKER
R6	N-1377	200,000 OHM .5W 20%	6	N-3040	OUTPUT TRANSFORMER
R7	N-1264	500,000 OHM .5W 20%			
R8	N-1615	250 OHM .5W 10%			
R9	N-1237	2,000 OHM .5W 20%			
R10	N-1742	25 OHM .5W 20%			
R11	N-1618	50 OHM 2 W 10%			
				N-3046	2 GANG CONDENSER
C1	N-1344	01 MFD. 400 V.			
C2	N-1345	05 MFD. 200V			
C3	N-1345	.05 MFD. 200V.			
C4	N-1374	100 MMFD.			
C5	N-1344	.01 MFD. 400V			
C6	N-1347	0005 MFD 400V.			
C7	N-1344	.01 MFD. 400V.			
C8	N-1376	02 MFD. 400V.			
C9 C10	N-2015	35 MFD. 50V 20 MFD. 150V ELECTRO.			
C11	N 1346	.05 MFD. 400V.			



5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRWN L.T.C APP'D

MARCH 18,1940

KH

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles and includes the popular 1712 KC police channel.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

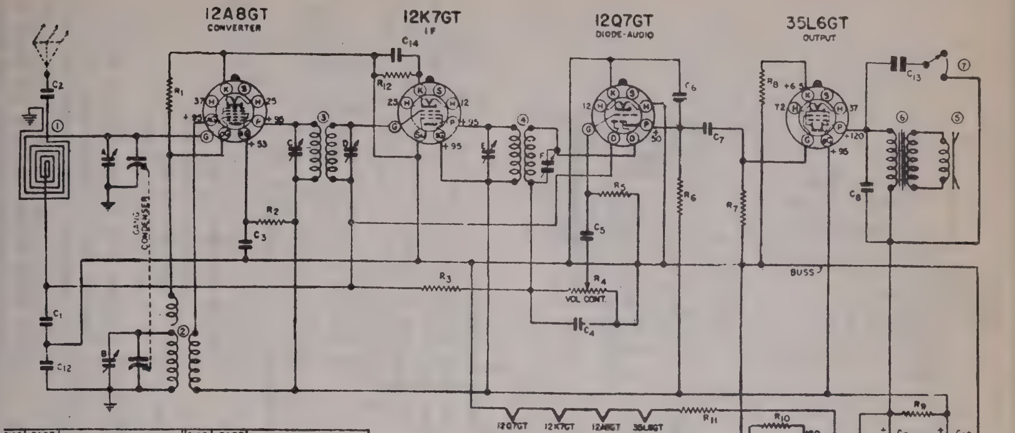
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

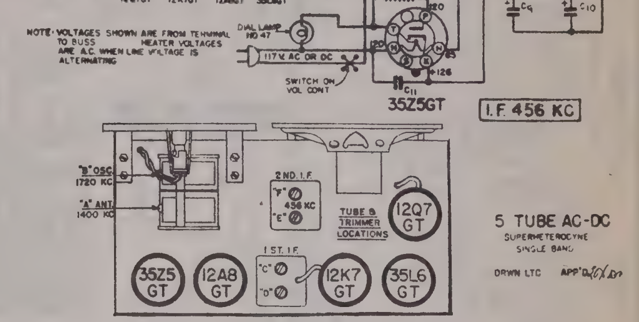
BROADCAST BAND ALIGNMENT. Remove chassis, shield, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set up on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

FIRESTONE TIRE & RUBBER CO.

MODEL S-7403-6





DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%	1	N-3041	ANTENNA COIL LOOP
R2	N-1259	15,000 OHM .5W 20%	2	N-1452	OSCILLATOR COIL
R3	N-1262	1 MEGOHM 5W. 20%	3	N-3043	1ST. I.F. TRANSFORMER
R4	N-3065	.5 MEGOHM VOL. CONTROL	4	N-3044	2ND. I.F. TRANSFORMER
R5	N-1263	10 MEGOHM .5W. 20%	5	N-3071	5½" SPEAKER
R6	N-1377	200,000 OHM .5W. 20%	6	N-3072	OUTPUT TRANSFORMER
R7	N-1264	500,000 OHM .5W. 20%	7	N-3050	TONE CONTROL SWITCH
R8	N-1616	250 OHM 5W. 10%			
R9	N-1257	2000 OHM .5W. 20%			
R10	N-1742	25 OHM .5W. 20%			
R11	N-[illegible]	80 OHM 2W. 10%			
R12	N-2487	200 OHM .5W. 20%			
C1	N-1345	.05 MFD. 200 V.		N-3046	2 GANG CONDENSER
C2	N-1344	.01 MFD. 400 V.			
C3	N-1345	.05 MFD. 200 V.			
C4	N-1374	100 MMFD.			
C5	N-1344	.01 MFD. 400 V.			
C6	N-1447	.0005 MFD. 400 V.			
C7	N-1344	.01 MFD. 400 V.			
C8	N-1376	.02 MFD. 400 V.			
C9 C10	N-3114	40 MFD. 150 V. 25 MFD. 150 V. ELECTRO.			
C11	N-1346	.05 MFD. 400 V.			
C12	N-3080	.22 MFD. 200 V.			
C13	N-1346	.05 MFD. 400 V.	C14	N-1351	.1 MFD. 200 V.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles and includes the popular 1712 KC police channel.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

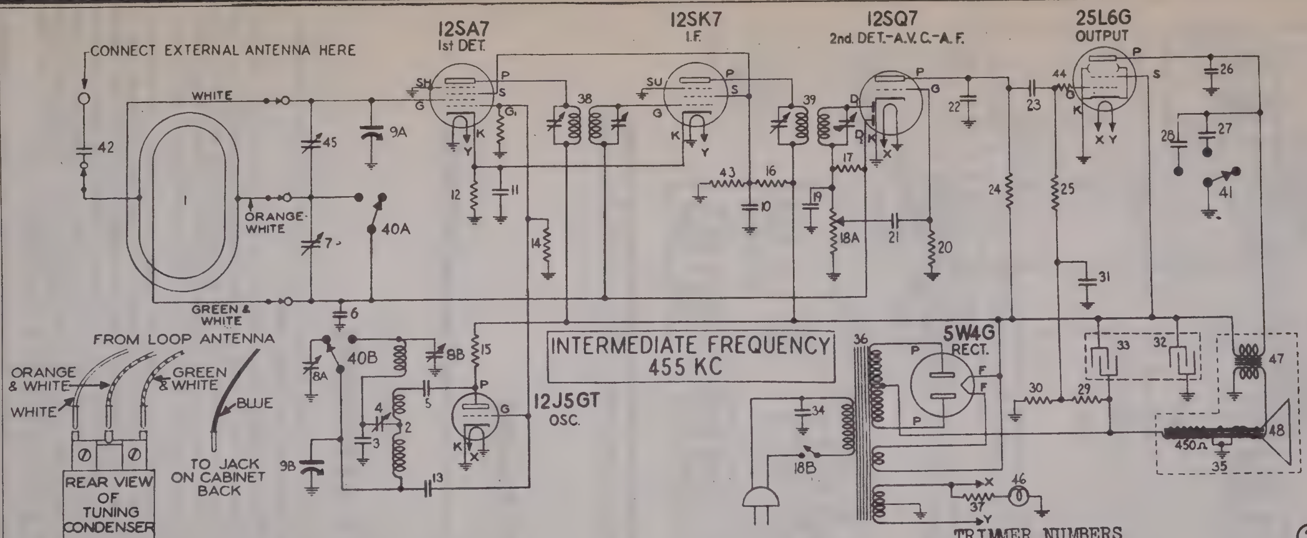
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

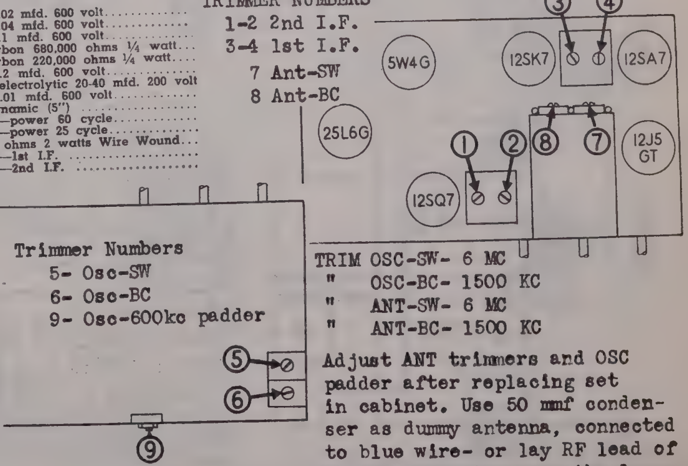
BROADCAST BAND ALIGNMENT. Remove chassis, shield, and loop antenna from cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set up on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODEL S-7403-7

FIRESTONE TIRE & RUBBER CO.





TRIM OSC-SW- 6 MC
" OSC-BC- 1500 KC
" ANT-SW- 6 MC
" ANT-BC- 1500 KC

Adjust ANT trimmers and OSC padder after replacing set in cabinet. Use 50 mmf condenser as dummy antenna, connected to blue wire- or lay RF lead of signal generator near the loop.

ELECTRICAL PARTS

Diagram Number	Description
1	Loop antenna
2	Coil—oscillator
3	Condenser—mica .002 mfd.
4	Condenser—padder
5	Condenser—.01 mfd. 600 V.
6	Condenser—.05 mfd. 600 V.
7	Condenser—trimmer
8A-8B	Condenser—trimmer (2 section)
9A-9B	Condenser—tuning
10-11	Condenser—.1 mfd. 600 V.
12	Resistor—carbon 150 ohms ¼ watt
13	Condenser—mica 51 mmfd.
14	Resistor—carbon 47,000 ohms ¼ watt
15	Resistor—carbon 10,000 ohms ¼ watt
16	Resistor—carbon 2,200 ohms 2 watts
17	Resistor—carbon 3.3 meg. ¼ watt
18A-18B	Volume control (with switch) 1 meg.
19	Condenser—mica 260 mmfd.
20	Resistor—carbon 3.3 meg. ¼ watt
21	Condenser—.004 mfd. 600 V.
22	Condenser—mica 260 mmfd.
23	Condenser—.01 mfd. 600 volt
24	Resistor—carbon 470,000 ohms ¼ watt
25	Resistor—carbon 220,000 ohms ¼ watt
26	Condenser—.02 mfd. 600 volt
27	Condenser—.04 mfd. 600 volt
28	Condenser—.1 mfd. 600 volt
29	Resistor—carbon 680,000 ohms ¼ watt
30	Resistor—carbon 220,000 ohms ¼ watt
31	Condenser—.2 mfd. 600 volt
32-33	Condenser—electrolytic 20-40 mfd. 200 volt
34	Condenser—.01 mfd. 600 volt
35	Speaker—dynamic (5")
36	Transformer—power 60 cycle Transformer—power 25 cycle
37	Resistor—20 ohms 2 watts Wire Wound
38	Transformer—1st I.F.
39	Transformer—2nd I.F.

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

DIAL TUNED TO 540 K.C.

NO SIGNAL CONDITION

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
12SA7	1st DET.	12.0 A.C.	1.9	0	—5	73		120		
12J5GT	OSC.	12.0 A.C.	0	—5				85		
12SK7	I.F.	12.0 A.C.	1.9	0		73	0	120		
12SQ7	2nd DET.-A.V.C.-A.F.	12.0 A.C.	0	0				NOTE B	0	0
25L6G	OUTPUT	25.0 A.C.	0	NOTE A		120		110		
5W4G	RECTIFIER	5.0 A.C.						150 V.A.C. to C.T.		

NOTE A: The 25L6G grid bias is —8.5 volts measured across resistor No. 30.

NOTE B: Due to the high resistance of No. 24, only a small voltage will be measured here.

Use a high resistance voltmeter of at least 1000 ohms per volt.

FIRESTONE TIRE & RUBBER CO.

MODEL S-7403-9

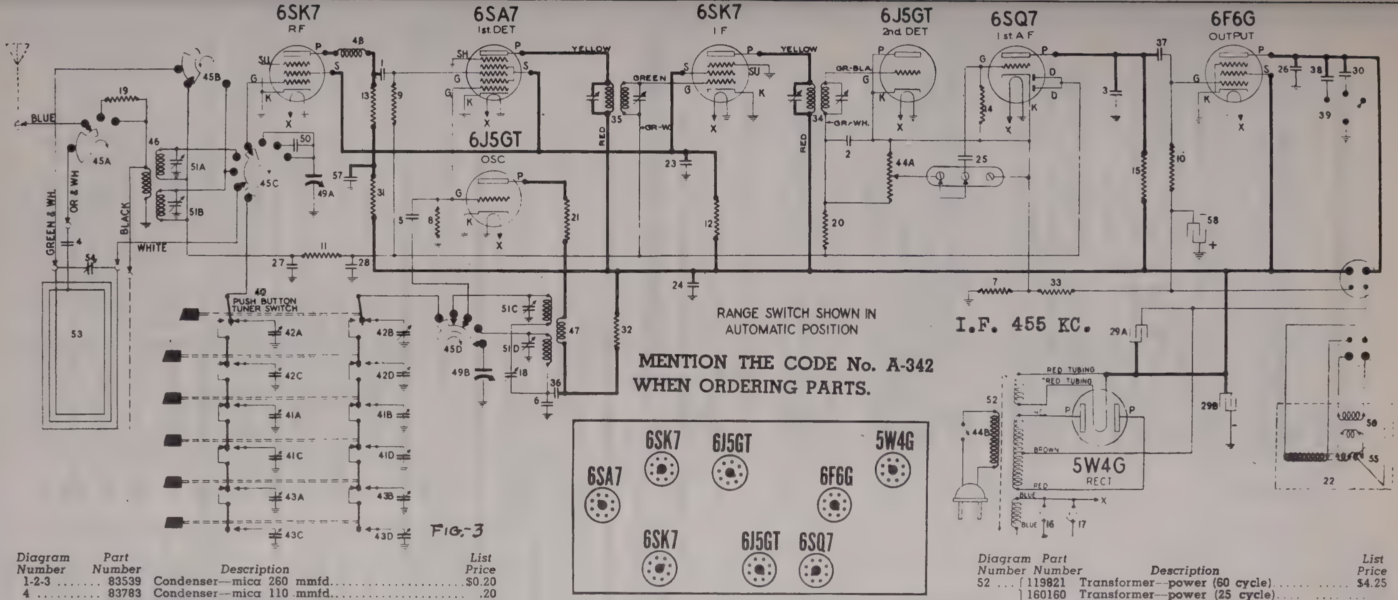


FIG.-3

MENTION THE CODE No. A-342 WHEN ORDERING PARTS.

Rear of Chassis

Diagram Number	Part Number	Description	List Price
1-2-3	83539	Condenser—mica 260 mmfd.	$0.20
4	83783	Condenser—mica 110 mmfd.	.20
5	85061	Condenser—mica 51 mmfd.	.15
6	88587	Condenser—mica .0042 mfd.	.35
7	110534	Resistor—wire wound 40 ohm ½ watt	.12
8	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
9	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
10-11	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
12	110561	Resistor—carbon 15,000 ohms 2 watt	.30
13	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
14	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
15	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
16-17	110629	Lamp—6.3 volt—.25 amps.	.15
18	112799	Condenser—Padder	.36
19	112955	Resistor—carbon 1000 ohms ¼ watt	.12
20	112973	Resistor—insulated—1.5 meg. ¼ watt	.15
21	112994	Resistor—carbon 220 ohm ¼ watt	.16
22	U-115098	Speaker—dynamic (6")	4.60
23-24	116625	Condenser—.1 mfd. 600 volt	.25
25-26	116647	Condenser—.004 mfd. 600 volt	.15
27-28	116819	Condenser—.05 mfd. 600 volt	.20
29A-29B	117034	Condenser electrolytic, 15—10 mfd. 450 volt	1.45
30	118487	Condenser—.07 mfd. 600 volt	.25
31-32	118805	Resistor—carbon 10,000 ohm 1W.	.12
33	118812	Resistor—180 ohms 1 watt, W.W.	.12
34	119024	Transformer—2nd I.F.	1.15
35	119042	Transformer—1st I.F.	1.10
36-37-38	119193	Condenser—.01 mfd. 600 volt	.15
39	119289	Switch—tone	.60
40	119603	P. B. Switch	2.30
41A to 41D	119663	Trimmer condenser for P.B. Trimmers (med. Freq.)	.24
42A to 42D	119664	Trimmer condenser for P.B. Trimmers (high Freq.)	.24
43A to 43D	119753	Trimmer condenser for P.B. Trimmers (low Freq.)	.24
44A-44B	119779	Volume control ½ meg. (with switch)	$1.25
45A to 45D	119780	Range Switch	1.25
46	119787	Coil Antenna	.85
47	119788	Coil—oscillator	.85
48	119789	Coil—compensating	.25
49A to 49B	119812	Gang condenser	2.65
50	119815	Condenser—mica 370 mmfd.	.24
51A to 51D	119819	Condenser—trimmer (4 section)	.60
52	119821	Transformer—power (60 cycle)	$4.25
	160160	Transformer—power (25 cycle)	
53	119838	Loop antenna & back (complete)	1.60
54	119845	Condenser—trimmer	.16
55	U-119868	Transformer—output for U-115098 speaker	1.75
56	U-119869	Cone & voice coil for U-115098 speaker	1.75
57	116706	Condenser—.2 mfd. 600 volt	.35
58	110377	Condenser—electrolytic—10 mfd. 35 volt	.80

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION

DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.0 A.C.	0	Note A		93	0	125		
6SA7	1st Det.	6.0 A.C.	0	Note A	— 5	93		235		
6J5GT	Osc.	6.0 A.C.	0	—5				155		
6SK7	I. F.	6.0 A.C.	0	Note A		93		235		
6J5GT	2nd Det - A.V.C.	6.0 A.C.	—2.8	Note A				—2.8		
6SQ7	1st A.F.	6.0 A.C.	—2.8	Note A				55	Note A	Note A
6F6G	Output	6.0 A.C.	0	Note B		235		215		
5W4G	Rectifier	5.0 A.C.						Plates 350 V.A.C to C.T.		

NOTE A: This voltage to ground is —2.8 volts measured across resistor No. 7.
NOTE B: The bias for this grid is —16 volts measured across resistor No. 33 and No. 7.
Use a high resistance voltmeter of at least 1000 ohms per volt.

FOR ALIGNMENT, TRIMMERS, P.B. DATA- SEE INDEX

FIRESTONE TIRE & RUBBER CO.

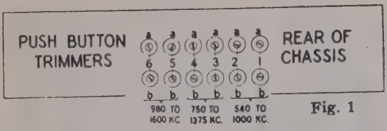
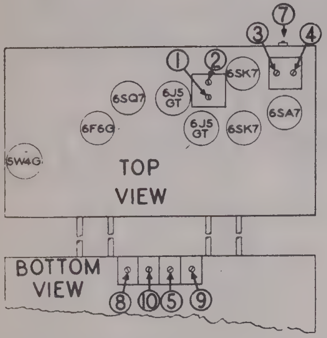
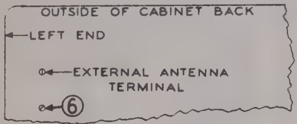


Fig. 1





TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.

2. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results. Also be sure to select stations that fall well within the frequency range of the buttons as shown in Fig. 1.

3. With the Band Switch in the "AM" Position tune in the station to be set up. Then turn the range switch to Automatic Position "AUT." Position and push in the button to be set up, being sure to select a button with the proper frequency range (see Fig. 1).

4. At the back of the chassis, as viewed from the rear of the radio, will be found 12 holes numbered in pairs to correspond to the numbers of the buttons. See Fig. 1. Adjust the "a" screw with the number corresponding to the number of the button you have pushed in, until the same station is again heard. Tune accurately, adjusting for deepest tone.

5. Now adjust the "b" screw (located below the "a" screw) until maximum output is obtained. Make a final adjustment on the "a" screw, always tuning for deepest tone.

6. The set-up is now complete for this button.

The remaining buttons may be set up in the same way.

ALIGNMENT PROCEDURE

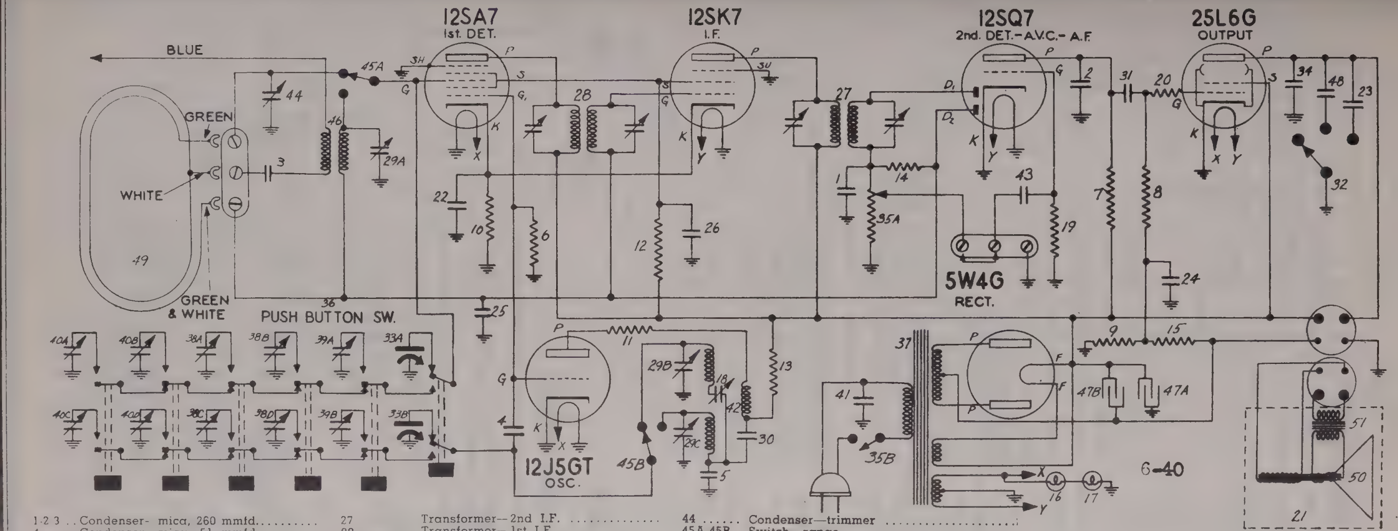
1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to ground through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. Check the pointer to see that it is correctly set. Connect the loop antenna as shown in Fig. 3.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Rear Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Ant. Terminal	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	External Ant. Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	6*	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	External Ant. Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	7*	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	External Ant. Terminal	2.5 MC	Intermediate	Tune to 2.5 MC Generator Signal	8	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	External Ant. Terminal	16 MC	Foreign	16 MC	9	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	External Ant. Terminal	16 MC	Foreign	Tune to 16 MC Generator Signal	10	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

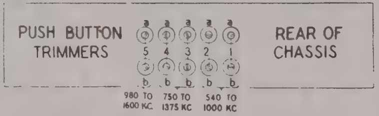
*When making these adjustments the loop must be in the same relative position to the chassis as when in the cabinet. Using a weak radiated signal, repeat adjustment 6 after set is in cabinet.

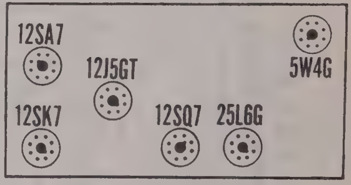
FIRESTONE TIRE & RUBBER CO.

MODEL S-7404-5

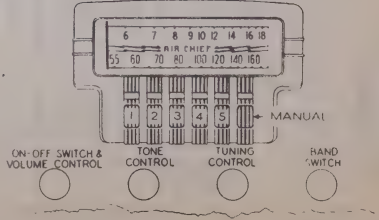


1-2-3	Condenser—mica, 260 mmfd.
4	Condenser—mica, 51 mmfd.
	Condenser—mica, .0042 mfd.
6	Resistor—carbon 47,000 ohms ¼ watt.
7-8-9	Resistor—carbon 220,000 ohms ¼ watt
10	Resistor—carbon 330 ohms ¼ watt
11	Resistor—carbon 100 ohms ¼ watt
12	Resistor—carbon 10,000 ohms ¼ watt.
13	Resistor—carbon 2,200 ohms ¼ watt
14	Resistor—carbon 3.3 meg. ¼ watt
15	Resistor—carbon 680,000 ohms ¼ watt
16-17	Lamp—6.3 volt—.25 amps.
18	Condenser—padder
19	Resistor—carbon 10 meg. ¼ watt
20	Resistor—carbon 220 ohms ¼ watt
21	Speaker—dynamic (8")
22-23	Condenser—.1 mfd. 600 volt
24	Condenser—.2 mfd. 600 volt
25-26	Condenser—.05 mfd. 600 volt
27	Transformer—2nd I.F.
28	Transformer—1st I.F.
29A-29B-29C	Condenser—trimmer—3 section
30-31	Condenser—.01 mfd. 600 volt
32	Switch—tone
33A-33B	Condenser—variable tuning
34	Condenser—.02 mfd. 600 volt
35A-35B	Volume control—1 meg. (with switch).
36	P. B. Switch
37	Transformer—power 60 cycle Transformer—power 25 cycle
38A to 38D	Trimmer condenser for P.B. trimmers (med. freq.)
39A-39B	Trimmer condenser for P.B. trimmers (high freq.)
40A to 40D	Condenser—P. B. trimmer (low freq.)
41	Condenser—(metal clad) .01 mfd. 600 volt
42	Coil—oscillator
43	Condenser—.004 mfd. 600 volt
44	Condenser—trimmer
45A-45B	Switch—range
46	Coil—short wave antenna
47A-47B	Condenser—electrolytic 20-40 mfd. 250 volt
48	Condenser—.04 mfd. 600 volt
49	Loop antenna—complete
50	Cone and Voice Coil for U-115100 Speaker
51	Transformer—output for U-115100 Speaker





REAR OF CHASSIS



I.F. 455 KC

FOR PUSH-BUTTON TUNER DATA SEE INDEX

SOCKET VOLTAGES — ALL D.C. POTENTIAL MEASURED TO CHASSIS

ANTENNA GROUNDED.

DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
12SA7	1st DET.	12.0 A.C.	3.1	0	—8	80	0	130		
12J5GT	OSC.	12.0 A.C.	0	—8				115		
12SK7	I.F. AMP.	12.0 A.C.	3.1	0		80		130		
12SQ7	2nd DET. — A.V.C. & A.F.	12.0 A.C.	0	0				65	0	0
25L6G	OUTPUT	24.0 A.C.	0	Note A		130		122		
5W4G	RECTIFIER	5.0 A.C.				Plate Voltage 200 A.C. to C.T.				

NOTE A: Bias on this grid is —8.5 volts. It can not be measured with an ordinary voltmeter because of the high resistances of resistors No. 9 and No. 15.

Use a high resistance voltmeter of at least 1000 ohms per volt.

MODEL S-7404-5
S-7404-6
S-7406-6

FIRESTONE TIRE & RUBBER CO.

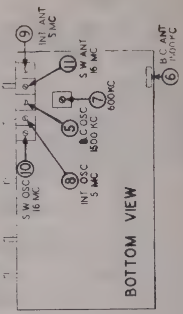
S-7404-6

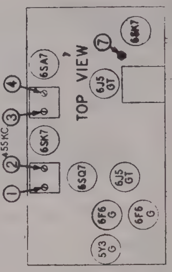
ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis and plug black wire lead from chassis into the inside clip on loop drum top.
3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
4. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
5. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Front Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment
					3-4	1st I.F.	
200 MMFD. Mica Condenser	Clip on Loop Drum	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Clip on Loop Drum	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Clip on Loop Drum	600 KC	Broadcast	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series)	Adjust for Maximum Output Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Clip on Loop Drum	5 MC	Intermediate	5 MC	8	Intermediate Oscillator	Adjust for Maximum Output Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 4.1 MC. If Image does not appear, Realign at 5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Clip on Loop Drum	5 MC	Intermediate	Tune to 5 MC Generator Signal	9	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Clip on Loop Drum	16 MC	Foreign	16 MC	10	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Clip on Loop Drum	16 MC	Foreign	Tune to 16 MC Generator Signal	11	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

NOTE: Realign trimmer No. 6 after set is in cabinet by placing range switch in broadcast position, and adjusting for maximum output on a weak signal at approximately 1500 KC.



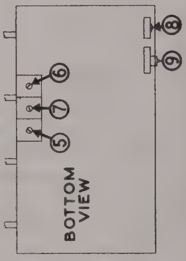


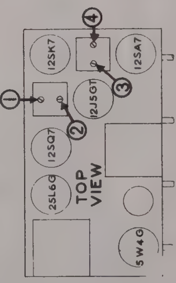
S-7404-5 S-7406-6

ALIGNMENT EQUIPMENT & PROCEDURE

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Rear Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
400 OHM Carbon Resistor	External Antenna Terminal Blue Wire	16 MC	Foreign	16 MC	5	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear realign at 16 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Terminal Blue Wire	16 MC	Foreign	Tune to 16 MC. Generator Signal	6	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	8*	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal Blue Wire	600 KC	Broadcast	Tune To 600 KC Generator Signal	9*	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

NOTE: These adjustments should be made with the set in the cabinet. Use a weak radiated signal at 1500 KC.





FIRESTONE TIRE & RUBBER CO.

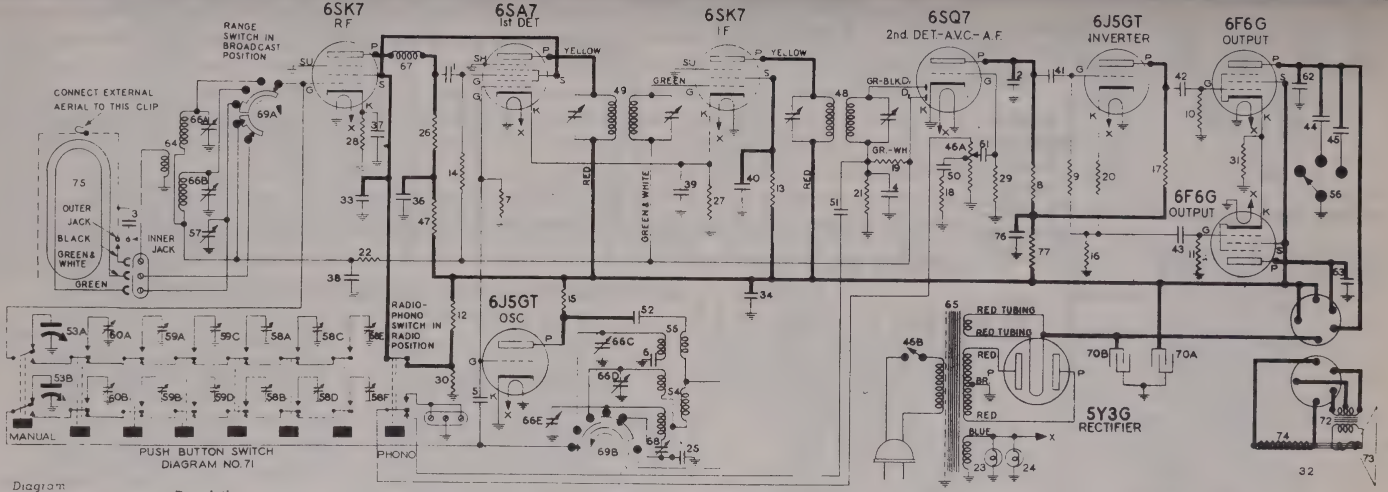
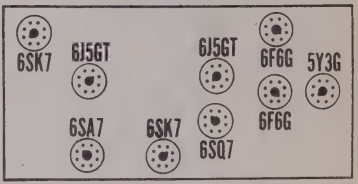


Diagram Number	Description
1-2	Condenser—mica 260 mmfd.
3-4	Condenser—mica, 110 mmfd.
5	Condenser—mica, 51 mmfd.
6	Condenser—mica .0042 mfd.
7	Resistor carbon 47,000 ohms ¼ watt
8	Resistor—carbon 220,000 ohms ¼ watt
9 to 11	Resistor—carbon 470,000 ohms ¼ watt
12	Resistor—carbon 15,000 ohms 2 watts
13 14	Resistor carbon 100,000 ohms, ¼ watt
15 to 17	Resistor—carbon 22,000 ohms ¼ watt
18	Resistor—carbon 68,000 ohms ¼ watt
19	Resistor—carbon 2.2 meg. ¼ watt
20	Resistor—carbon 2,200 ohms ¼ watt
21-22	Resistor carbon 330,000 ohms ¼ watt
23-24	Lamp—6.3 volt—.25 amps.
25	Condenser—mica 1650 mmfd.
26	Resistor—carbon 3,300 ohms ¼ watt
27	Resistor—carbon 220 ohms ¼ watt
28	Resistor—insulated 470 ohms ¼ watt
29	Resistor—carbon 10 meg. ¼ watt
30	Resistor—carbon 22,000 ohms 1 watt
31	Resistor—wire wound 360 ohms 2 watts
32	Speaker—12"
33 to 35	Condenser—.1 mfd. 600 volt
36 to 40	Condenser—.05 mfd. 600 volt
41 to 44	Condenser—.02 mfd. 600 volt
45	Condenser—.07 mfd. 600 volts
46A-46B	Volume control—1 meg. (with switch)
47	Resistor—carbon 10,000 ohms 1 watt
48	Transformer—2nd I.F.
49	Transformer—1st I.F.
50	Condenser—.02 mfd. 600 volt
51 to 52	Condenser—.01 mfd. 600 volt
53A-53B	Condenser—variable tuning
54	Coil—B.C. & Police Oscillator
55	Coil—short wave—oscillator
56	Switch—tone
57	Condenser—trimmer for loop
58A to 60B	Trimmer—cond. for P.B. trimmer (low freq.) Trimmer cond. for P.B. trimmers (med. freq.) Trimmer cond. for P.B trimmers (high freq.)
61 to 63	Condenser—.004 mfd. 600 volt
64	Coil—antenna
65	Transformer—power (50-60 cycle) Transformer—power (25 cycle)
66A to 66E	Trimmer condenser—five sections
67	Coil compensating
68	Condenser—padder
69A-69B	Range switch
70A-70B	Condenser—electrolytic 15-30 mfd. 450 v.
71	Switch—push button
72	Transformer—output for M-115101 spkr.
73	Cone & Voice coil for M-115101 speaker.
75	Loop antenna (complete)
76	Condenser—.2 mfd. 600 volt
77	Resistor—22,000 ohms ¼ watt

TUBE LOCATIONS



REAR OF CHASSIS

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION

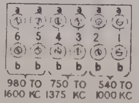
DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.0 A.C.	3.5	0		90	0	175		
6SA7	1st Det.	6.0 A.C.	3.1	0	—5	90	0	255		
6J5GT	Osc.	6.0 A.C.	0	—5				125		
6SK7	I.F.	6.0 A.C.	3.1	0		85	0	255		
6SQ7	2nd Det. - A.V.C. Audio	6.0 A.C.	0	0				85	0	0
6J5GT	Inverter	6.0 A.C.	4.5	Note A				190		
6F6G	Output	6.0 A.C.	19.5	0		255		248		
6F6G	Output	6.0 A.C.	19.5	0		255		248		
5Y3G	Rectifier	5.0 A.C.						Plates 370 V.A.C to C.T.		

NOTE A: Bias for the 6J5GT Inverter Grid is approximately 0.5 volt measured across Resistor No. 20.

Use a high resistance voltmeter of at least 1000 ohms per volt.

PUSH BUTTON TRIMMERS



REAR OF CHASSIS

FOR ALIGNMENT PROCEDURE

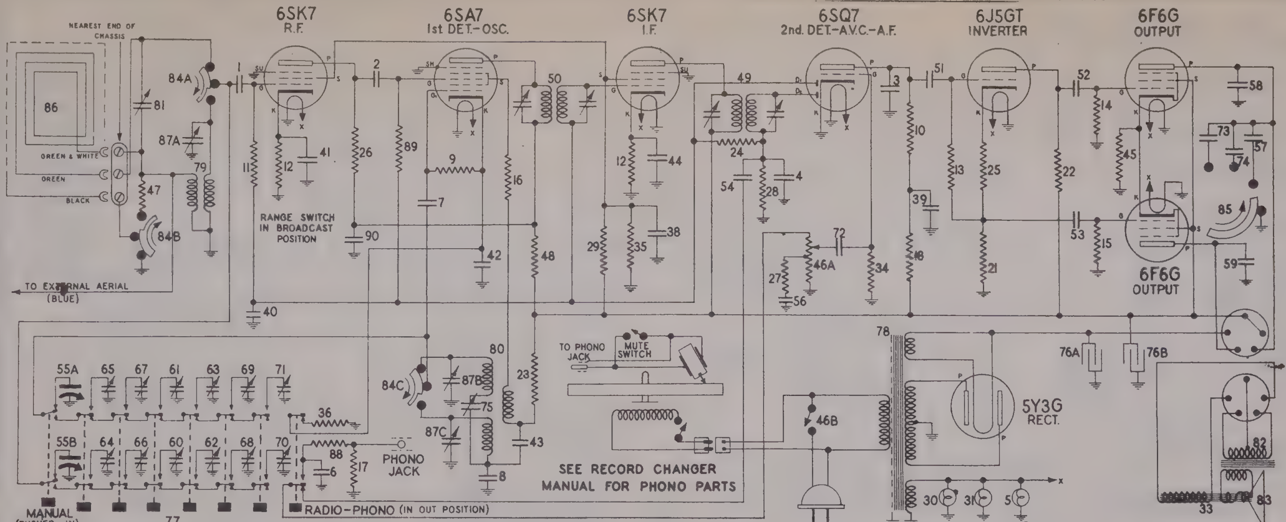
AND PUSH-BUTTON TUNER DATA

SEE INDEX

NOTE: MENTION CODE No. A-344
WHEN ORDERING PARTS.

MODEL S-7406-6

FIRESTONE TIRE & RUBBER CO.



1-2-3-4	Condenser—mica 260 mmfd.
5	Lamp (bull's eye) 6 to 8 volt (Mazda 51).
6	Condenser—mica 510 mmfd.
7	Condenser—mica 51 mmfd.
8	Condenser—mica .0042 mfd.
9	Resistor carbon 47,000 ohms ¼ watt
10	Resistor carbon 220,000 ohms ¼ watt.
11	Resistor—carbon 1 megohm ¼ watt
12	Resistor—carbon 330 ohms ¼ watt
13-14-15	Resistor—carbon 470,000 ohms ¼ watt.
16	Resistor—carbon 100 ohms ¼ watt
17 to 20	Resistor—carbon 100,000 ohms ¼ watt.
21-22	Resistor—carbon 22,000 ohms ¼ watt
23	Resistor—carbon 10,000 ohms ½ watt
24	Resistor—carbon 2.2 meg. ¼ watt
25-26	Resistor—carbon 2,200 ohms ¼ watt
27	Resistor—carbon 68,000 ohms ¼ watt
28	Resistor carbon 330,000 ohms ¼ watt.
29	Resistor—carbon 22,000 ohms 1 watt
30-31	Lamp—dial 6-8 volt, Mazda No. 44
33	Speaker (12")
34	Resistor—carbon 10 meg. ¼ watt
35	Resistor—carbon 27,000 ohms 1 watt
36	Resistor—150 ohms ¼ watt
37	Resistor—560 ohms ¼ watt
38	Condenser—.1 mfd. 600 volt
39	Condenser—.2 mfd. 600 volt
40 to 44	Condenser—.05 mfd. 600 volt
45	Resistor—wire wound 260 ohm 2 watts
46A-46B	Volume control—1 meg. (with switch).
47	Resistor carbon 400 ohms ¼ watt
48	Resistor—carbon 1500 ohms ½ watt
49	Transformer—2nd I.F.
50	Transformer—1st I.F.
51 to 54.	Condenser—.01 mfd. 600 volt
55A-55B	Condenser—variable tuning
56-57	Condenser—.02 mfd. 600 volt
58-59	Condenser—.006 mfd. 600 volt
60 to 63	Condenser—P.B. trimmer (med. freq.)
64 to 67	Condenser—P.B. trimmer (high freq.)
68 to 71	Condenser—P.B. trimmer (low freq.)
72	Condenser—.004 mfd. 600 volt
73-74	Condenser—.04 mfd. 600 volt
75	Condenser—padder
76A-76B	Condenser—electrolytic 30-15 mfd. 450 v
77	Switch—push button
78	Transformer—power (50-60 cycle)
79	Coil—short wave antenna
80	Coil—oscillator
81	Condenser—trimmer
82	Transformer—output
83	Cone & voice coil for
84A-84B-84C	Range switch
85	Switch—tone
86	Loop antenna—complete
87A-87B-87C	Condenser—trimmer—3 section
88	Resistor—carbon 470,000 ohms ¼ w
89	Resistor—carbon 68,000 ohms ¼ w
90	Condenser—.05 mfd. 600 volt

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION

DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SK7	R.F.	6.0 A.C.	2.2	0		85	0	185		
6SA7	1st Det. & Osc.	6.0 A.C.	1.4	0	—11	100	0	200		
6SK7	I.F.	6.0 A.C.	2.0	0		85	0	228		
6SQ7	2nd Det. - A.V.C. Audio	6.0 A.C.	0	0				75	0	0
6J5GT	Inverter	6.0 A.C.	50	Note A				175		
6F6G	Output	6.0 A.C.	16	0		228		220		
6F6G	Output	6.0 A.C.	16	0		228		220		
5Y3G	Rectifier	5.0 A.C.						Plates 250 V.A.C. to C.T.		

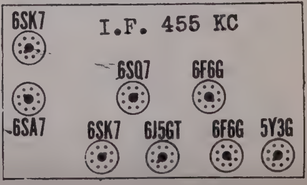
NOTE A: Bias for the 6J5GT inverter grid is approximately 8 volts measured across resistor No. 25.

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE: MENTION CODE No. A-346 WHEN ORDERING PARTS.

FOR P.B. DATA SEE INDEX

FOR ALIGNMENT SEE INDEX



REAR OF CHASSIS

Models B2RC, B3RC and B4RC

IMPORTANT

All service adjustments on Motorola Record Changers should be made with the instrument in a normal operating position.

Therefore, the instrument should be supported in such fashion that parts underneath are accessible. A jig consisting of four corner support posts would be helpful. A mirror would also permit the service man to make observations and adjustments without getting into awkward positions.

CHECK THE RECORDS FIRST

Before attempting to service or adjust this Record Changer, check the records first to make sure they are not causing the trouble. The instrument will handle most of the 10 or 12 inch records now available on the market, but it is not guaranteed to handle all of them. Records must be in good mechanical condition, and should not be chipped, particularly around the center hole. Do not try to play automatically, records that are too thick, too thin, or that are oversized or undersized, as regards diameter of record or center hole. Do not mix 10 and 12 inch records on the Changer.

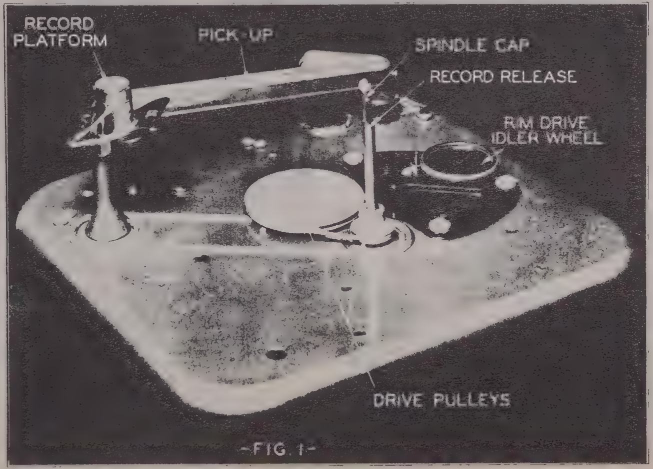
Old records made before the days of automatic record changers may not change automatically, due to the differences in thickness, or to lack of a proper eccentric groove at the finish. Most of the old records, however, may be played one at a time.

THEORY OF OPERATION

As in most modern phonograph turntables, power is derived from an electric motor. This power is transmitted to the turn-table through a geared down rim drive of the friction type.

The turntable is keyed to a small drive pulley, which in turn drives a large (3 inch) pulley, through a spring belt, both of these units being located on top of the base plate. (See Fig. 1). The 3 inch pulley transmits power by direct drive to another small pulley located under the mounting plate. This second small pulley in turn drives the large (4 inch) main drive wheel, also located under the mounting plate.

When the turntable revolves, all of these pulleys and wheels mentioned above, also revolve-regardless of whether or not the Changer is going through a cycle of changing a record. By means of this series of pulleys, a high ratio is obtained between the motor and the changing mechanism, which assures ample power.



-FIG. 1-

SETTING FOR 10 OR 12 INCH RECORDS

The record support platform is adjustable for either 10 or 12 inch records, depending upon which "lip" is turned toward the center of the turntable. The platform may be swung in an arc of 180 degrees, so that either the 10 or 12 inch lip may point toward the spindle.

Underneath the mounting plate, and mounted rigidly to the record platform support shaft is an eccentric mechanism which moves the 10" - 12" selector lever when the platform is moved. The position of this selector lever determines the point where the needle will come down on the record at the end of a changing cycle. In other words, it adjusts the pick-up for playing automatically either 10 or 12 inch records, depending upon the position to which the record support platform is turned. The eccentric cam and the selector lever are shown in Figs. 4 and 6.

START-REJECT SWITCH

The push switch mounted near one corner of the mounting plate is connected in parallel with the automatic change switch previously discussed. When this switch is closed, it energizes the electro magnet exactly in the same fashion as does the automatic change switch, thereby making it possible to start the changing cycle at any time, regardless of whether or not the record has been completely played. By this means a record can be "rejected". The wiring diagram showing switches and magnet can be seen in Fig. 2.

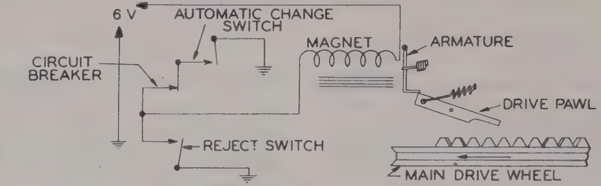
TO ADJUST AUTOMATIC CHANGE SWITCH

The Automatic Switch (See Fig. 7) starts the changing cycle after a record has been completely played. The switch is actuated by the oscillating of the tone arm in the eccentric groove of the record, through the spring clip which grips the movable switch blade.

If the switch fails to operate positively, it may be readily adjusted by means of the adjustment screw (F). (See Fig. 7).

To make the adjustment, place a record on the turntable, start it revolving, and move the pick-up over to the end of the record. Adjust screw (F) until switch closes the magnet circuit and starts the change cycle. Check points visually to make sure they do not remain closed after cycle is completed.

If the Changer immediately starts another cycle, it is an indication that the points are remaining closed or that the clutch release spring (G) (Fig.7) does not have enough tension. This tension may be increased by taking it up another notch.



- ELECTRICAL CIRCUIT -
FIG. 2

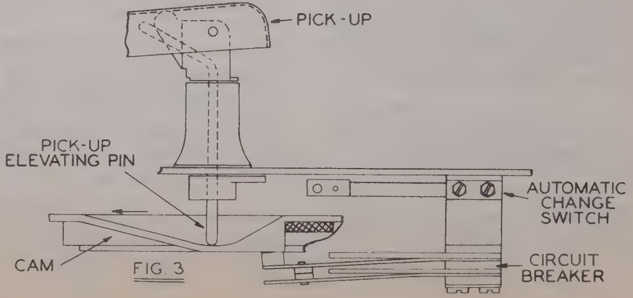


FIG. 3

CHANGING CYCLE

By referring to the various photographs and figures which will be found in this Service Manual, you can readily follow through the changing cycle from the continuity given hereafter.

1. The needle in the pick-up finishes a record and enters the eccentric groove.

2. As the pick-up has slowly approached the eccentric groove, a phosphor bronze spring clip has gripped a fin of the automatic change switch.

3. When the needle enters the eccentric groove on the record, the pick-up oscillates slightly, which in turn causes the automatic change switch to make contact.

4. The first momentary contact of the automatic change switch is all that is necessary to start the changing cycle. When the switch closes, a small electro magnet is energized. The electro magnet pulls an armature back out of the way, permitting a drive pawl which is mounted on the cam wheel to fall down and engage in one of the notches which are provided on the upper surface of the main drive wheel. (See Fig. 2.)

5. Since the main drive wheel is already revolving, the engagement of the pawl now causes the cam wheel to revolve with it.

6. When the cam wheel starts to revolve, it causes several things to occur. In the first few degrees of revolution, it opens a circuit breaker switch (Fig. 3) which automatically opens the magnet circuit, thereby de-energizing it, to prevent "chattering".

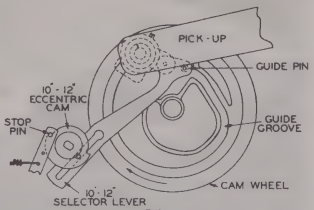


FIG. 4

7. The next few degrees of rotation causes the pick-up elevating pin to ride up on an inclined section of the cam, thereby elevating the pick-up and lifting the needle from the record which has just been played. (See Fig. 3).

8. A few more degrees of revolution cause the pick-up guide groove on top of the cam wheel. This part of the mechanism is not visible, since the cam wheel is mounted too close to the mounting plate, but Fig. 4 shows a drawing of the upper surface of the cam wheel. As the wheel revolves with the pin in the groove, it causes the pick-up to swing out beyond the edge of the record so it will be out of the way when the next record falls on the turntable.

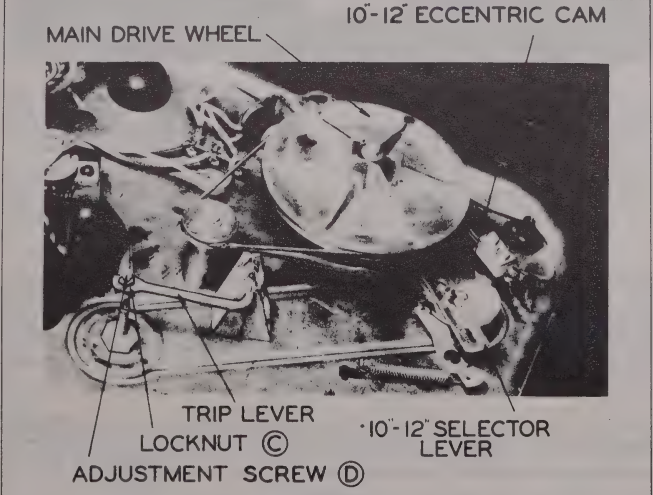
9. The cam wheel continues its revolution, and at another point on its circumference a roller on the end of the trip-lever rides up an inclined section on the cam. This trip-lever is the copper-plated rod which is hinged approximately in the center by running through a die cast fulcrum block. As the roller on one end of the trip-lever rolls up the incline on the cam, the other end of the trip-lever bears against the push rod which operates the record release, which is located near the top of the spindle, causing it to push the next record off its support, thereby dropping it on the turntable. (See Fig. 5).

10. The cam continues to revolve, the groove in the top bringing the pick-up back over the edge of the record to the proper position where the needle will fall near the first groove when it comes down.

11. A few more degrees of revolution, and the pick-up elevating pin rides down another incline, permitting the needle to settle gently on the first groove of the record. (Fig. 3).

12. At this point, the cam has completed one full revolution of 360 degrees. At the same time the needle touches the record, the drive pawl hits the magnet armature, which forces it up, thereby disengaging it from the notch in the drive wheel. The cam wheel therefore stops, the turntable continues to revolve, and the record is played.

13. During the last few degrees of revolution, the circuit breaker switch has again been closed, as its fibre stud rides up an incline on the lower surface of the cam. (Fig. 3). This switch must be closed at all times except when the instrument is going through a changing cycle, otherwise, it would be impossible to start a new changing cycle automatically.



-FIG. 6-

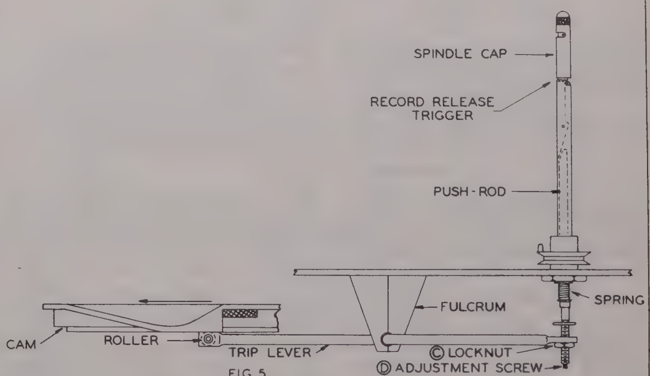
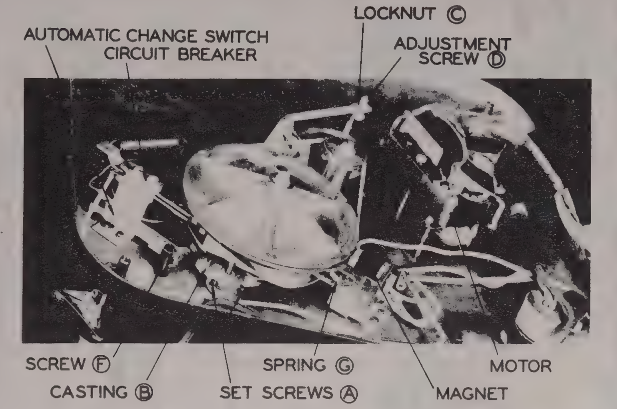


FIG. 5



-FIG. 7-

TO ADJUST RECORD RELEASE

1. Place a stack of 10 inch records on the changer, after turning the record support platform to the "10 inch" position.

2. Start the turntable revolving.

3. Press the "Start-Reject" button.

4. If the first record does not drop to the turntable, double check the record to make sure that it is not too thick, or that the diameter of the center hole is not undersized, causing it to bind.

5. If the record proves to be normal, and is not causing the failure, loosen lock nut (C) which locks adjustment screw (D), as shown in Figs. 5, 6, or 7.

6. With a slab-head wrench, turn screw (D) a fraction of a turn clockwise, and press the "Start-Reject" button again, checking to see if record is released.

7. If the record fails to drop, tighten screw (D) a trifle at a time, testing after each adjustment, until setting is reached, which releases record.

8. Tighten lock nut (C), after which a few more records should be changed, to make sure that this did not alter adjustment of screw (D).

NOTE: If the Changer stalls during the adjustment procedure, it may be an indication that screw (D) is too tight, in which case it should be turned back (counter-clockwise).

TO ADJUST PICK-UP POSITION

This adjustment is made to cause the needle to drop in the first groove of the record, as the Changer completes a changing cycle.

1. Turn the record support to the 10 inch position. (See Fig. 1).

2. Place a standard 10 inch record on the turntable and start it revolving.

3. Press the "Start-Reject" button. The Changer will now start a changing cycle.

4. Do not let the Changer complete the cycle, but stop it at the point where the pick-up starts to drop downward towards the outer rim of the record. If the cycle is stopped at the right point, the pick-up will still be "in cycle" and will not be free to swing back and forth. Check this gently. Do not exert too much sidewise pressure on the pick-up.

5. Now loosen the two hex-head set screws (A) in the bell crank casting (B), which you can see in Fig. 7.

6. With the set screws loose, the pick-up arm can now be moved back and forth. Move it to the point where the needle rests directly over the first groove in the record. (The correct dimension for proper adjustment is 4-25/32" from the needle point to the center of the spindle.)

7. Tighten one set screw securely so that the shaft does not move while checking proper position of the pick up arm. After proper position has been located tighten both set screws securely.

8. Now place a 12 inch record on the turntable; turn the record support to the 12 inch position.

9. Press the "Start-Reject" button and let the Changer go through another cycle, watching carefully to make sure the needle comes down on the record at the proper point. If necessary, make minor readjustment.

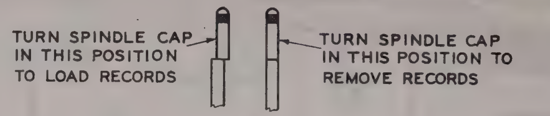

TURN SPINDLE CAP IN THIS POSITION TO LOAD RECORDS
TURN SPINDLE CAP IN THIS POSITION TO REMOVE RECORDS

FIG. 8

TO LINE UP RECORD PLATFORM

It is important that all points on the "lip" of the record support platform be equidistant from the center point of the spindle. This will assure that all points of the record will leave the platform at the same time. If the record support is too far out of alignment, the record would actually hang on the point nearest the spindle and fail to drop properly.

1. To check this alignment, turn the spindle-cap so it is in alignment with the rest of the spindle, which is the correct position for removing records. (See Fig. 8.)

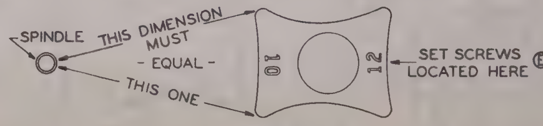
2. Turn the record support platform to the "10 inch record" position, making sure it is turned all the way to the stop.

3. Slip a standard 10 inch record over the spindle and check to make sure it clears the lip of the platform at all points. (See Fig. 9.)

4. If one point on the lip extends farther than the other, the position of the record support may be adjusted after loosening the two Bristo set screws (E), located directly under the numeral "12" on the record support. (See Fig. 9).

CAUTION: Make sure the eccentric selector cam, which is located under the base, is turned all the way to its stop. (See Fig. 4.)

TEST: After tightening the set screws, test the adjustment by running a 10 inch record through a complete cycle and check the point where the needle falls. If the needle misses the record by one inch, the record platform is 180 degrees out of line with the eccentric cam, and should be turned one-half turn without turning the cam.

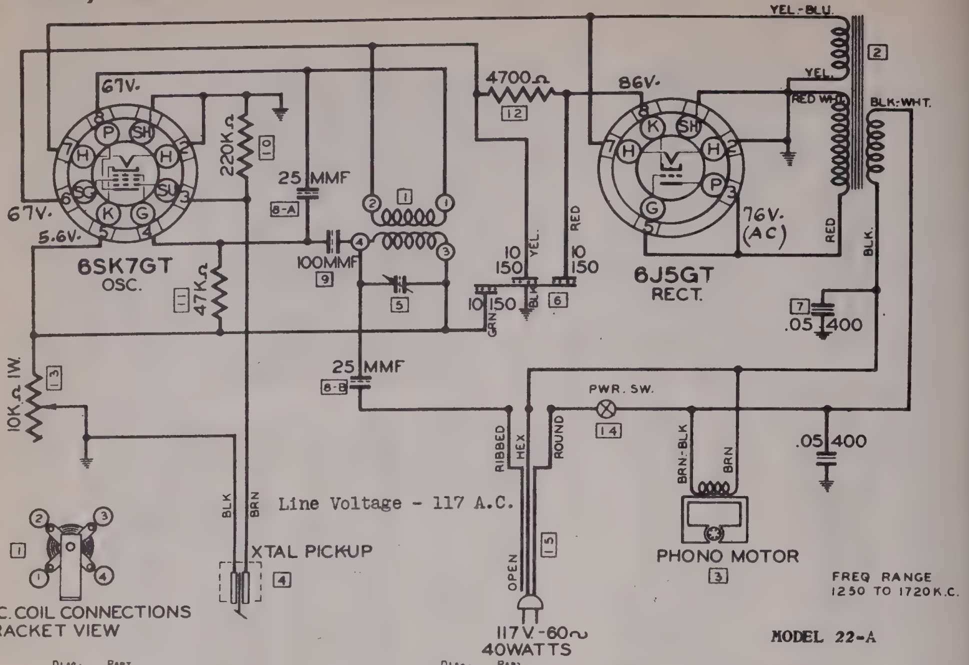


- RECORD SUPPORT -

FIG. 9

MODELS 22A,
23-RC, 23-RCW

GALVIN MFG. CO.



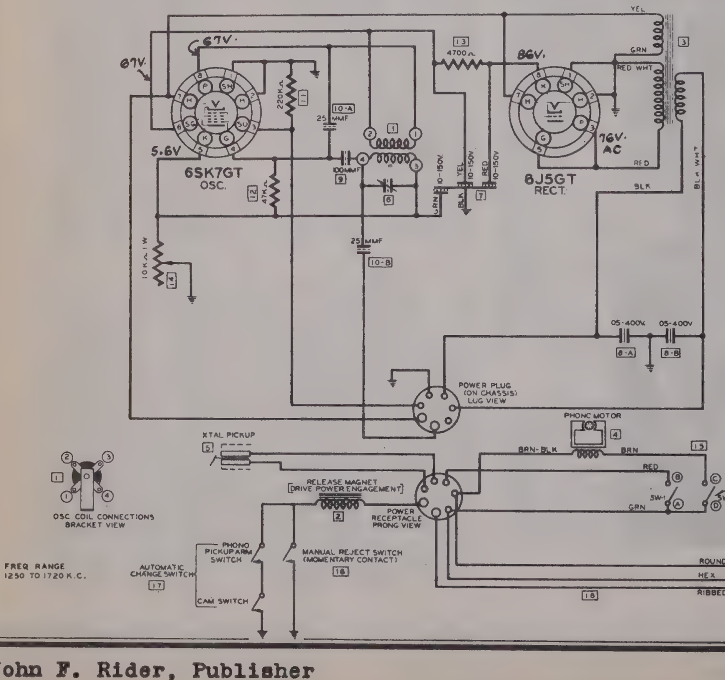
FREQ RANGE
1250 TO 1720 K.C.

MODEL 22-A

Diag. No.	Part No.	Description
1	24A20892	Osc. Coil (Ceramic) Org-Red
2	25A17449	Power Transformer
3	59X17433	Phono Motor (Complete Less Turn Table)
4	59B20888	Phono Pick-up
5	20A14502	Trimmer & Bracket
6	23A20887	Elect. Cond. & Strap (10-10-10/150V.)
7	8S9816	Tubular Condenser (.05-400V.)
8-A	21B6535	Molded Mica Condenser (25 mmf) 20%
8-B	21B6535	Molded Mica Condenser (25 mmf) 20%
9	21B6511	Molded Mica Condenser (100 mmf) 20%
10	6B6003	Carbon Resistor (220,000-1/3-20)N.I.
11	6B6020	Carbon Resistor (47,000-1/3-20)N.I.
12	6B6101	Carbon Resistor (4700-1/3-20)N.I.
13	18A20889	Variable Bias Control
14	40X11539	Slider Switch (SPST)
15	30K20395	Line Cord & Plug (3 Conductor)

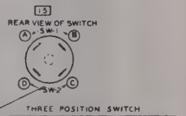
**FOR AUTOMATIC
RECORD-CHANGER**

SEE MODEL B2RC



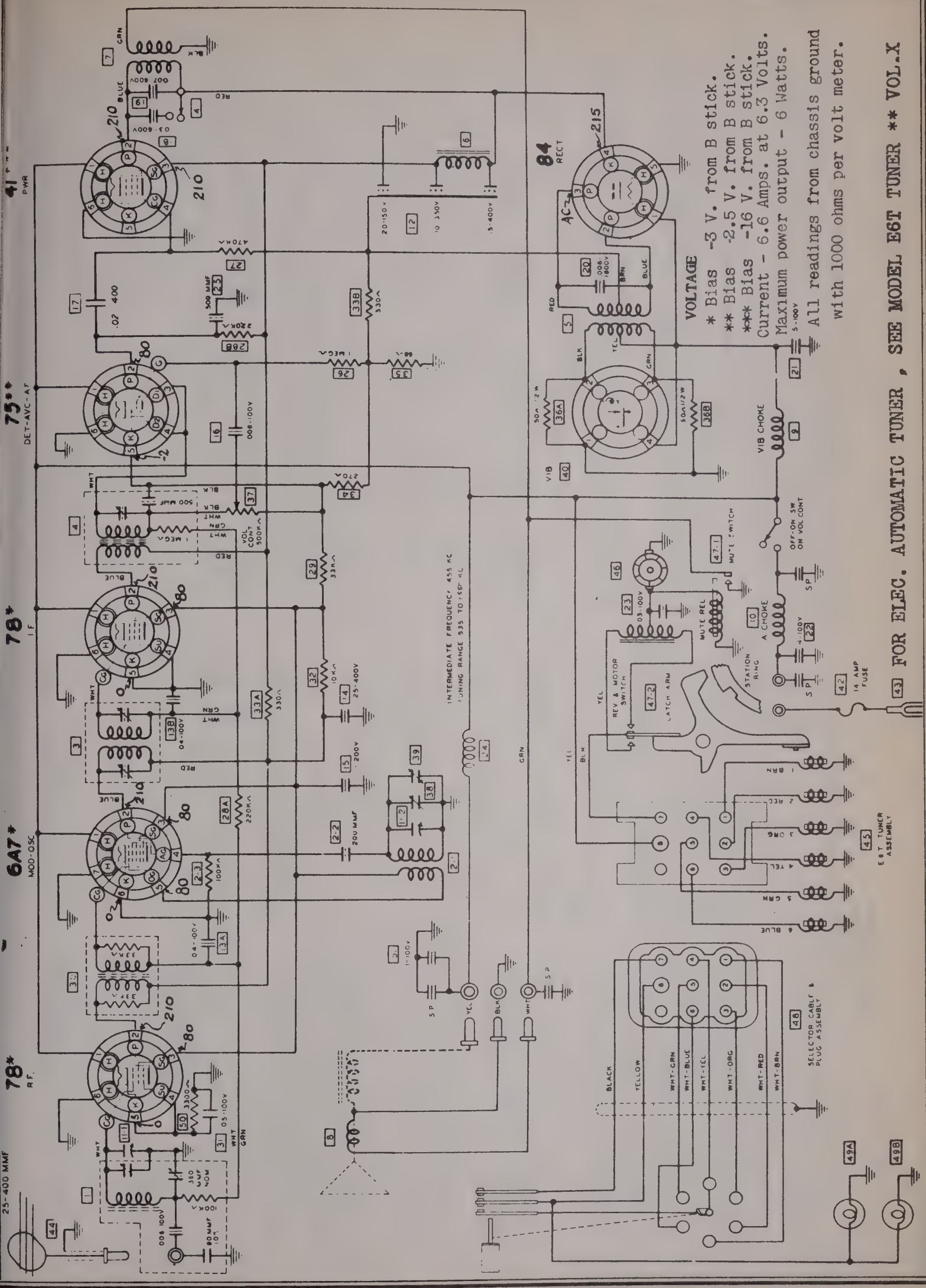
Diag. No.	Part No.	Description
1	24A20892	Osc. Coil Ceramic (Org-Red Cot.)
2	1B21560	Release Magnet Assembly
3	25B21402	Power Transformer
4	59B21404	Phono Motor & Mtg. Plate
5	59B21840	Phono Pick-up Arm (Less Mtg.)
6	20A14502	Trimmer & Bracket (.70 mmf)
7	23A20887	Elect. Cond. & Strap (10-10-10/150V.)
8-A	8S9816	Tubular Condenser (.05-400V.)
8-B	8S9816	Tubular Condenser (.05-400V.)
9	21B6511	Molded Mica Condenser (100 mmf) 20%
10-A	21B6535	Molded Mica Condenser (25 mmf) 20%
10-B	21B6535	Molded Mica Condenser (25 mmf) 20%
11	6B6003	Carbon Resistor (220,000-1/3-20)N.I.
12	6B6020	Carbon Resistor (47,000-1/3-20)N.I.
13	6B6101	Carbon Resistor (4700-1/3-20)N.I.
14	18A20889	Variable Bias Control
15	40A21482	Power Switch
16	40K21526	Push Switch (Momentary Contact)
17	1A21443	Record Changer Switch Assembly
18	30K21528	Line Cord & Plug (3 Conductor)

MODELS 23-RC & 23-RCW



THREE POSITION SWITCH

#1 POS	OFF	SW 1&2 OPEN
#2 POS	TUBES	SW 1 CLOSED SW 2 OPEN
#3 POS	MOTOR	SW 1&2 CLOSED



VOLTAGE

* Bias -3 V. from B stick.

** Bias -2.5 V. from B stick.

*** Bias -16 V. from B stick.

Current - 6.6 Amps. at 6.3 Volts.

Maximum power output - 6 Watts.

All readings from chassis ground with 1000 ohms per volt meter.

43 FOR ELEC. AUTOMATIC TUNER , SEE MODEL E6T TUNER ** VOL.X

©John F. Rider, Publisher

Model 550

ALIGNMENT PROCEDURE

Place the chassis on the service bench with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment. reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the R.F. coil can that is covered with Scotch Tape. The original adjustment, made in the factory should not be tampered with. (Fig. 1 below, shows all trimmer locations.)

I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A8GT) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.
2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.
3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.
4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

SETTING THE RANGE

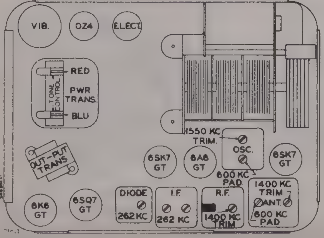
1. Connect the signal generator to the control grid of the R.F. tube (6SK7GT) using the same .1 MF condenser.
2. Set the signal generator at 1550 K.C. and with the condenser gang completely out of mesh adjust the 1550 K.C. oscillator trimmer to the point showing the highest output reading.
3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. oscillator padder for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

R.F. AND ANTENNA ALIGNMENT

NOTE: If the radio is to be operated on a Motorola Booster Antenna, a special dummy antenna Motorola part No. 1X18018 must be used in series with the lead from the signal generator to the antenna receptacle. Change the signal generator connection to the antenna lead, using the special dummy.

1. Set the signal generator at 4100 K.C. Turn the condenser gang until the signal is heard. Adjust the 1400 K.C. antenna trimmer in the antenna coil can for maximum output reading.



2. Adjust the 1400 K.C. R.F. trimmer in the R.F. coil can for maximum output reading.
3. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the 600 K.C. padder in the antenna coil can for the maximum output reading.
4. Recheck steps 1, 2, and 3, for accuracy.

Model 22-S Model 25-N

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

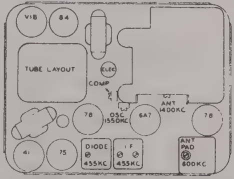


Figure 1--Trimmers

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the Signal Generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a special dummy, part No. 1X18018, in place of the .1MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Model 550

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READINGS **
42,000	262 K.C.	I.F. Grid	.1	.5 Meg	1.76
900	262 K.C.	Mod. Grid	.1	.5 Meg	1.76
950	600 K.C.	Mod. Grid	.1	.5 Meg	1.76
40	600 K.C.	R.F. Grid	.1	.5 Meg	1.76
6	600 K.C.	Ant. Lead	***	None	1.76

* For one watt output.
** Meter connected across voice coil.
1.76 volts equals 1 watt output for 3 ohm voice coil.
*** Use special dummy part No. 1X18018.
NOTE: If set is not used with a Motorola Booster antenna, substitute a 40 MMF condenser for the Special Dummy.

Model 22-S Model 25-N

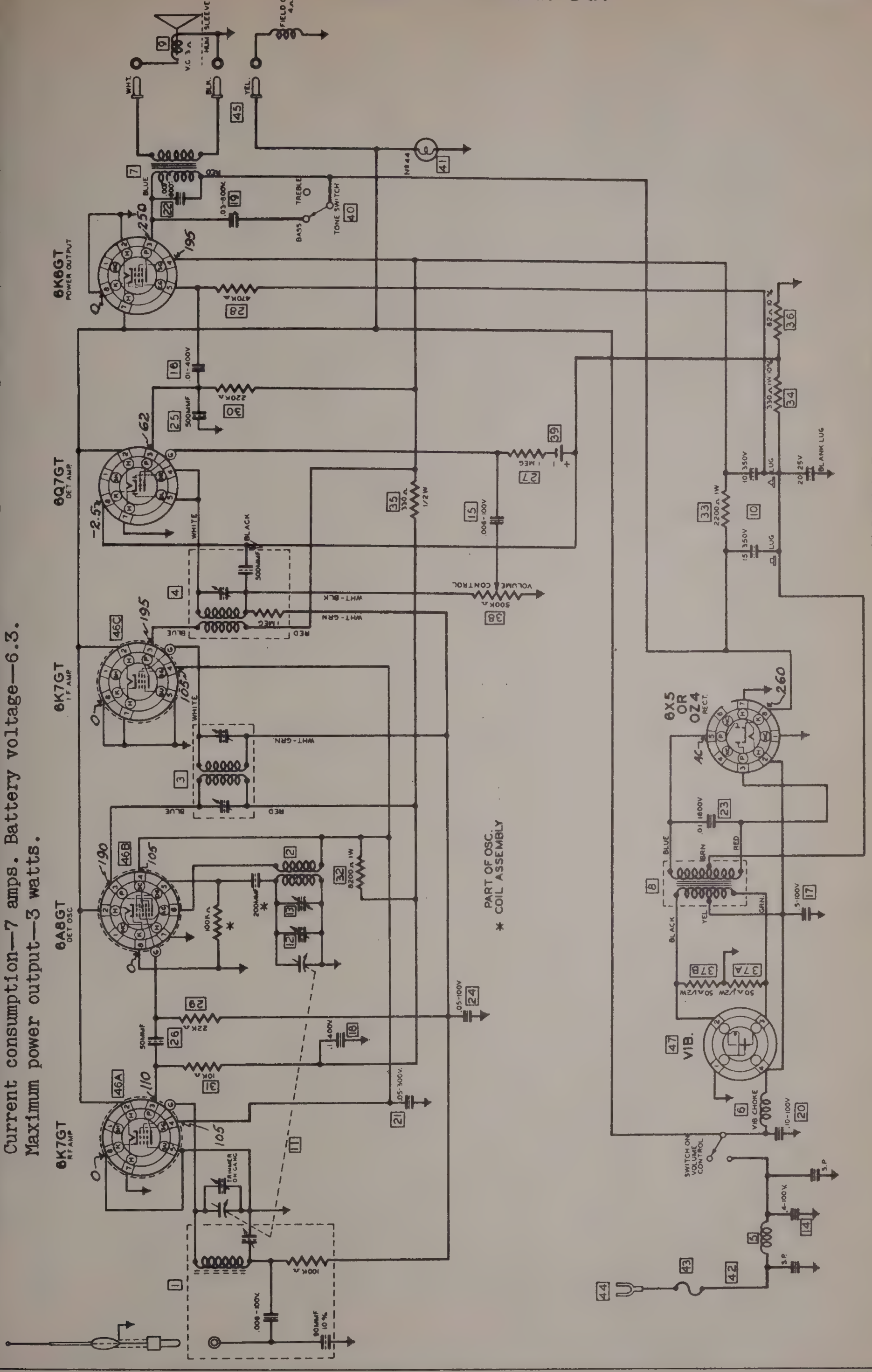
Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
10,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.74 Volts
150	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
200	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
50	600 K.C.	RF Grid	.1 MF	.5 Meg	1.74 Volts
5	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For one watt output. V.C. impedance - 3 ohms at 400 cycles.
** Meter connected across voice coil. 1.74 volts equals 1 watt output.

GALVIN MFG. CO.

MODEL 27-D-6

VOLTAGE: All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Current consumption—7 amps. Battery voltage—6.3.
Maximum power output—3 watts.



ALIGNMENT PROCEDURE: SAME AS MODEL 27-D.

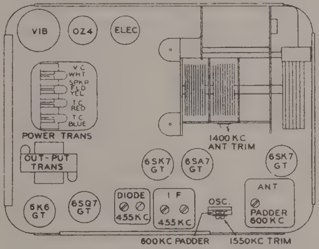
DIAL CORD INSTRUCTIONS: SAME AS MODEL 27-D.

Model No. 27-D-6

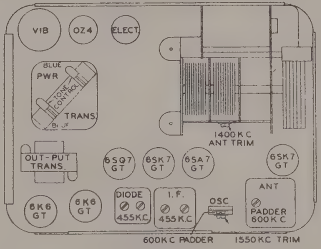
Models 34K-6 and 34K-7 For 1940 PACKARD

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Turn the volume control to maximum and leave it there throughout the alignment, reducing the signal generator output, if necessary.



Model 34-K6
Fig.1



Model 34-K7
Fig.2

I. F. ALIGNMENT

1. Connect the signal generator to the control grid of the oscillator tube and to chassis ground using a .1 Mfd. condenser in series with lead. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the two trimmers in the diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator, if necessary, to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. If the radio is to be operated on a Motorola Booster Antenna, a special dummy antenna Motorola part No. 1X18018 must be used in series with the lead from the signal generator to the antenna receptacle. Change the signal generator connection to the antenna lead, using the special dummy.

2. Set the signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

3. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

4. Set the signal generator at 600 K.C. and turn the condenser gang until the dial pointer reads 600 K.C. Adjust the oscillator padder to point giving highest output reading.

5. Leaving the signal generator set at 600 K.C., adjust the antenna padder located in the copper antenna coil can to the point giving the highest output reading.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the Signal Generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M ohm resistor connected as leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a special dummy, part No. 1X18018, in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same type, due to difference of tube characteristics, etc.

34K6 AVERAGE MICROVOLT INPUT *	34K7 AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READINGS **
28,000	13,000	455 K.C.	I.F. Grid	.1	.5 Meg	1.76
900	680	455 K.C.	Mod. Grid	.1	.5 Meg	1.76
1,000	780	600 K.C.	Mod. Grid	.1	.5 Meg	1.76
100	60	600 K.C.	R.F. Grid	.1	.5 Meg	1.76
5	3	600 K.C.	Ant. Lead	***	None	1.76

* For one watt output.
** Meter connected across voice coil.
1.76 volts equals 1 watt output for 3 ohm voice coil.
*** Use special dummy part No. 1X18018 or

NOTE: If set is not used with a Motorola Booster antenna, substitute a 40 MMF condenser for the Special Dummy.

Model No. 27-D-6

Specifically Designed to be Installed in 1940

CHRYSLER DESOTO DODGE PLYMOUTH

SENSITIVITY AND STAGE GAIN MEASUREMENTS

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

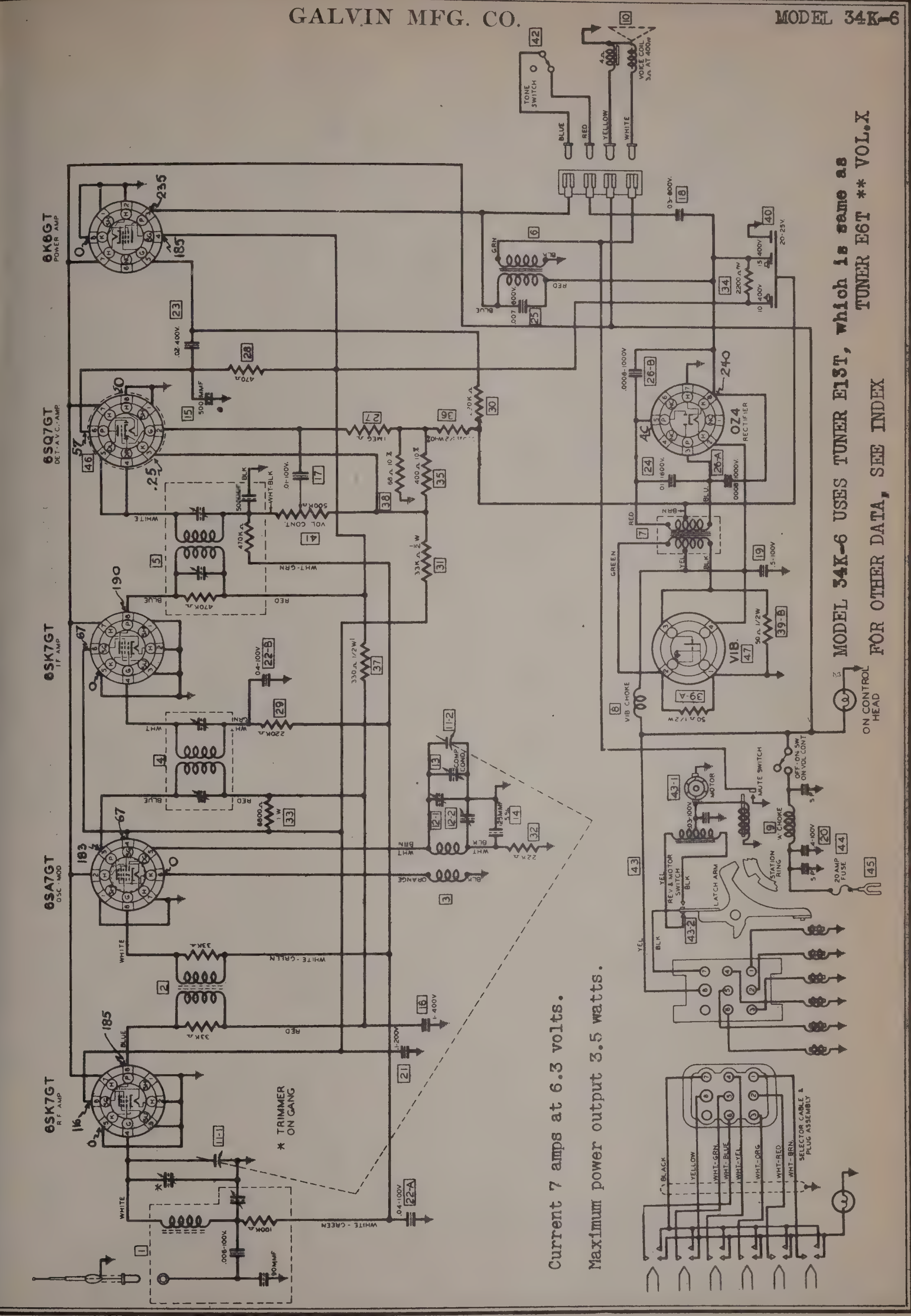
When measuring over-all sensitivity at the antenna terminal, use a special dummy part #1X18018 in place of the .1 MF.*** It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
8600	455 K.C.	I.F. Grid	.1 MF	.5 Meg	1.76 Volts
180	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
220	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
80	600 K.C.	R.F. Grid	.1 MF	.5 Meg	1.76 Volts
6	600 K.C.	Ant. Lead	***	None	1.76 Volts

** Meter connected across voice coil
1.76 Volts equals 1 watt output for 3 ohm voice coil
* For one watt output
*** Use special dummy part No.1X18018, or M434B booster coil Part No.17908 in series with 25 MMF cond.

GALVIN MFG. CO.

MODEL 34K-6



Current 7 amps at 6.3 volts.

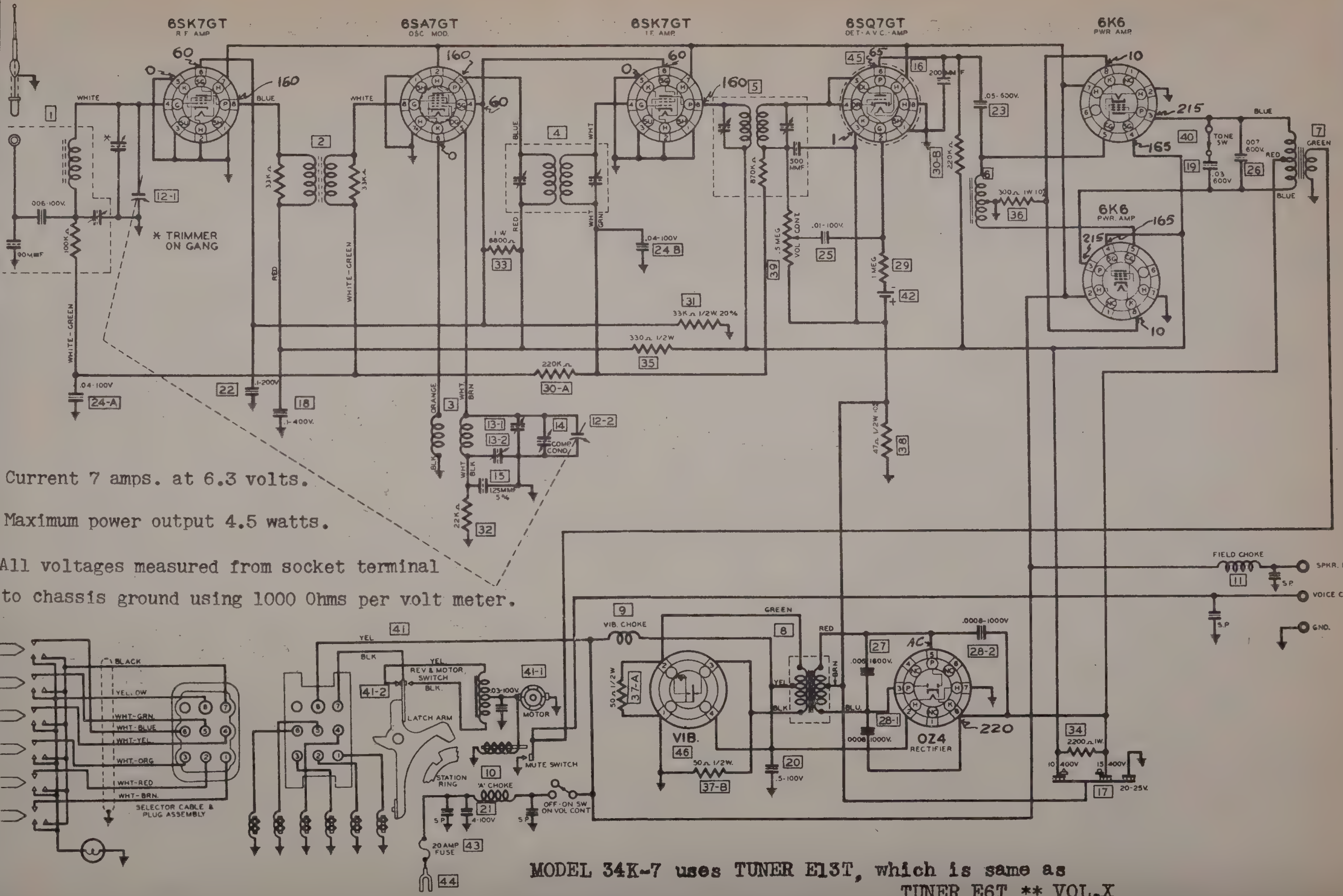
Maximum power output 3.5 watts.

MODEL 34K-6 USES TUNER E13T, which is same as TUNER E6T ** VOL.X

FOR OTHER DATA, SEE INDEX

MODEL 34K-7

GALVIN MFG. CO.



Current 7 amps. at 6.3 volts.

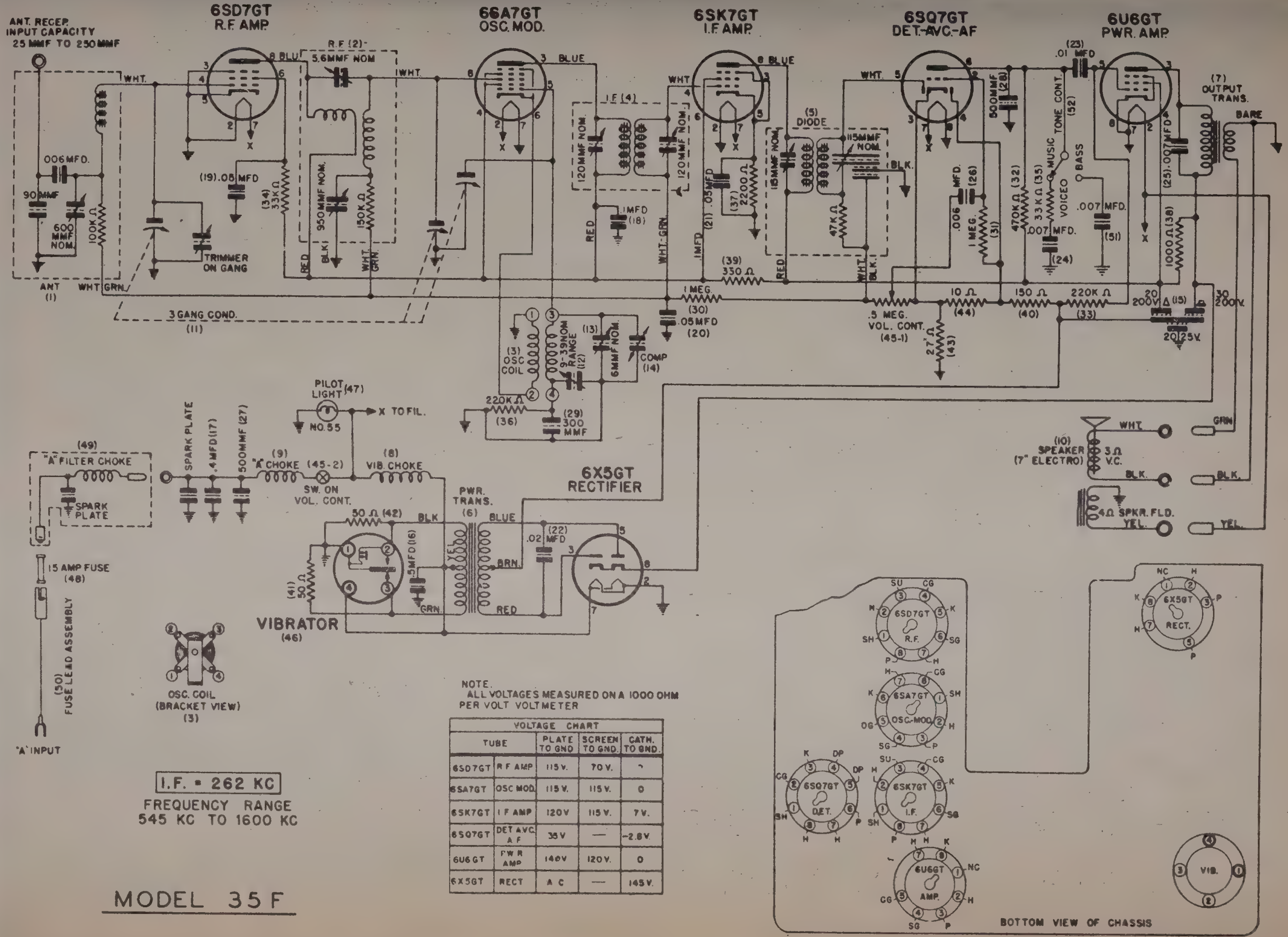
Maximum power output 4.5 watts.

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.

MODEL 34K-7 uses TUNER E13T, which is same as TUNER E6T ** VOL.X

FOR OTHER DATA, SEE INDEX

GALVIN MFG. CO.



NOTE.
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R F AMP	115 V.	70 V.	1
6SA7GT	OSC MOD	115 V.	115 V.	0
6SK7GT	I F AMP	120V	115 V.	7 V.
6SQ7GT	DET AVC A F	35 V	—	-2.8 V.
6U6GT	PWR AMP	140V	120 V.	0
6X5GT	RECT	A C	—	145 V.

I.F. = 262 KC

FREQUENCY RANGE
545 KC TO 1600 KC

MODEL 35 F

Model 35-F
SPECIFICALLY DESIGNED TO INSTALL IN 1941 FORD AND MERCURY

ALIGNMENT CHART

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	Special Dummy	7	1400 K.C.
5	1400 K.C.	*	Special Dummy	8	1400 K.C.
6	600 K.C.	*	Special Dummy	9	600 K.C.

* Use special dummy Part No. 1X26767 or Booster Coil Part No. 24K26751 in series with a 35 Mmf. condenser.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
22,250	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
700	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
710	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
13	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set at Maximum   Tone Control Set At Voice
* 1 Watt = 1.74 Volts ** Output meter connected across voice coil.

*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24K26751 in series with a 35 Mmf. condenser.

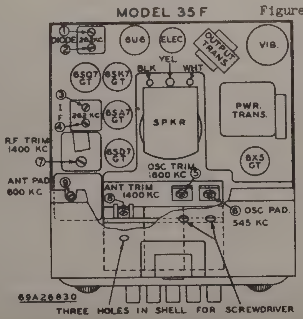


Figure 1

DIAL CORD INSTRUCTIONS

TUNING CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove the broken string.
3. Turn the condenser gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 25 inches long.
5. Thread one end of cord through hole (X) in drive pulley and with an ordinary paper clip fasten to tuning control bracket so that cord will stay in place.
6. In a clockwise direction, wind cord one half turn around drive pulley and up to tuning shaft. (See Fig. 2).
7. Route cord 7 turns around tuning shaft as shown in Fig. 2 and down to drive pulley.
8. Continue in a clockwise direction, one full turn to hole (X).

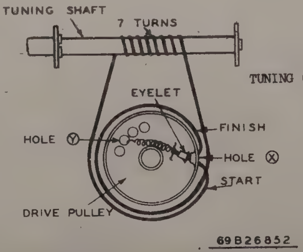
(CONT. IN NEXT COL.)

TUNING CORD—Continued

9. Thread the cord ends (inside pulley) through eyelet (Part No. 5S7824) and knot cord ends together.
10. Fasten one end of spring (Part No. 41A14759) to cord and the other end to hole (Y) in drive pulley.
11. Cut off surplus cord and place a drop of shellac on cord knot.

POINTER CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove broken string.
3. Set condenser gang to fully closed position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord through hole (C) in condenser pulley and with an ordinary paper clip fasten it to the tuner bracket to hold in place. (See Fig. 3).
6. In a clockwise direction run cord to idler pulley No. 1.
7. Route cord around idler pulley No. 1, as shown in Fig. 3, and then across chassis to idler pulley No. 2.
8. Continue around idler pulley No. 2 as shown in Fig. 3 and back across chassis to idler pulley No. 3.
9. Route cord around idler pulley No. 3 and in a clockwise direction around condenser pulley to hole (C).
10. Remove the paper clip from other end of cord and knot the two cord ends together inside of condenser pulley. Fasten one end of tension spring (Part No. 41A11091 to cord and other end to hole (D) in the condenser pulley. Place a drop of shellac on cord knot.
11. Cut off surplus cord and replace pointer.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on cord. Fasten pointer to cord with a drop of shellac.



TUNING CORD

Figure 2

POINTER CORD

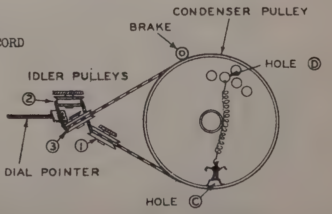
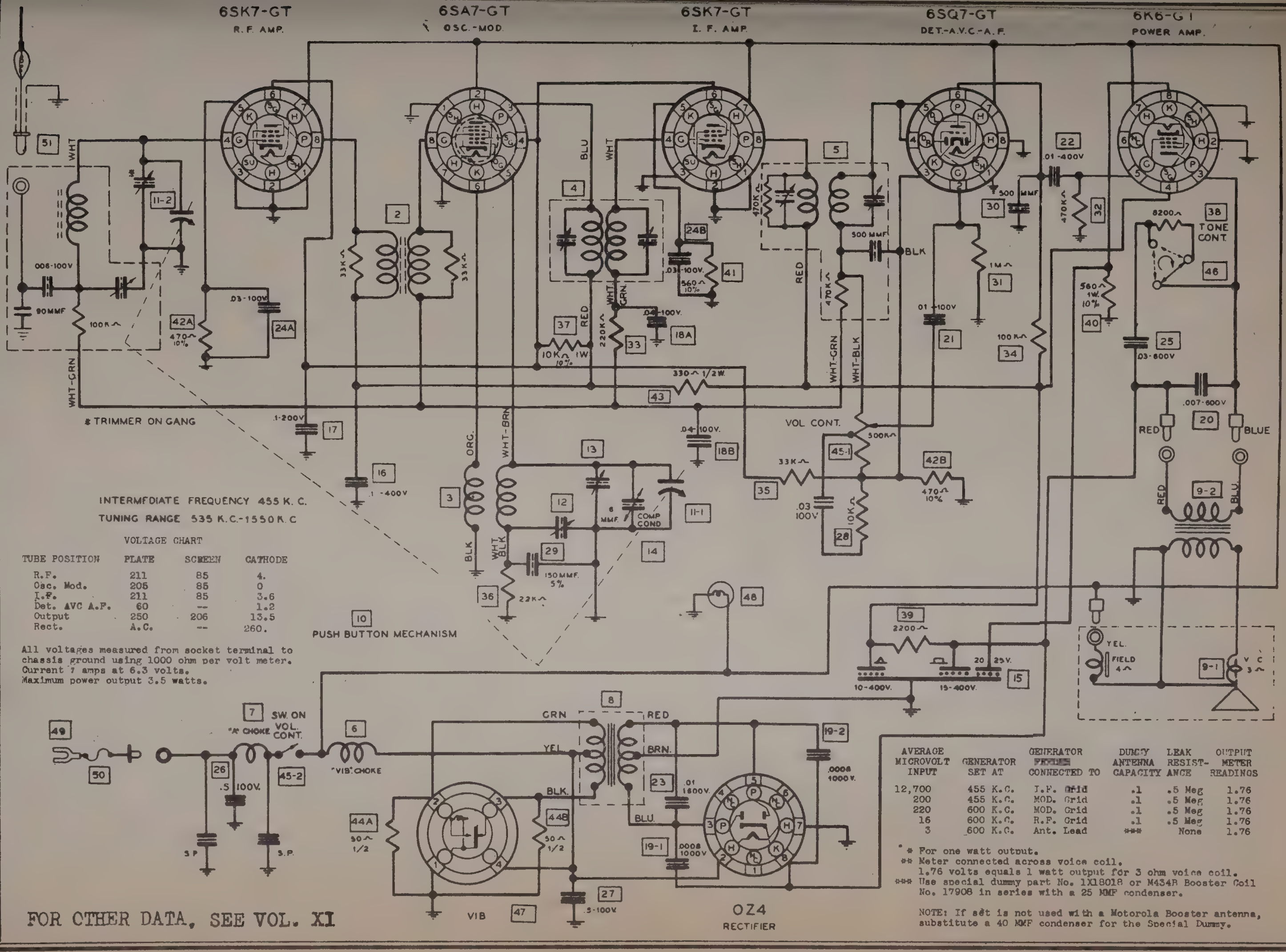


Figure 3

MODEL 35N

GALVIN MFG. CO.



INTERMEDIATE FREQUENCY 455 K. C.

TUNING RANGE 535 K.C.-1550 K.C

VOLTAGE CHART

TUBE POSITION	PLATE	SCREEN	CATHODE
R.F.	211	85	4.
Osc. Mod.	205	85	0
I.F.	211	85	3.6
Det. AVC A.F.	60	--	1.2
Output	250	206	13.5
Rect.	A.C.	--	260.

All voltages measured from socket terminal to chassis ground using 1000 ohm per volt meter.
Current 7 amps at 6.3 volts.
Maximum power output 3.5 watts.

AVERAGE MICROVOLT INPUT	GENERATOR SET AT	GENERATOR [illegible] CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READINGS
12,700	455 K.C.	I.F. Grid	.1	.5 Meg	1.76
200	455 K.C.	MOD. Grid	.1	.5 Meg	1.76
220	600 K.C.	MOD. Grid	.1	.5 Meg	1.76
16	600 K.C.	R.F. Grid	.1	.5 Meg	1.76
3	600 K.C.	Ant. Lead	***	None	1.76

* For one watt output.

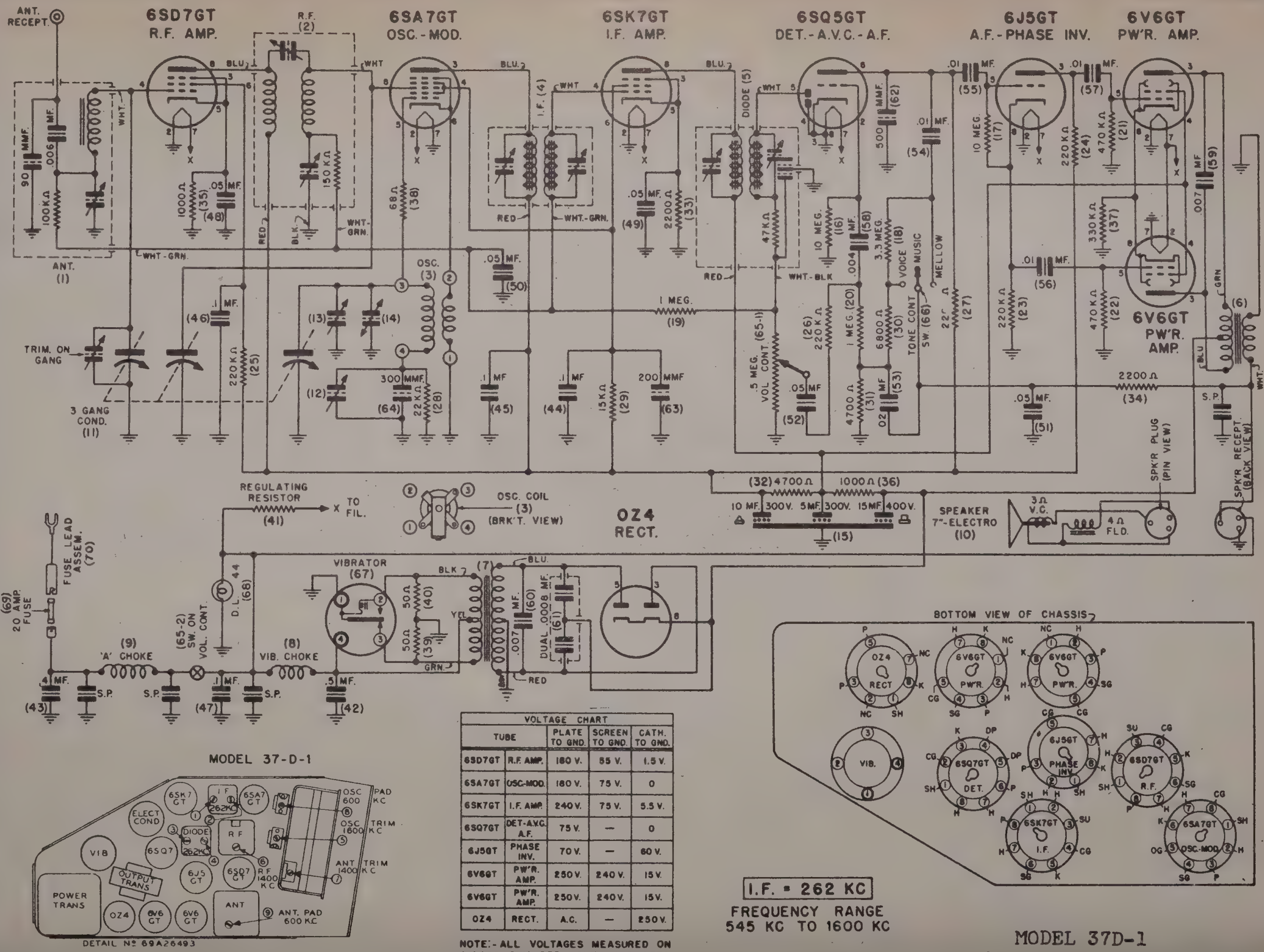
** Meter connected across voice coil.
1.76 volts equals 1 watt output for 3 ohm voice coil.

*** Use special dummy part No. 1X18018 or M434R Booster Coil No. 17908 in series with a 25 MMF condenser.

NOTE: If set is not used with a Motorola Booster antenna, substitute a 40 MMF condenser for the Special Dummy.

FOR OTHER DATA, SEE VOL. XI

GALVIN MFG. CO.



VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	180 V.	55 V.	1.5 V.
6SA7GT	OSC-MOD.	180 V.	75 V.	0
6SK7GT	I.F. AMP.	240 V.	75 V.	5.5 V.
6SQ7GT	DET-A.V.C. A.F.	75 V.	—	0
6J5GT	PHASE INV.	70 V.	—	60 V.
6V6GT	PW'R. AMP.	250 V.	240 V.	15 V.
6V6GT	PW'R. AMP.	250 V.	240 V.	15 V.
0Z4	RECT.	A.C.	—	250 V.

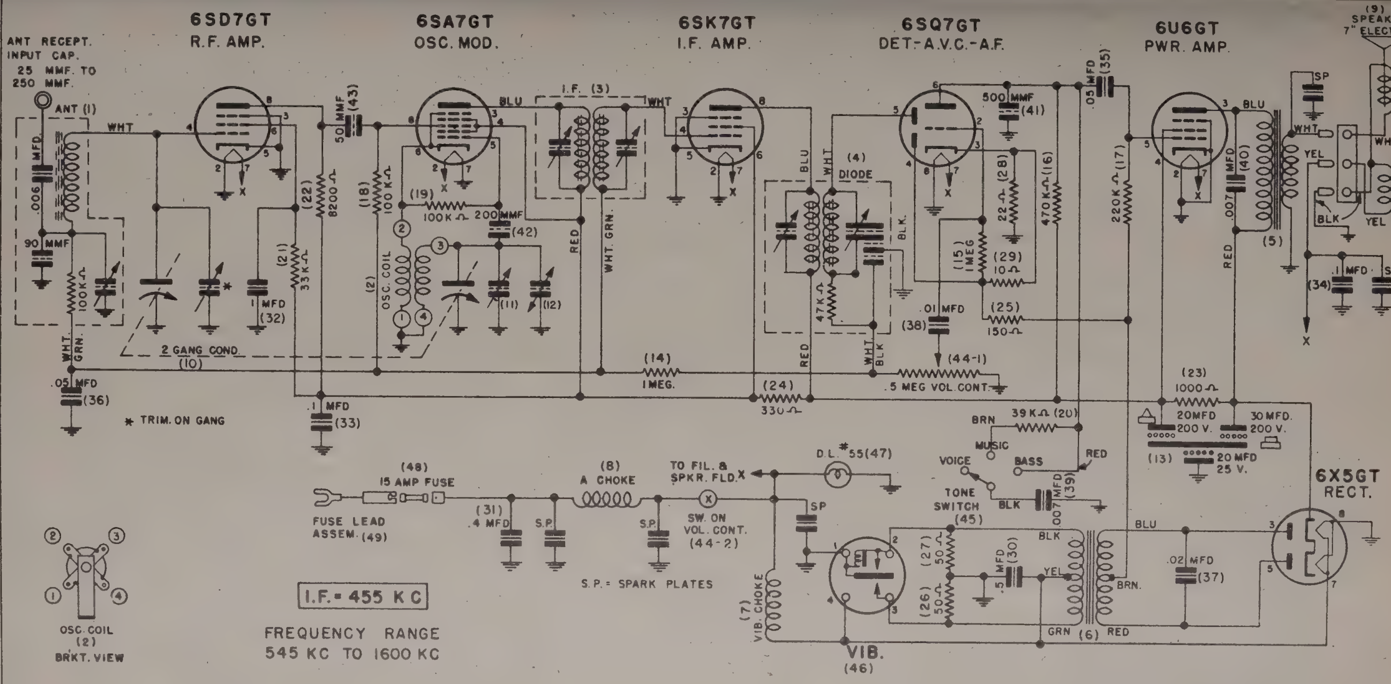
NOTE:- ALL VOLTAGES MEASURED ON A 1,000 OHM PER VOLT VOLTMETER.
S.P. = SPARK PLATE.

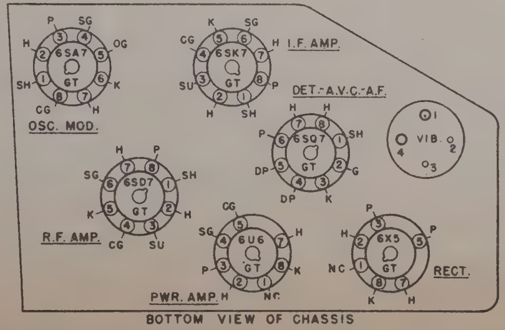
I.F. = 262 KC

FREQUENCY RANGE
545 KC TO 1600 KC

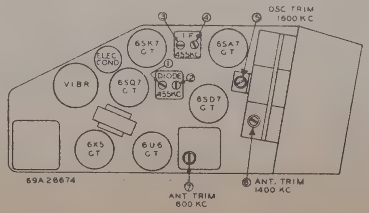
MODEL 37D-1

GALVIN MFG. CO.





MODEL 37D-2



VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	70 V.	60 V.	0
6SA7GT	OSC MOD.	100 V.	100 V.	0
6SK7GT	I.F. AMP.	108 V.	100 V.	0
6SQ7GT	DET. A.V.C.	35 V.	—	1.35 V.
6U6GT	PWR. AMP.	135 V.	105 V.	0
6X5GT	RECT.	A.C.	—	140 V

ALL MEASUREMENTS MADE WITH A 1000 OHM PER VOLT METER

For 1941 PLYMOUTH, DODGE, DE SOTO and CHRYSLER

*SENSITIVITY AND STAGE GAIN MEASUREMENTS - MODEL 37D-1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
30,000	262 K.C.	I.F. Grid	.1 Mmf.	.5 Meg.	1.74 Volts
470	262 K.C.	Mod. Grid	.1 MF	.5 Meg.	1.74 Volts
550	600 K.C.	Mod. Grid	.1 MF	.5 Meg.	1.74 Volts
13	600 K.C.	R.F. Grid	.1 MF	.5 Meg.	1.74 Volts
6	600 K.C.	Ant. Lead	***	None	1.74 Volts

Volume Control Set at Maximum Tone Control Set At Music
* 1 Watt = 1.74 Volts ** Output meter connected across voice coil.
*** Use Special Dummy Part No.1X26767 or Booster Coil Part No.24K26751 in series with a 35 MMF condenser.

SENSITIVITY AND STAGE GAIN MEASUREMENTS - MODEL 37D-2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
9,500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
250	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
300	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
95	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
14	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set at Maximum Tone Control Set At Voice
* 1 Watt = 1.74 Volts. ** Output meter connected across voice coil.
*** Use Special Dummy Part No.1X26767 or Booster Coil Part No.24K26751 in series with a 35 MMF condenser.

TO RESTRING POINTER CORD - Models 37D-1 and 37D-2

Remove push-buttons, tone switch assembly, (tone switch on 37D-1 only) and control head from chassis. (This requires removal of three (two on 37D-2) screws from the right hand side of the control head, one from the left hand side (37D-1 only) of the control head, and a "C" washer from the volume control shaft.)
Cut a 30 inch length of 18 lb. silk fish cord.
Lay control head on service bench and route cord through the two eyelet holes and around idler pulley, exactly as shown in Fig. 3.
Adjust cord so both ends are approximately of equal length, and clip to control head as shown in Fig. 3.
Set pointer at approximately 550 K.C. on dial scale and interlace cord on pointer clips. Fasten to pointer with a drop of shellac or household cement.
Mount control head and tone switch (tone switch on 37D-1 only) back on chassis. Replace "C" washer on volume control shaft.
Turn gang to fully meshed position. This will place hole in condenser pulley at the top.
Remove paper clip from cord "A" and fish end of cord under brake shoe and around condenser pulley 1/2 turn to hole (C). Thread end of cord through hole (C) and clip to control head. (See Fig. 4).
Remove paper clip from cord (B) and route cord the short distance from idler pulley to the hole (C) in condenser pulley.
Tie both ends of cord together inside pulley; then tie in tension spring (Part No. 41A11091). Hook other end of spring in hole (D). Cut off surplus cord.
Place a drop of shellac or household cement on cord knot.
Tune in a station of known frequency and adjust dial pointer to correct dial reading by loosening the screw (S) in the drive pulley, (See Fig. 5) and moving pointer pulley. Tighten screw securely after adjustment.
Reassemble in housing.

ALIGNMENT CHART MODEL 37D-1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	1400 K.C.	.1 Mfd.	R.F. Grid	6	1400 K.C.
4	1400 K.C.	*	To special dummy	7	1400 K.C.
5	600 K.C.	*	To special dummy	8	600 K.C.
6	600 K.C.	*	To special dummy	9	600 K.C.

* Use special dummy part No. 1X26767, or Booster Coil Part No. 24K26751, in series with a 35 Mmf. condenser.

ALIGNMENT CHART MODEL 37D-2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1600 K.C.	.1	Osc.-Mod. Grid	5	1600 K.C.
3	1400 K.C.	*	To special dummy	6	1400 K.C.
4	600 K.C.	*	To special dummy	7	600 K.C.

* Use special dummy part No. 1X26767 or Booster Coil Part No. 24K26751 in series with a 35 Mmf. condenser.

Fig. 4

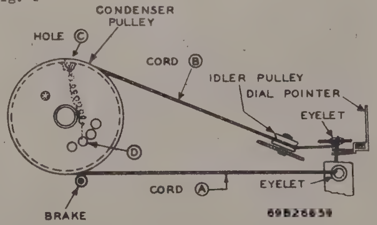
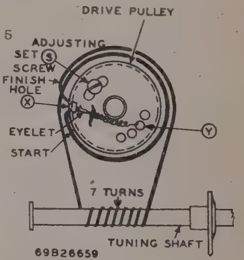


Fig. 5



TO RESTRING TUNING CORD - Model 37D-1 & 37D-2

Remove the chassis from the housing, and place on service bench with the tubes up.
Remove the broken string.
Turn condenser gang to fully meshed position.
Cut a length of 30 lb. silk fish cord 25 inches long.
Thread one end of cord through hole (X) in drive pulley, and with an ordinary paper clip fasten to volume control bracket so that cord will stay in place.
In a counter-clockwise direction, wind cord one full turn around drive pulley and down to tuning shaft. (See Fig. 5).
Wind cord in a clockwise direction seven turns around tuning shaft and up to drive pulley.
Continue in a counter-clockwise direction one half turn to hole (X).
Thread cord through hole (X) and then thread both ends through eyelet (Part No. 5S7824).
Knot the two ends of cord together and fasten one end of spring (Part No.41A14759) to cord and other end to hole (Y) in drive pulley.
Place a drop of shellac or household cement on cord knot.
Pinch eyelet on cord with a pair of pliers.

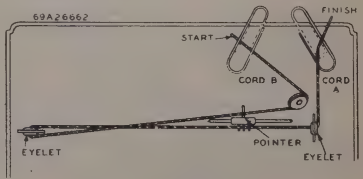
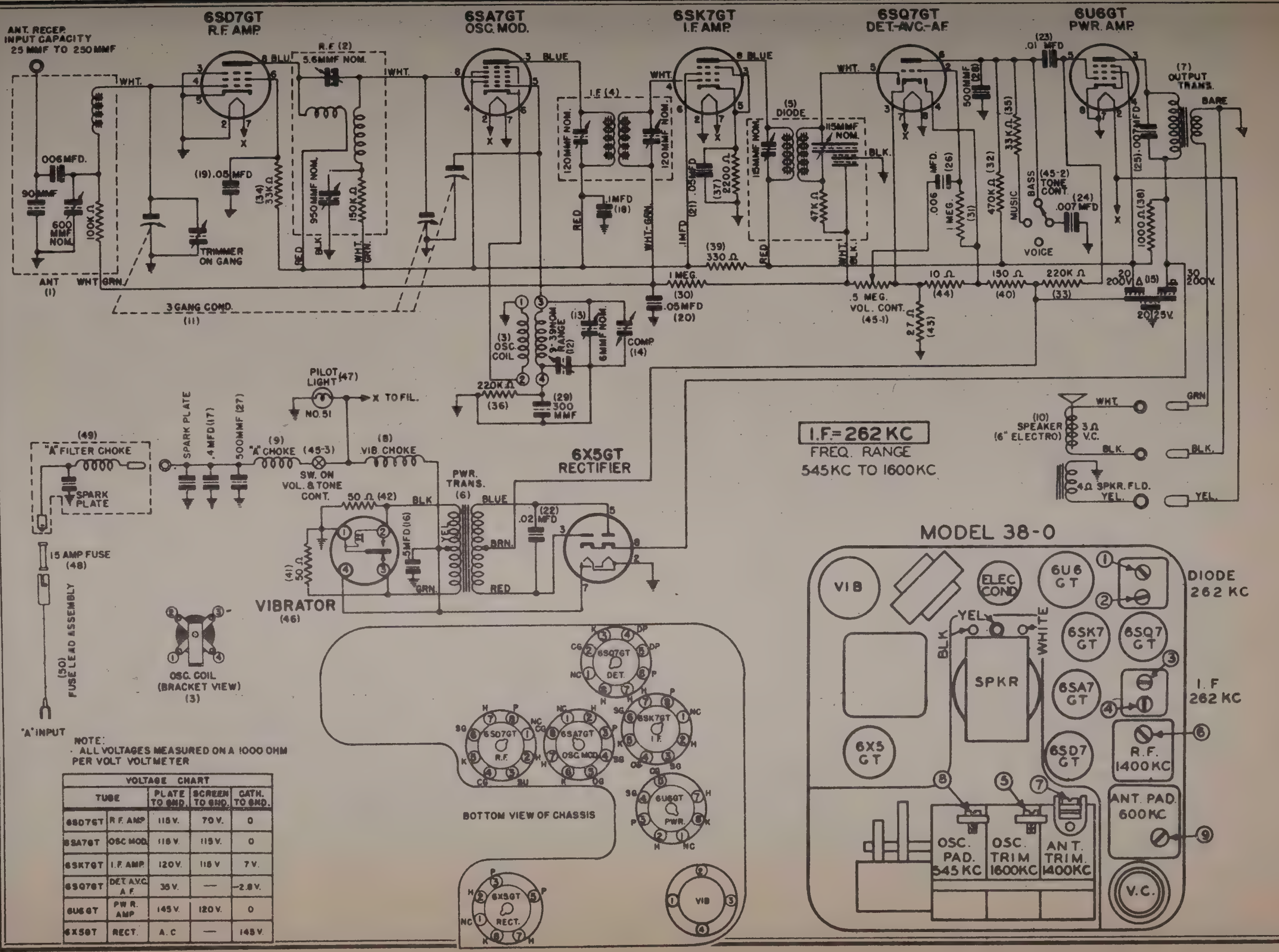


Fig. 3

GALVIN MFG. CO.



NOTE:
- ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP	115 V.	70 V.	0
6SA7GT	OSC MOD	118 V.	115 V.	0
6SK7GT	I.F. AMP.	120 V.	118 V	7 V.
6SQ7GT	DET A.V.C. A.F.	35 V.	—	-2.8 V.
6U6GT	PWR. AMP	145 V.	120 V.	0
6X5GT	RECT.	A.C	—	145 V.

Model 38-0
Specifically Designed to be Installed in 1941
OLDSMOBILE

TUNING CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove the broken string.
3. Turn the condenser gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 25 inches long.
5. Thread one end of cord through Slot (B) in drive pulley and with an ordinary paper clip fasten to tuning control bracket so that cord will stay in place.
6. In a clockwise direction, wind cord one full turn around drive pulley and up to tuning shaft. (See Fig. 2).
7. Route cord 7 turns around tuning shaft as shown in Fig. 2 and down to drive pulley.
8. Continue in a clockwise direction around drive pulley and through slot (B).
9. Slip the two cord ends through eyelet (Part No.5S7824) inside of pulley.
10. Knot the two cord ends together and fasten to one end of spring (Part No. 41A14759). Hook other end of spring to hole (C) in drive pulley.
11. With a pair of pliers pinch eyelet on cord and place drop of shellac on cord knot.

POINTER CORD

1. Remove the chassis from housing and place on service bench.
2. Remove broken string.
3. Set condenser gang to fully open position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord through slot (A) in condenser pulley and with an ordinary paper clip fasten it to the tuning shaft bracket to hold in place. (See Fig. 3).
6. In a clockwise direction run cord around condenser pulley, under brake shoe and over to idler pulley No. 3 and around it in a counter-clockwise direction.
7. Route string across chassis to idler pulley No. 2, and around it in a counter-clockwise direction.
8. Route cord back across chassis and down over idler pulley No. 1.
9. Route cord down and around condenser pulley one-half turn to slot (A).
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of drive pulley and fasten one end of spring (Part No.41A11091) to cord and the other end to hook in condenser pulley.
11. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string.
13. Fasten pointer to string with a drop of shellac. Place a drop of shellac on cord knot.

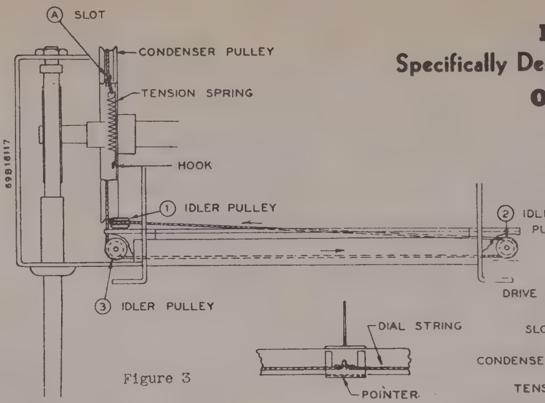


Figure 3

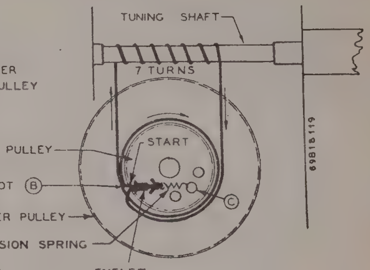


Figure 2

ALIGNMENT CHART MODEL 38-0

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	1400 K.C.	.1 Mfd.	R.F. Grid	6	1400 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	545 K.C.	*	To Special Dummy	8	545 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

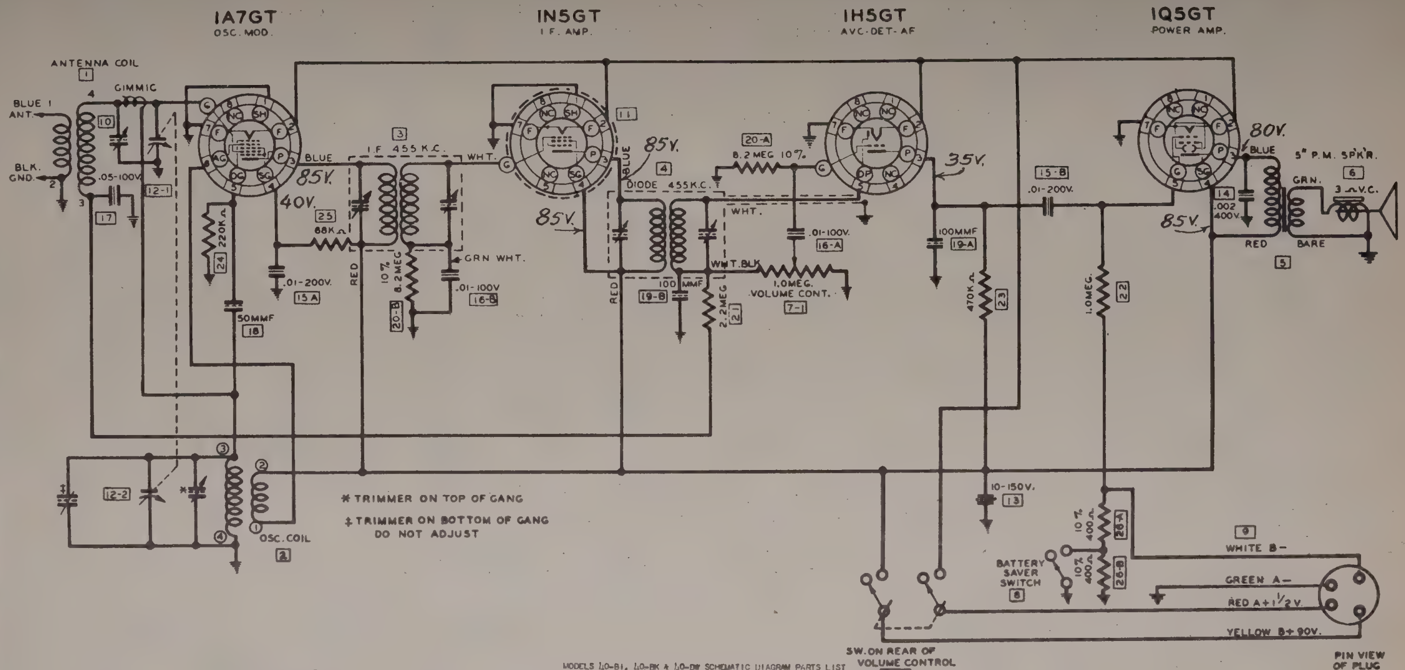
* Use special dummy Part No.1X26767 or booster coil Part No.24K26751 in series with a 35 Mmf. condenser.

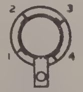
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
22,750	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg	1.74
700	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
700	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
13	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

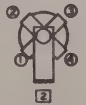
Volume Control Set at Maximum.
* 1 Watt = 1.74 Volts.

Tone Control Set At Voice.
** Output meter connected across voice coil.
*** Use special dummy Part No.1X26767 or booster coil part No.24K26751 in series with a 35 Mmf. condenser.





BOTTOM VIEW OF ANT. COIL



2 BRACKET VIEW OF OSC COIL

MODELS 40-B1, 40-BK & 40-BW SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	24A19975	Antenna Coil
2	24A16227	Osc. Coil (Ceramic) White Dot
3	1X21342	I.F. Coil & Shield Assembly
4	1X21338	Diode Coil & Shield Assembly.
5	25A15786	Output Transformer
6	50B19976	Speaker (5" P.M.)
7	10A19979	Volume Control & Switch (1. meg.)
8	40A15939	Battery Saver Switch
9	1X12179	Battery Cable Assembly (5 feet)
10	20K20911	Trimmer & Bracket (RH)
11	26X14760	Tube Shield (Bantam)
12	1X20506	Gang & Pulley Assembly
13	23A14727	Electrolytic Condenser (10-150V.)
14	8S9824	Tubular Condenser (.002-400V.)
15-A	8S9825	Tubular Condenser (.01-200V.)
15-B	8S9825	Tubular Condenser (.01-200V.)
16-A	8S9801	Tubular Condenser (.01-100V.)
16-B	8S9801	Tubular Condenser (.01-100V.)
17	8S9805	Tubular Condenser (.05-100V.)
18	2106503	Molded Mica Cond. (50 mmf) 20%
19-A	2106511	Molded Mica Cond. (100 mmf) 20%
19-B	2106511	Molded Mica Cond. (100 mmf) 20%
20-A	6B6297	Carbon Resistor (8.2 meg-1/3-10)N.I.
20-B	6B6297	Carbon Resistor (8.2 meg-1/3-10)N.I.
21	6B6049	Carbon Resistor (2.2 meg-1/3-20)N.I.
22	6B6071	Carbon Resistor (1.0 meg-1/3-20)N.I.
23	6B6011	Carbon Resistor (470,000-1/3-20)N.I.
24	6B6003	Carbon Resistor (220,000-1/3-20)N.I.
25	6B6125	Carbon Resistor (68,000-1/3-20)N.I.
26-A	6B6025	Carbon Resistor (400-1/3-10)N.I.
26-B	6B6025	Carbon Resistor (400-1/3-10)N.I.
27	48X21257	Battery Pack (1-1/2V. "A" / 90 V. "B")

Eveready 748
Raytheon #AB 82
Burgess #17-GD-60
General #60DL-11L

Motorola
— Model 40BK —
— Model 40BW —
— Model 40B1 —

©John F. Rider, Publisher

MODELS 40-B1, 40-BK, 40-BW, 40-40B, 52XAH1, B-150

GALVIN MFG. CO.

ALIGNMENT CHART **MODELS 40-40B, 40-B1, 40-BK, 40-BW**

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmer No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod. Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	Antenna Lead	6	1400 K.C.

Volume Control Set at Maximum.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3600	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
105	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
120	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
22	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

** Output Meter Connected Across Voice Coil.

ALIGNMENT CHART **MODEL 52. XAH1**

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	5	1720 K.C.
3	600 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	6	600 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	18 M.C.	400 Ohm	S.W.	External Antenna Terminal	8	18 M.C.
6	16 M.C.	400 Ohm	S.W.	External Antenna Terminal	9	16 M.C.

Volume Control set at maximum.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input **	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3400	455	I.F. Grid	.1 Mfd.	.5 Meg.	.38
40	455	Mod. Grid	.1 Mfd.	.5 Meg.	.38
45	600	Mod. Grid	.1 Mfd.	.5 Meg.	.38
20	600	Antenna Terminal	200 Mmf.	None	.38

Volume Control set at maximum.
* .05 Watts .38 Volts.

** Output meter connected across voice coil.

ALIGNMENT CHART **MODEL B 150**

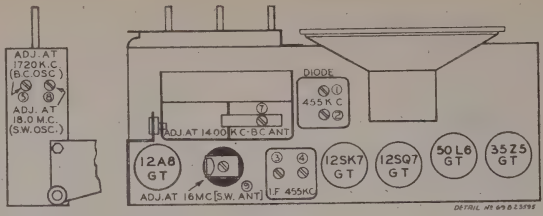
Operations In Order	Tuning Dial Set At	Dummy Antenna	Generator Connected To	Adjust. Trimmers No.	Generator Set At
1	Minimum 1600 K.C.	.1 Mfd	Osc-Mod. Grid	1-2-3	455 K.C.
2	Minimum 1600 K.C.	50 Mmf	Antenna Terminal	4	1600 K.C.
3	1200 K.C.	50 Mmf	Antenna Terminal	5	1200 K.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolts Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4500	455	I.F. Grid	.1 Mfd.	.5 Meg	.32 Volts
85	455	Mod. Grid	.1 Mfd.	.5 Meg	.32 Volts
100	600	Mod. Grid	.1 Mfd.	.5 Meg	.32 Volts
15	600	Ant. Terminal	50 Mmfd.	None	.32 Volts

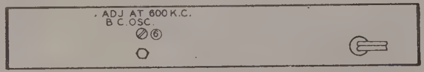
Volume Control Set at Maximum
* .05 Watts = .32 Volts

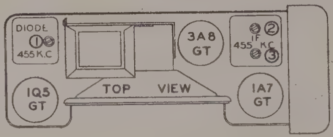
** Output meter connected across voice coil.

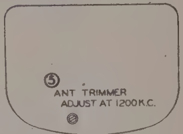


MODEL 52XAH1

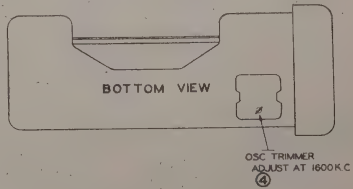
52XAHI TRIMMER ADJ. DETAIL

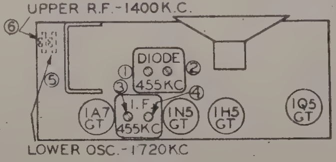




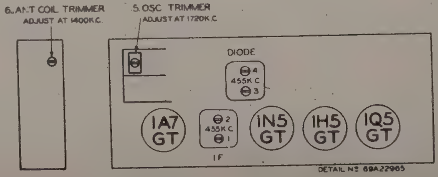


MODEL B-150



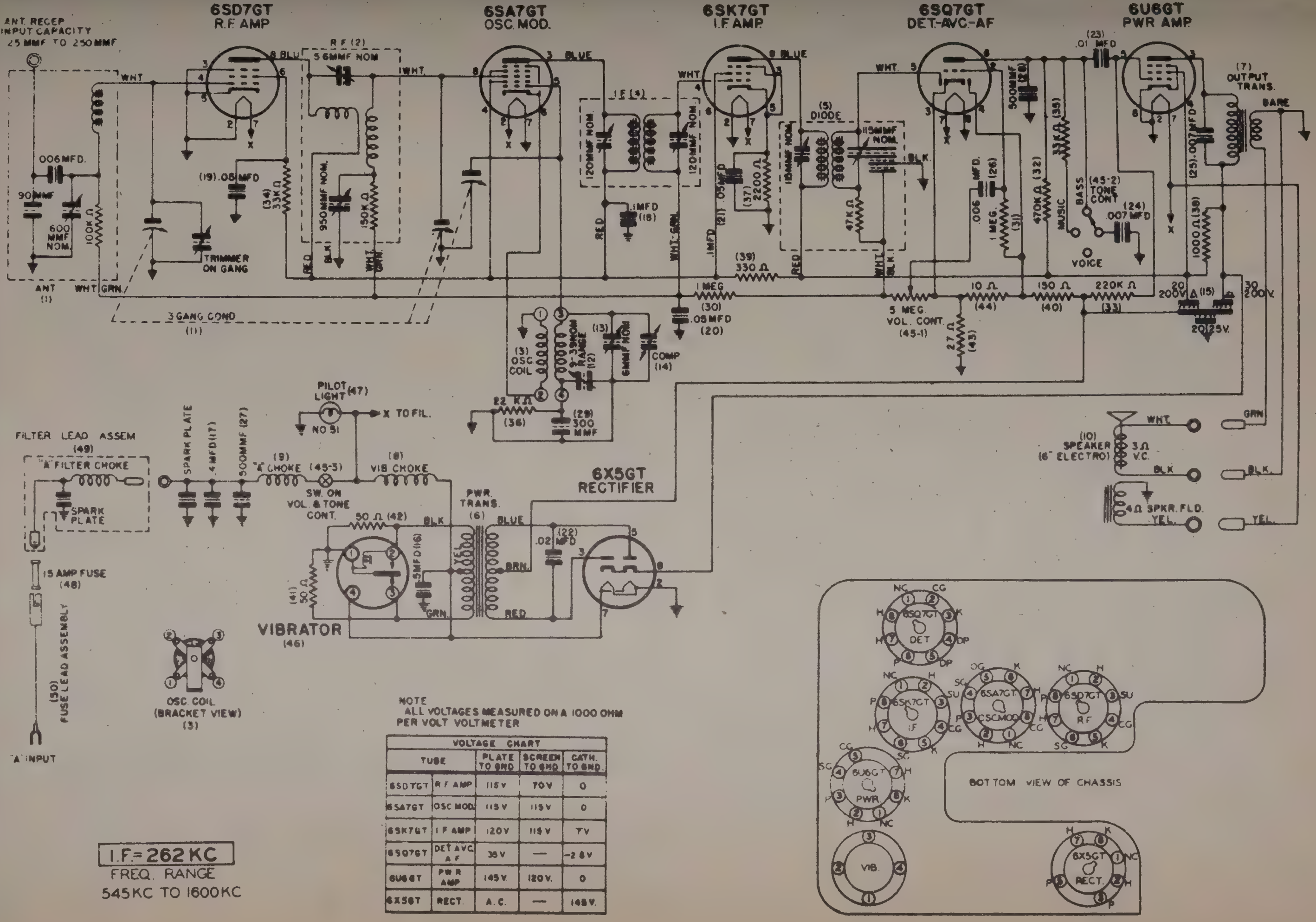


– Model **40-40B**



MODELS

40-B1
40-BK
40-BW



NOTE
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND.
6SD7GT	R.F. AMP	115 V	70 V	0
6SA7GT	OSC MOD.	115 V	115 V	0
6SK7GT	I F AMP	120 V	115 V	7 V
6SQ7GT	DET AVC A F	35 V	—	-2.8 V
6U6GT	PWR AMP	145 V.	120 V.	0
6X5GT	RECT.	A. C.	—	148 V.

I.F.=262 KC
FREQ. RANGE
545KC TO 1600KC

Model 40-P
SPECIFICALLY DESIGNED TO INSTALL IN 1941 PONTIAC

Model 43-H
SPECIFICALLY DESIGNED TO INSTALL IN 1941 HUDSON

Model 44-K
SPECIFICALLY DESIGNED TO INSTALL IN 1941 PACKARD

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24K26751 in series with a 35 Mmf. condenser.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
22,250	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
700	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
710	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
13	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set at Maximum
* 1 Watt = 1.74 Volts

Tone Control Set At Voice Position.
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X126767.

MODEL 40 P DIAL CORD INSTRUCTIONS

POINTER CORD

Remove the chassis from housing and place on service bench.
Remove broken string.
Turn the gang to fully opened position.
Cut a length of 18 lb. silk fish cord 27 inches long.
Thread one end of cord thru hole (A) in pointer pulley and with an ordinary paper clip fasten it to the tuning shaft bracket to hold it in place. See Fig. 2.
In a counter-clockwise direction route cord to idler pulley No. 3 and around it in a clock-wise direction.
Route cord across chassis to idler pulley No. 2 and around it in a clock-wise direction.
Route cord back across chassis and down over idler Pulley No. 1.
Route cord down and around pointer pulley to hole (A).
Remove the paper clip from end of cord and knot the two ends of cord together inside of pointer pulley.
Fasten one end of spring (Part No. 41A11091) to cord and the other end to hook in pointer pulley.
Cut off surplus cord. Place a drop of shellac on cord knot.
To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string. Fasten to string with a drop of shellac.

TUNING CORD

Remove the chassis from the housing and place on service bench.
Remove the broken string.
Turn the gang to fully meshed position.
Cut a length of 30 lb. silk fish cord 25 inches long.
Thread one end of cord thru hole (B) in drive pulley and with an ordinary paper clip fasten to tuning shaft bracket so that cord will stay in place.
In a counter-clockwise direction, wind cord one full turn around drive pulley and up to idler pulley No. 5.
Continue around idler pulley No. 5 and down to tuning shaft.
Wind cord four full turns in a counter-clockwise direction around tuning shaft and continue down to idler pulley No. 4.
Continue cord in a counter-clockwise direction around idler pulley No. 4 and to hole (B) in drive pulley.
Thread both ends of cord (inside pulley) thru eyelet (Part No. 5S7824) and knot both ends together.
Fasten one end of spring (Part No. 41A14759) to cord and other end to hole in drive pulley. See Fig. 2.
Place a drop of shellac on cord knot.

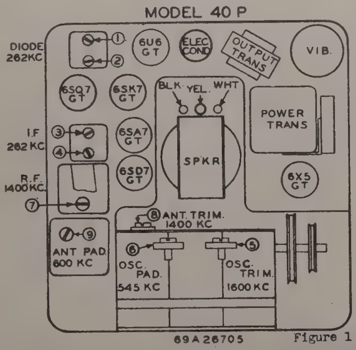


Figure 1

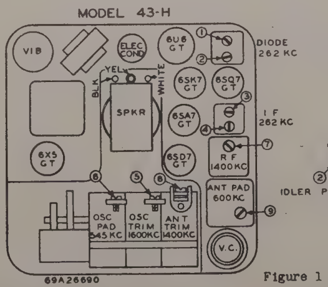


Figure 1

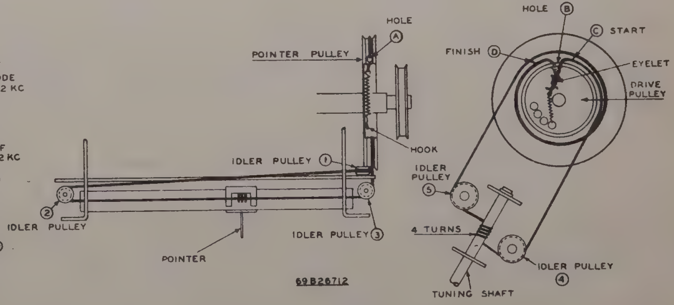


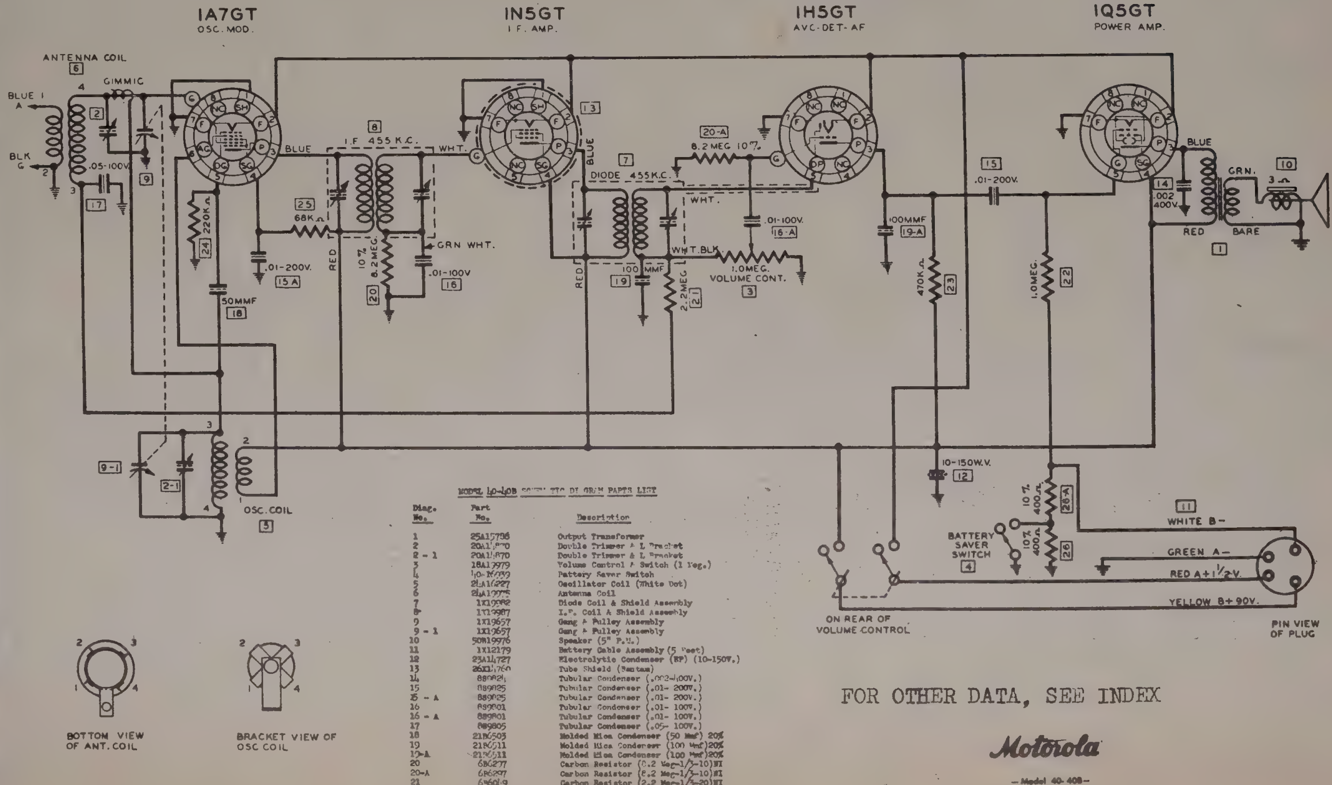
Figure 2

VOLTAGE CHART

TUBE	PLATE	SCREEN
Osc.-Mod.	85	40
I.F.	85	85
Det. AVC AF	35	-
Output	80	85

"A" Bat - 1½V

"B" Bat - 90 V



MODEL 40-40B SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	25A15736	Output Transformer
2	20A14870	Double Trimmer & L Bracket
2 - 1	20A14870	Double Trimmer & L Bracket
3	18A17979	Volume Control & Switch (1 Meg.)
4	40A16039	Battery Saver Switch
5	24A16227	Oscillator Coil (White Dot)
6	24A19975	Antenna Coil
7	1X19982	Diode Coil & Shield Assembly
8	1X19987	I.F. Coil & Shield Assembly
9	1X19657	Gang & Pulley Assembly
9 - 1	1X19657	Gang & Pulley Assembly
10	50R19976	Speaker (5" P.M.)
11	1X12179	Battery Cable Assembly (5 Feet)
12	23A14727	Electrolytic Condenser (RP) (10-150V.)
13	26X14760	Tube Shield (Bantam)
14	880824	Tubular Condenser (.002-400V.)
15	889825	Tubular Condenser (.01- 200V.)
15 - A	889825	Tubular Condenser (.01- 200V.)
16	889801	Tubular Condenser (.01- 100V.)
16 - A	889801	Tubular Condenser (.01- 100V.)
17	889805	Tubular Condenser (.05- 100V.)
18	21R6503	Molded Mica Condenser (50 Mmf) 20%
19	21R6511	Molded Mica Condenser (100 Mmf)20%
19-A	21R6511	Molded Mica Condenser (100 Mmf)20%
20	6R6277	Carbon Resistor (8.2 Meg-1/3-10)WI
20-A	6R6297	Carbon Resistor (8.2 Meg-1/3-10)WI
21	6R6049	Carbon Resistor (2.2 Meg-1/3-20)WI
22	6R6071	Carbon Resistor (1.0 Meg-1/3-20)WI
23	6R6011	Carbon Resistor (470,000-1/3-20)WI
24	6R6003	Carbon Resistor (220,000-1/3-20)WI
25	6R6125	Carbon Resistor (68,000-1/3-20)WI
26	6R6025	Carbon Resistor (400 - 1/3-10)WI
26-A	6R6025	Carbon Resistor (400 - 1/3-10)WI

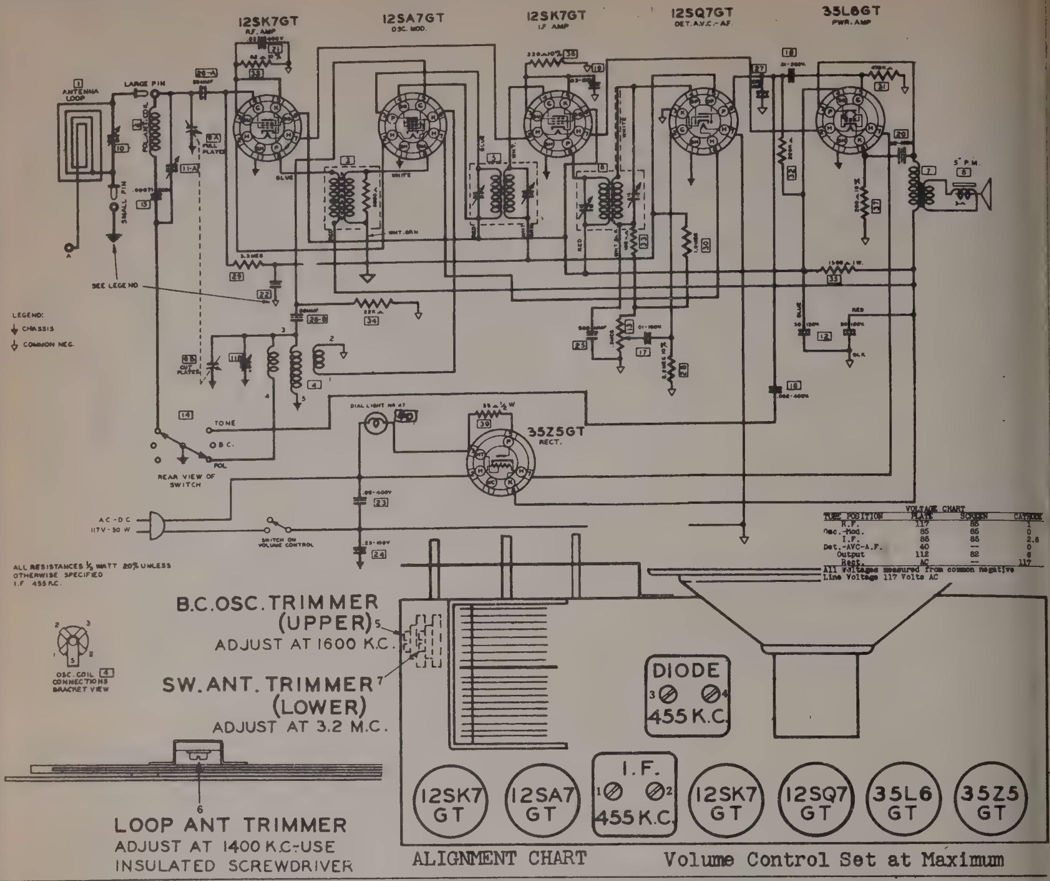
FOR OTHER DATA, SEE INDEX

Motorola

— Model 40-40B —

MODEL 40--60W

GALVIN MFG. CO.



VOLTAGE CHART

TUBE POSITION	PLATE	SCREEN	CATHODE
R.F.	117	85	1
Osc.-Mod.	85	85	0
I.F.	85	85	2.8
Det.-AVC-A.F.	40	--	0
Output	112	82	6
Rect.	AC	--	117

All voltages measured from common negative
Line Voltage 117 Volts AC

ALIGNMENT CHART Volume Control Set at Maximum

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	BAND SWITCH SET AT	GENERATOR CONNECTED TO	ADJUST. TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1	B.C.	Osc-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	400 ohms	B.C.	External Antenna Terminal	5	1600 K.C.
3	1400 K.C.	400 ohms	B.C.	External Antenna Terminal	6	1400 K.C.
4	3.2 M.C.	400 ohms	S.W.	External Antenna Terminal	7	3.2 M.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

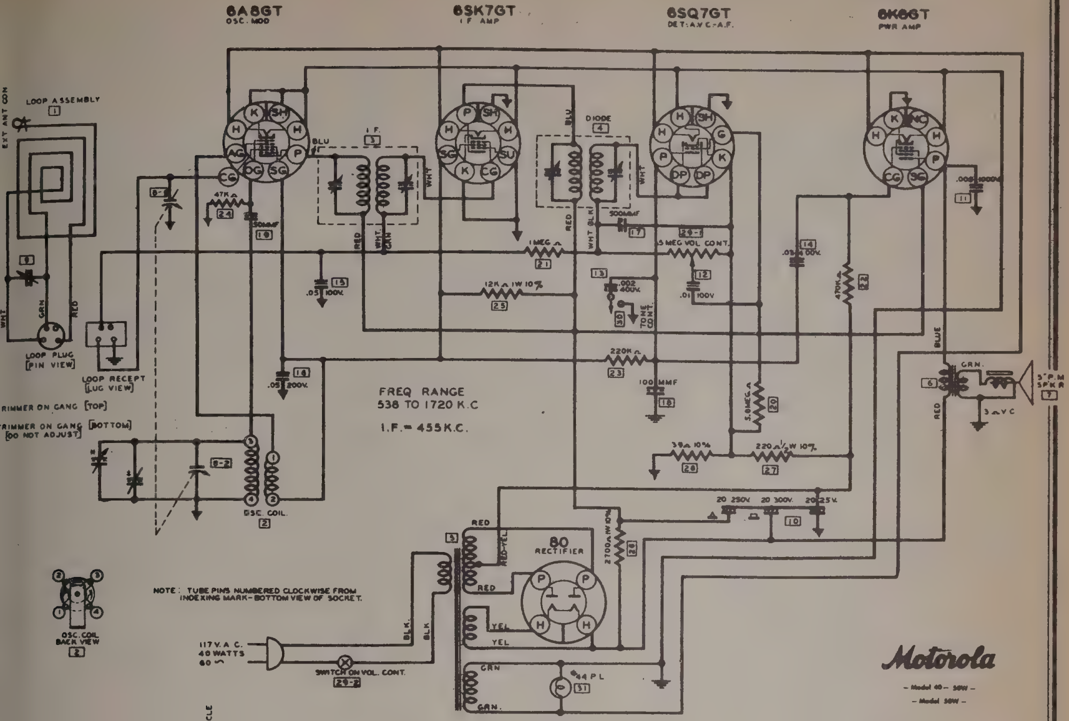
AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTOR	OUTPUT METER READING **
3200	455	I.F. Grid	.1 Mfd.	.5 Meg.	.38
70	455	Mod. Grid	.1 "	.5 Meg.	.38
90	600	Mod. Grid	.1 "	.5 Meg.	.38
25	600	R.F. Grid	.1 "	.5 Meg.	.38
3	600	Ant. Terminal	400 ohms	None	.38

Volume Control set at Maximum
* .05 Watts = .38 Volts

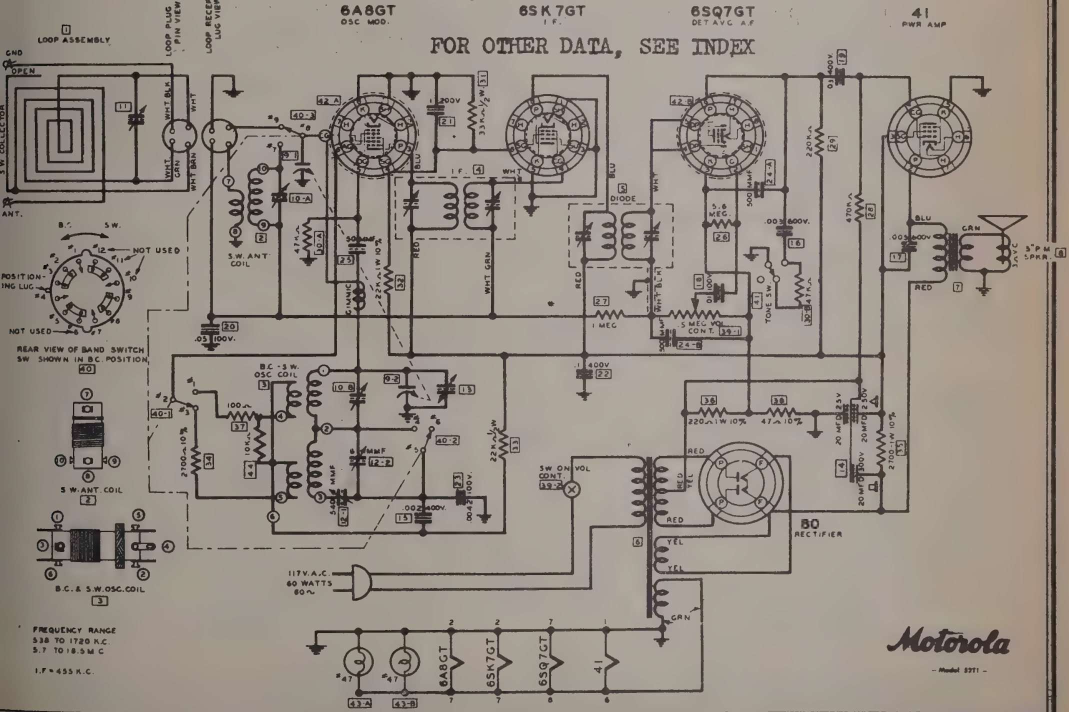
Tone Control set at Center Position
** Output Meter connected across voice coil

GALVIN MFG. CO.

MODEL 40--50W, 50-W,
52T1



FOR OTHER DATA, SEE INDEX



MODELS 40-50, 50W, 52T1, 62T1, 56X1, 56XA1, 56XA2, 56XAW

GALVIN MFG. CO.

MODELS 50X1,50X2,50XC1,50XC2, 50XC3,50XC4,50XH1,50XH2,50XW

MODELS
50X1 50XC4 50XC1 56X1
50X2 50XH1 50XC2 56XA1
50XW 50XH2 50XC3 56XAW

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1720 K.C.
3	1400 K.C.	200 Mmfd.	External Antenna Terminal	6	1400 K.C.

Volume Control Set at Maximum.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 50X1-50X2-50XW-50XC1-50XC2-50XC3-50XC4

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3200	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
45	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
50	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
12	600	Ant. Terminal	400 Ohms	None	.38

Volume Control Set at Maximum.
* .05 Watts = .38 Volts

** Output Meter Connected across voice coil.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 50XH1-50XH2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3400	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
50	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
55	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
25	600	Ant. Terminal	200 MMF.	None	.38

Volume Control Set at Maximum.
* .05 Watt = .38 Volts

** Output Meter connected across voice coil.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 56XA1-56XA2-56XAW-56X1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3700	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
50	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
55	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
15	600	Ant. Terminal	400 Ohms	None	.38

Volume Control Set at Maximum.
* .05 Watts = .38 Volts

** Output meter connected across voice coil.

VOLTAGE CHART

Tube	Plate	Screen	Cathode
Osc.-Mod.	85	85	0
I.F.	85	85	2
Det-AVC-AF	40-45	--	0
Pwr.-Amp.	75	85	5
Rect.	A.C.	--	105

All voltages measured from common negative. Line Voltage 117 Volts A.C.

VOLTAGE CHART MODEL 52T1

TUBE	PLATE	SCREEN	CATHODE
Osc. Mod.	185	70	0
I.F.	185	70	0
Det.-AVC-AF	75	-	-2V
Pwr - Amp	220	185	0
Rectifier	A.C.	-	235V(From fil.)

Measurements from socket terminal to chassis ground using 1000 ohms per voltmeter.
Line Voltage - 117 Volts A.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 40-50W, 50W, 52T1

Average Microvolts Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2300	455	I.F. Grid	.1	.5 Meg	.38
25	455	Mod. Grid	.1	.5 Meg	.38
30	600	Mod. Grid	.1	.5 Meg	.38
4	600	Ant. Terminal	200 Mmfd.	None	.36

Volume Control Set at Maximum. * .05 Watts .38 Volts. ** Output meter connected across voice coil.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 62T1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2500	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
35	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
40	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
4	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
3	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum.
* .05 Watts .38 Volts.

Tone Control set in treble position.
** Output meter connected across voice coil.

ALIGNMENT CHART MODEL 50-W MODEL 40-50W

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod.Grid	5	1720 K.C.
3	1400 K.C.	400 Ohms	External Antenna Terminal	6	1400 K.C.

Volume Control Set at Maximum.

ALIGNMENT CHART MODEL 52T1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	5	1720 K.C.
3	538 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	6	538 K.C.
4	18 M.C.	.1 Mfd.	S.W.	Osc-Mod.Grid	7	18 M.C.
5	16 M.C.	400 Ohms	S.W.	External Antenna Terminal	8	16 M.C.
6	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	9	1400 K.C.

Volume Control Set at Maximum.

ALIGNMENT CHART MODEL 62T1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	5	1720 K.C.
3	538 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	6	538 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	18 M.C.	.1 Mfd.	S.W.	Osc-Mod.Grid	8	18 M.C.
6	16 M.C.	400 Ohms	S.W.	External Antenna Terminal	9	16 M.C.
7	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	10	1400 K.C.

Volume Control Set at Maximum.

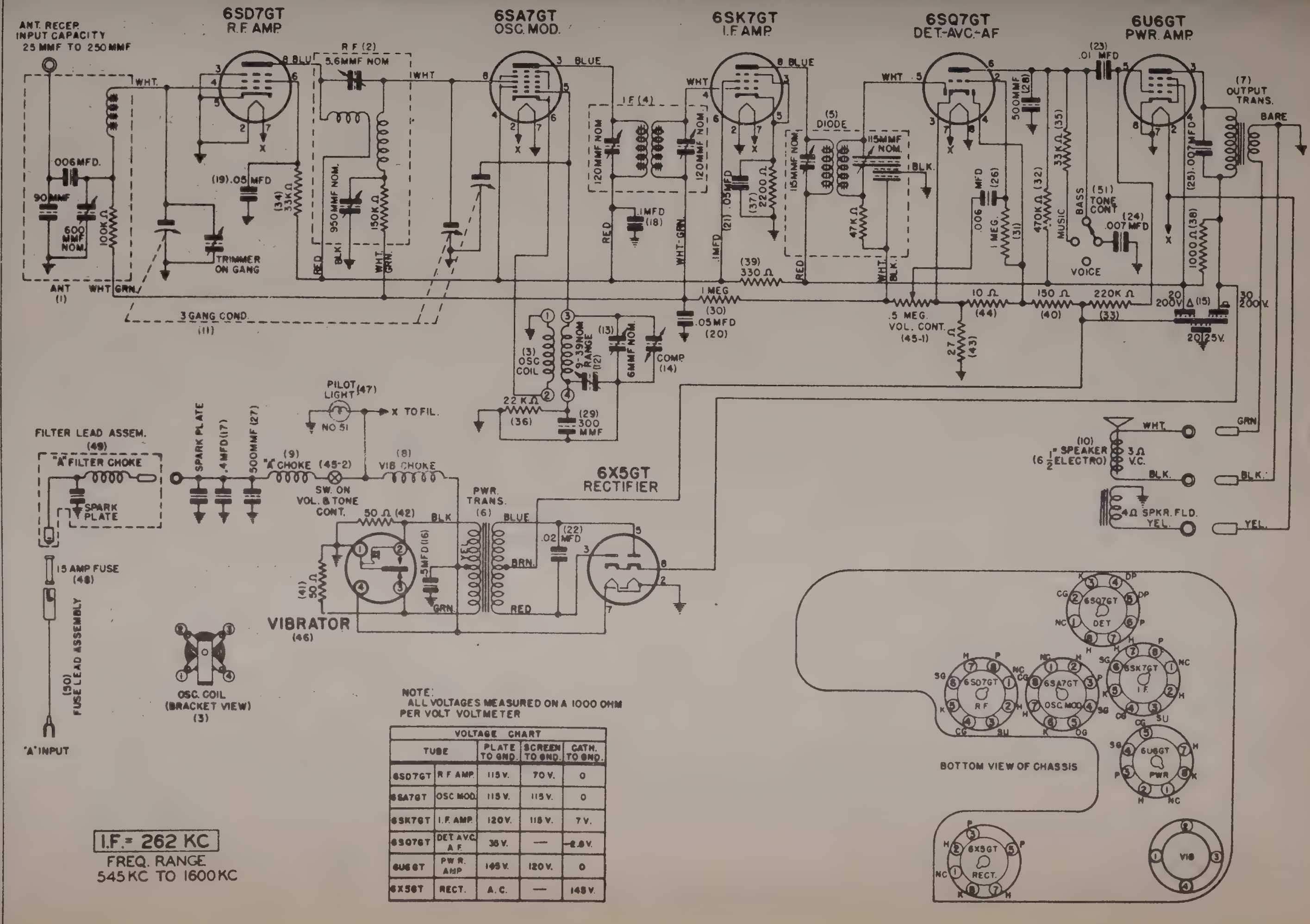
VOLTAGE CHART MODELS 40-50W - 50W

TUBE	PLATE	SCREEN	CATHODE
Osc. Mod.	175V	80V	0
I.F.	175V	80V	0
Det.-AVC-AF	40V	-	-2V
Pwr. Amp.	220V	175V	0
Rec.	A.C.	-	230V(from fil.)

Measurements from socket terminal to chassis ground using 1000 ohms per voltmeter.
Line Voltage - 117 Volts A.C.

GALVIN MFG. CO.

MODEL 42S



NOTE:
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	115 V.	70 V.	0
6SA7GT	OSC MOD.	115 V.	115 V.	0
6SK7GT	I.F. AMP.	120 V.	118 V.	7 V.
6SQ7GT	DET AVC. A.F.	38 V.	—	-2.8 V.
6U6GT	PWR. AMP	145 V.	120 V.	0
6X5GT	RECT.	A.C.	—	148 V.

I.F. = 262 KC

FREQ. RANGE
545KC TO 1600KC

SPECIFICALLY DESIGNED TO INSTALL IN 1941 STUDEBAKER

Model 42-S

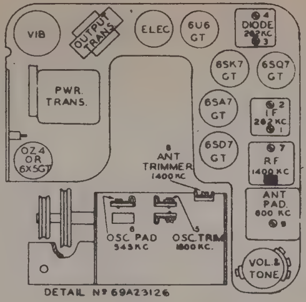


Figure 1

TUNING CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove the broken string.
3. Turn the condenser gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 23 inches long.
5. Thread one end of cord through Slot (B) in drive pulley and with an ordinary paper clip fasten to tuning control bracket so that cord will stay in place.
6. In a clockwise direction, wind cord one full turn around drive pulley and up to tuning shaft. (See Fig. 2).
7. Route cord 7 turns around tuning shaft as shown in Fig. 2 and down to drive pulley.
8. Continue in a clockwise direction around drive pulley and through slot (B).
9. Slip the two cord ends through eyelet (Part No. 5S7824) inside of pulley.
10. Knot the two cord ends together and fasten to one end of spring (Part No. 41A14759). Hook other end of spring to hole (C) in drive pulley.
11. With a pair of pliers pinch eyelet on cord and place drop of shellac on cord knot.

POINTER CORD

1. Remove the chassis from housing and place on service bench.
2. Remove broken string.
3. Set condenser gang to fully open position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord through slot (A) in condenser pulley and with an ordinary paper clip fasten it to the tuning shaft bracket to hold in place. (See Fig. 3).
6. In a clockwise direction run cord around condenser pulley, under brake shoe and over to idler pulley No. 3 and around it in a counter-clockwise direction.
7. Route string across chassis to idler pulley No. 2, and around it in a counter-clockwise direction.
8. Route cord back across chassis and down over idler pulley No. 1.
9. Route cord down and around condenser pulley one-half turn to slot (A).
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of drive pulley and fasten one end of spring (Part No. 41A11091) to cord and the other end to hook in condenser pulley.
11. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string.
13. Fasten pointer to string with a drop of shellac. Place a drop of shellac on cord knot.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
22,250	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
700	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
710	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
13	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	To Special Dummy	***	None	1.74

Volume Control Set at Maximum.
* 1 Watt = 1.74 Volts.

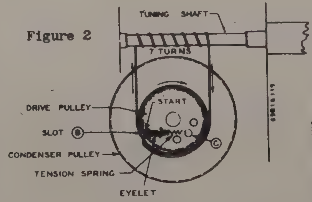
Tone Control Set At Voice.
** Output meter connected across voice coil.
*** Use special dummy Part No. 1X26767.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster coil Part No. 24K26751 in series with a 35 Mmf. condenser.

Figure 2



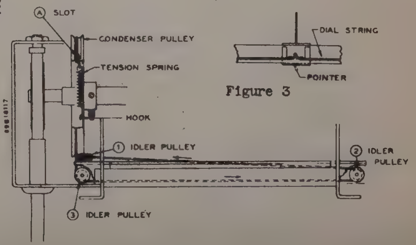
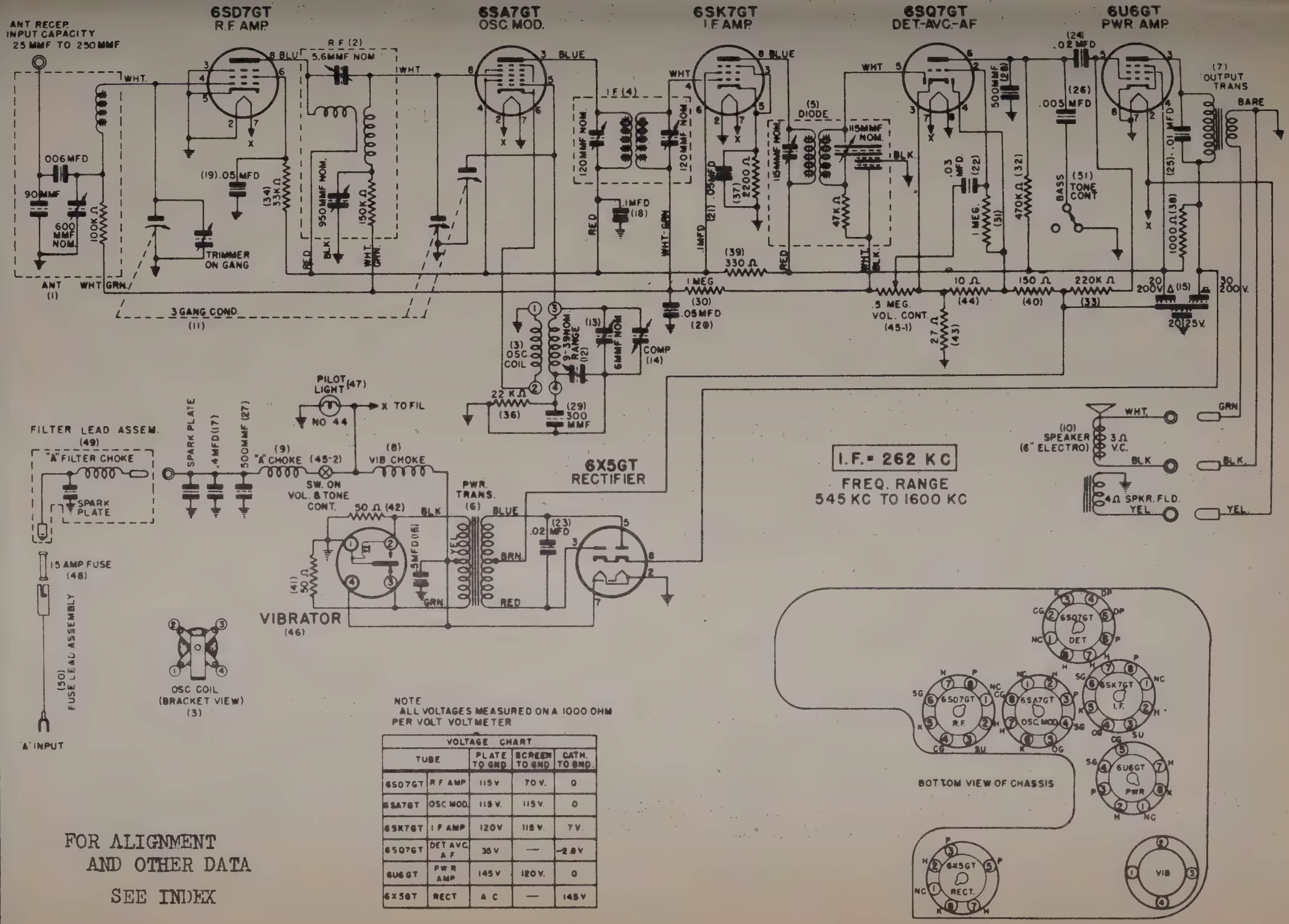


Figure 3

©John F. Rider, Publisher

MODEL 43H

GALVIN MFG. CO.



I.F. = 262 KC

FREQ. RANGE 545 KC TO 1600 KC

NOTE
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND.
6SD7GT	R F AMP	115 V	70 V.	0
6SA7GT	OSC MOD.	115 V.	115 V.	0
6SK7GT	I F AMP	120V	115 V.	7 V.
6SQ7GT	DET AVC. A F	35 V	—	-2.8 V
6U6GT	PWR AMP	145 V	120 V.	0
6X5GT	RECT	A C	—	145 V

FOR ALIGNMENT
AND OTHER DATA
SEE INDEX

MODELS 43H, 44K

GALVIN MFG. CO.

MODEL 43H

TUNING CORD

1. Remove the chassis from the housing and place on service bench.
2. Remove the broken string.
3. Turn the gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 25 inches long.
5. Thread one end of cord thru hole (A) in drive pulley and with an ordinary paper clip fasten to tuning shaft bracket so that cord will stay in place.
6. In a clockwise direction wind cord one full turn around drive pulley and up to tuning shaft. See Fig. 2.
7. Route cord 8 turns around tuning shaft as shown in Fig. 2 and down to drive pulley.
8. Continue in a clockwise direction around drive pulley to hole (A).
9. Thread both ends of cord (inside pulley) thru eyelet (Part No. 557824) and knot ends together.
10. Fasten one end of spring (Part No. 41A14759) to cord and other end to hole (B) in drive pulley.
11. Cut off surplus cord and place drop of shellac on cord knot.
12. Pinch eyelet on cord with a pair of pliers.

POINTER CORD

1. Remove the chassis from housing and place on service bench.
2. Remove broken string.
3. Turn the gang to fully meshed position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord thru hole (C) in pointer pulley and with an ordinary paper clip fasten to the tuning shaft bracket to hold it in place. See Fig. 3.
6. In a counter-clockwise direction route cord to idler pulley No. 1 and around it in a clock-wise direction.
7. Route cord across chassis to idler pulley No. 2 and around it in a clock-wise direction.
8. Route cord back across chassis and around idler pulley No. 3.
9. Route cord counter-clockwise around pointer pulley to hole (C).
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of pointer pulley.
11. Fasten one end of spring (Part No. 41A11091) to cord and the other end to hole in pointer pulley.
12. Cut off surplus cord. Place a drop of shellac on cord knot.
13. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string. Fasten to string with a drop of shellac.

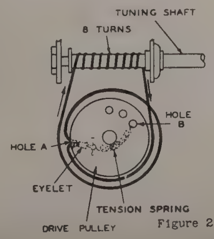


Figure 2

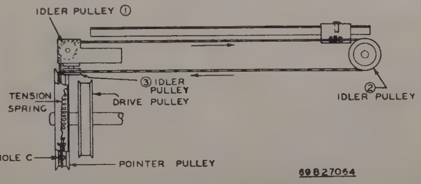


Figure 3

MODEL 44K

TUNING CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove the broken string.
3. Turn the condenser gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 25 inches long.
5. Thread one end of cord through hole (X) in drive pulley and with an ordinary paper clip fasten to tuning control bracket so that cord will stay in place.
6. In a clockwise direction, wind cord one full turn around drive pulley and up to tuning shaft. (See Fig. 2.)
7. Route cord 6 turns around tuning shaft as shown in Fib. 2 and down to drive pulley.
8. Continue in a clockwise direction around drive pulley and to hole (X).
9. Slip the two cord ends through eyelet (Part No. 5S7824) inside of pulley.
10. Knot the two cord ends together and fasten to one end of spring (Part No. 41A14759). Hook other end of spring to hole (Y) in drive pulley.
11. With a pair of pliers pinch eyelet on cord and place drop of shellac on cord knot.

POINTER CORD

1. Remove the chassis from housing and place on service bench.
2. Remove broken string.
3. Set condenser gang to fully meshed position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord through hole (C) in condenser pulley and with an ordinary paper clip fasten it to the tuning shaft bracket to hold in place. (See Fig. 3).
6. Route cord from hole (C) around idler pulley No. 1 in a clockwise direction.
7. Route string across chassis to idler pulley No. 2, and around it in a counter-clockwise direction.
8. Route cord back across chassis and around idler pulley No. 3.
9. Route cord down and around condenser pulley to hole (C).
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of drive pulley; fasten one end of spring (Part No. 41A11091) to cord and the other end to hook in condenser pulley.
11. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string.
13. Fasten pointer to string with a drop of shellac. Place a drop of shellac on cord knot.

MODEL 44 K

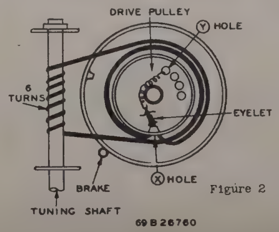


Figure 2

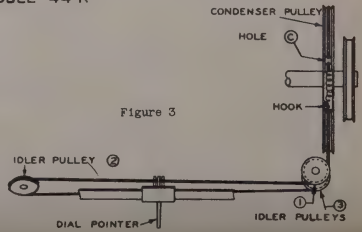
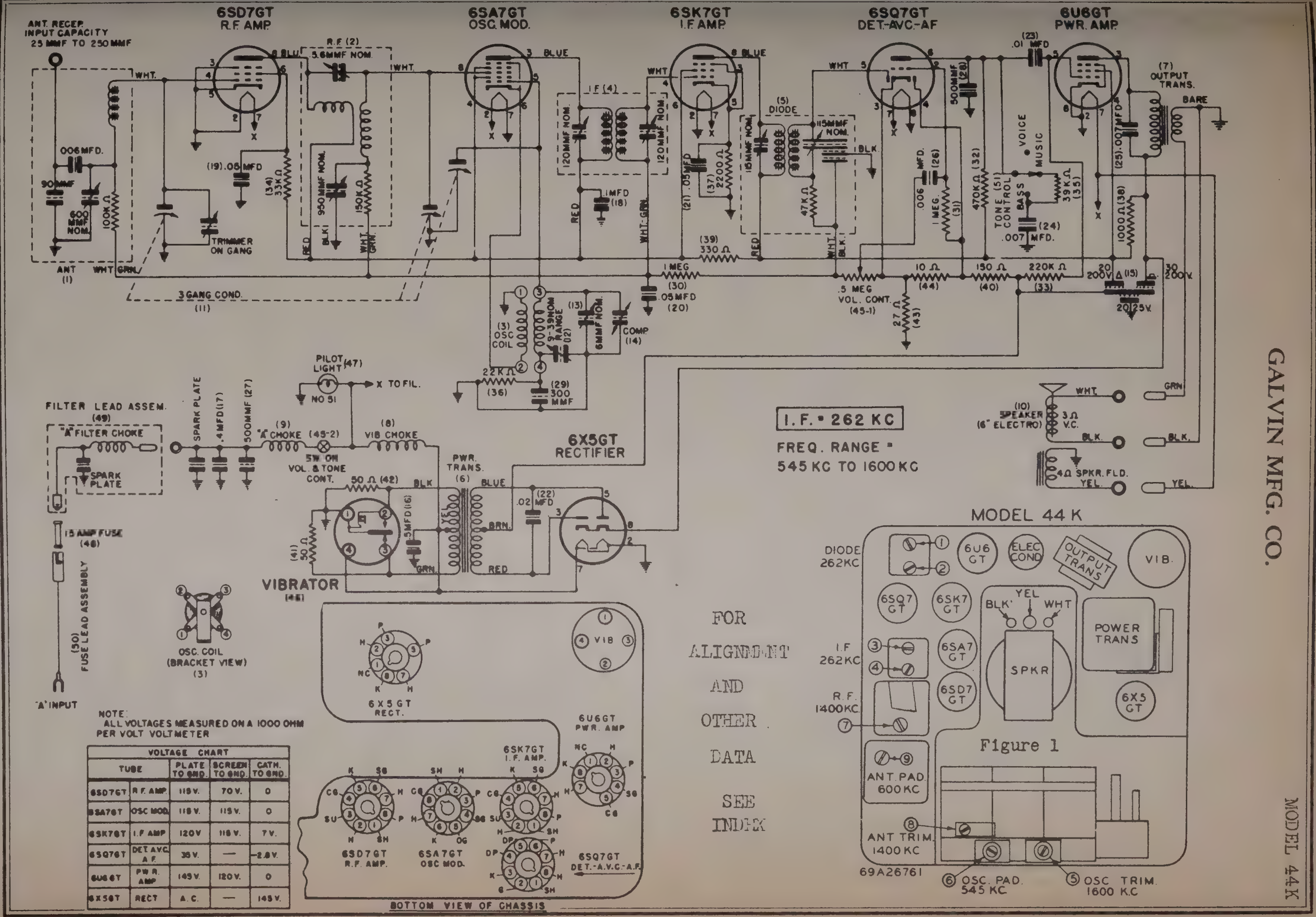


Figure 3

GALVIN MFG. CO.



I.F. = 262 KC

FREQ. RANGE = 545 KC TO 1600 KC

FOR ALIGNMENT AND OTHER DATA SEE INDEX

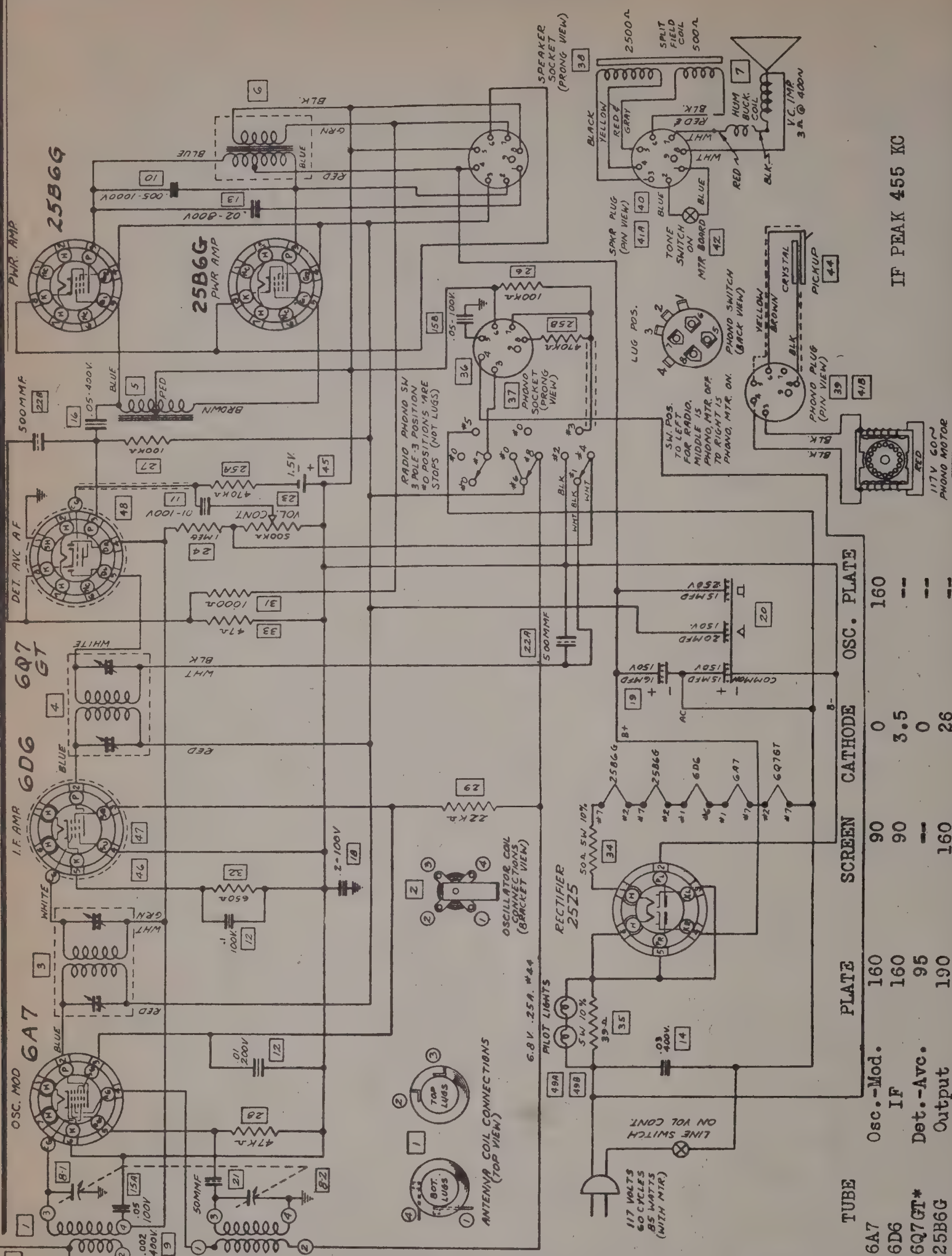
NOTE:
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	115 V.	70 V.	0
6SA7GT	OSC MOD.	118 V.	115 V.	0
6SK7GT	I.F. AMP	120 V	118 V.	7 V.
6SQ7GT	DET. A.V.C. A.F.	38 V.	—	−2.8 V.
6U6GT	PWR. AMP	145 V.	120 V.	0
6X5GT	RECT	A. C.	—	145 V.

MODEL 61F

GALVIN MFG. CO.



TUBE		PLATE	SCREEN	CATHODE	OSC. PLATE
6A7	Osc.-Mod.	160	90	0	160
6D6	IF	160	90	3.5	--
6Q7GT*	Det.-Avc.	95	--	0	--
25B6G	Output	190	160	26	--
25Z5**	Output	190	160	26	
	Rect.	P1--0 P2--195	-- --	K1--0 K2--100	

* Bias --1.1 V. from bias cell.

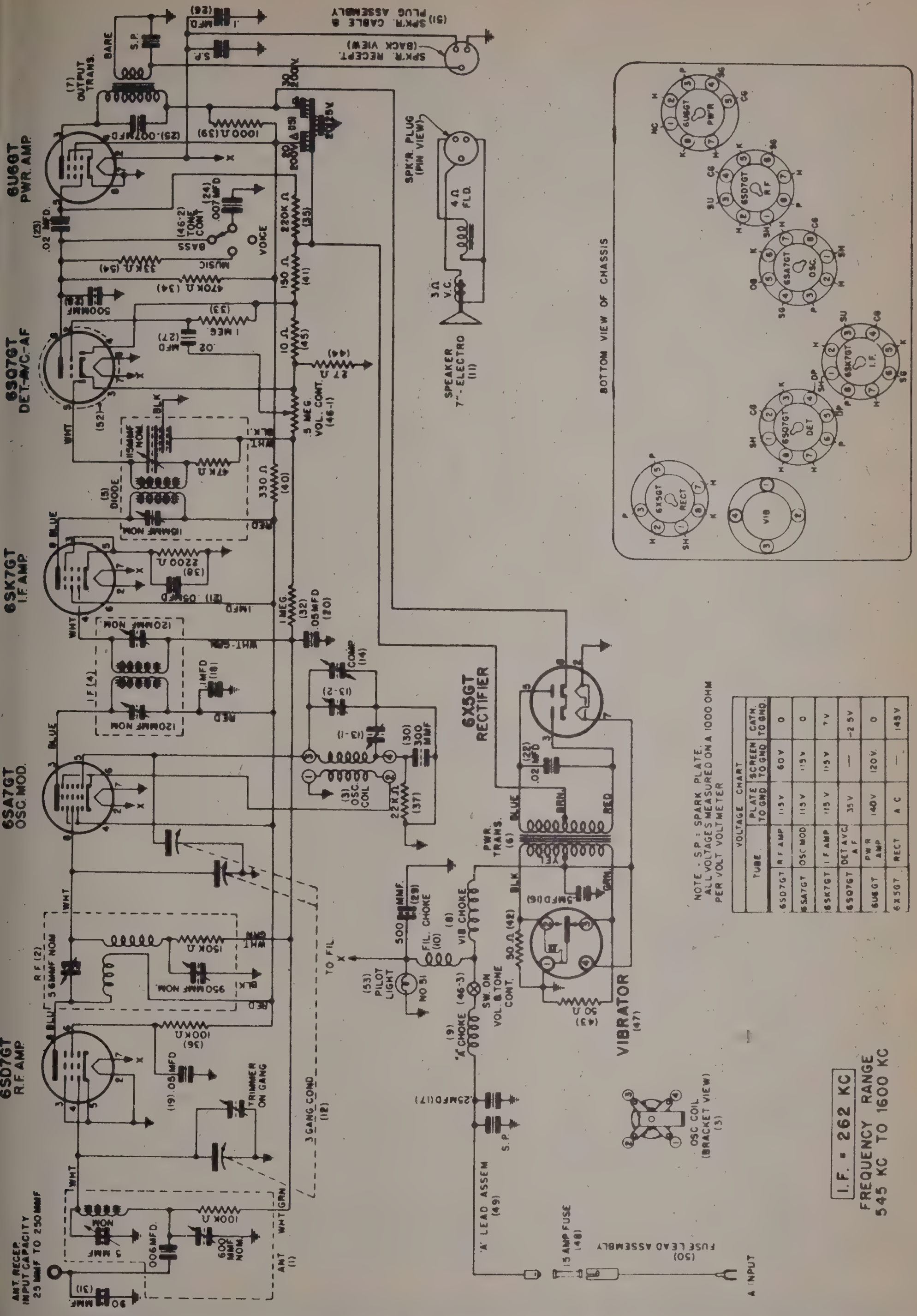
** Voltage doubler tube.

Measurements from B-- to socket terminal, using 1000 ohms per volt meter.

ALIGNMENT 1. Conn. the sig. gen. to the ant. lead thru a 200 MMF cond. and to chass. gnd. Turn the cond. gang completely out of mesh. o.p. meter across the spkr. voice coil. 2. Set sig. gen. at 455 KC; carefully adj. the two IF trims. and the two DIODE trims. to point show. highest read. on o.p. meter. Advance sig. gen. atten. if necessary. 3. Turn sig. gen. to 1750 KC, and with cond. gang completely out of mesh adj. OSC. trim. until 1750 KC sig. is heard. 4. Set sig. gen at 1400 Adj. ANT. trim. to point showing highest reading on o.p. meter.

GALVIN MFG. CO.

MODEL 45N



NOTE - S.P. = SPARK PLATE.
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART

TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND.
6SD7GT	R F AMP	115 V	60 V	0
6SA7GT	OSC MOD	115 V	115 V	0
6SK7GT	I F AMP	115 V	115 V	7 V
6SQ7GT	DET AVC A F	35 V	—	-2.5 V
6U6GT	PWR AMP	140 V	120 V.	0
6X5GT	RECT	A C	—	145 V

I.F. = 262 KC

FREQUENCY RANGE 545 KC TO 1600 KC

Model 45-N
SPECIFICALLY DESIGNED TO INSTALL IN 1941 NASH

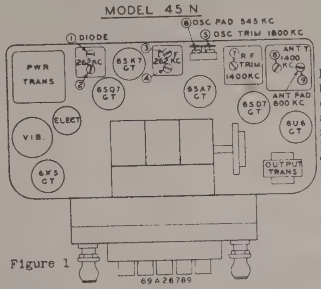


Figure 1

DIAL CORD INSTRUCTIONS

TUNING CORD

Remove the die cast escutcheon and the bottom cover from the receiver. The escutcheon is fastened by means of 9 screws and the bottom cover is fastened with two nuts and lockwashers.

Remove the broken string.

Turn the condenser gang to fully meshed position.

Cut a length of 30 lb. silk fish cord 25 inches long.

Thread one end of cord thru hole (X) in drive pulley and with an ordinary paper clip fasten cord to tuner bracket so that cord will stay in place.

(cont. in next column)

TUNING CORD (cont.)

In a counter-clockwise direction wind cord one turn on drive pulley and route to idler pulley No. 4. (See Fig. 2).

Route cord over idler pulley No. 4 and down to tuning shaft.

Wind four full turns in a clock-wise direction on tuning shaft and continue down to idler pulley.

Route cord under idler pulley No. 5 and to hole (X) in drive pulley.

Thread cord ends through eyelet (Part No. 5S7824) inside of pulley.

Knot cord ends together and fasten to one end of spring (Part No. 41A14759). Hook other end of spring to hole (Y) in drive pulley.

With a pair of pliers pinch eyelet on cord and place drop of shellac on cord knot.

POINTER CORD

1. Remove the die cast escutcheon and the bottom cover from the receiver (see step 1 above).
2. Remove the broken string.
3. Turn gang to fully opened position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord thru hole (C) in condenser pulley. See Fig. 3. With an ordinary paper clip fasten to tuner bracket to hold it in place.
6. Route cord in a counter-clockwise direction from hole (C) to idler pulley No. 1.
7. Route cord clockwise around pulley No. 1 and across chassis to idler pulley No. 2.
8. Continue counter-clockwise around pulley No. 2 and back across the chassis to idler pulley No. 3.
9. Continue around idler pulley No. 3 and in a counter-clockwise direction around condenser pulley to hole (C).
10. Remove the paper clip and knot the two ends of cord together inside of pulley. Fasten one end of spring (Part No. 41A11091) to cord and hook other end to hole in condenser pulley. Place a drop of shellac on cord knot.
11. Cut off surplus cord and assemble pointer to cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on cord. Fasten with a drop of shellac.
13. Minor calibration errors may be corrected by loosening set screw (S) in drive pulley and moving condenser pulley. Tighten set screw (S) after adjustment.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
25,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
825	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
835	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
14	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum.
* 1 Watt = 1.74 Volts.

Tone Control Set At Voice.
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24K26751 in series with a 35 Mmf. Condenser.

MODEL 45 N

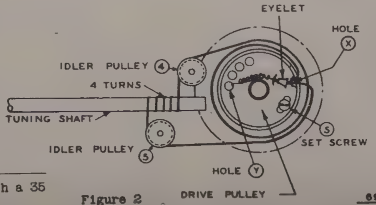


Figure 2

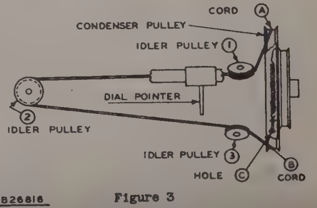
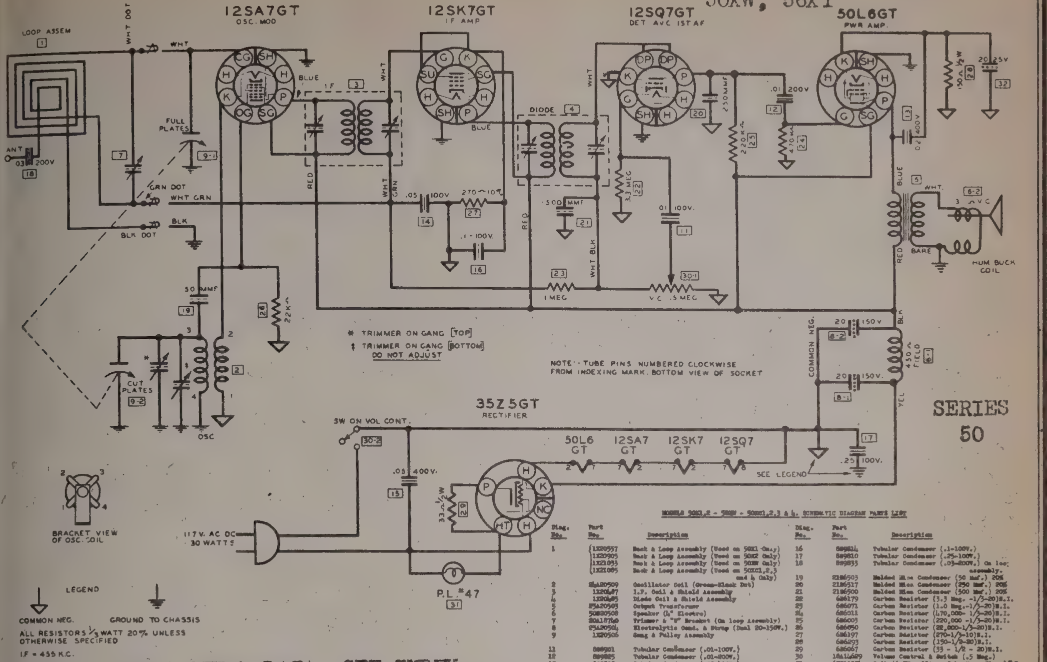


Figure 3

GALVIN MFG. CO.

MODELS 50X1, 50X2, 50XC1, 50XC2, 50XC3, 50XC4, 50XW, 56X1



* TRIMMER ON GANG [TOP]
‡ TRIMMER ON GANG [BOTTOM] DO NOT ADJUST

NOTE - TUBE PINS NUMBERED CLOCKWISE FROM INDEXING MARK, BOTTOM VIEW OF SOCKET

LEGEND

COMMON NEG. GROUND TO CHASSIS

ALL RESISTORS 1/3 WATT 20% UNLESS OTHERWISE SPECIFIED

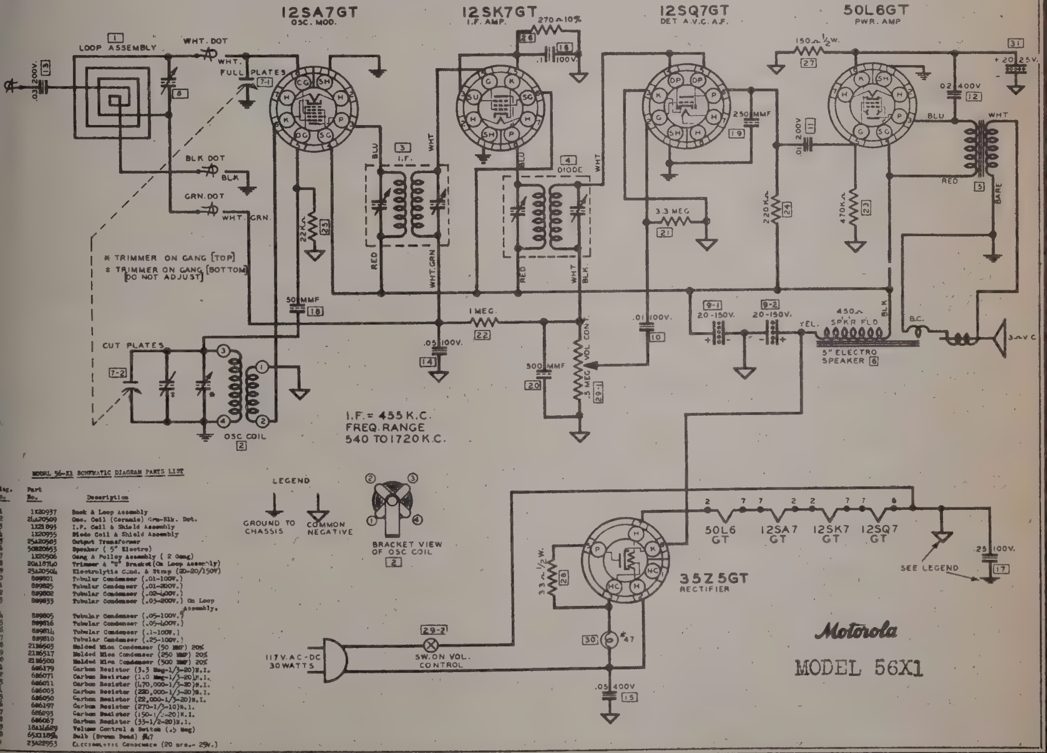
I.F. = 455 K.C.

SERIES 50

FOR OTHER DATA, SEE INDEX

MODELS 50X1,2 - 50XW - 50XC1,2,3 & 4. SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	1X20957	Back & Loop Assembly (Used on 50X1 Only)
	1X20905	Back & Loop Assembly (Used on 50X2 Only)
	1X21033	Back & Loop Assembly (Used on 50XW Only)
	1X21085	Back & Loop Assembly (Used on 50XC1,2,3 and 4 Only)
2	24A20509	Oscillator Coil (Green-Black Dot)
3	1X20487	I.F. Coil & Shield Assembly
4	1X20485	Diode Coil & Shield Assembly
5	25A20503	Output Transformer
6	50B20508	Speaker (4" Electro)
7	20A18740	Trimmer & "U" Bracket (On loop Assembly)
8	23A20504	Electrolytic Cond. & Strap (Dual 20-150V.)
9	1X20506	Gang & Pulley Assembly
11	889801	Tubular Condenser (.01-100V.)
12	889825	Tubular Condenser (.01-200V.)
13	889802	Tubular Condenser (.02-400V.)
14	889805	Tubular Condenser (.05-100V.)
15	889816	Tubular Condenser (.05-400V.)
16	889814	Tubular Condenser (.1-100V.)
17	889810	Tubular Condenser (.25-100V.)
18	889833	Tubular Condenser (.03-200V.) On loop assembly.
19	2186503	Molded Mica Condenser (50 Mmf.) 20%
20	2186517	Molded Mica Condenser (250 Mmf.) 20%
21	2186500	Molded Mica Condenser (500 Mmf.) 20%
22	686179	Carbon Resistor (3.3 Meg. -1/3-20)M.I.
23	686071	Carbon Resistor (1.0 Meg.-1/3-20)M.I.
24	686011	Carbon Resistor (470,000- 1/3-20)M.I.
25	686003	Carbon Resistor (220,000 -1/3-20)M.I.
26	686050	Carbon Resistor (22,000-1/3-20)M.I.
27	686197	Carbon Resistor (270-1/3-10)M.I.
28	686293	Carbon Resistor (150-1/2-20)M.I.
29	686067	Carbon Resistor (33 - 1/2 - 20)M.I.
30	18A14629	Volume Control & Switch (.5 Meg.)
31	65X11354	Bulb (6.3V.-.15Amp. Tab. Bay. Clear)#47
32	23A22953	Electrolytic Cond. (20 Mfd.-25V.)



* TRIMMER ON GANG [TOP]
‡ TRIMMER ON GANG [BOTTOM] DO NOT ADJUST

I.F. = 455 K.C.
FREQ. RANGE
540 TO 1720 K.C.

MODEL 56-X1 SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	1X20937	Back & Loop Assembly
2	24A20509	Osc. Coil (Ceramic) Grn-Blk. Dot.
3	1X21893	I.F. Coil & Shield Assembly
4	1X20935	Diode Coil & Shield Assembly
5	25A20503	Output Transformer
6	50B20653	Speaker (5" Electro)
7	1X20506	Gang & Pulley Assembly (2 Gang)
8	20A18740	Trimmer & "U" Bracket (On Loop Assembly)
9	23A20504	Electrolytic Cond. & Strap (20-20/150V)
10	889801	Tubular Condenser (.01-100V.)
11	889825	Tubular Condenser (.01-200V.)
12	889802	Tubular Condenser (.02-400V.)
13	889833	Tubular Condenser (.03-200V.) On Loop Assembly.
14	889805	Tubular Condenser (.05-100V.)
15	889816	Tubular Condenser (.05-400V.)
16	889814	Tubular Condenser (.1-100V.)
17	889810	Tubular Condenser (.25-100V.)
18	2186503	Molded Mica Condenser (50 MMF) 20%
19	2186517	Molded Mica Condenser (250 MMF) 20%
20	2186500	Molded Mica Condenser (500 MMF) 20%
21	686179	Carbon Resistor (3.3 Meg-1/3-20)M.I.
22	686071	Carbon Resistor (1.0 Meg-1/3-20)M.I.
23	686011	Carbon Resistor (470,000-1/3-20)M.I.
24	686003	Carbon Resistor (220,000-1/3-20)M.I.
25	686050	Carbon Resistor (22,000-1/3-20)M.I.
26	686197	Carbon Resistor (270-1/3-10)M.I.
27	686293	Carbon Resistor (150-1/2-20)M.I.
28	686067	Carbon Resistor (33-1/2-20)M.I.
29	18A14629	Volume Control & Switch (.5 Meg)
30	65X11894	Bulb (Brown Bead) #47
31	23A22953	Electrolytic Condenser (20 Mfd.- 25V.)

Motorola

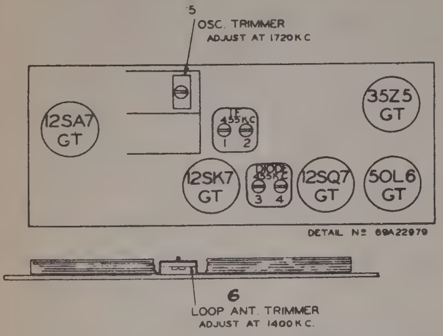
MODEL 56X1

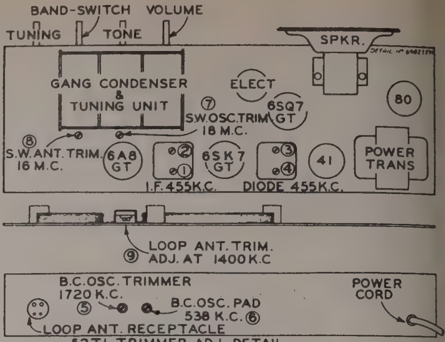
FOR MODELS, See Below

GALVIN MFG. CO.

– Model 50X1 – – Model 50X2 – – Model 50XW –

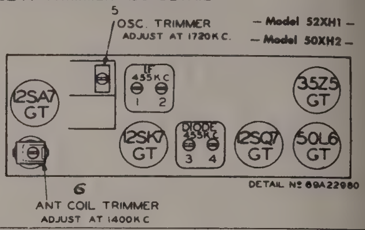
– Model 50XC -1 and 2 – – Model 50XC -3 and 4 –

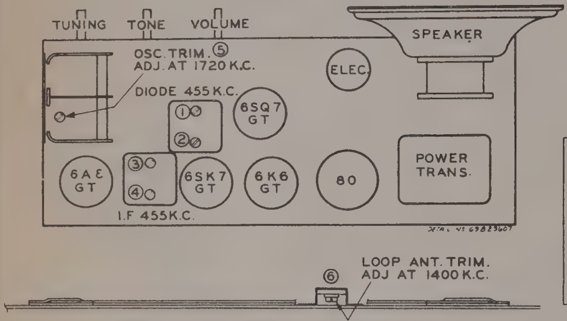




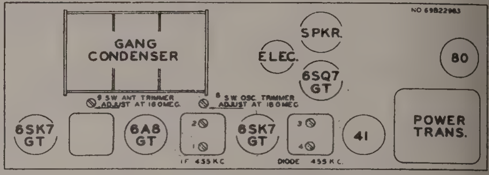
52T1 TRIMMER ADJ. DETAIL

– Model 52XH1 –
– Model 50XH2 –

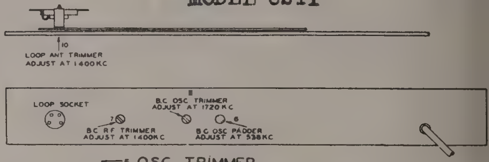


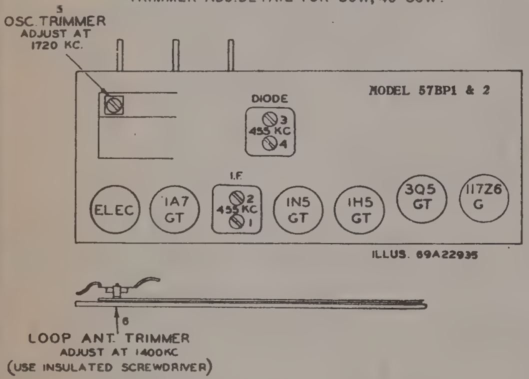


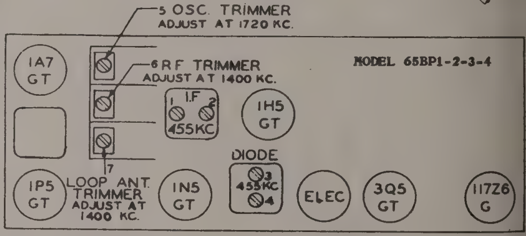
TRIMMER ADJ. DETAIL FOR 50W, 40-50W.



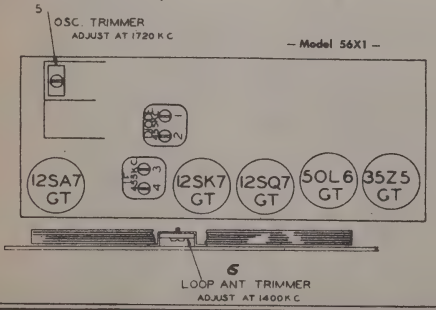
MODEL 62T1

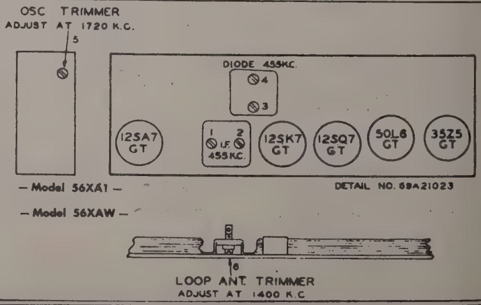

10
LOOP ANT TRIMMER
ADJUST AT 1400KC
LOOP SOCKET
B.C. OSC. TRIMMER ADJUST AT 1720 KC
7
B.C. RF TRIMMER ADJUST AT 1400KC
6
B.C. OSC. PADDER ADJUST AT 538KC





– Model 56X1 –



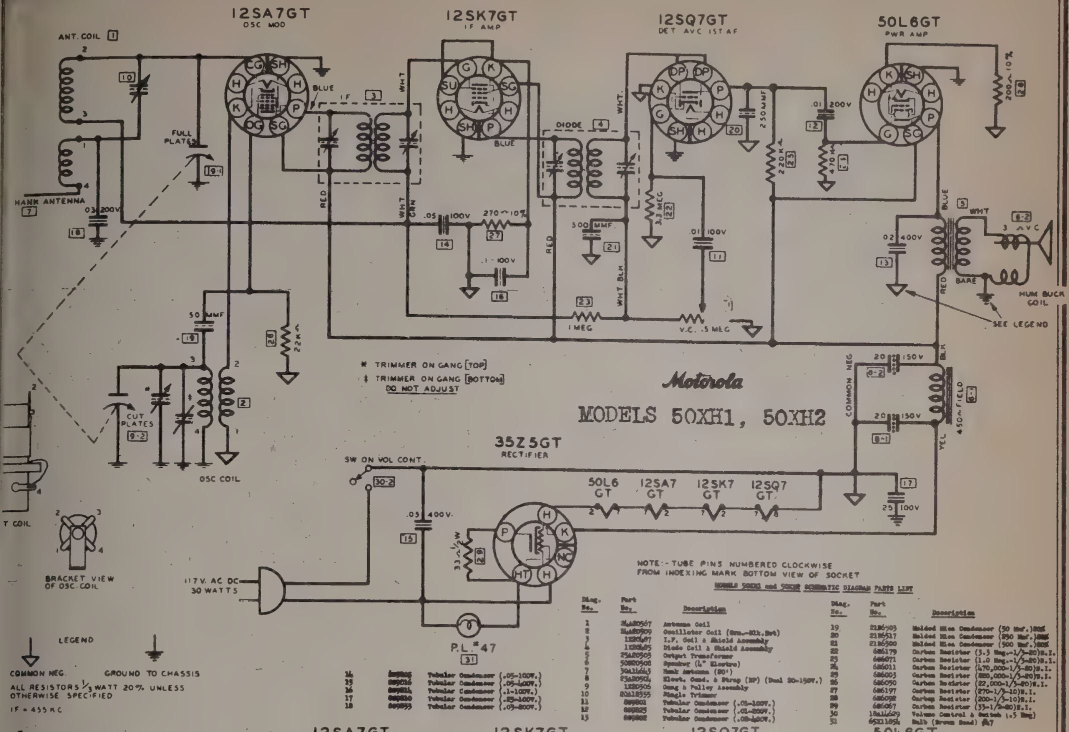


– Model 56XA1 –

– Model 56XAW –

MODELS 50XH1, 50XH2
MODELS 56XA1, 56XAW

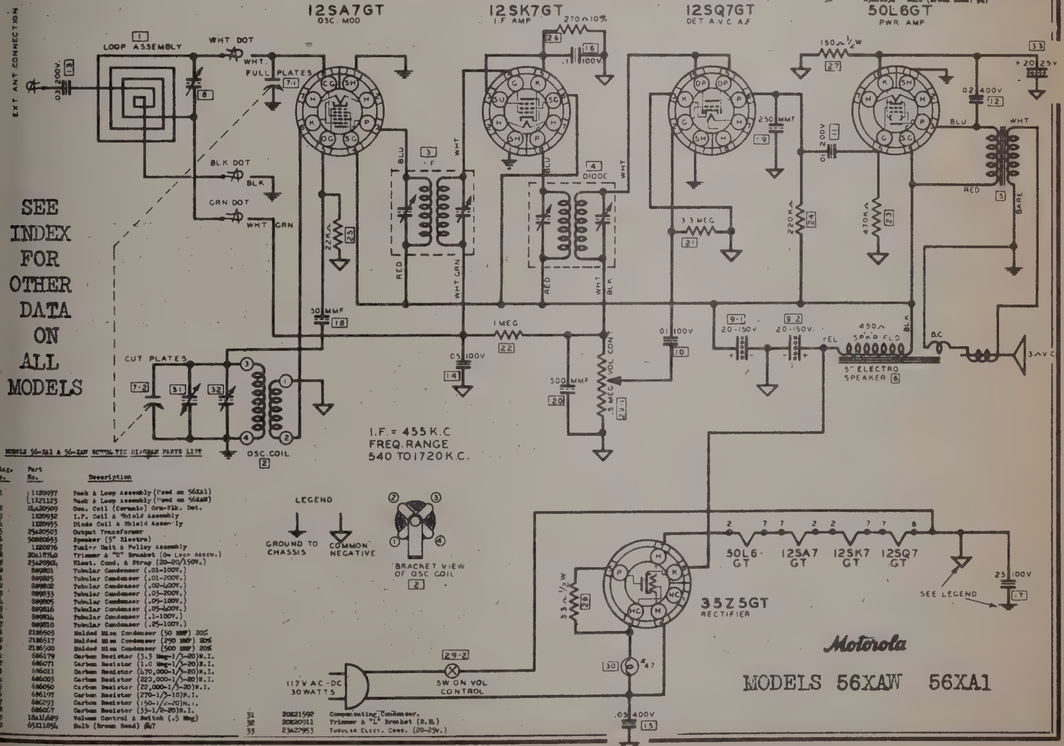
GALVIN MFG. CO.



NOTE:- TUBE PINS NUMBERED CLOCKWISE FROM INDEXING MARK BOTTOM VIEW OF SOCKET

MODELS 50XH1 and 50XH2 SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	24A20567	Antenna Coil
2	24A20509	Oscillator Coil (Grn.-Blk.Dot)
3	1X20487	I.F. Coil & Shield Assembly
4	1X20485	Diode Coil & Shield Assembly
5	25A20503	Output Transformer
6	50B20508	Speaker (4" Electro)
7	30A11643	Hank Antenna (20')
8	23A20504	Elect. Cond. & Strap (HP) (Dual 20-150V.)
9	1X20506	Gang & Pulley Assembly
10	20A18355	Single Trimmer
11	889801	Tubular Condenser (.01-100V.)
12	889825	Tubular Condenser (.01-200V.)
13	889802	Tubular Condenser (.02-400V.)
14	889805	Tubular Condenser (.05-100V.)
15	889816	Tubular Condenser (.05-400V.)
16	889814	Tubular Condenser (.1-100V.)
17	889830	Tubular Condenser (.25-100V.)
18	889833	Tubular Condenser (.03-200V.)
19	2186505	Molded Mica Condenser (50 Mmf.)20%
20	2186517	Molded Mica Condenser (250 Mmf.)20%
21	2186500	Molded Mica Condenser (500 Mmf.)20%
22	686179	Carbon Resistor (3.3 Meg.-1/3-20)N.I.
23	686071	Carbon Resistor (1.0 Meg.-1/3-20)N.I.
24	686011	Carbon Resistor (470,000-1/3-20)N.I.
25	686003	Carbon Resistor (220,000-1/3-20)N.I.
26	686050	Carbon Resistor (22,000-1/3-20)N.I.
27	686197	Carbon Resistor (270-1/3-10)N.I.
28	686092	Carbon Resistor (200-1/3-10)N.I.
29	686067	Carbon Resistor (33-1/2-20)N.I.
30	18A11629	Volume Control & Switch (.5 Meg)
31	65X11854	Bulb (Brown Bead) #47



I.F. = 455 K.C.
FREQ. RANGE
540 TO 1720 K.C.

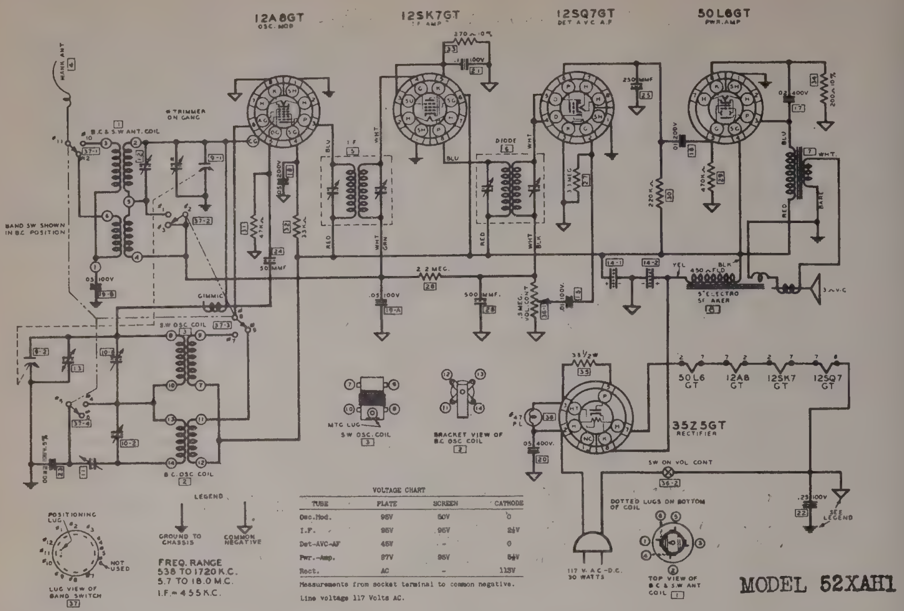
SEE INDEX FOR OTHER DATA ON ALL MODELS

MODELS 56-XA1 & 56-XAW SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	1X20937 1X21123	Rack & Loop Assembly (Used on 56XA1) Rack & Loop assembly (Used on 56XAW)
2	24A20509	Osc. Coil (Ceramic) Grn-Blk. Dot.
3	1X20932	I.F. Coil & Shield Assembly
4	1X20935	Diode Coil & Shield Assembly
5	25A20503	Output Transformer
6	50B20653	Speaker (5" Electro)
7	1X20876	Tuning Unit & Pulley Assembly
8	20A18740	Trimmer & "U" Bracket (On Loop Assem.)
9	23A20904	Elect. Cond. & Strap (20-20/150V.)
10	889801	Tubular Condenser (.01-100V.)
11	889825	Tubular Condenser (.01-200V.)
12	889802	Tubular Condenser (.02-400V.)
13	889833	Tubular Condenser (.03-200V.)
14	889805	Tubular Condenser (.05-100V.)
15	889816	Tubular Condenser (.05-400V.)
16	889814	Tubular Condenser (.1-100V.)
17	889830	Tubular Condenser (.25-100V.)
18	2186505	Molded Mica Condenser (50 MMF) 20%
19	2186517	Molded Mica Condenser (250 MMF) 20%
20	2186500	Molded Mica Condenser (500 MMF) 20%
21	686179	Carbon Resistor (3.3 Meg-1/3-20)N.I.
22	686071	Carbon Resistor (1.0 Meg-1/3-20)N.I.
23	686011	Carbon Resistor (470,000-1/3-20)N.I.
24	686003	Carbon Resistor (220,000-1/3-20)N.I.
25	686050	Carbon Resistor (22,000-1/3-20)N.I.
26	686197	Carbon Resistor (270-1/3-10)N.I.
27	686293	Carbon Resistor (150-1/2-20)N.I.
28	686067	Carbon Resistor (33-1/2-20)N.I.
29	18A11629	Volume Control & Switch (.5 Meg)
30	65X11854	Bulb (Brown Bead) #47
31	20B21592	Compensating Condenser.
32	20B20911	Trimmer & "L" Bracket (R.H.)
33	23A22953	Tubular Elect. Cond. (20-25V.)

MODELS 52XAH1, B-150
Model B-150

GALVIN MFG. CO.



VOLTAGE CHART

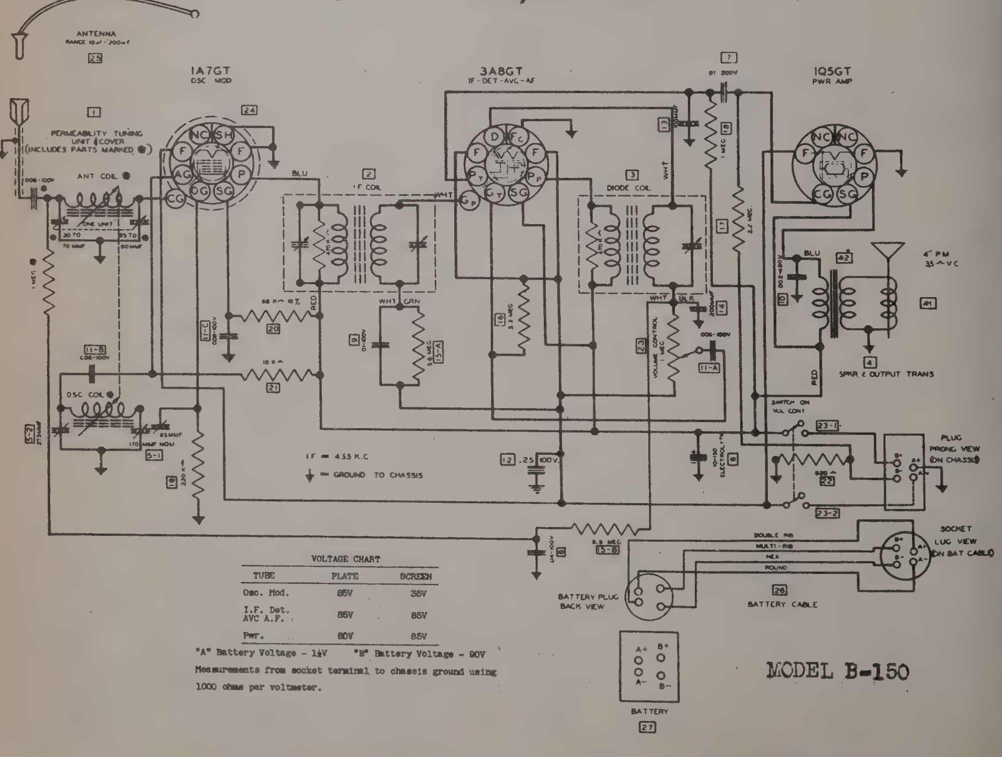
TUBE	PLATE	SCREEN	CATHODE
Osc.Mod.	95V	50V	0
I.F.	95V	95V	2½V
Det-AVC-AF	45V	-	0
Pwr.-Amp.	87V	95V	5½V
Rect.	AC	-	113V

Measurements from socket terminal to common negative.

Line voltage 117 Volts AC.

MODEL 52XAH1

FOR OTHER DATA, SEE INDEX



VOLTAGE CHART

TUBE	PLATE	SCREEN
Osc. Mod.	85V	35V
I.F. Det. AVC A.F.	85V	85V
Pwr.	80V	85V

"A" Battery Voltage - 1½V "B" Battery Voltage - 90V

Measurements from socket terminal to chassis ground using 1000 ohms per voltmeter.

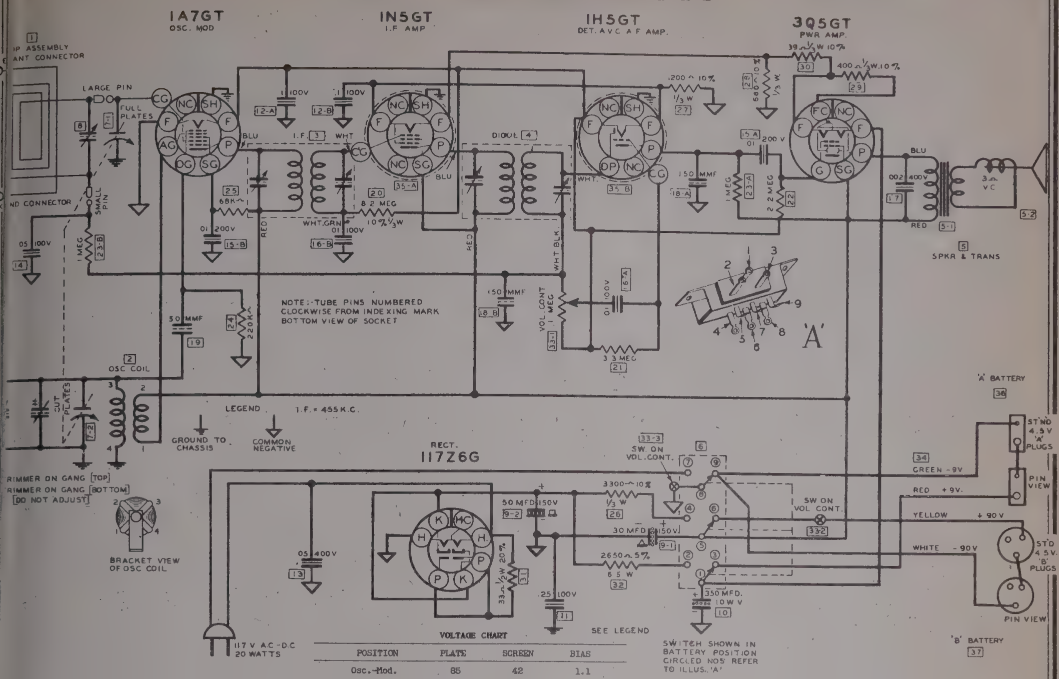
MODEL B-150

MODELS 65BP1,65BP2,
65BP3,65BP4

MODELS 57BP1,57BP2

GALVIN MFG. CO.

CIRCUIT DIAGRAM MODELS 57BP1 & 2



Line Voltage - 117 Volts A.C.

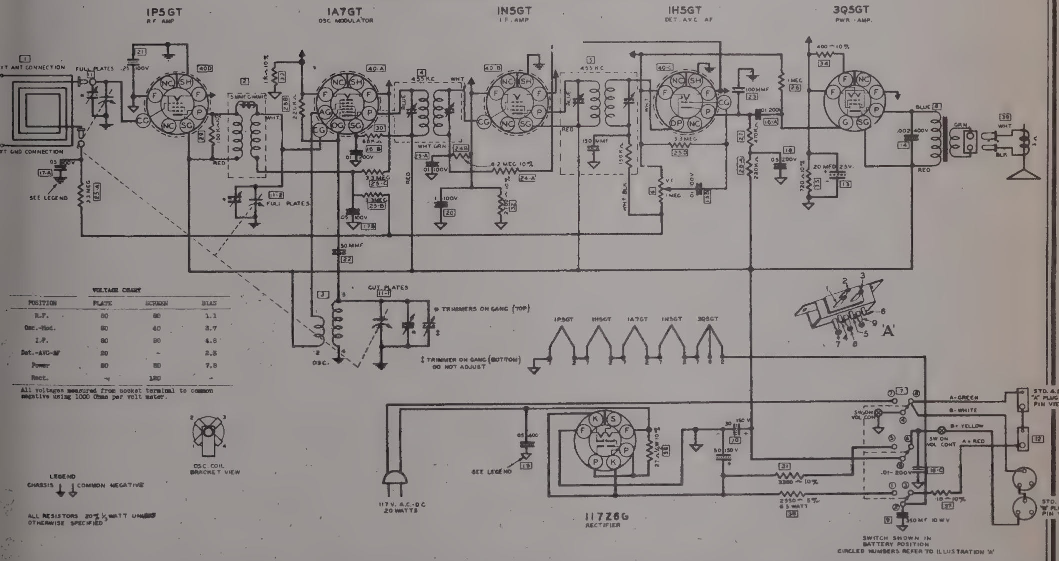
voltages measured from socket terminal to common negative
ng 1000 Ohms per volt meter.

VOLTAGE CHART

POSITION	PLATE	SCREEN	BIAS
Osc.-Mod.	85	42	1.1
I.F.	85	85	3.7
Det.AVC.-AF	15	-	2.3
Power	85	87	8.5
Rect.	-	123	-

FOR OTHER DATA, SEE INDEX

CIRCUIT DIAGRAM MODELS 65BP1-2-3-4



VOLTAGE CHART

POSITION	PLATE	SCREEN	BIAS
R.F.	80	80	1.1
Osc.-Mod.	80	40	3.7
I.F.	80	80	4.8
Det.-AVC-AF	20	-	2.3
Power	80	80	7.8
Rect.	-	120	-

All voltages measured from socket terminal to common negative using 1000 Ohms per volt meter.

MODELS 57BP1,57BP2,60X1,60X2 60XA1,60XA2,60XW,61XW

GALVIN MFG. CO.

ALIGNMENT CHART MODELS 57BP1 & 2

* OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1720 K.C.	.1	Osc-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	200 Mmf.	External Antenna	5	1720 K.C.
3	1400 K.C.	200 Mmf.	External Antenna	6	1400 K.C.

Volume Control Set at Maximum

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 57BP1 & 2

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4200	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
85	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
95	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
26	600	Ant. Terminal	400 Ohms	None	.38

Volume Control set at maximum.
* .05 Watts = .38 Volts.

** Output meter connected across voice coil.

ALIGNMENT CHART MODELS 65BP1-2-3-4

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1720 K.C.	.1	Osc-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	200 Mmf.	External Antenna	5	1720 K.C.
3	1400 K.C.	200 Mmf.	External Antenna	6	1400 K.C.
4	1400 K.C.	200 Mmf.	External Antenna	7	1400 K.C.

Volume Control Set at Maximum

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 65BP1-2-3-4

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
7100	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
185	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
200	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
11	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
2	600	Ant. Terminal	400 Ohms	None	.38

Volume Control set at maximum.
* .05 Watts = .38 Volts.

** Output meter connected across voice coil.

ALIGNMENT CHART

MODELS 60X1 - 60X2 - 60XW - 60XA1 - 60XA2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected to	Adjust Trimmer No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod Grid	5	455 K.C.
3	Minimum 1720 K.C.	.1 Mfd.	Osc-Mod Grid	6	1720 K.C.
4	1400 K.C.	200 Mmf.	External Antenna Terminal	7	1400 K.C.

Volume Control set at Maximum
NOTE: Wave Trap adjustment set for minimum deflection on output meter.

ALIGNMENT CHART

MODEL 61XW

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmer No.	Generator Set At
1	Minimum 1600 K.C.	.1 Mfd.	B.C.	Osc-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	.1 Mfd.	B.C.	Osc-Mod. Grid	5	455 K.C.
3	Minimum 1600 K.C.	.1 Mfd.	B.C.	Osc-Mod. Grid	6	1600 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	3.2 M.C.	400 ohms	S.W.	External Antenna Terminal	8	3.2 M.C.

Volume Control set at Maximum
NOTE: Wave Trap adjustment set for minimum deflection on output meter.

VOLTAGE CHART

TUBE	PLATE	SCREEN	CATHODE
R.F.	80V	80V	2.2
Osc.-Mod.	80V	80V	0.0
I.F.	80V	80V	2.0
Det-AVC-A.F.	45V	-	0.0
Output	75V	80V	- 4.5
Rect.	AC	-	100V.

All voltages measured from common negative with 1000 ohm per volt meter.
Line voltage 117 Volts AC

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
6800	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
155	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
170	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
35	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
6	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control set at Maximum * .05 Watts = .38 Volts ** Output meter connected across voice coil.

ALIGNMENT CHART MODEL 83K1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	5	1720 K.C.
3	600 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	6	600 K.C.
4	1400 K.C.	400 Ohms	B.C.	External Antenna Terminal	7	1400 K.C.
5	5.8 M.C.	.1 Mfd.	Pol.	Osc.-Mod.Grid	8	5.8 M.C.
6	4.1 M.C.	400 Ohms	Pol.	External Antenna Terminal	9	4.1 M.C.
7	18 M.C.	.1 Mfd.	S.W.	Osc.-Mod.Grid	10	18 M.C.
8	16 M.C.	400 Ohms	S.W.	External Antenna Terminal	11	16 M.C.

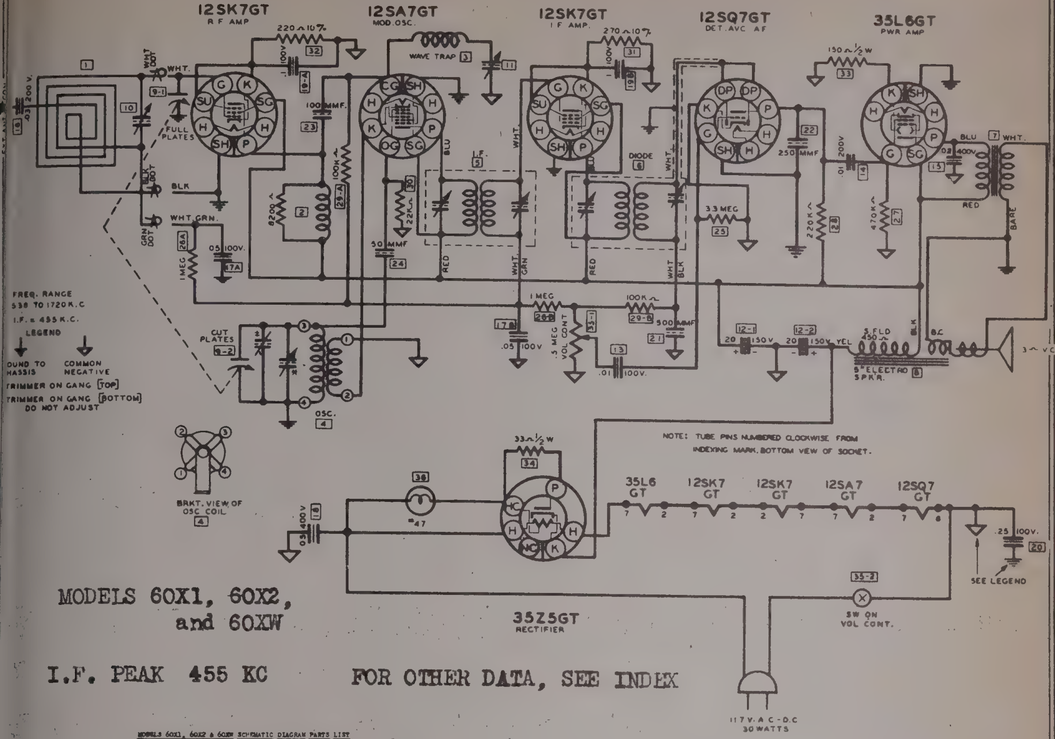
Volume Control Set at Maximum. Tone Control Set in Treble Position.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 83K1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3500	455	I.F. Grid	.1 Mfd.	.5 Meg.	.63
40	455	Mod. Grid	.1 Mfd.	.5 Meg.	.63
45	600	Mod. Grid	.1 Mfd.	.5 Meg.	.63
4	600	R.F. Grid	.1 Mfd.	.5 Meg.	.63
3	600	Antenna Terminal	400 Ohms	None	.63

Volume Control Set at Maximum. ** Output meter connected across voice coil.
* .05 Watts = .63 Volts

GALVIN MFG. CO.



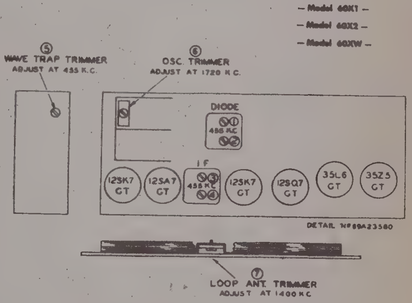
MODELS 60X1, 60X2, and 60XW

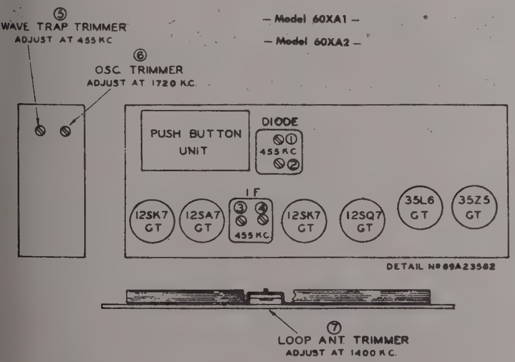
I.F. PEAK 455 KC

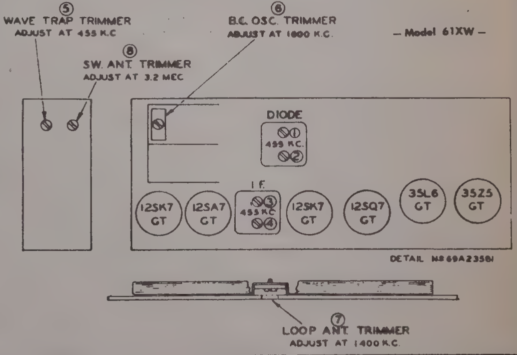
FOR OTHER DATA, SEE INDEX

MODELS 60X1, 60X2 & 60XW SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	1X20674	Back & Loop Assembly (Used on 60X1 Only)
	1X20922	Back & Loop Assembly (Used on 60X2 Only)
	1X21129	Back & Loop Assembly (Used on 60XW Only)
2	24A20559	R.F. Coupling Coil (Gray-Red)
3	24A21858	Wave Trap Coil
4	24A20509	Oscillator Coil (Green-Black Dot)
5	1X20646	I.F. Coil & Shield Assembly
6	1X20643	Diode Coil & Shield Assembly
7	25A20503	Output Transformer
8	50B20653	Speaker (5" Electro)
9	1X20586	Gang & Pulley Assembly
10	20A18740	Trimmer & "U" Bracket (on loop assembly)
11	20X21878	Trimmer Condenser
12	23A20504	Elect. Cond. & Strap (20-20 MFD/150V.)
13	889801	Tubular Condenser (.01-100V.)
14	889825	Tubular Condenser (.01-200V.)
15	889802	Tubular Condenser (.02-400V.)
16	889833	Tubular Condenser (.03-200V.)(On loop assem.)
17-A	889805	Tubular Condenser (.05-100V.)
17-B	889805	Tubular Condenser (.05-100V.)
18	889816	Tubular Condenser (.05-400V.)
19-A	889814	Tubular Condenser (.1-100V.)
19-B	889814	Tubular Condenser (.1-100V.)
20	889810	Tubular Condenser (.25-100V.)
21	21R6500	Molded Mica Condenser (500 Mmf.) 20%
22	21R6517	Molded Mica Condenser (250 Mmf.) 20%
23	21R6511	Molded Mica Condenser (100 Mmf.) 20%
24	21R6503	Molded Mica Condenser (50 Mmf.) 20 %
25	6R6179	Carbon Resistor (3.3 Meg.-1/3-20)W.I.
26-A	6R6071	Carbon Resistor (1.0 Meg.-1/3-20)W.I.
26-B	6R6071	Carbon Resistor (1.0 Meg.-1/3-20)W.I.
27	6R6011	Carbon Resistor (470,000-1/3-20)W.I.
28	6R6005	Carbon Resistor (220,000-1/3-20)W.I.
29-A	6R6029	Carbon Resistor (100,000-1/3-20)W.I.
29-B	6R6029	Carbon Resistor (100,000-1/3-20)W.I.
30	6R6050	Carbon Resistor (22,000-1/3-20)W.I.
31	6R6197	Carbon Resistor (270-1/3-10)W.I.
32	6R6095	Carbon Resistor (220-1/3-10)W.I.
33	6R6295	Carbon Resistor (150-1/2-20)W.I.
34	6R6067	Carbon Resistor (33-1/2-20)W.I.
35	18A14629	Volume Control & Switch (.5 Meg.)
36	65X11854	Bulb (Brown Bead) #47

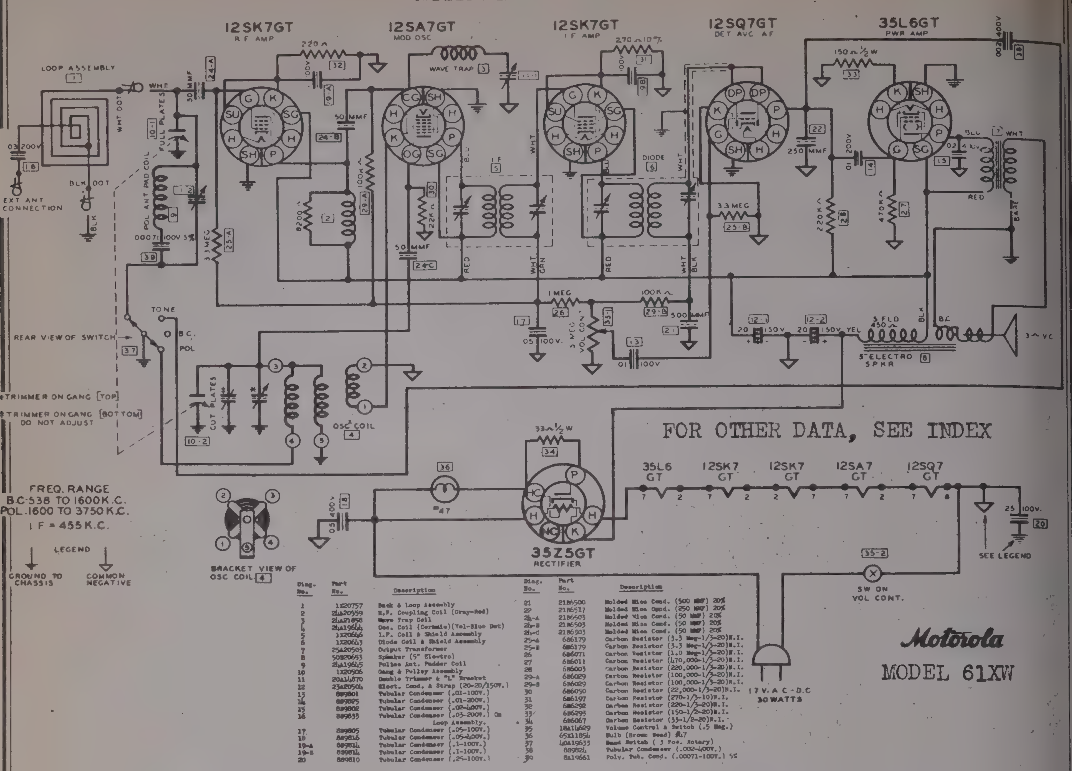





— Model 61XW —
⑤ WAVE TRAP TRIMMER ADJUST AT 455 K.C.
⑥ B.C. OSC. TRIMMER ADJUST AT 1600 K.C.
⑧ SW. ANT. TRIMMER ADJUST AT 3.2 MEC
DIODE
455 KC.
I F
455 KC
12SK7 GT
12SA7 GT
12SK7 GT
12SQ7 GT
35L6 GT
35Z5 GT
DETAIL Nº 69A23581
⑦ LOOP ANT. TRIMMER ADJUST AT 1400 K.C.

MODELS 60XA1,60XA2, 61XW

GALVIN MFG. CO.



FREQ. RANGE
B.C.538 TO 1600 K.C.
POL. 1600 TO 3750 K.C.
I F = 455 K.C.

LEGEND

GROUND TO CHASSIS

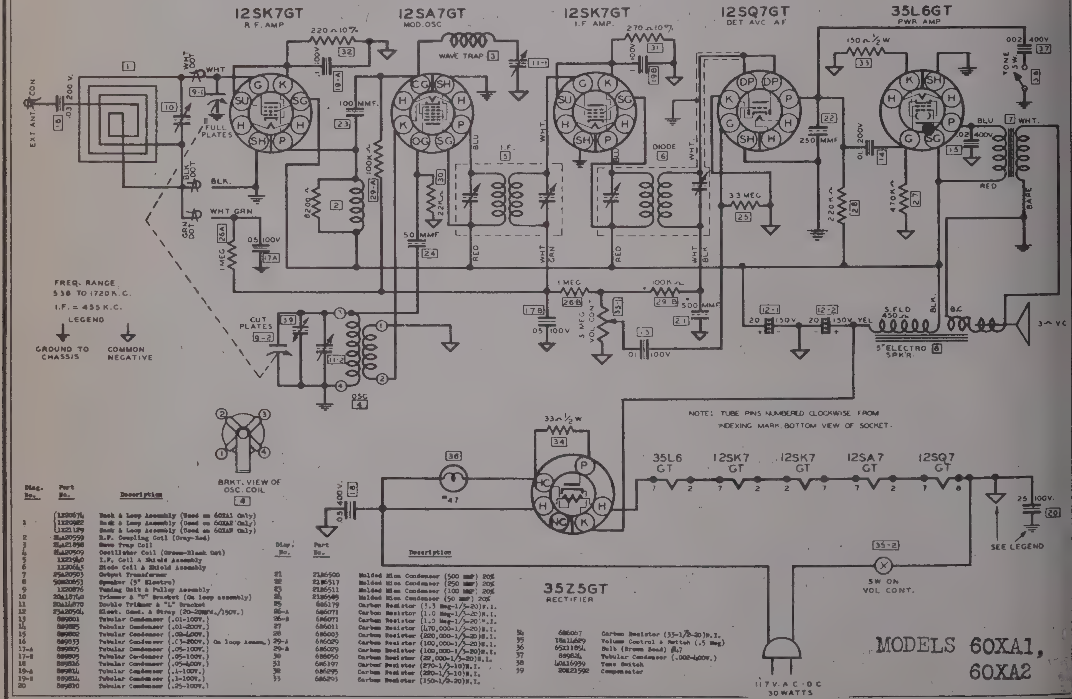
COMMON NEGATIVE

FOR OTHER DATA, SEE INDEX

Motorola

MODEL 61XW

Diag. No.	Part No.	Description
1	1X20757	Back & Loop Assembly
2	24A20559	R.F. Coupling Coil (Gray-Red)
3	24A21858	Wave Trap Coil
4	24A19644	Osc. Coil (Ceramic)(Yel-Blue Dot)
5	1X20646	I.F. Coil & Shield Assembly
6	1X20643	Diode Coil & Shield Assembly
7	25A20503	Output Transformer
8	50B20653	Speaker (5" Electro)
9	24A19645	Police Ant. Padder Coil
10	1X20506	Gang & Pulley Assembly
11	20A14870	Double Trimmer & "L" Bracket
12	23A20504	Elect. Cond. & Strap (20-20/150V.)
13	8S9801	Tubular Condenser (.01-100V.)
14	8S9825	Tubular Condenser (.01-200V.)
15	8S9802	Tubular Condenser (.02-400V.)
16	8S9833	Tubular Condenser (.03-200V.) On Loop Assembly.
17	8S9805	Tubular Condenser (.05-100V.)
18	8S9816	Tubular Condenser (.05-400V.)
19-A	8S9814	Tubular Condenser (.1-100V.)
19-B	8S9814	Tubular Condenser (.1-100V.)
20	8S9810	Tubular Condenser (.25-100V.)
21	21B6500	Molded Mica Cond. (500 MMF) 20%
22	21B6517	Molded Mica Cond. (250 MMF) 20%
24-A	21B6503	Molded Mica Cond. (50 MMF) 20%
24-B	21B6503	Molded Mica Cond. (50 MMF) 20%
24-C	21B6503	Molded Mica Cond. (50 MMF) 20%
25-A	6B6179	Carbon Resistor (3.3 Meg-1/3-20)M.I.
25-B	6B6179	Carbon Resistor (3.3 Meg-1/3-20)M.I.
26	6B6071	Carbon Resistor (1.0 Meg-1/3-20)M.I.
27	6B6011	Carbon Resistor (470,000-1/3-20)M.I.
28	6B6003	Carbon Resistor (220,000-1/3-20)M.I.
29-A	6B6029	Carbon Resistor (100,000-1/3-20)M.I.
29-B	6B6029	Carbon Resistor (100,000-1/3-20)M.I.
30	6B6050	Carbon Resistor (22,000-1/3-20)M.I.
31	6B6197	Carbon Resistor (270-1/3-10)M.I.
32	6B6292	Carbon Resistor (220-1/3-20)M.I.
33	6B6293	Carbon Resistor (150-1/2-20)M.I.
34	6B6067	Carbon Resistor (33-1/2-20)M.I.
35	18A14629	Volume Control & Switch (.5 Meg.)
36	65X11854	Bulb (Brown Bead) #47
37	40A19633	Band Switch (3 Pos. Rotary)
38	8S9824	Tubular Condenser (.002-400V.)
39	8A19661	Poly. Tub. Cond. (.00071-100V.) 5%



FREQ. RANGE
538 TO 1720 K.C.
I.F. = 455 K.C.

LEGEND

GROUND TO CHASSIS

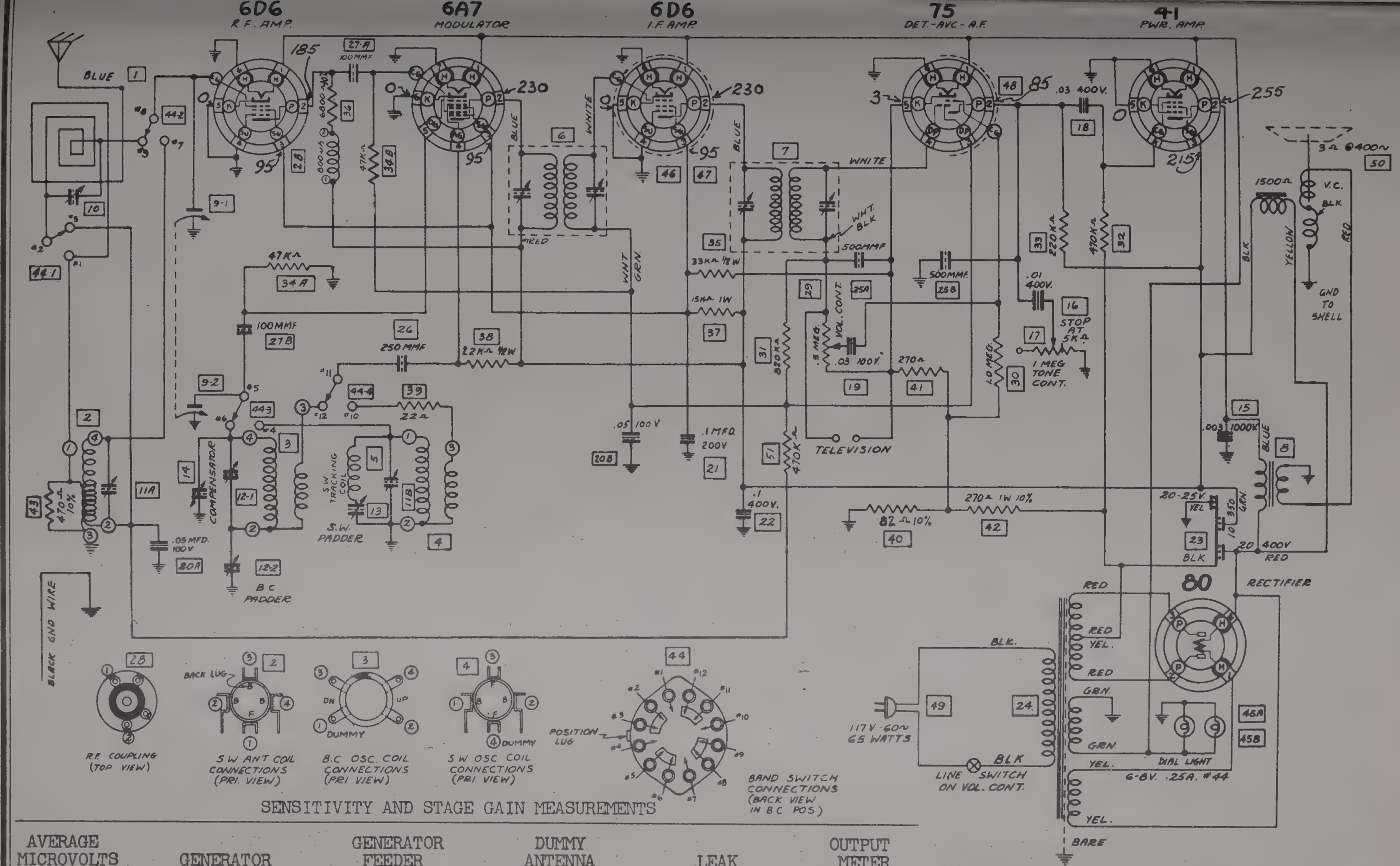
COMMON NEGATIVE

NOTE: TUBE PINS NUMBERED CLOCKWISE FROM INDEXING MARK, BOTTOM VIEW OF SOCKET.

Diag. No.	Part No.	Description
1	1X20674 1X20922 1X21129	Back & Loop Assembly (Used on 60XA1 Only) Back & Loop Assembly (Used on 60XA2 Only) Back & Loop Assembly (Used on 60XAW Only)
2	24A20559	R.F. Coupling Coil (Gray-Red)
3	24A21858	Wave Trap Coil
4	24A20509	Oscillator Coil (Green-Black Dot)
5	1X21940	I.F. Coil & Shield Assembly
6	1X20645	Diode Coil & Shield Assembly
7	25A20503	Output Transformer
8	50B20653	Speaker (5" Electro)
9	1X20876	Tuning Unit & Pulley Assembly
10	20A18740	Trimmer & "U" Bracket (On loop assembly)
11	20A14870	Double Trimmer & "L" Bracket
12	23A20504	Elect. Cond. & Strap (20-20Mfd./150V.)
13	8S9801	Tubular Condenser (.01-100V.)
14	8S9825	Tubular Condenser (.01-200V.)
15	8S9802	Tubular Condenser (.02-400V.)
16	8S9833	Tubular Condenser (.03-200V.) On loop Assem.)
17-A	8S9805	Tubular Condenser (.05-100V.)
17-B	8S9805	Tubular Condenser (.05-100V.)
18	8S9816	Tubular Condenser (.05-400V.)
19-A	8S9814	Tubular Condenser (.1-100V.)
19-B	8S9814	Tubular Condenser (.1-100V.)
20	8S9810	Tubular Condenser (.25-100V.)
21	21B6500	Molded Mica Condenser (500 MMF) 20%
22	21B6517	Molded Mica Condenser (250 MMF) 20%
23	21B6511	Molded Mica Condenser (100 MMF) 20%
24	21B6503	Molded Mica Condenser (50 MMF) 20%
25	6B6179	Carbon Resistor (3.3 Meg-1/3-20)M.I.
26-A	6B6071	Carbon Resistor (1.0 Meg-1/3-20)M.I.
26-B	6B6071	Carbon Resistor (1.0 Meg-1/3-20)M.I.
27	6B6011	Carbon Resistor (470,000-1/3-20)M.I.
28	6B6003	Carbon Resistor (220,000-1/3-20)M.I.
29-A	6B6029	Carbon Resistor (100,000-1/3-20)M.I.
29-B	6B6029	Carbon Resistor (100,000-1/3-20)M.I.
30	6B6050	Carbon Resistor (22,000-1/3-20)M.I.
31	6B6197	Carbon Resistor (270-1/3-10)M.I.
32	6B6295	Carbon Resistor (220-1/3-10)M.I.
33	6B6293	Carbon Resistor (150-1/2-20)M.I.
34	6B6067	Carbon Resistor (33-1/2-20)M.I.
35	18A14629	Volume Control & Switch (.5 Meg)
36	65X11854	Bulb (Brown Bead) #47
37	8S9824	Tubular Condenser (.002-400V.)
38	40A16939	Tone Switch
39	20B21592	Compensator

MODELS 60XA1,
60XA2

GALVIN MFG. CO.



SENSITIVITY AND STAGE GAIN MEASUREMENTS

AVERAGE MICROVOLTS INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
2800	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
30	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
35	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
7	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
2	600	Ant. Terminal	400 Ohms	None	.38

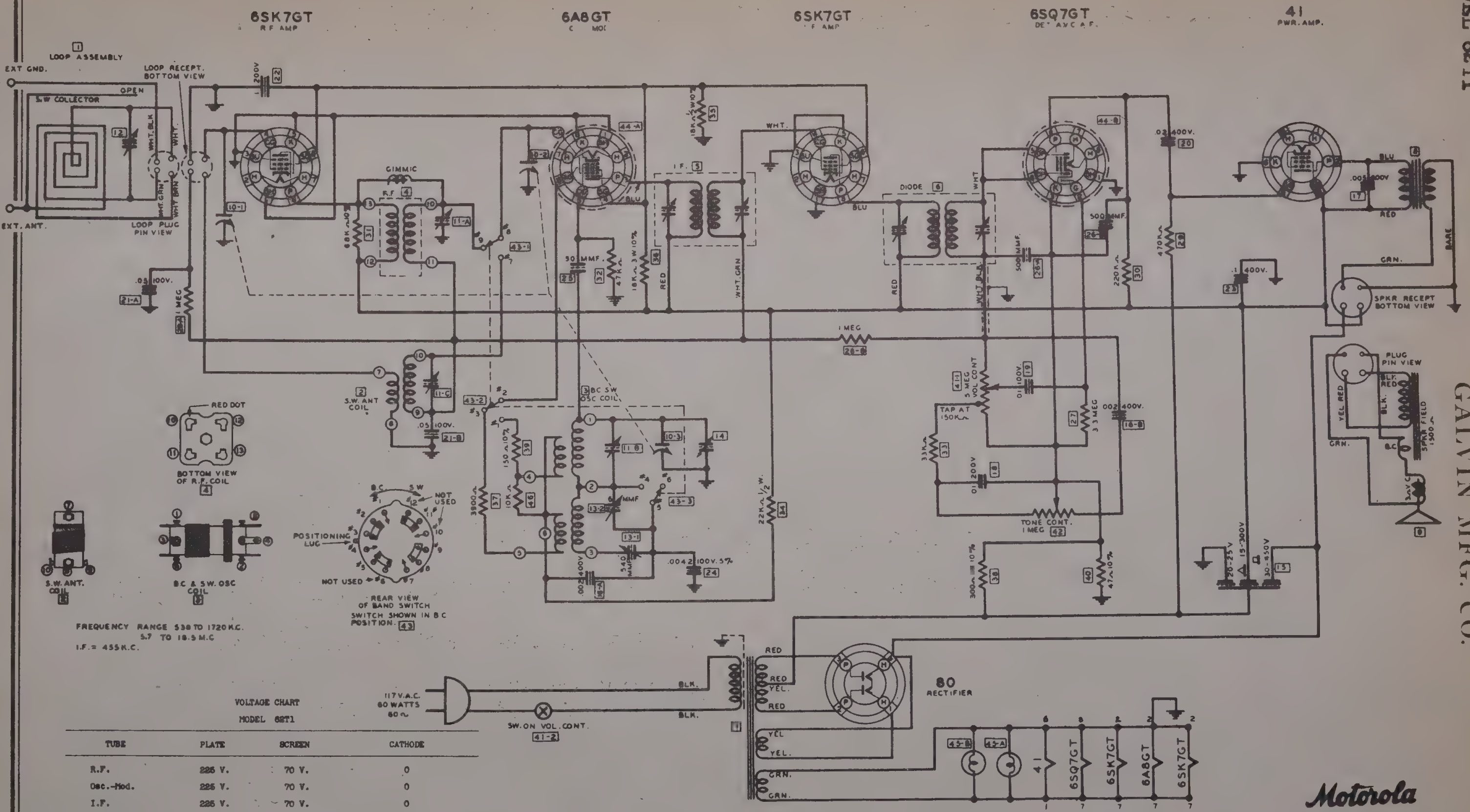
Volume Control set at maximum. * .05 Watts = .38 Volts ** Output meter connected
Tone Control set in treble position. across voice coil.

VOLTAGE
Measurements from socket terminal to chassis ground using 1000 ohms per volt meter.
Line Voltage - 117 Volts.

FOR ALIGNMENT, SEE MODEL 61D (with loop)
Vol. XI

MODEL 62T1

GALVIN MFG. CO.



VOLTAGE CHART

MODEL 62T1

TUBE	PLATE	SCREEN	CATHODE
R.F.	225 V.	70 V.	0
Osc.-Mod.	225 V.	70 V.	0
I.F.	225 V.	70 V.	0
Det.-AVC-AF	80 V.	-	-2.5 V.
Pwr.-Amp.	215 V.	225 V.	0
Rectifier	A.C.	-	300 V.(From fil.)

Measurements from socket terminal to chassis ground using 1000 ohms per volt meter.

Line Voltage - 117 Volts A.C.

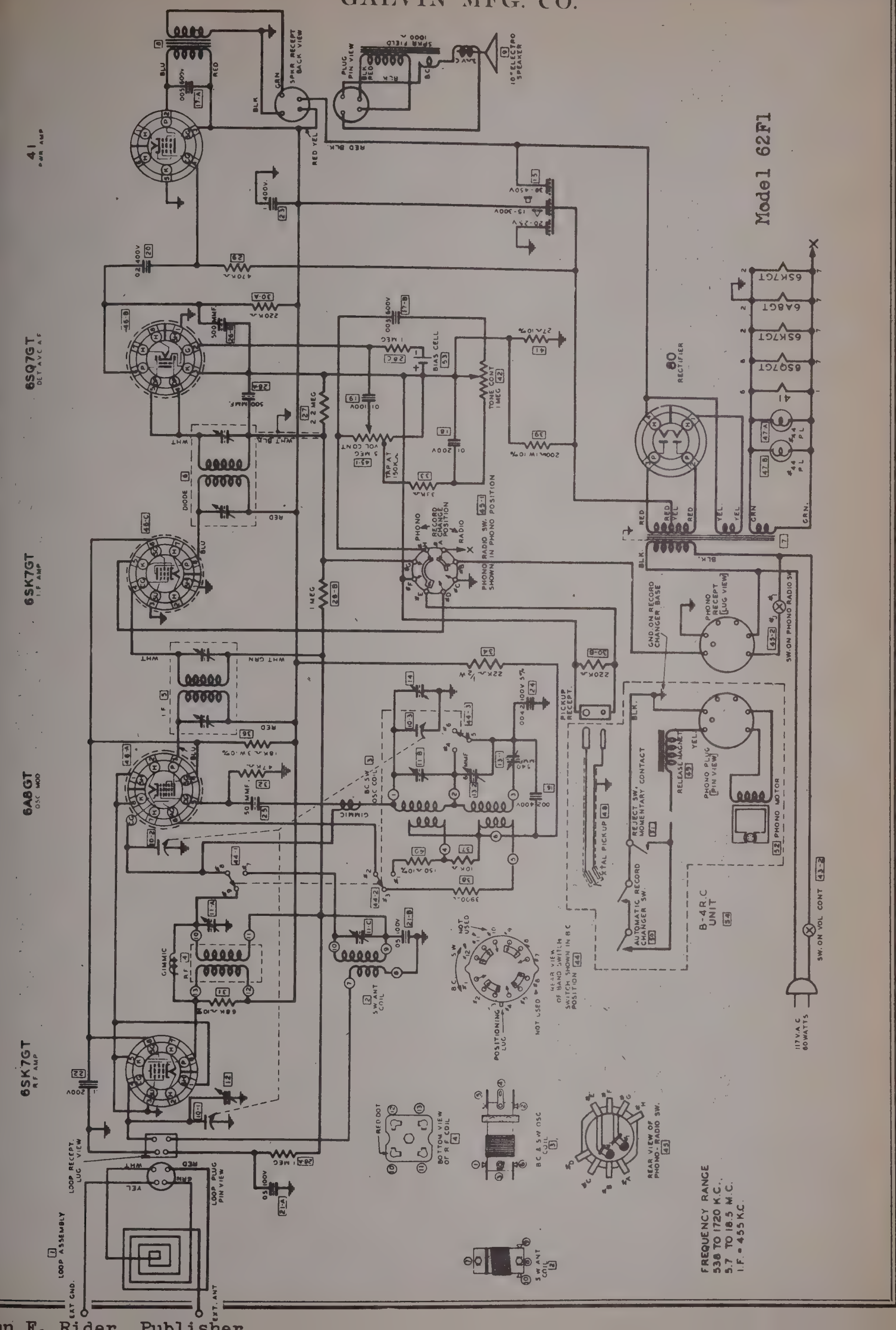
Motorola

MODEL 62T1

I.F. PEAK 455 KC

FOR OTHER DATA SEE INDEX

GALVIN MFG. CO.



FREQUENCY RANGE
538 TO 1720 K.C.
5.7 TO 18.5 M.C.
I.F. = 455 K.C.

ALIGNMENT CHART MODEL 62F1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	5	1720 K.C.
3	538 K.C.	.1 Mfd.	B.C.	Osc-Mod.Grid	6	538 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	18 M.C.	.1 Mfd.	S.W.	Osc-Mod.Grid	8	18 M.C.
6	16 M.C.	400 Ohms	S.W.	External Antenna Terminal	9	16 M.C.
7	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	10	1400 K.C.

Volume Control Set at Maximum.

ALIGNMENT CHART MODEL 83F1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected to	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	B.C.	Osc.Mod. Grid	1-2-3-4	455 K.C.
2	1720 K.C.	400 Ohms	B.C.	Ext. Ant. Con. Clip	5	1720 K.C.
3	1400 K.C.	400 Ohms	B.C.	Ext. Ant. Con. Clip	6	1400 K.C.
4	* 600 K.C.	400 Ohms	B.C.	Ext. Ant. Con. Clip	7	600 K.C.
5	5.8 M.C.	400 Ohms	Pol.	S.W. Collector Clip on Loop	8	5.8 M.C.
6	4.1 M.C.	400 Ohms	Pol.	S.W. Collector Clip on Loop	9	4.1 M.C.
7	18.0 M.C.	400 Ohms	S.W.	S.W. Collector Clip on Loop	10	18.0 M.C.
8	16.0 M.C.	400 Ohms	S.W.	S.W. Collector Clip on Loop	11	16.0 M.C.

Volume Control Set at Maximum.
* Rock condenser until a combination is found which gives the highest output reading.

VOLTAGE CHART MODEL 62F1

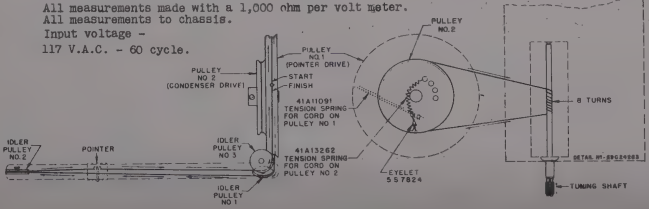
POSITION	PLATE	SCREEN	CATHODE
R.F.	220 V.	80 V.	0
Osc.-Mod.	220 V.	80 V.	0
I.F. Amp.	220 V.	80 V.	0
Det.-AVC.-A.F.	85 V.	-	-1.5 V.
Pwr. Amp.	210 V.	220 V.	0
Rect.	AC	-	280 V. from filament

All measurements made with a 1000 ohm per volt meter.
All measurements to chassis. Input voltage - 117 V. A.C. - 60 cycle.

VOLTAGE CHART MODEL 83F1

POSITION	PLATE	SCREEN	CATHODE
R.F. Amp.	225 V.	90 V.	0
Osc. Mod.	225 V.	90 V.	0
I.F. Amp.	225 V.	90 V.	0
Det. AVC. AF	125 V.	-	-4 V.
Phase Inv.	125 V.	-	-4 V.
Pwr. Amp.	225 V.	235 V.	12 V.
Pwr. Amp.	225 V.	235 V.	12 V.
Rectifier	330 V. AC	-	325 V. from filament

All measurements made with a 1,000 ohm per volt meter.
All measurements to chassis.
Input voltage -
117 V.A.C. - 60 cycle.



PULLEY NO.2
PULLEY NO.1 (POINTER DRIVE)
PULLEY NO 2 (CONDENSER DRIVE)
START
FINISH
41A11091 TENSION SPRING FOR CORD ON PULLEY NO 1
8 TURNS
IDLER PULLEY NO.2
POINTER
IDLER PULLEY NO 3
41A13262 TENSION SPRING FOR CORD ON PULLEY NO 2
EYELET 557824
DETAIL NO-89C24263
TUNING SHAFT
IDLER PULLEY NO 1

MODEL 62F1 SENSITIVITY AND STAGE GAIN MEASUREMENTS

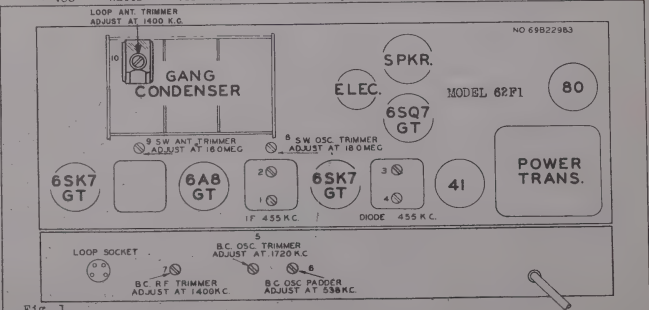
Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2500	455 K.C.	I.F. Grid	.1	.5 Meg.	.38 Volts
35	455 K.C.	Mod. Grid	.1	.5 Meg.	.38 Volts
40	600 K.C.	Mod. Grid	.1	.5 Meg.	.38 Volts
4	600 K.C.	R.F. Grid	.1	.5 Meg.	.38 Volts
3	600 K.C.	Ant. Terminal	200 Mmf.	None	.38 Volts

Volume Control Set at Maximum. Tone Control set at Treble position.
* .05 Watts = .38 Volts. ** Output meter connected across voice coil.

MODEL 83F1 SENSITIVITY AND STAGE GAIN MEASUREMENTS

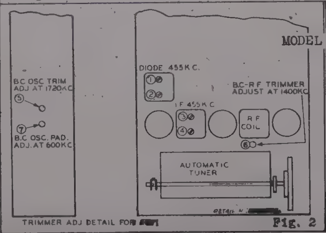
Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.63 Volts
40	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.63 Volts
45	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.63 Volts
4	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.63 Volts
3	600 K.C.	Ant. Terminal	400 Ohms	None	.63 Volts

Volume Control Set at Maximum. Tone Control set at Treble position.
* .05 Watts = .63 Volts. ** Output meter connected across voice coil.



LOOP ANT. TRIMMER ADJUST AT 1400 K.C.
10
NO 69B22983
GANG CONDENSER
SPKR.
ELEC.
MODEL 62F1
80
6SQ7 GT
9 SW ANT TRIMMER ADJUST AT 18 0 MEG
8 SW OSC. TRIMMER ADJUST AT 18 0 MEG
6SK7 GT
6A8 GT
2
1
6SK7 GT
3
4
41
POWER TRANS.
IF 455 K.C.
DIODE 455 K C.
LOOP SOCKET
5
B.C. OSC. TRIMMER ADJUST AT 1720 K.C
7
B.C. R.F TRIMMER ADJUST AT 1400K.C.
6
B.C OSC PADDER ADJUST AT 538K.C.

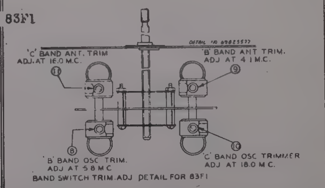
Fig. 1



MODEL 83F1
B.C OSC TRIM ADJ AT 1720KC
5
7
B.C OSC. PAD. ADJ. AT 600KC
DIODE 455K C.
1
2
I F 455 K C
3
4
B.C-R F TRIMMER ADJUST AT 1400KC
R F COIL
6
AUTOMATIC TUNER
DETAIL N [redacted]

TRIMMER ADJ DETAIL FOR [redacted]

Fig. 2



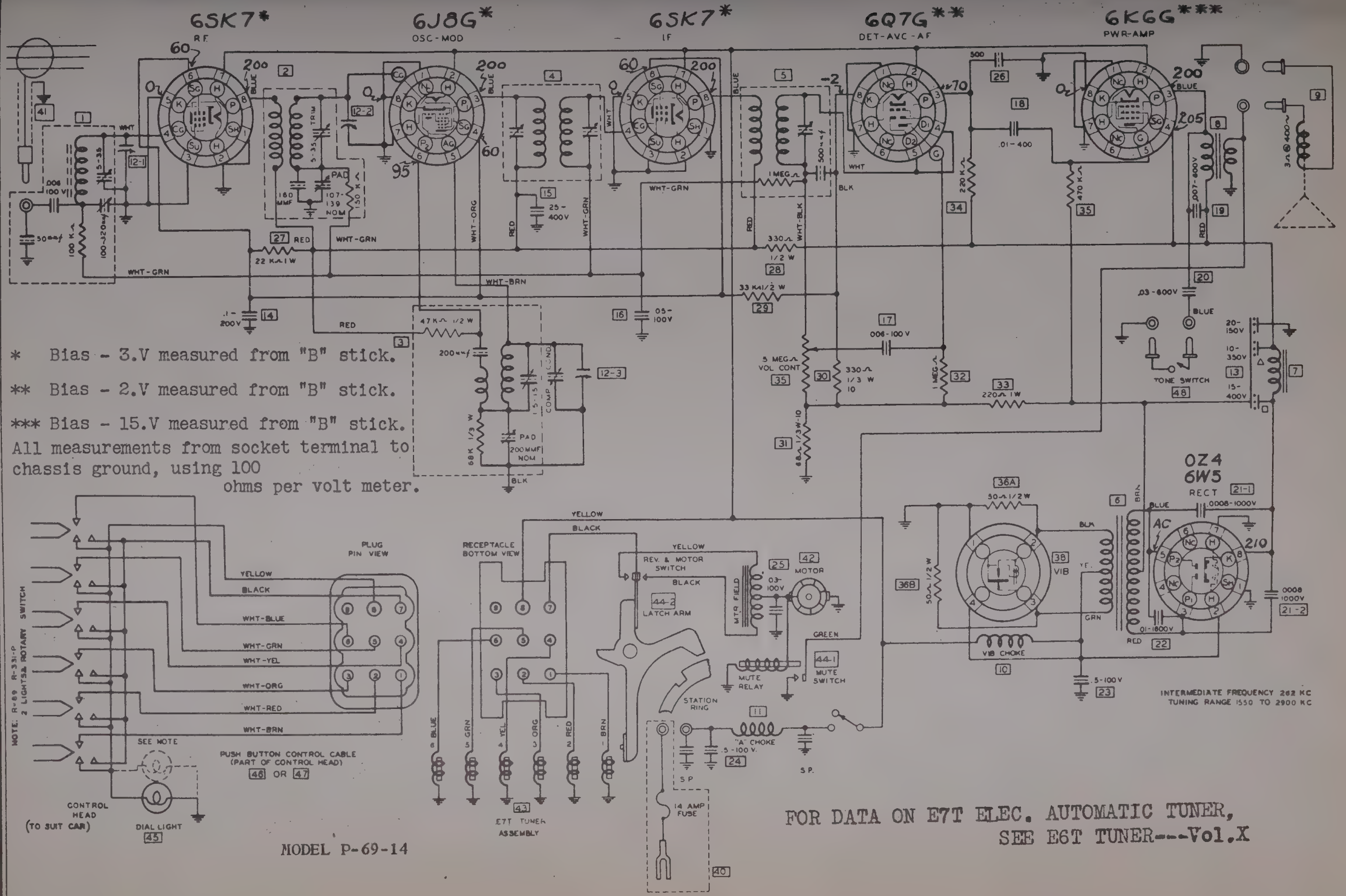
DETAIL NO 69B25577
'C' BAND ANT. TRIM ADJ. AT 16.0 M.C.
11
'B' BAND ANT TRIM. ADJ AT 4 1 M.C.
9
8
'B' BAND OSC TRIM. ADJ AT 5 8 M C
10
'C' BAND OSC TRIMMER ADJ AT 18.0 M C.

BAND SWITCH TRIM. ADJ DETAIL FOR 83F1

Fig. 3

GALVIN MFG. CO.

Battery voltage 6.3 V. Current consumption 5.1 Amps. Maximum power output 4.5 Watts.



* Bias - 3.V measured from "B" stick.

** Bias - 2.V measured from "B" stick.

*** Bias - 15.V measured from "B" stick.

All measurements from socket terminal to chassis ground, using 100 ohms per volt meter.

MODEL P-69-14

FOR DATA ON E7T ELEC. AUTOMATIC TUNER, SEE E6T TUNER---Vol.X

Model P-69-14 is a variable frequency receiver, designed to cover the Police Bands between 1550 K.C. and 2900 K.C. It is equipped with a 6-button electric automatic tuner so that any of six pre-selected police transmitters can be tuned in automatically..

POLICE CRUISER Model P-69-14

ANTENNA ADJUSTMENT

Proceed as follows:

1. Turn the receiver to maximum volume.

2. Turn the dial to a spot near 1600 K.C. that is entirely free from stations.

3. With a screw driver, adjust the antenna trimmer screw for maximum noise level.

4. After first trimming on noise level, tune in a weak station near 1600 K.C. and check the accuracy of the adjustment by readjusting the trimmer for maximum volume.

The antenna trimmer screw may be reached through a small hole in the receiver housing. Replace the plug button after adjustment.

TO SET AUTOMATIC TUNER

NOTE: Before setting any station, let the set warm up for not less than ten minutes. If you wish you can "set" the automatic tuner on the service bench before installing the radio in the car. Use a short aerial and peak the antenna trimmer to it. Then readjust the antenna trimmer after the installation in the car.

IMPORTANT: You will note that the 9-contact plug on the end of the control head cable has one pin that is shorter than the others. For the "setting up" procedure, this plug should be inserted in its receptacle on the receiver only half way. This will cause all of the magnet terminals to be connected, but will not permit the tuning motor to run during the adjustment, since the short pin will not make contact, thereby holding the motor circuit open. The motor should not be run at any time during the "setting up" procedure.

1. Loosen the AUTOMATIC LOCKING SCREW which can be reached by removing a plug button in the receiver housing. This screw should be turned counter-clockwise four or five revolutions - far enough to assure plenty of looseness.

2. Turn the dial all the way to the low frequency end (1550 K.C.)

3. Press the first button and hold it down. A faint "click" should be heard, indicating that the tuning magnet has attracted the latch bar.

4. Holding the magnet energized, turn the dial manually all the way to the high frequency end (2900 K.C.) and then all the way back to the low frequency end (1550 K.C.).

5. Still pressing on the button, tune in the station to be set on that button.

6. Proceed to set the remaining five stations. For each station follow steps 2, 3, 4, and 5, as outlined above. AT NO TIME IN THE SETTING UP PROCEDURE SHOULD THE TUNING MOTOR BE PERMITTED TO RUN.

7. Tighten the automatic locking screw very securely. Do not hold the tuning knob while locking the automatic, but allow the mechanism to turn to its natural stop.

8. Replace the plug button, making sure the spring contact in it touches the locking screw. This is essential for motor noise reasons.

9. Push the plug all the way into the receptacle on the receiver housing so the short motor pin will also make contact.

ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the R.F. coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 3 below, shows all trimmer locations.)

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6J8G) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 2). Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R.F. ALIGNMENT

1. Connect the signal generator to the antenna terminal through a 150 MMF condenser.

2. Set the signal generator at 2900 K.C. and with the condenser gang completely out of mesh adjust the 2900 K.C. trimmer in the oscillator coil can to the point showing the highest output reading.

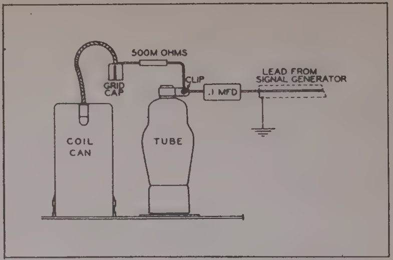


Figure 2

3. Set the signal generator at 1550 K.C. Turn the condenser gang completely in mesh and adjust the 1600 K.C. padder in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

4. Set the signal generator at 1600 K.C. and turn the condenser gang until the signal is heard. Adjust the 1600 K.C. padder on the antenna coil can for the maximum output reading.

5. Set the signal generator at 2800 K.C. Turn the condenser gang until the signal is heard. Adjust the 2800 K.C. trimmer in the antenna coil can, for maximum output reading.

6. Adjust the 2800 K.C. trimmer in the R.F. coil can for maximum output reading.

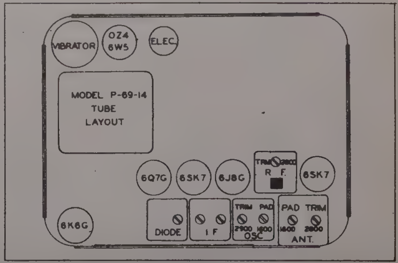
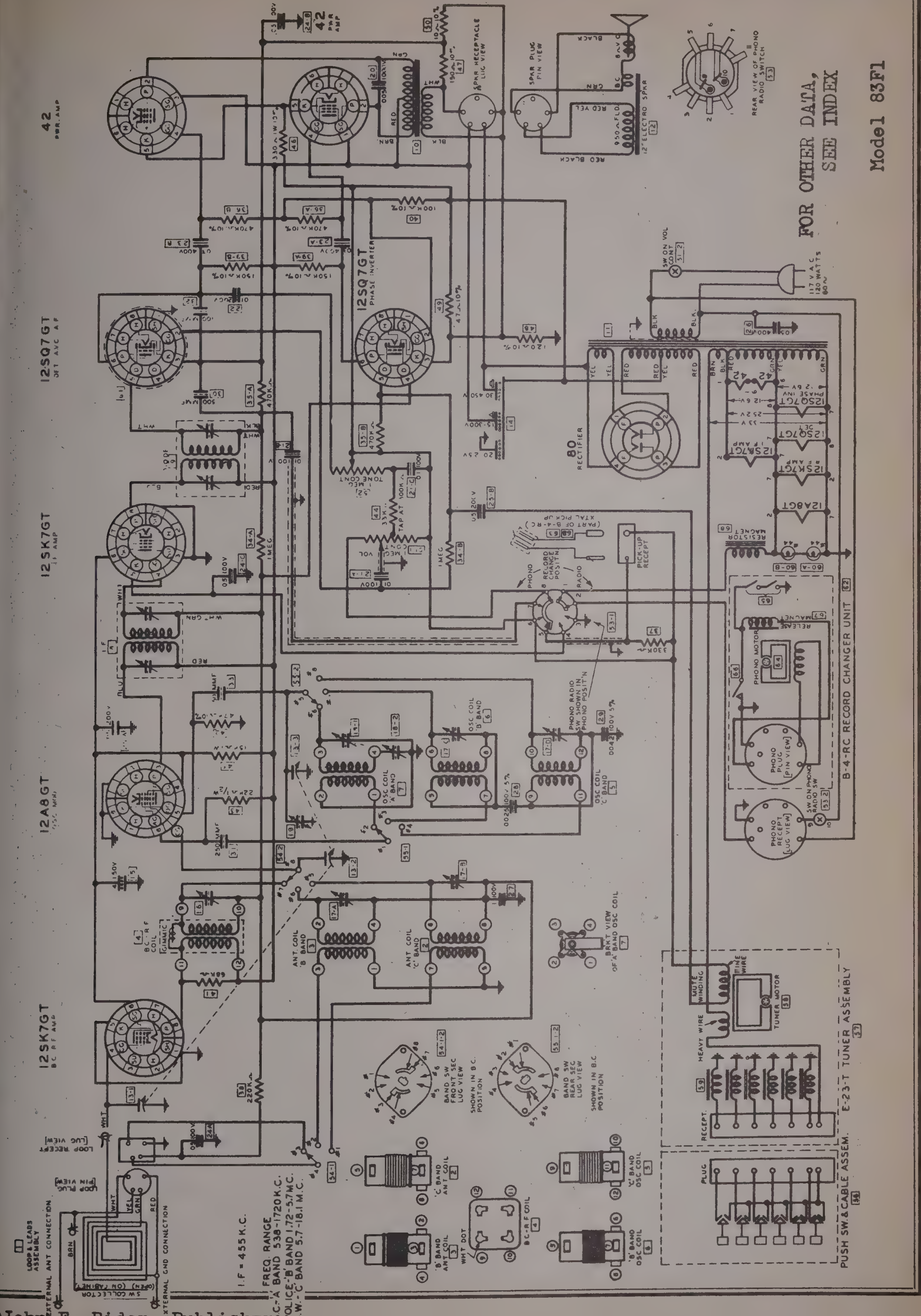


Figure 3

GALVIN MFG. CO.

MODEL 83F1



I.F. = 455 K.C.

FREQ. RANGE
BC-'A' BAND 538-1720 K.C.
POLICE 'B' BAND 1.72-5.7 M.C.
S.W. 'C' BAND 5.7-18.1 M.C.

FOR OTHER DATA, SEE INDEX

Model 83F1

GALVIN MFG. CO.

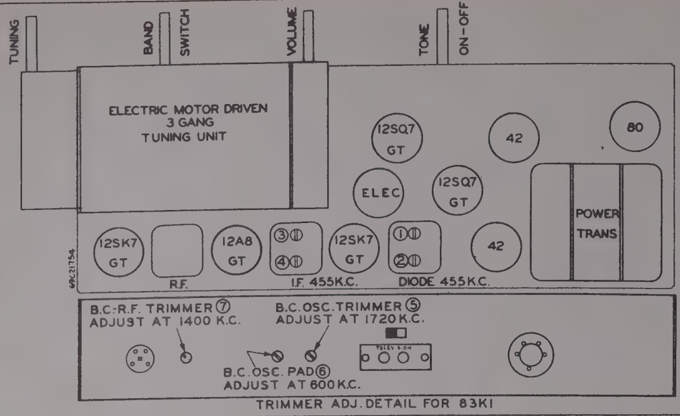
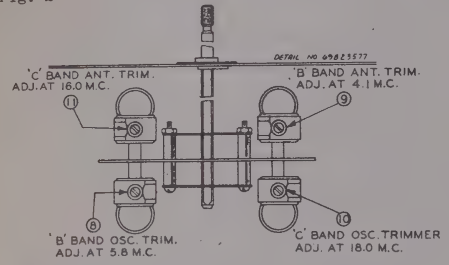

TUNING
BAND
SWITCH
VOLUME
TONE
ON-OFF
ELECTRIC MOTOR DRIVEN 3 GANG TUNING UNIT
12SQ7 GT
42
80
ELEC
12SQ7 GT
POWER TRANS
12SK7 GT
R.F.
12A8 GT
③ ④
I.F. 455K.C.
12SK7 GT
① ②
DIODE 455K.C.
42
B.C.-R.F. TRIMMER ⑦ ADJUST AT 1400 K.C.
B.C. OSC. TRIMMER ⑤ ADJUST AT 1720 K.C.
B.C. OSC. PAD ⑥ ADJUST AT 600 K.C.
TRIMMER ADJ. DETAIL FOR 83K1

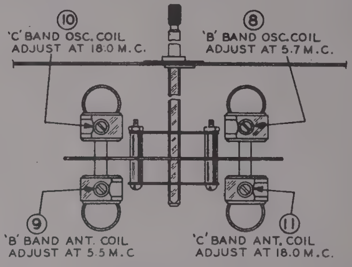
Fig. 1

Fig. 2


DETAIL NO 69B23577
'C' BAND ANT. TRIM. ADJ. AT 16.0 M.C.
⑪
'B' BAND ANT. TRIM. ADJ. AT 4.1 M.C.
⑨
⑧
'B' BAND OSC. TRIM. ADJ. AT 5.8 M.C.
⑩
'C' BAND OSC. TRIMMER ADJ. AT 18.0 M.C.

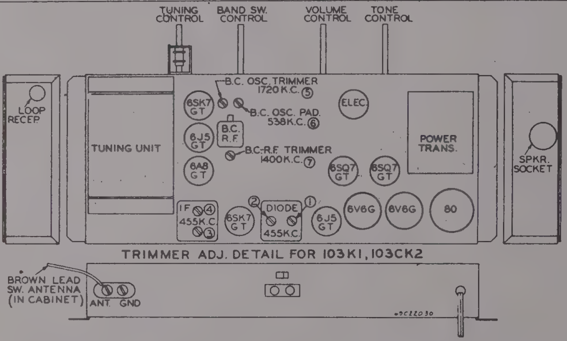
BAND SWITCH TRIM. ADJ. DETAIL FOR MODEL 83K1

Fig. 3


⑩
'C' BAND OSC. COIL ADJUST AT 18.0 M.C.
⑧
'B' BAND OSC. COIL ADJUST AT 5.7 M.C.
⑨
'B' BAND ANT. COIL ADJUST AT 5.5 M.C
⑪
'C' BAND ANT. COIL ADJUST AT 18.0 M.C.

BAND SWITCH TRIMMER ADJ. FOR 103K1, 103CK2

Fig. 4



VOLTAGE CHART

MODEL 83K1

POSITION	PLATE	SCREEN	CATHODE
R.F. Amp.	235 V.	95 V.	0
Osc.-Mod.	235 V.	95 V.	0
I.F. Amp.	235 V.	95 V.	0
Det.AVC.A.F.	135 V.	--	-5.5 V.
Phase Inv.	135 V.	--	-5.5 V.
Pwr. Amp.	225 V.	235 V.	9.0 V.
Pwr. Amp.	225 V.	235 V.	9.0 V.
Rectifier	325 V. AC	--	320 V.(from filament)

Measurements from socket terminal to chassis ground using 1000 Ohms per volt meter.
Line Voltage - 117 Volts.

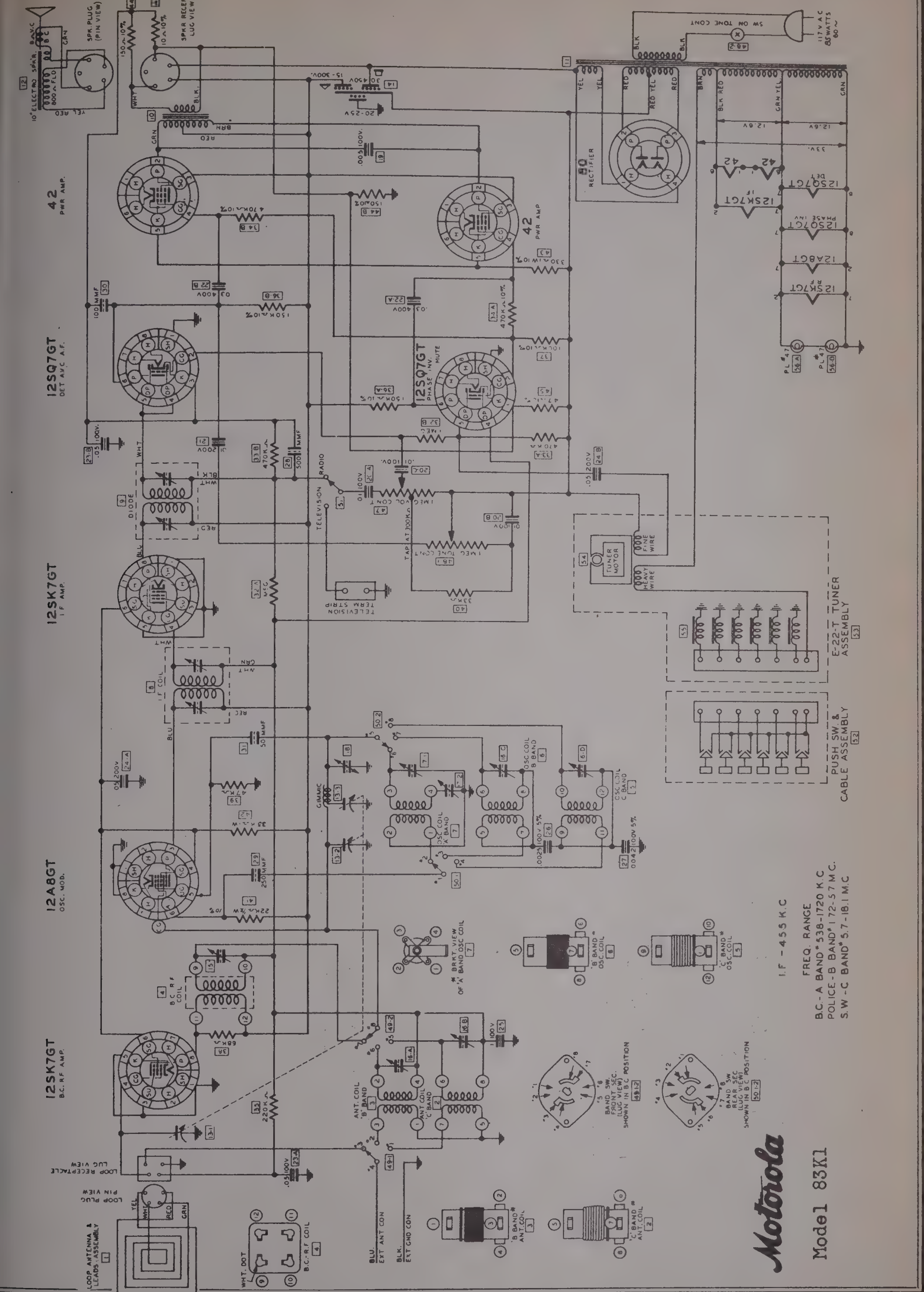
VOLTAGE CHART MODELS 103K1 AND 103CK2

POSITION	PLATE	SCREEN	CATHODE
R.F. Amp.	200 V.	80 V.	1.5 V.
Mixer	265 V.	80 V.	1.5 V.
Osc.	130 V.	-	0
I.F. Amp.	265 V.	80 V.	1.5 V.
Det. AVC.	-	-	-
A.F. Amp.	135 V.	-	0
Phase Inv.	100 V.	-	0
Pwr. Amp.	300 V.	265 V.	15. V.
Pwr. Amp.	300 V.	265 V.	15. V.
Rectifier	355 V. A.C.	-	380 V.(from filament)

Measurements from socket terminal to chassis ground using 1000 Ohms per volt meter.
Line Voltage - 117 Volts.

GALVIN MFG. CO.

MODEL 83K1



MODELS 83K1
103K1, 103CK2

GALVIN MFG. CO.

TO RESTRING DIAL DRIVE CORDS
Model 83K1

TUNING CORD

1. Cut a length of 24 lb. test silk fish cord 40" long.
2. Turn gang to fully meshed position.
3. Thread end of cord through hole in Gang Drive Pulley. Fasten temporarily in place with an ordinary paper clip. ("A" START.) See Fig. 5.
4. Run cord down to Tuning Shaft.
5. Wind cord counter-clockwise six full turns around Tuning Shaft.
6. Bring end of cord up to Gang Drive Pulley.
7. Wind cord counter-clockwise 1½ turns around Gang Drive Pulley and thread cord through hole. ("A" FINISH)
8. Tie end of cords securely to one end of the Tension Spring (Part No. 41A13262).
9. Hook other end of Tension Spring through center hole in pulley.

POINTER CORD

1. Cut a length of 24 lb. test silk fish cord 40" long.
2. Thread end of cord through hole in Pointer Drive Pulley. ("B" START.) Fasten temporarily in place with an ordinary paper clip.
3. Run cord around Idler Pulley No. 1.
4. Continue cord across top of dial and counter-clockwise around Idler Pulley No. 2.
5. Continue cord across back of dial scale to Idler Pulley No. 3.
6. Continue cord around Idler Pulley No. 3 to Pointer Drive Pulley.
7. Wind cord 1½ turns around Pointer Drive Pulley. (Counter-clockwise)
8. Thread cord through hole in pulley. ("B" FINISH)
9. Tie both ends securely to hook on Tension Spring (Part No. 41A11091).
10. Hook other end of spring to center hole in pulley.
11. Replace Dial Pointer.
12. To set Pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
13. Secure Pointer to string with a drop of shellac or a good grade of household cement.

PLACE A DROP OF SHELLAC OR A GOOD GRADE OF HOUSEHOLD CEMENT ON ALL CORD KNOTS.

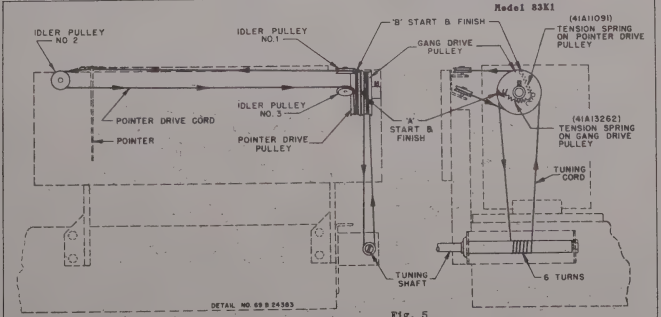


Fig. 5

MODEL 103K1

TUNING CORD

1. Turn gang to fully meshed position.
2. Thread end of Tuning Drive Cord (Part No. 1X24246) through hole in Dial Cord Raceway ("A" START).
3. Wind 9½ turns (clockwise) on Dial Cord Raceway and bring end up to Gang Drive Pulley.
4. Thread end of cord through slot in Gang Drive Pulley ("A" FINISH). Fasten temporarily with an ordinary paper clip.
5. Thread end of second tuning drive cord (Part No. 1X24246) through hole in Dial Cord Raceway ("B" START).
6. Wind 1½ turns (counter-clockwise) on Dial Cord Raceway and bring end up to gang drive pulley.
7. Wind cord 1-2/3 turns in a counter-clockwise direction on gang drive pulley and thread through slot in gang drive pulley ("B" FINISH).
8. Tie ends of tuner drive cords securely to springs (Part No. 41A14759) and hook other ends of springs through center hole of gang drive pulley.
9. Slip the two split lead "B-B-S-" over the cord as shown in the illustration. Clamp tightly with a pair of pliers.

POINTER CORD

1. Take the Pointer Drive Cord (Part No. 1X24248) and thread both ends through the hole in the Pointer Drive Pulley. Use the hole shown in the illustration.
2. Wind long end of the Pointer Cord counter-clockwise on Pointer Drive Pulley.
3. Run cord over idler Pulley No. 1.
4. Continue to Idler Pulley No. 2. (See illustration).
5. Continue across the dial to Idler Pulley No. 3.
6. Continue cord counter-clockwise around Idler Pulley No. 3.
7. Fasten one end of the tension spring (Part No. 41A19231) securely to the cord in the position shown in illustration.
8. Wind other end of Pointer cord clockwise 2 turns and tie securely to the other end of the tension spring. Do not make the pointer cord too tight.
9. Replace dial pointer.
10. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
11. Secure pointer to string with a drop of shellac or a good grade of household cement.

PLACE A DROP OF SHELLAC OR HOUSEHOLD CEMENT ON ALL KNOTS.

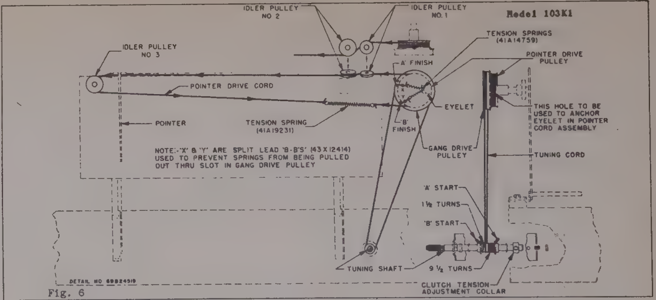

Model 103K1
IDLER PULLEY NO 2
IDLER PULLEY NO. 1
IDLER PULLEY NO 3
TENSION SPRINGS (41A14759)
POINTER DRIVE PULLEY
'A' FINISH
POINTER DRIVE CORD
EYELET
THIS HOLE TO BE USED TO ANCHOR EYELET IN POINTER CORD ASSEMBLY
POINTER
TENSION SPRING (41A19231)
'B' FINISH
NOTE:-'X' & 'Y' ARE SPLIT LEAD 'B-B'S' (43X12414) USED TO PREVENT SPRINGS FROM BEING PULLED OUT THRU SLOT IN GANG DRIVE PULLEY
GANG DRIVE PULLEY
TUNING CORD
'A' START
1½ TURNS
'B' START
TUNING SHAFT
9½ TURNS
CLUTCH TENSION ADJUSTMENT COLLAR
DETAIL NO 69B24519

Fig. 6

MODEL 103CK2

TUNING CORD

1. Turn gang to fully meshed position.
2. Thread end of Tuning Drive Cord (Part No. 1X24246) through hole in Dial Cord Raceway ("A" START).
3. Wind 9½ turns (clockwise) on Dial Cord Raceway and bring end up to Gang Drive Pulley.
4. Thread end of cord through slot in Gang Drive Pulley ("A" FINISH). Fasten temporarily with an ordinary paper clip.
5. Thread end of second tuning drive cord (Part No. 1X24246) through hole in Dial Cord Raceway ("B" START).
6. Wind 1½ turns (counter-clockwise) on Dial Cord Raceway and bring end up to gang drive pulley.
7. Wind cord 1-2/3 turns in a counter-clockwise direction on gang drive pulley and thread through slot in gang drive pulley ("B" FINISH).
8. Tie ends of tuner drive cords securely to springs (Part No. 41A14759) and hook other ends of springs through center hole of gang drive pulley.
9. Slip the two split lead "B-B-S-" over the cord as shown in the illustration. Clamp tightly with a pair of pliers.

POINTER CORD

1. Take the Pointer Drive Cord (Part No. 1X24247) and thread both ends through the hole in the Pointer Drive Pulley. Use the hole shown in the illustration.
2. Wind long end of the Pointer Cord counter-clockwise on Pointer Drive Pulley, to Idler Pulley No. 1.
3. Run cord over Idler Pulley No. 1.
4. Continue down and clock-wise around Idler Pulley No. 2.
5. Continue across the dial to Idler Pulley No. 3.
6. Continue cord clock-wise around Idler Pulley No. 3.
7. Fasten one end of the tension spring (Part No. 41A19231) securely to the cord in the position shown in illustration.
8. Wind other end of Pointer cord clockwise 2 turns around Pointer Drive Pulley and tie securely to the other end of the tension spring. Do not make the pointer cord too tight.
9. Replace dial pointer.
10. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
11. Secure pointer to string with a drop of shellac or a good grade of household cement.

PLACE A DROP OF SHELLAC OR HOUSEHOLD CEMENT ON ALL KNOTS.

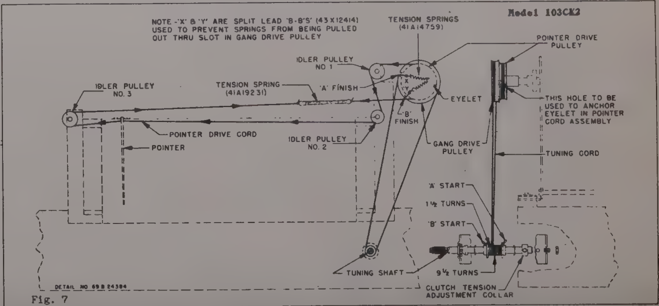
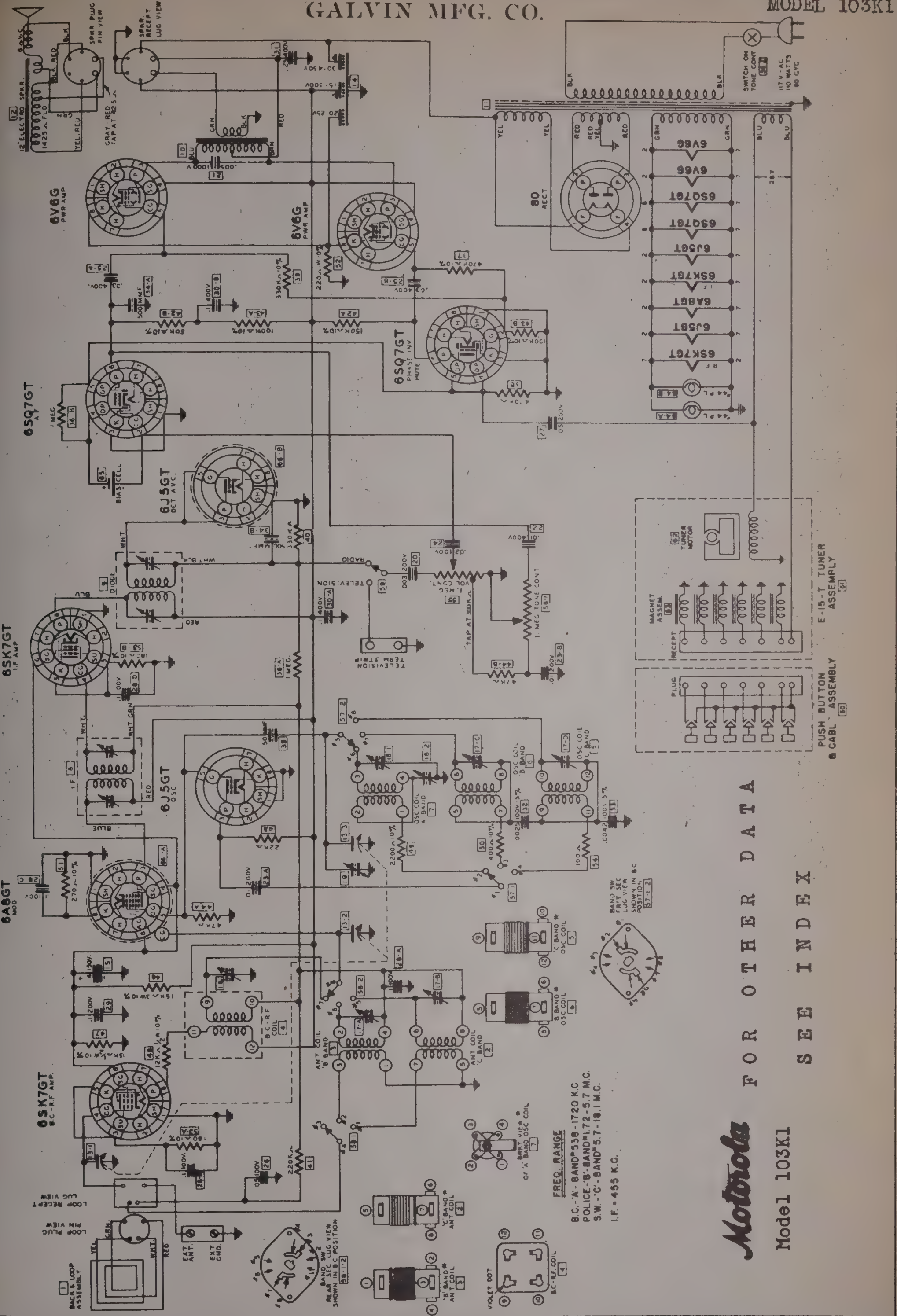

Model 103CK2
NOTE:-'X' & 'Y' ARE SPLIT LEAD 'B-B'S' (43X12414) USED TO PREVENT SPRINGS FROM BEING PULLED OUT THRU SLOT IN GANG DRIVE PULLEY
TENSION SPRINGS (41A14759)
POINTER DRIVE PULLEY
IDLER PULLEY NO 1
IDLER PULLEY NO. 3
TENSION SPRING (41A19231)
'A' FINISH
EYELET
THIS HOLE TO BE USED TO ANCHOR EYELET IN POINTER CORD ASSEMBLY
'B' FINISH
POINTER DRIVE CORD
POINTER
IDLER PULLEY NO. 2
GANG DRIVE PULLEY
TUNING CORD
'A' START
1½ TURNS
'B' START
TUNING SHAFT
9½ TURNS
CLUTCH TENSION ADJUSTMENT COLLAR
DETAIL NO 69 B 24384

Fig. 7

GALVIN MFG. CO.

MODEL 103K1



FREQ. RANGE

B.C.-'A'-BAND-538-1720 K.C.
POLICE-'B'-BAND-1.72-5.7 M.C.
S.W.-'C'-BAND-5.7-18.1 M.C.
I.F.-455 K.C.

FOR OTHER DATA

SEE INDEX

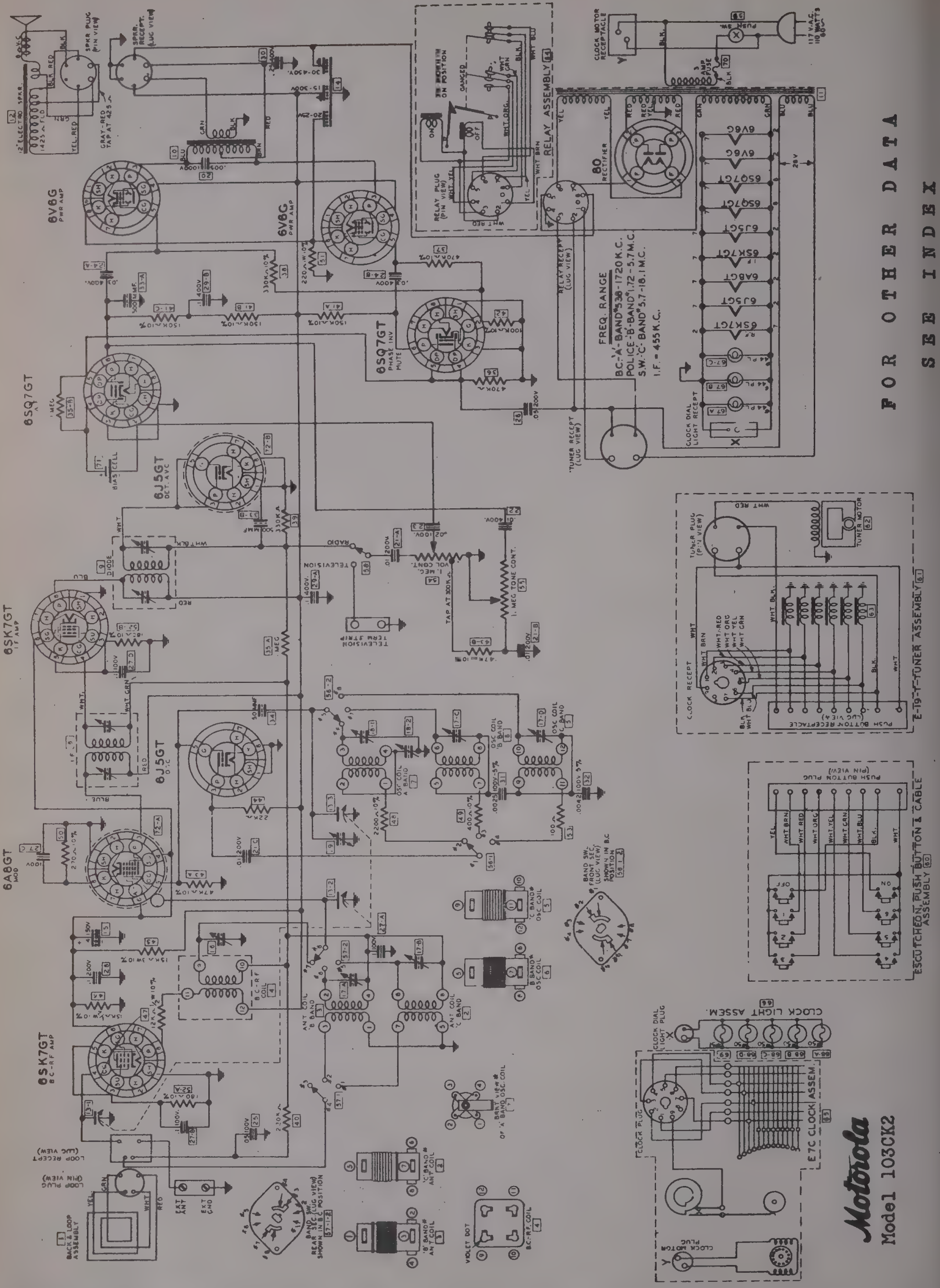
Motorola

Model 103K1

©John F. Rider, Publisher

MODEL 103CK2

GALVIN MFG. CO.

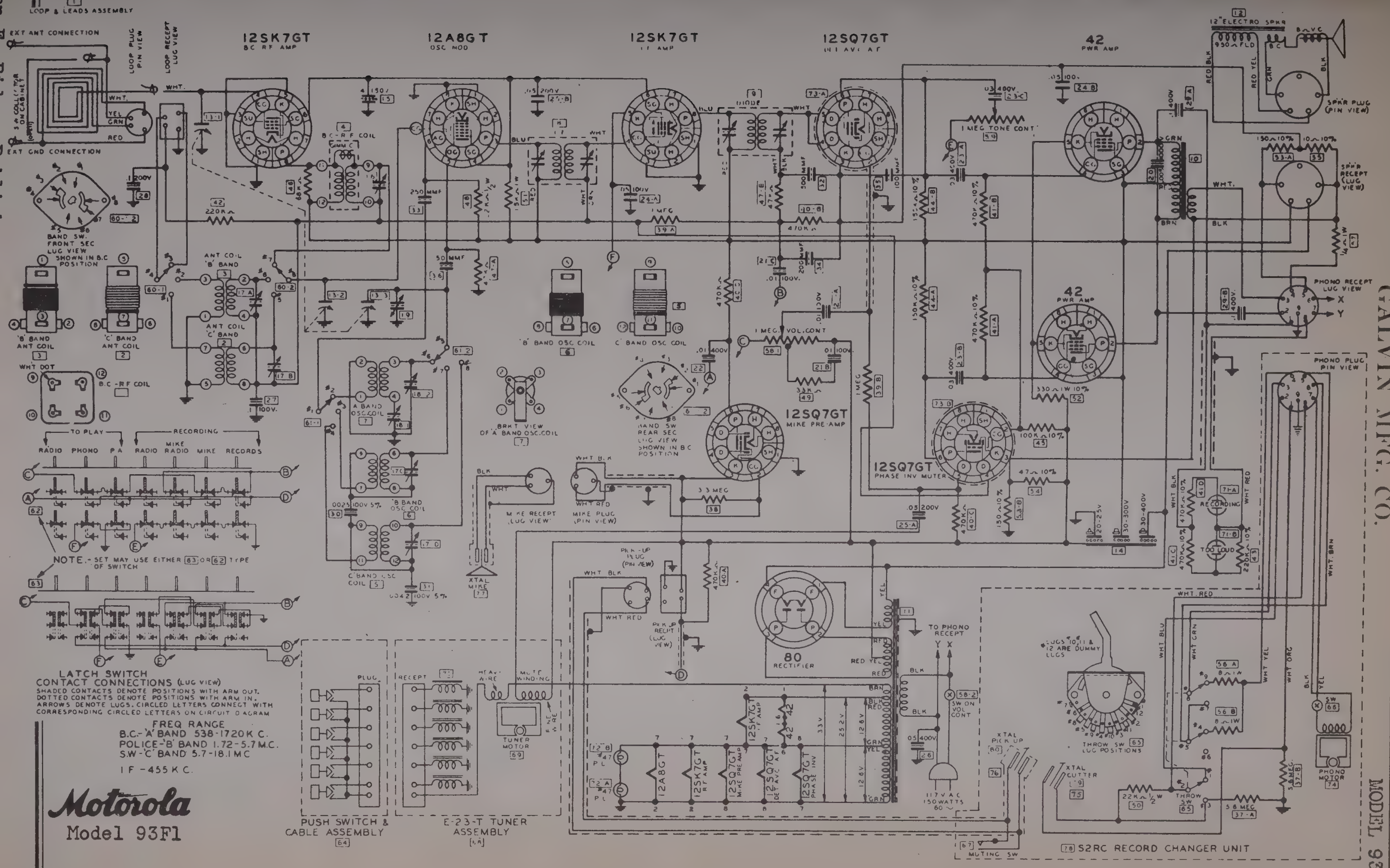


FOR OTHER DATA SEE INDEX

©John F. Rider, Publisher

GALVIN MFG. CO.

MODEL 93F1



LATCH SWITCH
CONTACT CONNECTIONS (LUG VIEW)
SHADED CONTACTS DENOTE POSITIONS WITH ARM OUT.
DOTTED CONTACTS DENOTE POSITIONS WITH ARM IN.
ARROWS DENOTE LUGS. CIRCLED LETTERS CONNECT WITH CORRESPONDING CIRCLED LETTERS ON CIRCUIT DIAGRAM

FREQ RANGE
B.C.-'A' BAND 538-1720 K C.
POLICE-'B' BAND 1.72-5.7 M.C.
S.W.-'C' BAND 5.7-18.1 MC

I F - 455 K C.

Motorola
Model 93F1

MODELS 93F1; 103F1,103F2
103K1,103CK2

GALVIN MFG. CO.

ALIGNMENT CHART MODELS 93F1 - 103F1 - 103F2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	B.C.	Osc.-Mod.Grid	1-2-3-4-	455 K.C.
2	1720 K.C.	.1 Mfd.	B.C.	R.F. Grid	5	1720 K.C.
3	1400 K.C.	.1 Mfd.	B.C.	R.F. Grid	6	1400 K.C.
4	* 600 K.C.	.1 Mfd.	B.C.	R.F. Grid	7	600 K.C.
5	5.8 M.C.	400 Ohm	Police	Ant.	8	5.8 M.C.
6	4.1 M.C.	400 Ohm	Police	Ant.	9	4.1 M.C.
7	18 M.C.	400 Ohm	S.W.	Ant.	10	18 M.C.
8	16 M.C.	400 Ohm	S.W.	Ant.	11	18 M.C.

* Rock condenser until a combination is found which gives the highest output reading.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 93F1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
3500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg	.63 Volts
40	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	.63 Volts
45	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	.63 Volts
4	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	.63 Volts
3	600 K.C.	Ant. Terminal	400 Ohms	None	.63 Volts

Volume Control Set at Maximum
* .05 Watts = .63 Volts

Tone Control Set At Treble Position.
** Output meter connected across voice coil.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 103F1 - 103F2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2850	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg	2.83
40	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	2.83
45	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	2.83
3	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	2.83
2	600 K.C.	Ant. Terminal	400 Ohms	None	2.83

Volume Control Set at Maximum
* 1 Watt = 2.83 Volts

Tone Control Set At Treble Position.
** Output meter connected across voice coil.

VOLTAGE CHART MODEL 93F1

POSITION	PLATE	SCREEN	CATHODE
R.F. Amp.	245 V.	110 V.	0
Osc. Mod.	245 V.	110 V.	0
I.F. Amp.	245 V.	110 V.	0
Det.-AVC.-A.F.	125 V.	-	-4.5 V.
Phase Inv.	125 V.	-	-4.5 V.
Pwr. Amp.	240 V.	245 V.	12 V.
Pwr. Amp.	240 V.	245 V.	12 V.
Mike Pre-Amp.	50 V.	-	-5.5 V.
Rectifier	330 V. A.C.	-	335 V. (from filament)

Measurements from socket terminal to chassis ground using 1000 ohm per volt meter.
Line Voltage 117 V. A.C.

VOLTAGE CHART MODEL 103F1 & 103F2

POSITION	PLATE	SCREEN	CATHODE
R.F. Amp.	290 V.	80 V.	2.5 V.
Osc. Mod. (103F1 Only)	290 V.	80 V.	2.5 V.
Osc. (103F2 Only)	150 V.	-	-
I.F. Amp.	290 V.	80 V.	2.75 V.
Det. AVC	0	0	0
A.F. Amp.	155 V.	-	0
Phase Inv.	100 V.	-	0
Pwr. Amp.	325 V.	290 V.	20 V.
Pwr. Amp.	325 V.	290 V.	20 V.
Mike Pre-Amp. (103F1 Only)	70 V.	-	0
Rectifier	350 V.	-	375 V. (from filament)

Measurements from socket terminal to chassis ground using 1000 ohms per volt meter.
Line Voltage 117 V. A.C.

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 103K1 AND 103CK2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2800	455	I.F. Grid	.1 Mfd.	.5 Meg.	.63
40	455	Mod. Grid	.1 Mfd.	.5 Meg.	.63
45	600	Mod. Grid	.1 Mfd.	.5 Meg.	.63
3	600	R.F. Grid	.1 Mfd.	.5 Meg.	.63
2	600	Antenna Terminal	200 Mmf.	None	.63

Volume Control Set at Maximum.
* .05 Watts = .63 Volts

** Output meter connected across voice coil.

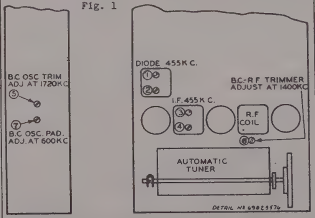
ALIGNMENT CHART MODELS 103K1 AND 103CK2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	1-2-3-4	455 K.C.
2	Minimum 1720 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	5	1720 K.C.
3	538 K.C.	.1 Mfd.	B.C.	Osc.-Mod.Grid	6	538 K.C.
4	1400 K.C.	200 Mmf.	B.C.	External Antenna Terminal	7	1400 K.C.
5	5.7 M.C.	.1 Mfd.	Pol.	Osc.-Mod.Grid	8	5.7 M.C.
6	5.5 M.C.	400 Ohms	Pol.	External Antenna Terminal	9	5.5 M.C.
7	18. M.C.	.1 Mfd.	S.W.	Osc.-Mod.Grid	10	18 M.C.
8	18. M.C.	400 Ohms	S.W.	Osc.-Mod.Grid	11	18 M.C.

Volume Control Set at Maximum.

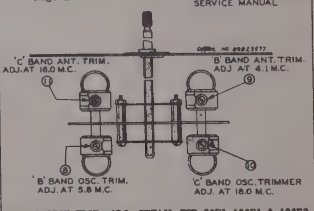
Tone Control Set in Treble Position.

Fig. 1



TRIMMER ADJ. DETAIL FOR 93F1,103F1 & 103F2.

Fig. 2



BAND SWITCH TRIM. ADJ. DETAIL FOR 93F1,103F1 & 103F2.

TO RESTRING DIAL DRIVE CORDS
93F1, 103F1 and 103F2

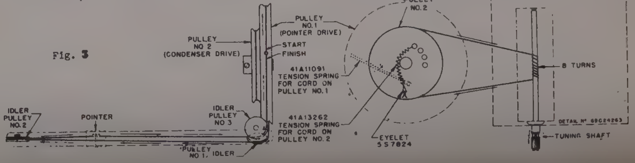
TUNING CORD

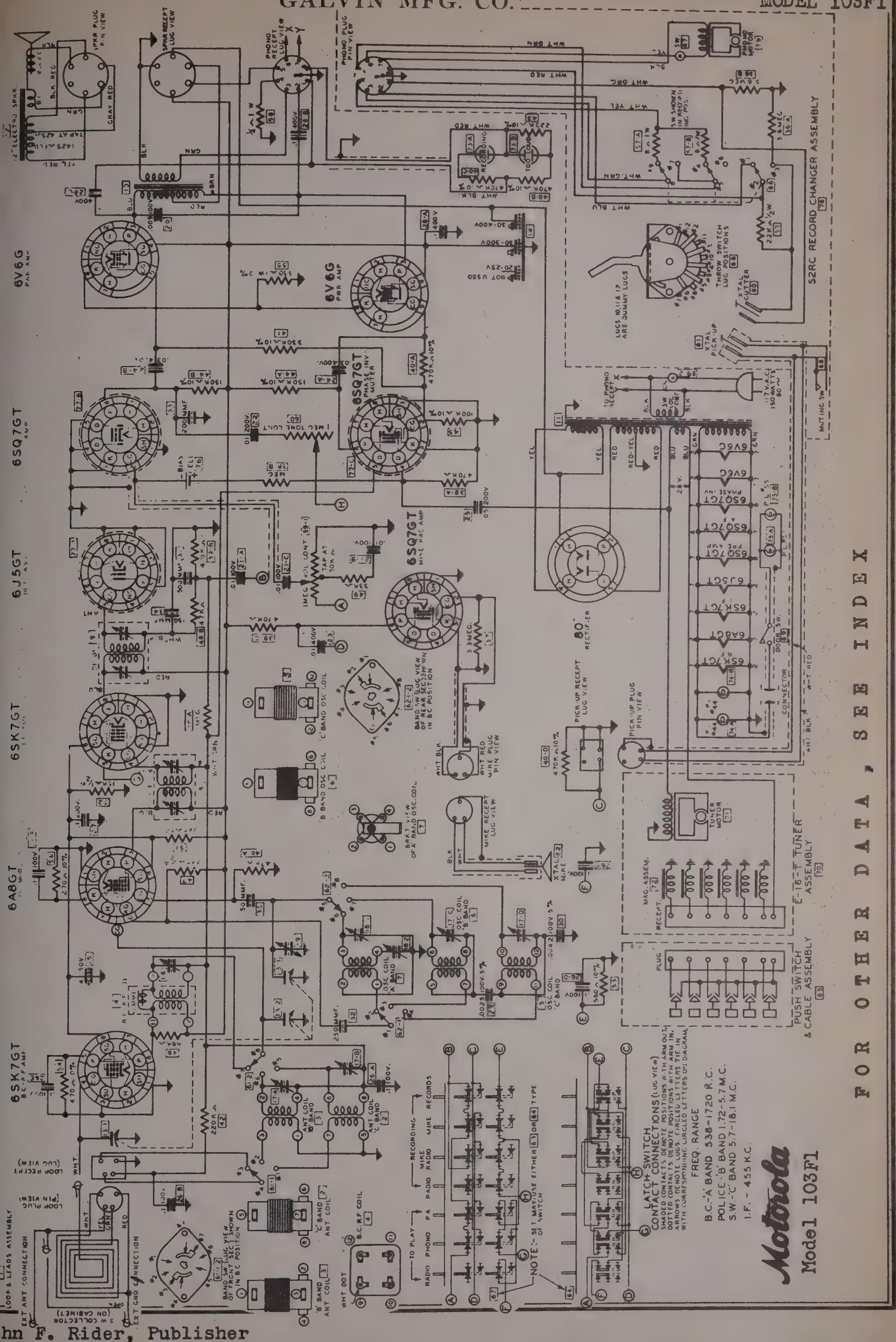
1. Remove the large pulley.
2. Cut a length of 24 lb. test silk fish cord 29 inches long.
3. Turn the gang to fully meshed position.
4. Thread end of cord through hole in rim of small pulley.
5. With an ordinary paper clip fasten cord to pulley to hold in place.
6. Wind cord in a clockwise direction around the condenser pulley and down to the tuning shaft.
7. Wind cord in a clockwise direction eight times around the tuning shaft and up to the condenser pulley.
8. Thread end of cord through hole in condenser pulley.
9. Slip both ends of cord through eyelet (Part No. 5S7824) and knot both ends of cord together securely.
10. Hook one end of tension spring (Part No.41A13262) to cord.
11. Connect the other end of the spring to the hole in the condenser pulley as shown in drawing. (See Fig. 3)
12. Pinch the eyelet tightly on cord and apply drop of shellac to cord knot.

POINTER CORD

1. Place large pointer pulley in position on shaft as shown in Fig. 3. Tighten set screws securely.
2. Cut a length of 24 lb. test silk fish cord 35 inches long.
3. Thread end of cord through hole in rim of large pulley.
4. With an ordinary paper clip fasten cord to pulley to hold in place.
5. Wind cord in a clockwise direction around the pointer pulley and up to idler pulley No.1.
6. Continue cord clockwise (as seen from front) around idler pulley No. 2 and around idler pulley No. 3 to pointer pulley.
7. Thread end of cord through hole in pointer pulley and knot both ends together securely.
8. Hook one end of tension spring (Part No.41A11091) to cord.
9. Connect other end or spring to hook on pointer pulley.
10. Replace dial pointer.
11. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
12. Clamp pointer on string with a pair of pliers and secure with a drop of shellac or a good grade of household cement.

Fig. 3





LATCH SWITCH CONTACT CONNECTIONS (LUG VIEW)

SHADED CONTACTS DENOTE POSITIONS WITH ARM OUT. DOTTED CONTACTS DENOTE POSITIONS WITH ARM IN. ARROWS DENOTE LUGS. CIRCLED LETTERS TIE IN WITH CORRESPONDING CIRCLED LETTERS ON DIAGRAM.

FREQ. RANGE

B.C.-'A' BAND 538-1720 K.C.
POLICE-'B' BAND 1.72-5.7 M.C.
S.W.-'C' BAND 5.7-18.1 M.C.

I.F. - 455 K.C.

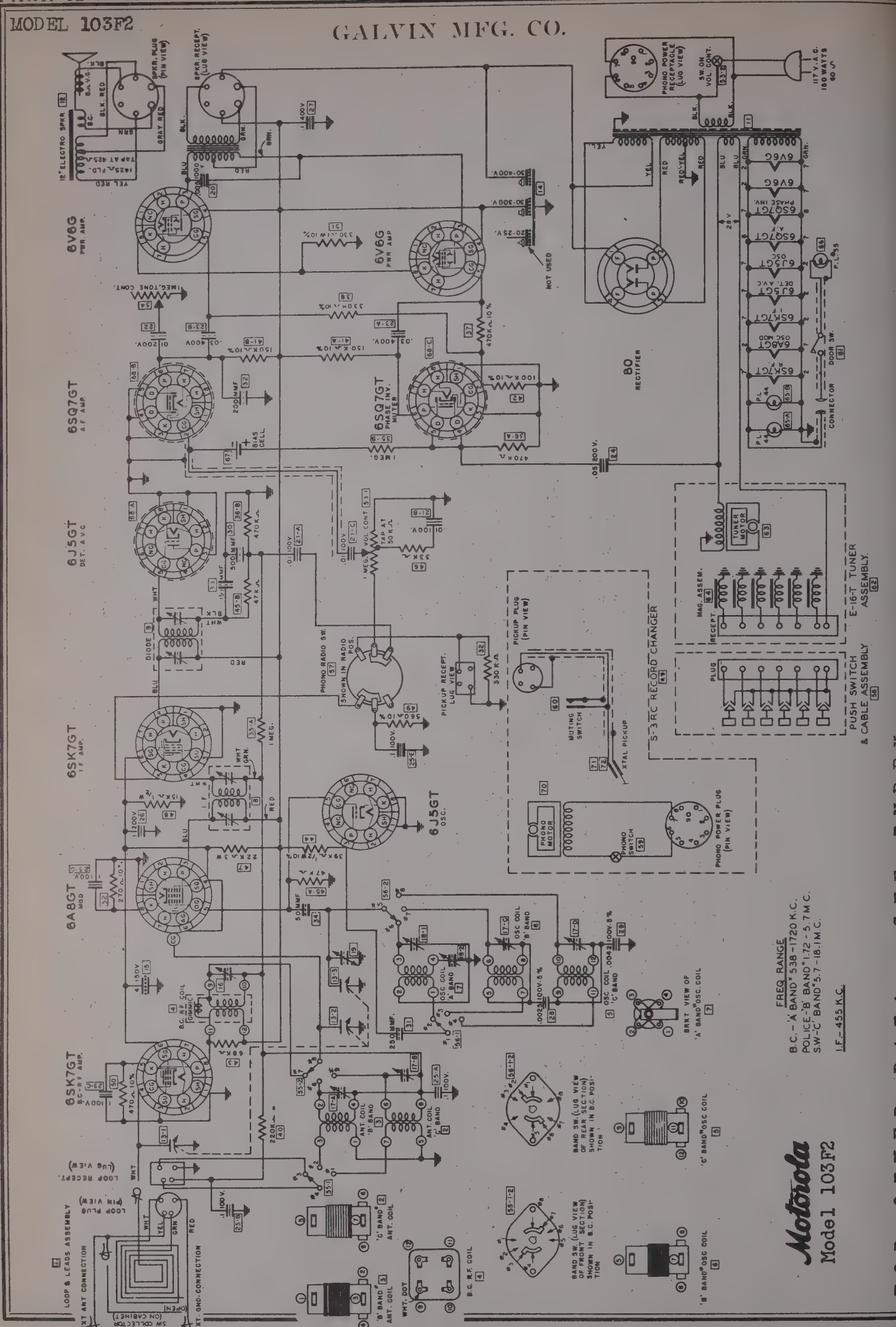
Motorola

Model 103F1

FOR OTHER DATA, SEE INDEX

MODEL 103F2

GALVIN MFG. CO.



FREQ RANGE
B.C.-'A' BAND" 538-1720 K.C.
POLICE-'B' BAND" 1.72-5.7 M C.
S.W.-'C' BAND" 5.7-18.1 M.C.

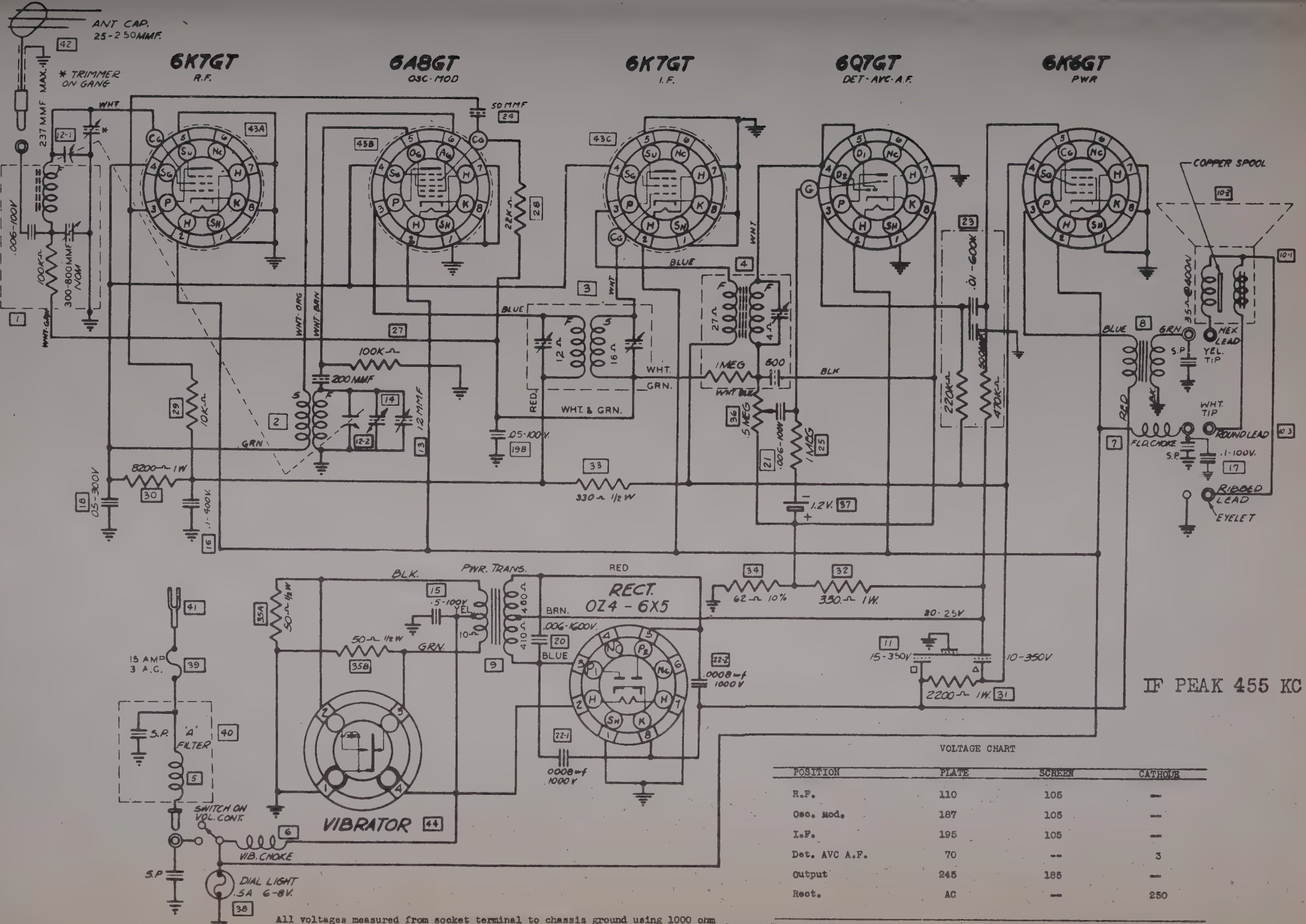
I.F.-455 K.C.

Motorola
Model 103F2

FOR OTHER DATA, SEE INDEX

MODEL 250

GALVIN MFG. CO.



IF PEAK 455 KC

VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE
R.F.	110	105	—
Osc. Mod.	187	105	—
I.F.	195	105	—
Det. AVC A.F.	70	--	3
Output	245	185	—
Rect.	AC	—	250

All voltages measured from socket terminal to chassis ground using 1000 ohm per volt meter.

Current 7 amps at 6.3 volts

Maximum power output 3 watts.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.
2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.) See Fig. 1.
3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.
4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

1. If the radio is to be operated on a Motorola Booster Antenna, a special dummy antenna, Motorola Part No. 1X18018 must be used in series with the lead from the signal generator to the antenna receptacle. Change the signal generator connection to the antenna lead, using the special dummy.
2. Set the signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.
3. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.
4. Set the signal generator at 600 K.C. and turn the condenser gang until the dial pointer reads 600 K.C. Rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.
5. Recheck step No. 3.

NOTE: The antenna padder is reached through a hole in the bottom of the chassis base, directly under the antenna coil can.

POINTER CORD INSTRUCTIONS

1. Remove the chassis from the housing.
2. Remove the broken string.
3. Set the condenser gang to fully opened position.
4. Cut a length of 24 lb. dial cord 24 inches long.
5. Thread one end of the cord through slot "A" in the condenser pulley, and with an ordinary paper clip fasten it to the idler pulley bracket to hold it in place. (See Fig. 2).
6. Run the cord over to idler pulley No. 1, and around it in a clockwise direction.

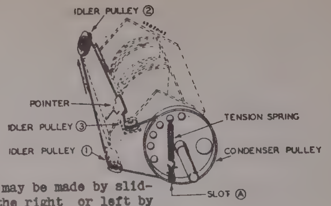


FIGURE 2

NOTE: Minor corrections may be made by sliding the dial scale to the right or left by loosening the self-tapping screws which hold it in position.

7. Route string across chassis to idler pulley No. 2, and around it in a clockwise direction.
8. Route cord back across chassis and around idler pulley No.3, in a counter-clockwise direction.
9. Route cord around condenser pulley three-quarters turn to slot "A".
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of pulley. Fasten one end of the tension spring (41A11091) to the cord and the other end to hole in the condenser pulley.
11. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency, preferably one between five and six hundred K.C. and attach the pointer to the cord so that the proper frequency is indicated, because the pointer cannot be slid on the cord.

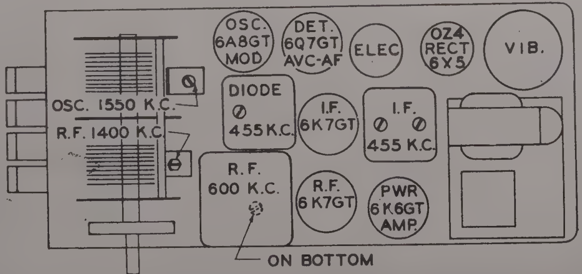


FIGURE 1

SENSITIVITY DATA - Model 250

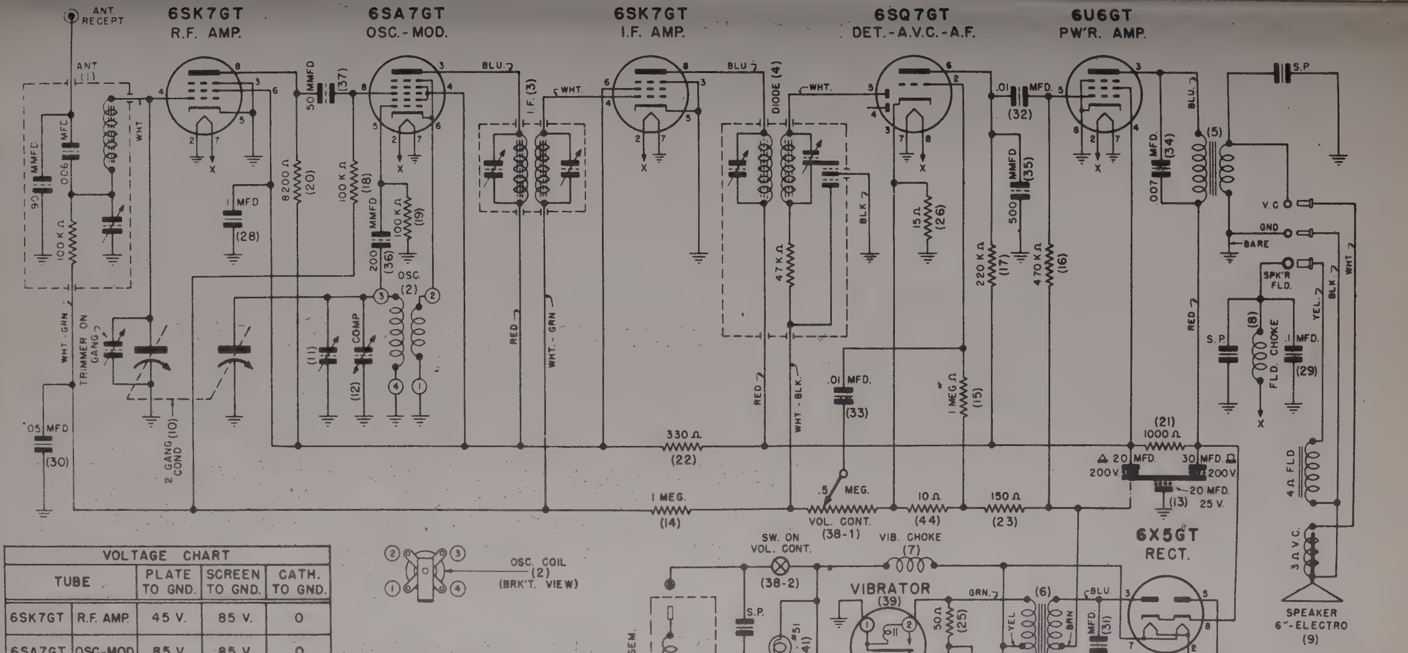
Microvolt Input *	Generator Set at	Generator connected to	Dummy Ant. Capacity	Leak Resistance	Output Meter Reading **
8900	455 K.C.	I.F. Grid	.1	.5 Meg	1.76
185	455 K.C.	Mod. Grid	.1	.5 Meg	1.76
220	600 K.C.	Mod. Grid	.1	.5 Meg	1.76
80	600 K.C.	R.F. Grid	.1	.5 Meg	1.76
7	600 K.C.	Ant. Lead	40 MMF	None	1.76

* For one watt output

** Meter connected across voice coil
1.76 volts equals 1 watt output for 3 ohm voice coil

NOTE: If a Motorola Booster antenna is used substitute a Special Motorola dummy part No. 1X18018 or M434B Booster coil No.17908 in series with a 25 MMF condenser in place of the 40 MMF condenser.

GALVIN MFG. CO.



VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F. AMP.	45 V.	85 V.	0
6SA7GT	OSC.-MOD.	85 V.	85 V.	0
6SK7GT	I.F. AMP.	90 V.	85 V.	0
6SQ7GT	DET.-A.V.C. A.F.	45 V.	–	-.8 V.
6U6GT	PW'R. AMP.	110 V.	90 V.	0
6X5GT	RECT.	AC	–	115 V.

(40) 15 AMP. FUSE

FUSE LEAD ASSEM. (43)

S.P. = SPARK PLATE.

.5 MFD. (27)

I.F. = 455 KC

FREQUENCY RANGE 545 KC TO 1600 KC

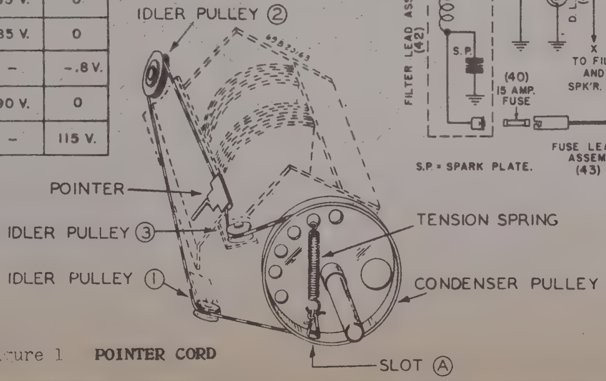


Figure 1 POINTER CORD

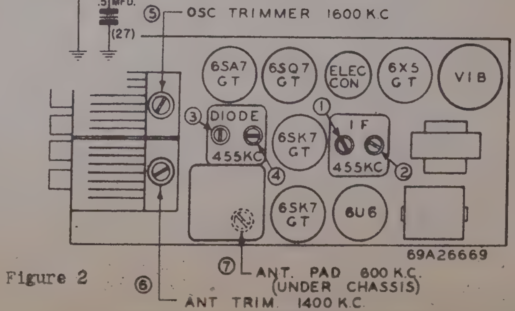


Figure 2

MODEL 251 MODEL 451
MODEL 301 MODEL 501
MODEL 351 MODEL 551
MODEL 401 MODEL 701

GALVIN MFG. CO.

MODEL 251

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
10,000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg	1.74
600	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
250	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
90	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	1.74
15	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

ALIGNMENT CHART **MODEL 251**

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	1400 K.C.	*	To Special Dummy	6	1400 K.C.
4	600 K.C.	*	To Special Dummy	7	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 501

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,250	262 K.C	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
335	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
425	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
7	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
2	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

Tone Control Set At Voice
Sensitivity Control Set at Country
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 401

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2,800	262 K.C.	I.F. Grid	.1 Mfg.	.5 Meg.	1.74
420	262 K.C.	Mod. Grid	.1 Mfg.	.5 Meg.	1.74
510	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
8	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
2	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

Tone Control Set At Voice
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 451

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
34,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
640	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
677	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
11	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

Tone Control Set At Voice
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 301

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
9,300	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg	1.74
330	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
355	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg	1.74
8	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg	1.74
4	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1,74 Volts

** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

ALIGNMENT CHART **MODELS 301,351,501,551,701**

Operations In Order	Gang Condenser Set	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

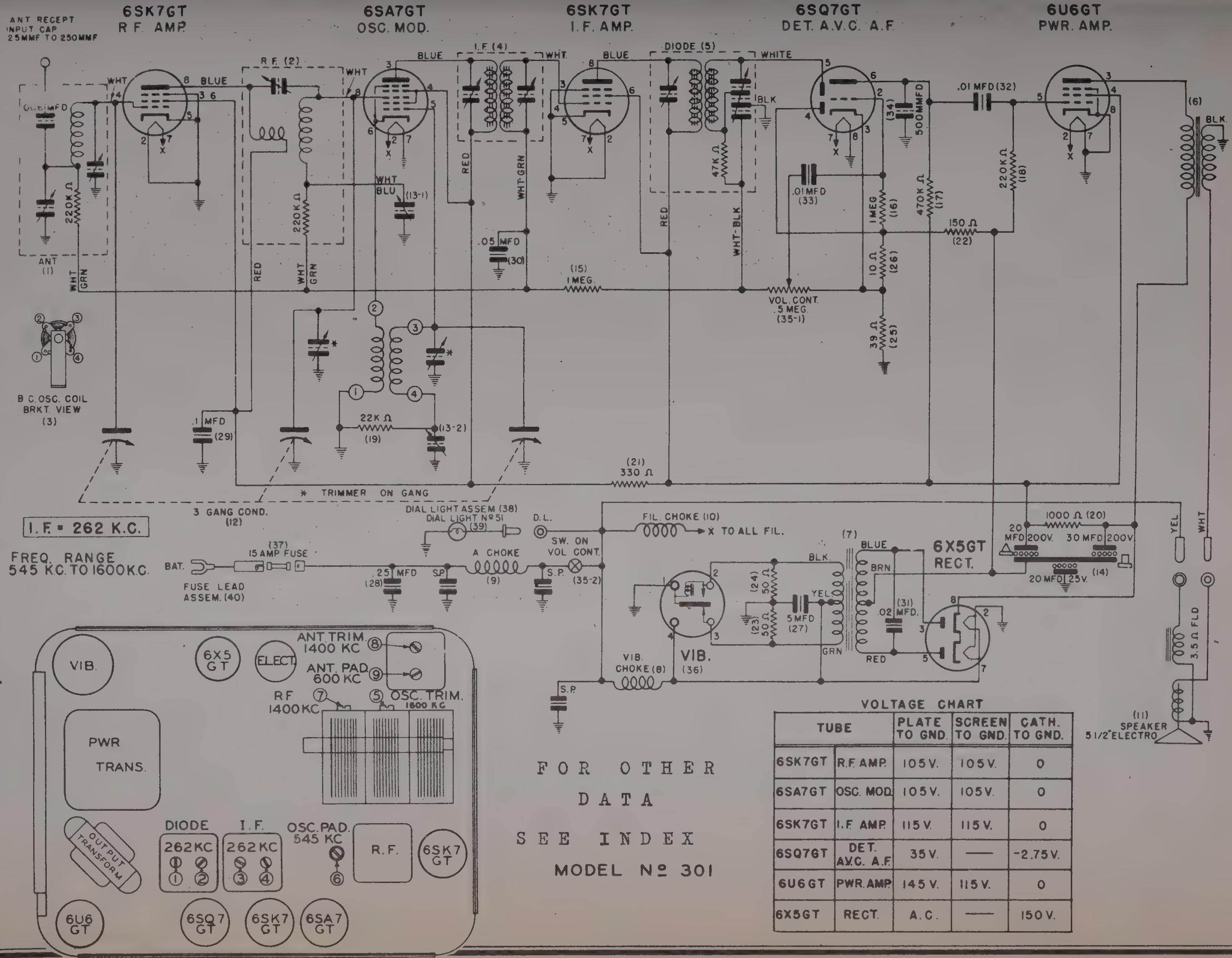
* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

ALIGNMENT CHART **MODELS 401,451**

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	600 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	600 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

GALVIN MFG. CO.



FOR OTHER DATA

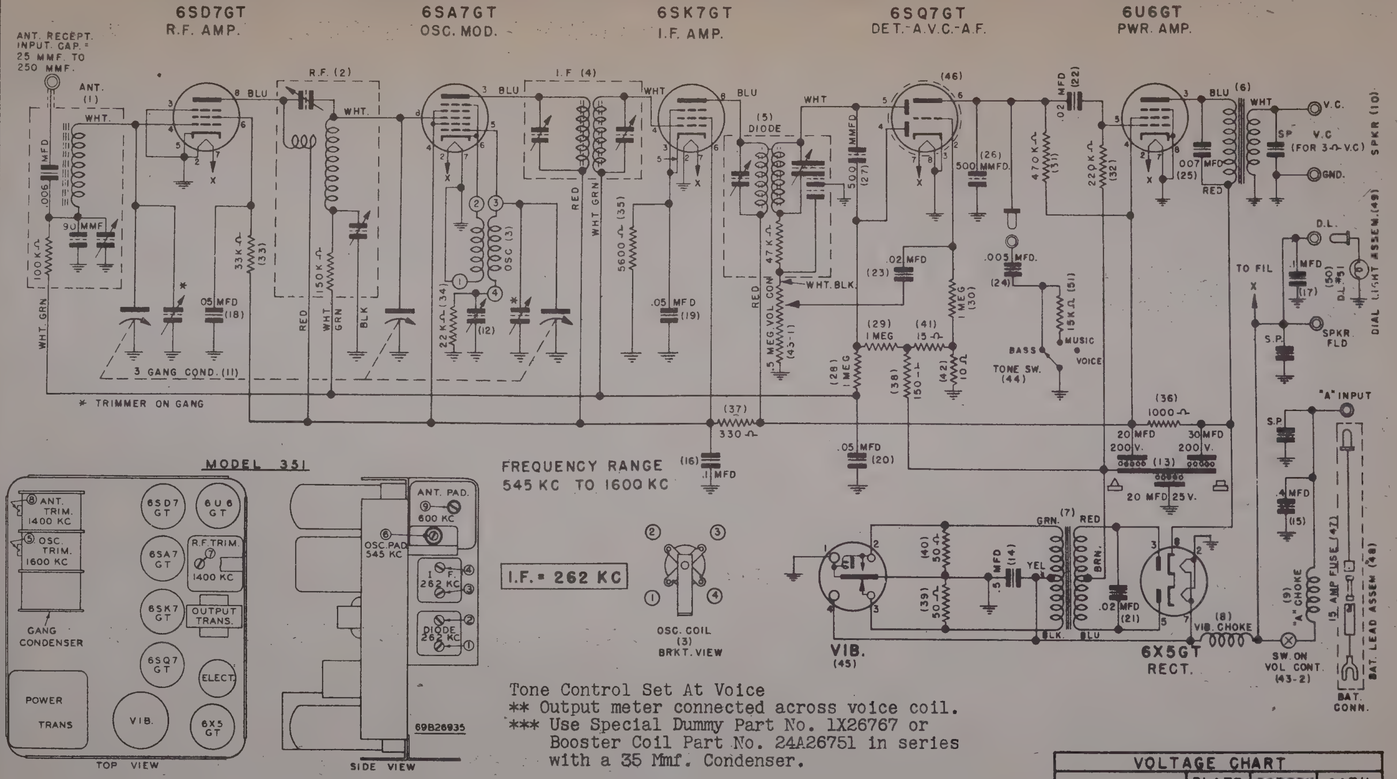
SEE INDEX

MODEL Nº 301

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F. AMP.	105 V.	105 V.	0
6SA7GT	OSC. MOD.	105 V.	105 V.	0
6SK7GT	I.F. AMP.	115 V.	115 V.	0
6SQ7GT	DET. A.V.C. A.F.	35 V.	—	-2.75 V.
6U6GT	PWR. AMP.	145 V.	115 V.	0
6X5GT	RECT.	A.C.	—	150 V.

GALVIN MFG. CO.



Tone Control Set At Voice
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or
Booster Coil Part No. 24A26751 in series
with a 35 Mmf. Condenser.

MODEL 351

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
48,500	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
1,100	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
1,300	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
10	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
2	600 K.C.	Ant. Lead	***	None	1.74

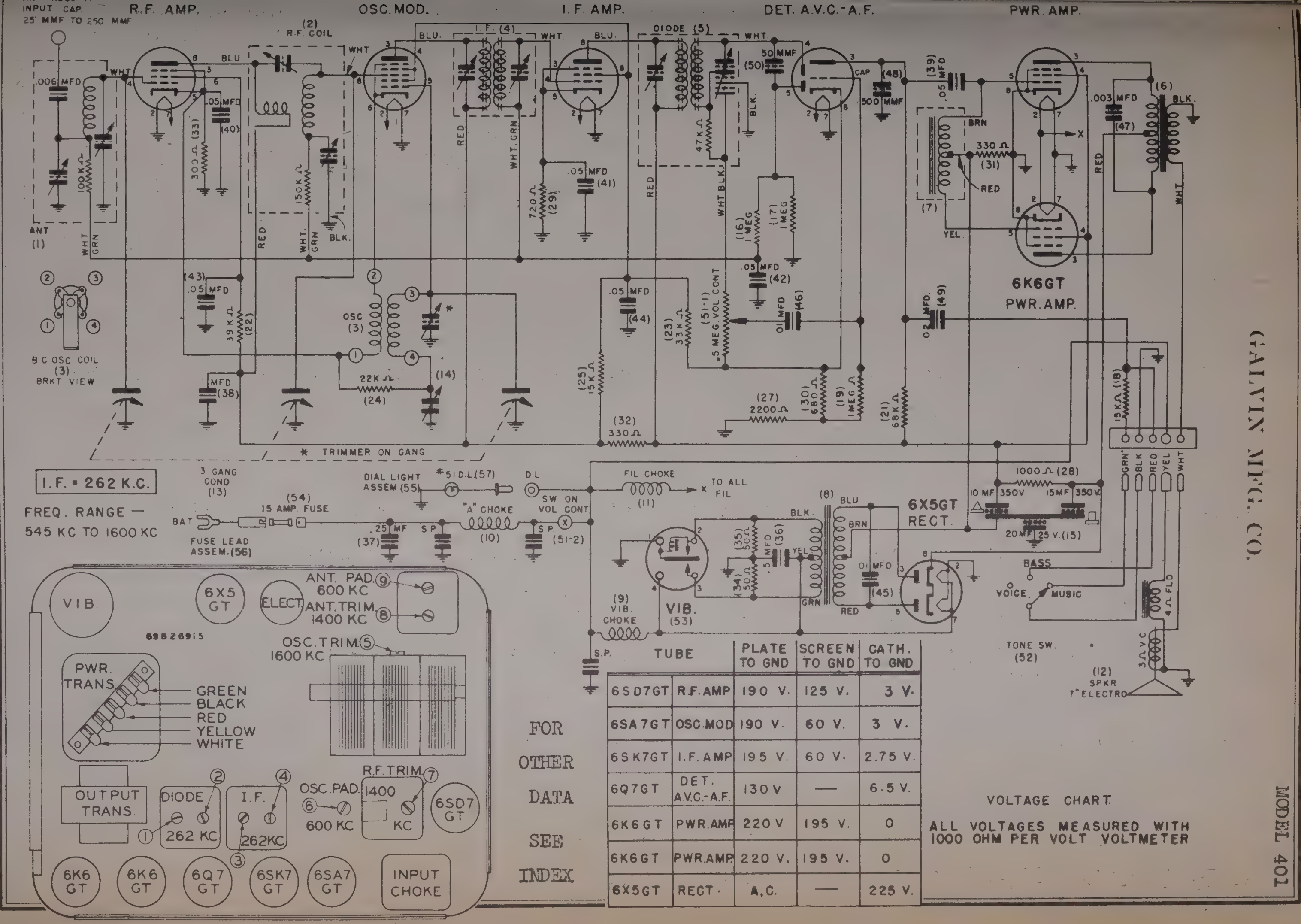
FOR ALIGNMENT DATA, SEE INDEX

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	RF AMP	110 V.	40 V.	0
6SA7GT	OSC.MOD	110 V.	110 V.	0
6SK7GT	IF AMP.	115 V	110 V.	8.5 V.
6SQ7GT	DET. AVC-AF	40 V.	—	0
6U6GT	PWR AMP	130 V.	115 V.	0
6X5GT	RECT.	AC	—	140

MODEL 401

GALVIN MFG. CO.



TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SD7GT	R.F. AMP	190 V.	125 V.	3 V.
6SA7GT	OSC. MOD	190 V.	60 V.	3 V.
6SK7GT	I.F. AMP	195 V.	60 V.	2.75 V.
6Q7GT	DET. A.V.C.-A.F.	130 V	—	6.5 V.
6K6GT	PWR. AMP	220 V	195 V.	0
6K6GT	PWR. AMP	220 V.	195 V.	0
6X5GT	RECT.	A.C.	—	225 V.

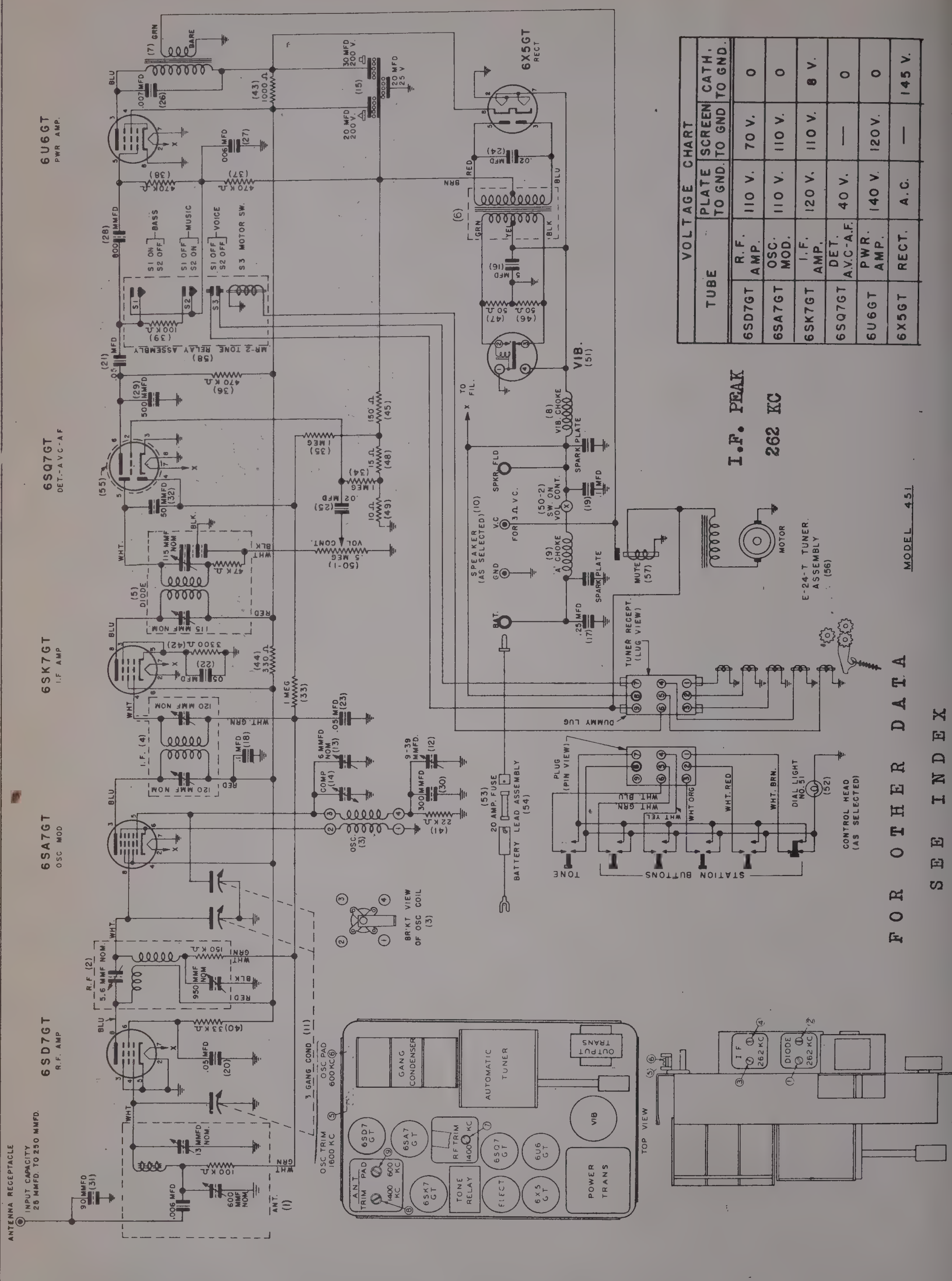
VOLTAGE CHART

ALL VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER

FOR OTHER DATA SEE INDEX

MODEL 451

GALVIN MFG. CO.



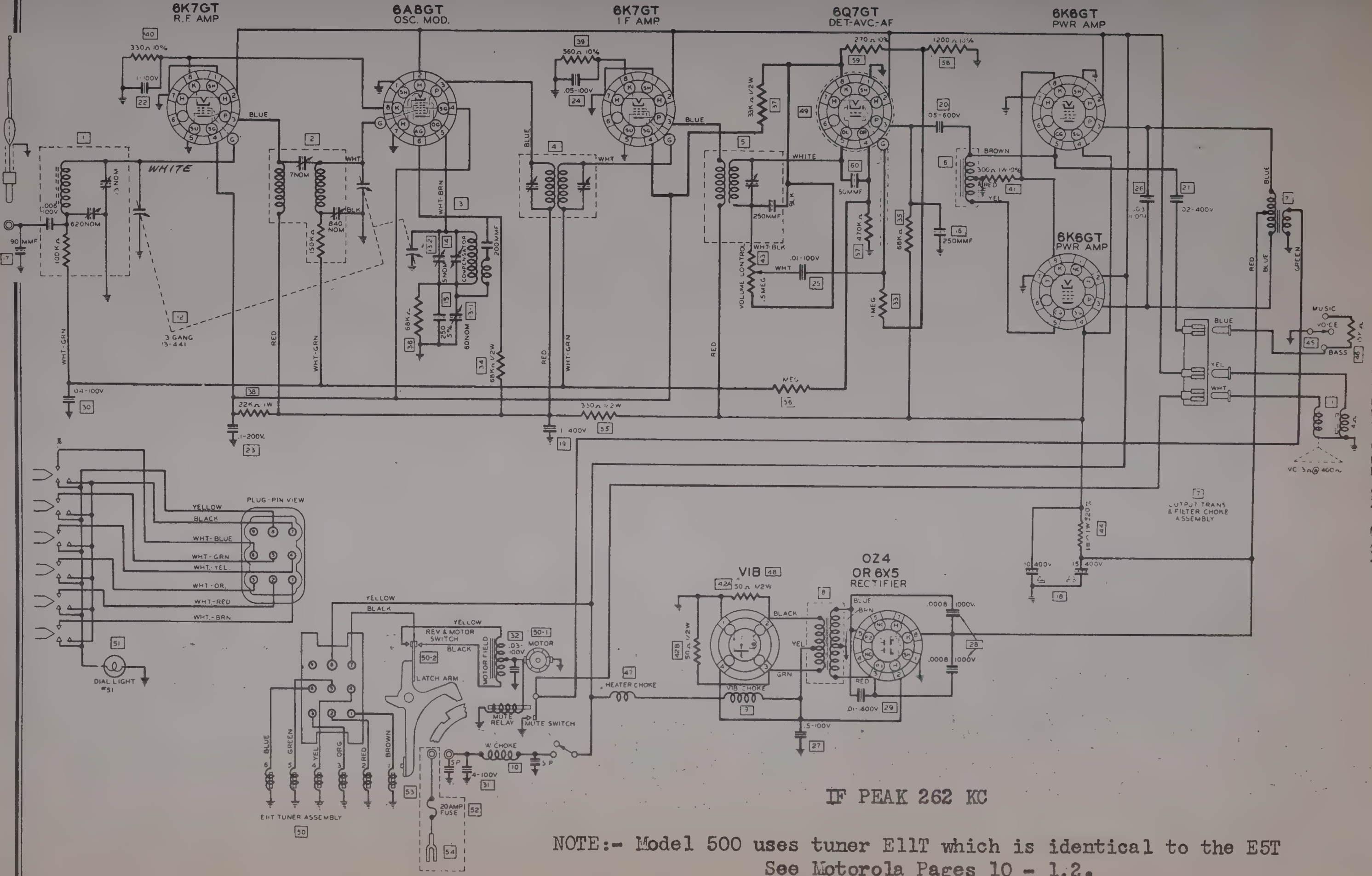
TUBE		VOLTAGE CHART PLATE TO GND.	SCREEN TO GND	CATH. TO GND.
6SD7GT	R.F. AMP.	110 V.	70 V.	0
6SA7GT	OSC. MOD.	110 V.	110 V.	0
6SK7GT	I.F. AMP.	120 V.	110 V.	8 V.
6SQ7GT	DET. A.V.C-A.F.	40 V.	—	0
6U6GT	PWR. AMP.	140 V	120 V.	0
6X5GT	RECT.	A.C.	—	145 V.

I.F. PEAK
262 KC

MODEL 451

FOR OTHER DATA
SEE INDEX

GALVIN MFG. CO.



IF PEAK 262 KC

NOTE:- Model 500 uses tuner E11T which is identical to the E5T
See Motorola Pages 10 - 1,2.

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

Place the chassis on the service bench with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the R.F. coil can that is covered with Scotch Tape. The original adjustment, made in the factory should not be tampered with. (Fig. 1 below, shows all trimmer locations.)

I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A8GT) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.
2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.
3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.
4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (6K7GT) using the same .1 MF condenser.

2. Set the signal generator at 1550 K.C. and with the condenser gang completely out of mesh adjust the 1550 K.C. oscillator trimmer to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. Oscillator padder for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

R.F. AND ANTENNA ALIGNMENT

NOTE: If the radio is to be operated on a Motorola Booster Antenna, a special dummy antenna Motorola Part No. 1X18018 must be used in series with the lead from the signal generator to the antenna receptacle. Change the signal generator connection to the antenna lead, using the special dummy.

1. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the 1400 K.C. antenna trimmer in the antenna coil can for maximum output reading.
2. Adjust the 1400 K.C. RF trimmer in the RF coil can for maximum output reading.
3. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the 600 K.C. padder in the antenna coil can for the maximum output reading.
4. Recheck steps 1, 2, and 3, for accuracy.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M Ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF

It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
26,000	262 K.C.	I.F. Grid	.1 MF	.5 Meg	1.76 Volts
565	262 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
565	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
30	600 K.C.	R.F. Grid	.1 MF	.5 Meg	1.76 Volts
4	600 K.C.	Ant. Lead	40 MMF***	None	1.76 Volts

* For one watt output.

** Meter connected across voice coil.
1.76 volts equals 1 watt output for 3 ohm voice coil.

*** Use special dummy part No. 1X18018 or M434B Booster Coil No. 17908 in series with a 25 MMF condenser.

NOTE: If set is not used with a Motorola Booster antenna, substitute a 40 MMF condenser for the Special Dummy.

VOLTAGE CHART - MODEL 500

POSITION	PLATE	SCREEN	CATHODE
RF	195	72	2.7
Osc.-Mod.	195	72	2.7
I.F.	195	72	2
Det. Avc. AF	110	-	0
Output	205	200	13
Output	205	200	13
Rect.	AC	-	210

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.
Current 6.5 amps at 6.3 volts. Maximum power output 5 watts.

MODEL 500 PARTS PRICE LIST

(Note: Numbers in first column refer to squared numbers on circuit diagram)

DRAWING NO.	PART NO.	DESCRIPTION	LIST
		MAJOR PARTS	
46	48A5067	Vibrator (3333)	$2.50
18	23A17190	Electrolytic Condenser (FP)	1.00
50	1K18718	E11T Tuner Assembly	16.00
	15C18947	Bottom cover	.75
	62D18952	Housing Overlay (Plated)	3.00
1	1X18981	Ant. Coil & Shield Assembly	2.40
8	25B19058	Power Transformer (Shielded)	2.55
7	25A19061	Output Transformer	1.00
45	40A19065	Tone Switch	.40
4	1X19076	I.F. Coil & Shield Assembly	1.40
2	1X19078	R.F. Coil & Shield Assembly	1.80
3	1X19080	Osc. Coil & Leads Assembly	.75
	1B19084	Spark Plate Assembly	.40
	1X19094	Housing Assembly	3.50
	24X19103	Heater Choke	.10
	1X19110	Input Choke & Bracket Assembly	2.00
	18A19341	Vol. Cont. & Switch. (.5 Meg.)	.75
43	1K19343	Vol. Control & Shaft Assembly	.85
10	1K19475	"A" Choke Assembly	.35
11	50B20197	Speaker 7 1/2" Electro	3.75
		Speaker Exchange	2.20
11	50B20198	Speaker 8" Electro	3.75
		Speaker Exchange	2.20
5	1X20267	Diode Coil & Shield Assembly	1.10
9	24A20549	Vibrator Choke (4 Double Pie Wnd.)	.35
		RESISTORS	
34	6B6001	Carbon Resistor 68000-1/2-20	.DOZ. .60
42	6B6005	Carbon Resistor 50-1/2-20	.DOZ. .60
55	6B6009	Carbon Resistor 330-1/2-20	.DOZ. .60
57	6B6011	Carbon Resistor 470,000-1/3-20	.DOZ. .60
37	6B6012	Carbon Resistor 33,000-1/2-20	.DOZ. .60
38	6B6016	Carbon Resistor 22,000-1-20 N.I.	.10
40	6B6042	Carbon Resistor 330-1/3-10	.DOZ. .60
	6B6070	Carbon Resistor 150,000-1/3-20 N.I	.DOZ. .60
33	6B6071	Carbon Resistor 1 MEG.-1/3-20 N.I.	.DOZ. .60
36	6B6125	Carbon Resistor 68,000-1/3-20 N.I.	.DOZ. .60
56	6B6159	Carbon Resistor 1 MEG.1/3-20 INS	.DOZ. .60
44	6B6184	Carbon Resistor 1000-1-20.N.I.	.10
41	6B6187	Carbon Resistor 300-1-10 N.I	.10
58	6B6198	Carbon Resistor 1200-1/3-10 N.I.	.DOZ. .60
39	6D6224	Carbon Resistor 560-1/3-10 N.I	.DOZ. .60
35	6B6256	Carbon Resistor 68,000-1/3-20 Ins	.DOZ. .60
59	6B6272	Carbon Resistor 270-1/3-10 Ins	.DOZ. .60
46	6B6284	Carbon Resistor 15,000-1/3-20 Ins.	.DOZ. .60
		CONDENSERS	
25	8A1400	Tubular Condenser .01-100V	.15
22	8A3302	Tubular Condenser .1-100V.	.15
23	8A3310	Tubular Condenser .1-200V.	.15
27	8A4588	Tubular Condenser .5-100V.	.30
		CONDENSERS CONT'D.	
17	21A4807	Molded Mica Condenser 90 MMF 10%	$ .20
28	8A4925	Dual Tub. Condenser .0008-0008-1000V	.25
	21B6501	Molded Mica Condenser 200 MMF-20%	.15
60	21B6503	Molded Mica Condenser 50 MMF-20%	.15
16	21B6517	Molded Mica Cond. 250 MMF-20%	.15
32	8A10306	Tubular Condenser & Strap .03-100V	.15
29	8A10432	Tubular Condenser .01-1800V	.35
30	8A12898	Tubular Condenser & Strap .04-100V	.20
	8A13014	Condenser Res. .006-100V-100K	.25
26	8K13165	Tubular Condenser .003-1000V	.15
24	8A13514	Tubular Condenser .05-100V	.15
31	8A14095	Tubular Condenser .4-100V	.30
	21A16369	Ceramic Condenser 10 MMF 1% MMF	.25
20	8A17336	Tubular Condenser & Strap .05-600V	.25
14	20A18179	Compensating Condenser	.25
13	20A18391	Osc. Trimmer & Padder	.35
19	8A19072	Tubular Condenser & Strap .1-400	.25
15	21A19088	Ceramic Condenser 250 MMF. 5%	.20
21	8A19940	Tubular Condenser & Strap .02-400V	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

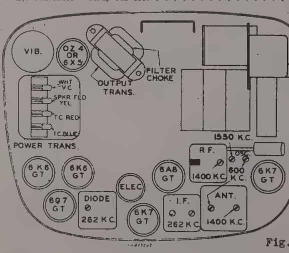
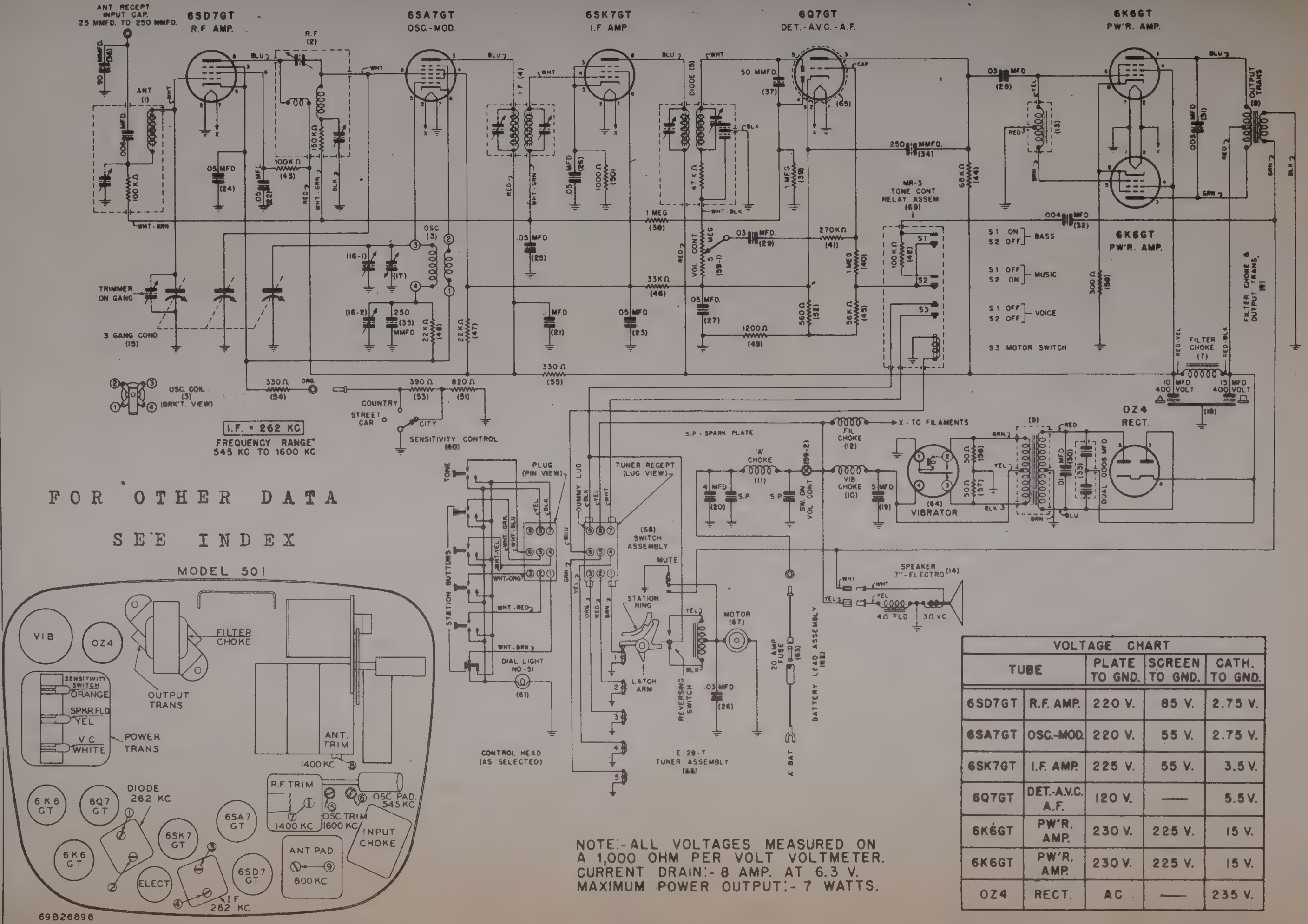


Fig. 1

GALVIN MFG. CO.



FOR OTHER DATA

SEE INDEX

VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	220 V.	85 V.	2.75 V.
6SA7GT	OSC.-MOD.	220 V.	55 V.	2.75 V.
6SK7GT	I.F. AMP.	225 V.	55 V.	3.5 V.
6Q7GT	DET.-A.V.C. A.F.	120 V.	—	5.5 V.
6K6GT	PW'R. AMP.	230 V.	225 V.	15 V.
6K6GT	PW'R. AMP.	230 V.	225 V.	15 V.
0Z4	RECT.	AC	—	235 V.

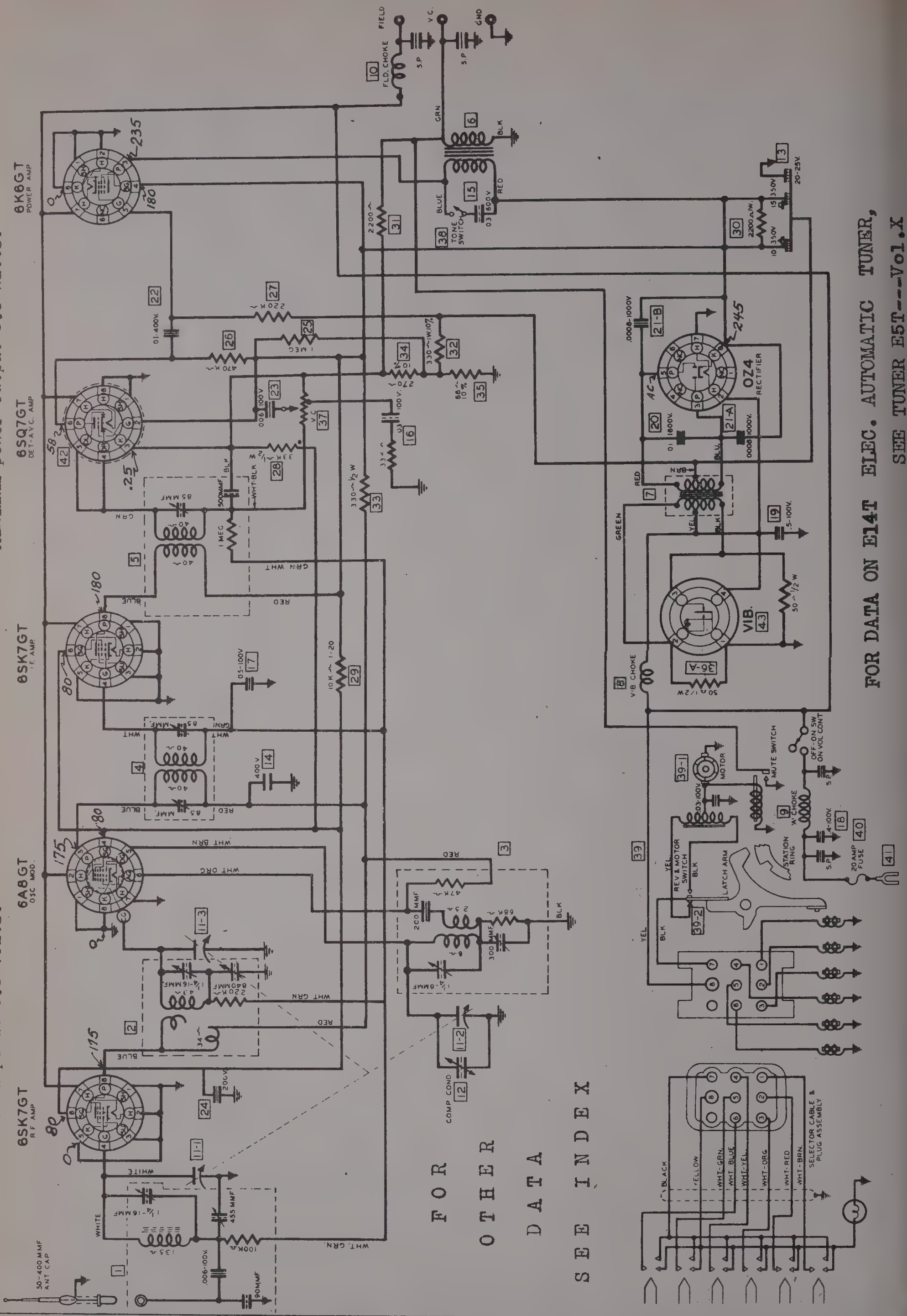
NOTE:- ALL VOLTAGES MEASURED ON A 1,000 OHM PER VOLT VOLTMETER.
CURRENT DRAIN:- 8 AMP. AT 6.3 V.
MAXIMUM POWER OUTPUT:- 7 WATTS.

MODEL 550

GALVIN MFG. CO.

All voltages measured from socket terminal to chassis ground using 1000 Ohm per volt meter.

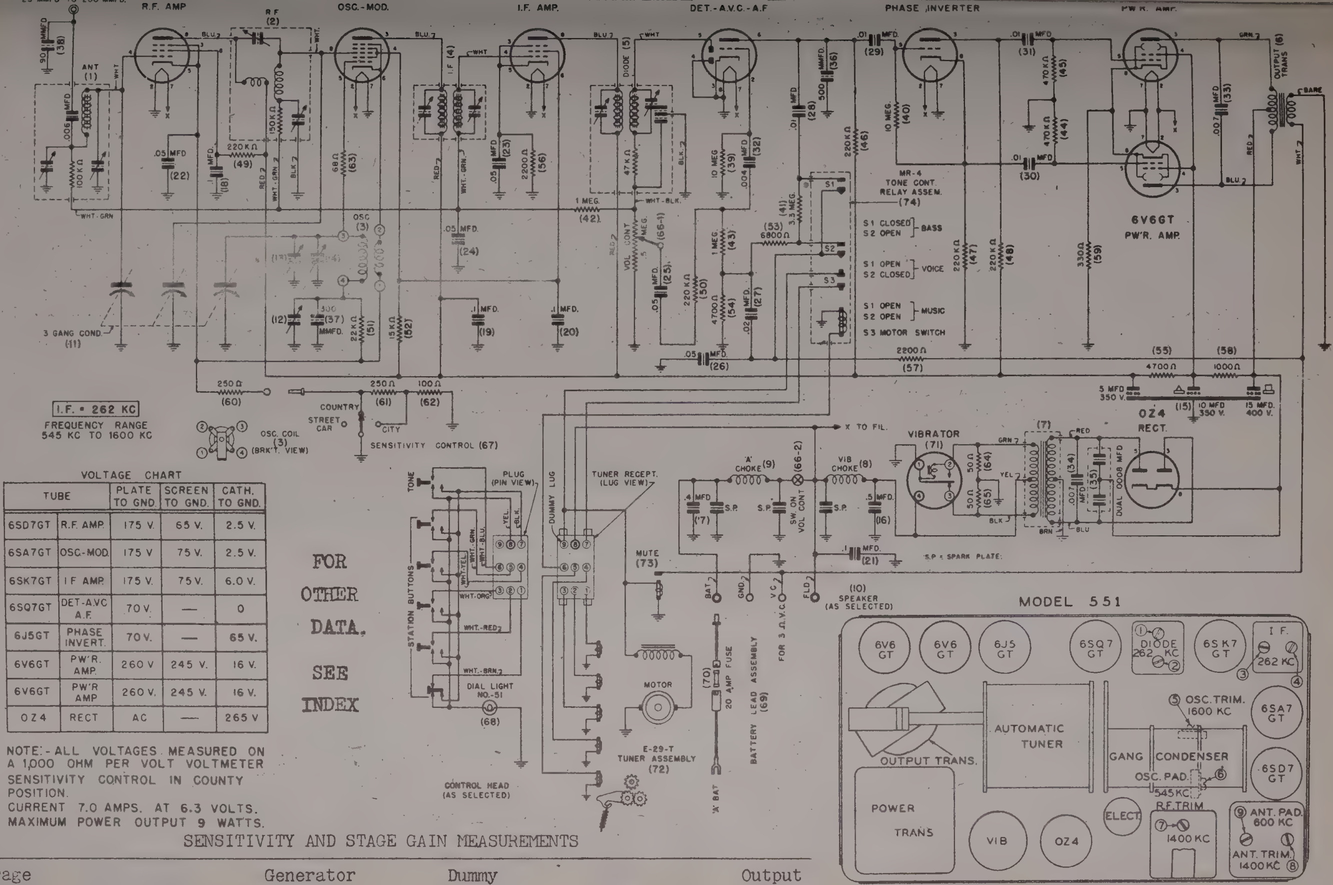
Current 6.5 amps at 6.3 volts. Maximum power output 3.5 watts.



FOR OTHER DATA SEE INDEX

FOR DATA ON E14T ELEC. AUTOMATIC TUNER, SEE TUNER E5T---Vol.X

GALVIN MFG. CO.



VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	175 V.	65 V.	2.5 V.
6SA7GT	OSC-MOD.	175 V.	75 V.	2.5 V.
6SK7GT	I F AMP.	175 V.	75 V.	6.0 V.
6SQ7GT	DET-AVC A.F.	70 V.	—	0
6J5GT	PHASE INVERT.	70 V.	—	65 V.
6V6GT	PW'R. AMP.	260 V	245 V.	16 V.
6V6GT	PW'R AMP	260 V.	245 V.	16 V.
0Z4	RECT	AC	—	265 V

NOTE:- ALL VOLTAGES MEASURED ON A 1,000 OHM PER VOLT VOLTMETER SENSITIVITY CONTROL IN COUNTY POSITION.
CURRENT 7.0 AMPS. AT 6.3 VOLTS.
MAXIMUM POWER OUTPUT 9 WATTS.

FOR OTHER DATA. SEE INDEX

SENSITIVITY AND STAGE GAIN MEASUREMENTS

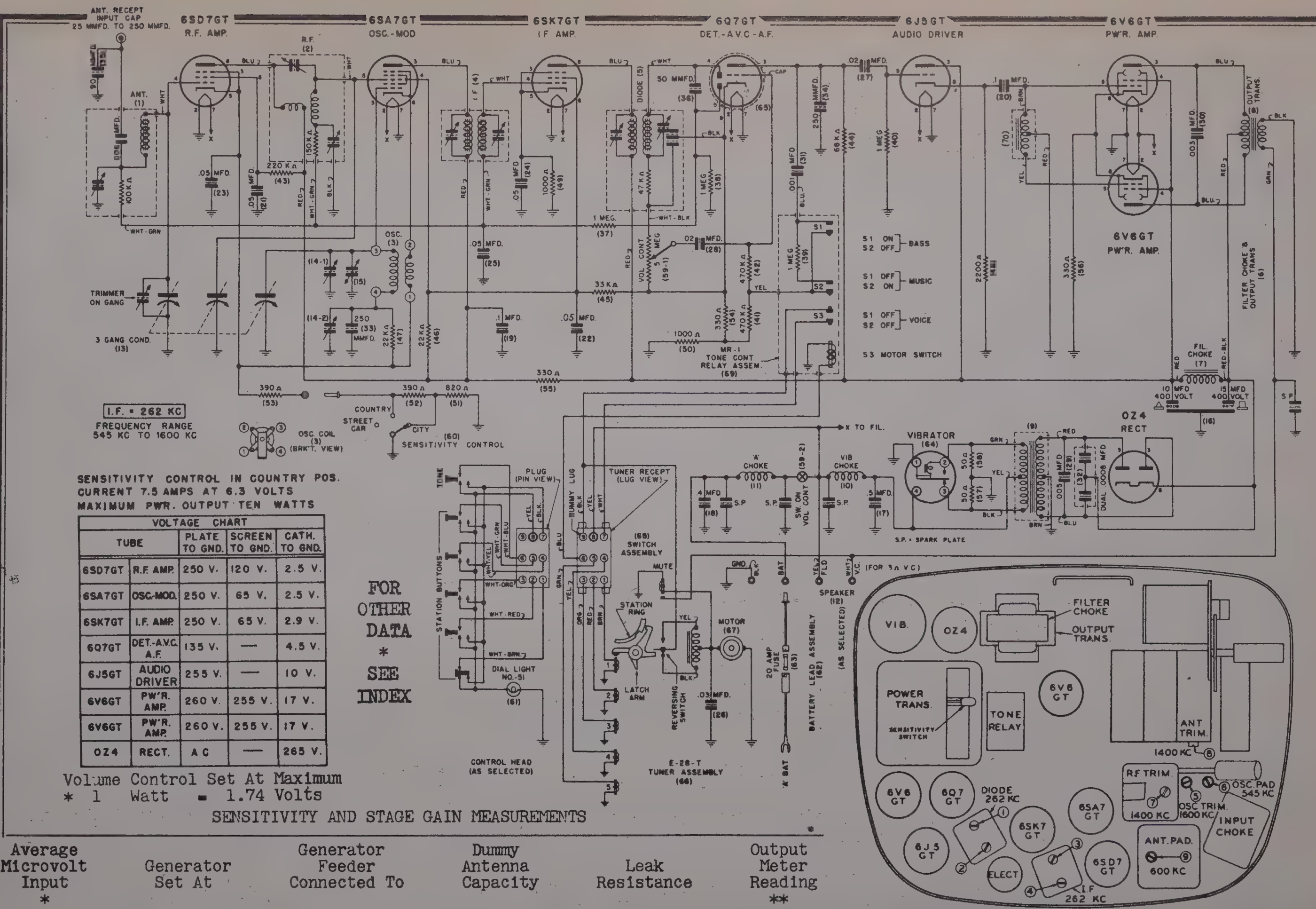
Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
34,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
590	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
677	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
11	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	Antenna	***	None	1.74

Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

Tone Control Set At Music
Sensitivity Control Set At Country
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or
Booster Coil Part No. 24A26751 in series
with a 35 Mmf. Condenser.

MODEL 701

GALVIN MFG. CO.



SENSITIVITY CONTROL IN COUNTRY POS.
CURRENT 7.5 AMPS AT 6.3 VOLTS
MAXIMUM PWR. OUTPUT TEN WATTS

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SD7GT	R.F. AMP.	250 V.	120 V.	2.5 V.
6SA7GT	OSC-MOD.	250 V.	65 V.	2.5 V.
6SK7GT	I.F. AMP.	250 V.	65 V.	2.9 V.
6Q7GT	DET.-A.V.C. A.F.	135 V.	—	4.5 V.
6J5GT	AUDIO DRIVER	255 V.	—	10 V.
6V6GT	PW'R. AMP.	260 V.	255 V.	17 V.
6V6GT	PW'R. AMP.	260 V.	255 V.	17 V.
OZ4	RECT.	A C	—	265 V.

FOR OTHER DATA * SEE INDEX

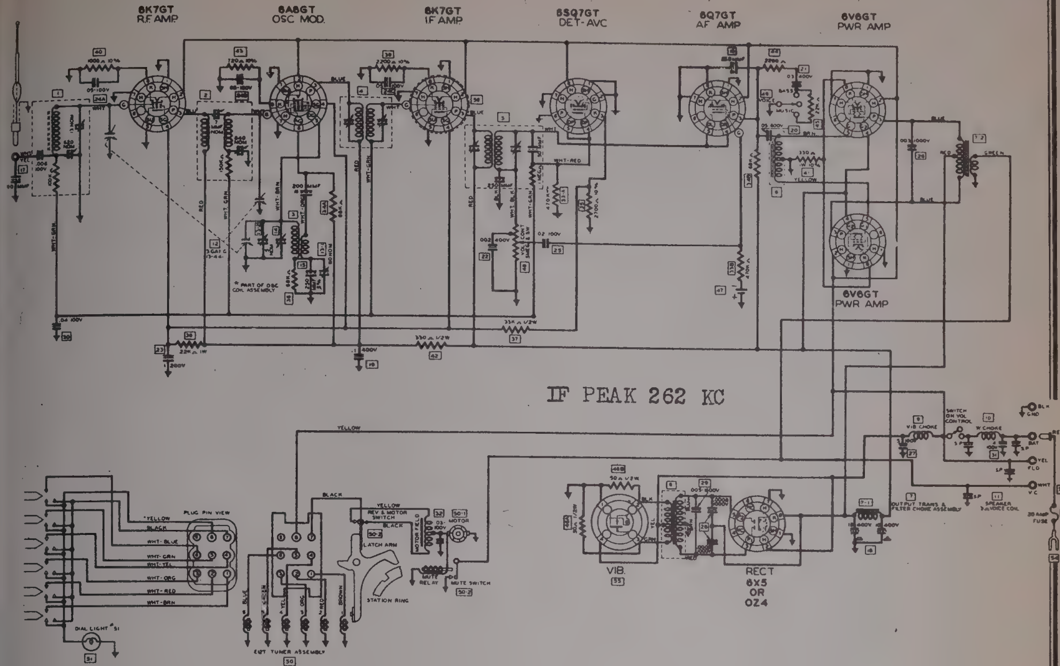
Volume Control Set At Maximum
* 1 Watt = 1.74 Volts

SENSITIVITY AND STAGE GAIN MEASUREMENTS

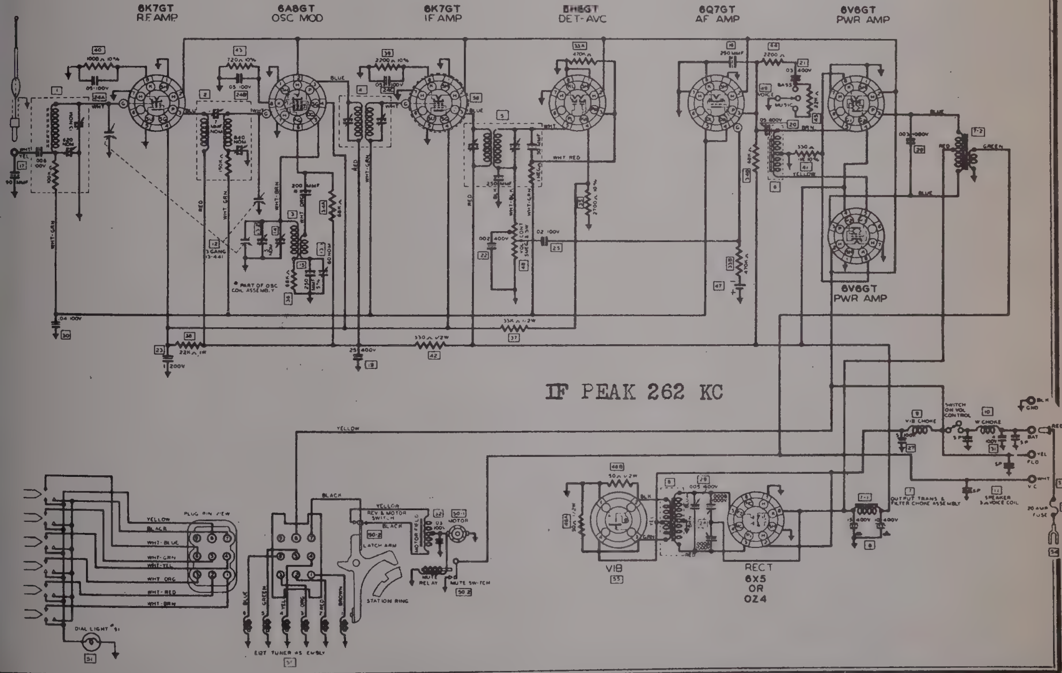
Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
10,000	262 K.C.	I.F. Grid	.1	.5 Meg.	1.74
360	262 K.C.	Mod. Grid	.1	.5 Meg.	1.74
385	600 K.C.	Mod. Grid	.1	.5 Meg.	1.74
8	600 K.C.	R.F. Grid	.1	.5 Meg.	1.74
2	600 K.C.	Ant. Lead	***	None	1.74

Tone Control Set At Voice
Sensitivity Control In Country Position
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or
Booster Coil Part No. 24A26751 in series
with a 35 Mmf. Condenser

MODEL 700
Early,Late



NOTE:- Model 700 uses tuner E12T which is identical to the E5T
See Motorola Pages 10 - 1,2.



MODEL 700
Early,Late

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

Place the chassis on the service bench with the speaker and battery connected to it.
Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.
NOTE: Fig. 1 below shows all trimmer locations.

I. F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A8GT) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.
2. Set the signal generator at 262 K.C. and carefully adjust the two trimmers in the Diode coil can to the point showing the highest reading on the output meter.
3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.
4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (6K7GT) using the same .1 MF condenser.
2. Set the signal generator at 1550 K.C. and with the condenser gang completely out of mesh adjust the 1550 K.C. oscillator trimmer to the point showing the highest output reading.
3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. oscillator padder for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

R. S. AND ANTENNA ALIGNMENT

NOTE: If the radio is to be operated on a Motorola Booster Antenna, a special dummy antenna Motorola part No. 1X18018 should be used in series with the lead from the signal generator to the antenna receptacle. Change the signal generator connection to the antenna lead, using the special dummy.

1. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the 1400 K.C. antenna trimmer in the antenna coil can for maximum output reading.
2. Adjust the 1400 K.C.R.F. trimmer in the R.F. coil can for maximum output reading.
3. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the 600 K.C. padder in the antenna coil can for the maximum output reading.
4. Recheck steps 1, 2, and 3, for accuracy.

SENSITIVITY AND STAGE GAIN MEASUREMENT

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a special dummy part #1X18018 in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

AVERAGE MICROVOLT INPUT *	GENERATOR SET AT	GENERATOR FEEDER CONNECTED TO	DUMMY ANTENNA CAPACITY	LEAK RESISTANCE	OUTPUT METER READING **
11,500	262 K.C.	I.F. Grid	.1 MF	.5 Meg	1.76 Volts
255	262 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
14	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.76 Volts
12	600 K.C.	R.F. Grid	.1 MF	.5 Meg	1.76 Volts
1.5	600 K.C.	Ant. Lead	***	None	1.76 Volts

* For one watt output
** Meter connected across voice coil
1.76 Volts equals 1 watt output for 3 ohm voice coil
*** Use special dummy part No. 1X18018.
NOTE: If set is not used with a Motorola Booster antenna, substitute a 40 MMF. condenser for the special dummy.

VOLTAGE CHART

TUBE POSITION	PLATE	SCREEN	CATHODE
R.F.	235	80	3.8
Osc. Mod.	235	80	3.8
I.F.	235	80	4
Det. AVC	-	-	50
A.F.	130	-	0
Output	242	235	16
Output	242	235	16
Rect.	AC	-	250

All voltages measured from socket terminal to chassis ground using 1000 ohm per volt meter.

Current 8 amps. at 6.3 volts.

Maximum power output 10 watts.

Model 700 PARTS PRICE LIST

NOTE: Numbers in first column refer to squared numbers on circuit diagram.

Drawing No.	Part No.	Description	List
		MAJOR PARTS	
6	25B10954	Input Choke	$1.75
55	48K11026	Vibrator (3353)	2.50
18	23A17190	Electrolytic Condenser (FP)	1.00
	62D18954	Housing Overlay. - Chrome	3.00
1	1X18981	Ant. Coil & Shield Assembly	2.40
9	24A19055	Vibrator Choke (8 Pie).	.35
49	40A19065	Tone Switch	.40
4	1X19076	I.F. Coil & Shield Assembly	1.40
2	1X19078	R.F. Coil & Shield Assembly	1.80
3	1X19080	Osc. Coil & Leads Assembly.	.75
48	1K19085	Vol. Control & Coupling Assembly.	.95
8	25B19243	Power Transformer	3.50
7	25B19246	Output Trans. & Filter Choke.	2.30
7-2	35K19247	Output Trans. Only.	1.50
7-1	25K19248	Filter Choke Only	.80
5	1X19252	Diode Coil & Shield Assembly.	1.80
	1B19257	Spark Plate Assembly.	.75
	1K19265	Housing Assembly.	3.25
10	1K19475	"A" Choke Assembly.	.35
		CONDENSERS	
25	8A1697	Tubular Condenser (.02-100V.)	.15
23	8A3310	Tubular Condenser (.1-200V)	.15
	8A4383	Tubular Condenser & Strap (.25-400.).	.35
27	8A4588	Tubular Condenser (.5-100.)	.30
22	8A4736	Tubular Condenser (.002-400.)	.15
17	21A4807	Molded Mica Condenser (90 MMF) 10%.	.20
28	8A4925	Dual Tub. Cond. (.0008-1000V)	.25
	21B6501	Molded Mica Condenser (200 MMF-20%)	.15
	21B6503	Molded Mica Condenser (50 MMF-20%).	.15
16	21B6517	Molded Mica Condenser. (250-MMF-20%).	.15
32	8A10306	Tubular Cond. & Strap .03-100V.	.15
21	8A11968	Special Condenser .03-400	.25
30	8A12898	Tubular Condenser & Strap (.04-100V).	.20
	8A13014	Condenser Res. (.006-100V-100K)	.25
26	8K13165	Tubular Condenser (.003-100V.).	.15
24	8A13514	Tubular Condenser (.05-100V.)	.15
31	8A14095	Flat Tubular Condenser (.4-100V.)	.30
29	8A15370	Tubular Condenser (.005-1600V.)	.35
	21A18120	Molded Mica Condenser (90 MMF-10%).	.20
14	20A18179	Compensating Condenser.	.25
13	20A18391	Osc. Trimmer & Padder	.35
15	21A19088	Ceramic Condenser (250 MMF) 5%.	.20
20	8K19242	Ceramic Condenser & Strap. (.05-600V)	.25

Drawing No.	Part No.	Description		List
		RESISTORS		
46	6B6005	Carbon Resistors (50-1/2-20).	DOZ.	$ .60
42	6B6010	Carbon Resistor (330-1/2-20 INS).	DOZ.	.60
33	6B6011	Carbon Resistor (470,000-1/3-20).	DOZ.	.60
37	6B6012	Carbon Resistor (33000-1/2-20).	DOZ.	.60
38	6B6018	Carbon Resistor (22000-1-20. N.I.).		.10
44	6B6072	Carbon Resistor (2200-1/3-20. N.I.)	DOZ.	.60
40	6B6086	Carbon Resistor (1000-1/3-10. N.I.)	DOZ.	.60
41	6B6103	Carbon Resistor (330-1-10. N.I.).		.10
36	6B6125	Carbon Resistor (68000-1/3-20. N.I.).	DOZ.	.60
	6B6159	Carbon Resistor (1 MEG-1/3-20 INS).	DOZ.	.60
39	6B6198	Carbon Resistor (1200-1/3-10 N.I.).	DOZ.	.60
45	6B6212	Carbon Resistor (22000-1/3-20. INS)	DOZ.	.60
43	6B6224	Carbon Resistor (560-1/3-10. N.I.).	DOZ.	.60
34	6B6256	Carbon Resistor (68000-1/3-20 INS).	DOZ.	.60
35	6B6275	Carbon Resistor (2700-1/3-10. INS).	DOZ.	.60

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

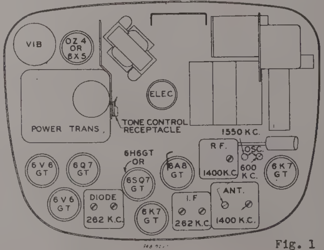


Fig. 1

GAMBLE-SKOGMO, INC.

MODEL 609

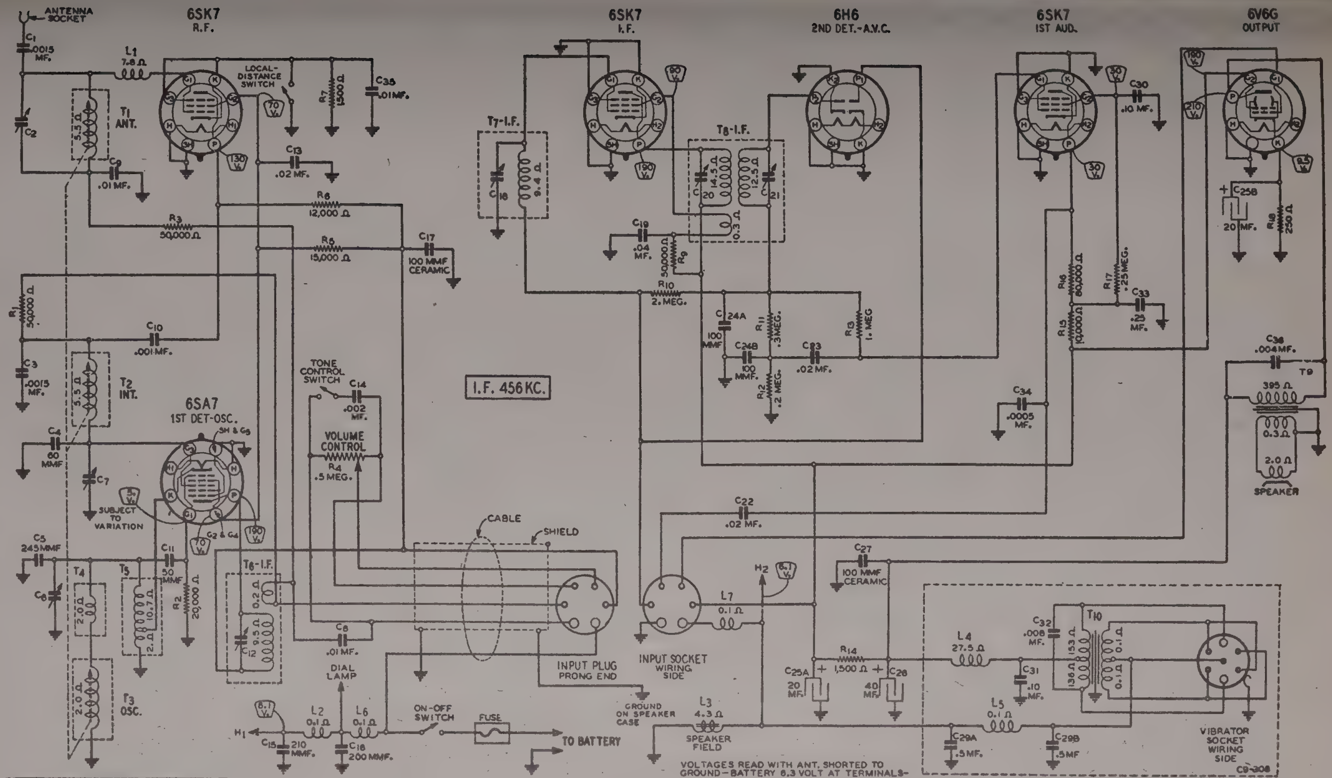


Fig. 5—Schematic Circuit Diagram

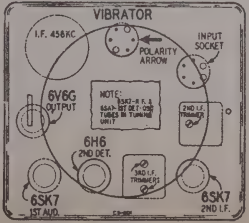


Fig. 2—Tube and Vibrator Location

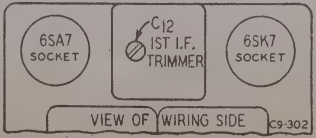


Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

Power Consumption	6.8 Amperes at 6.3 Volts
Power Output	3 Watts Undistorted
Sensitivity	1.5 Microvolts at .5 Watt Output (L-D Switch in Distance Position)
Selectivity	39 KC Broad at 1000 Times Signal
Tuning Frequency Range	540 to 1560 KC
Intermediate Frequency	456 KC
Speaker	6" Electro-Dynamic

Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Make a list of your favorite stations, those which you tune in regularly.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

NOW LOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening and turning the locking screw in a clockwise direction until it is tight.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

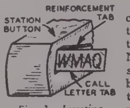


Fig. 3—Inserting Station Tab

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

Alignment Procedure

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit —See Fig. 6.

Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1560 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Antenna

A shielded antenna cable with bayonet connector plug is required.

The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Types of Low Capacity Antennas —Door hinge; fishpole; over-the-roof types which are mounted quite a distance from the metal roof of the car.

The antenna should be mounted on the same side of the car as the tuning unit.

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (200 mmf. total capacity of antenna and shielded cable) an adapter must be used. The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is inserted in the adapter.

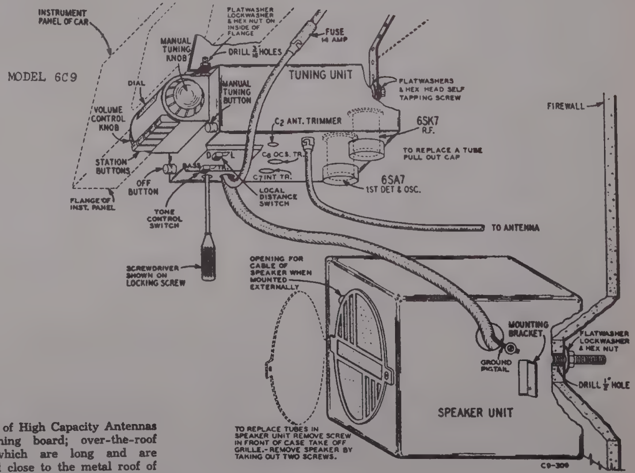


Fig. 1—Details of Mounting Tuning and Speaker Units

Types of High Capacity Antennas — Running board; over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built in roof antennas (not metal roof).

ANTENNA CABLE

The total capacity of antenna and shielded cable should be 35 to 60 mmf.

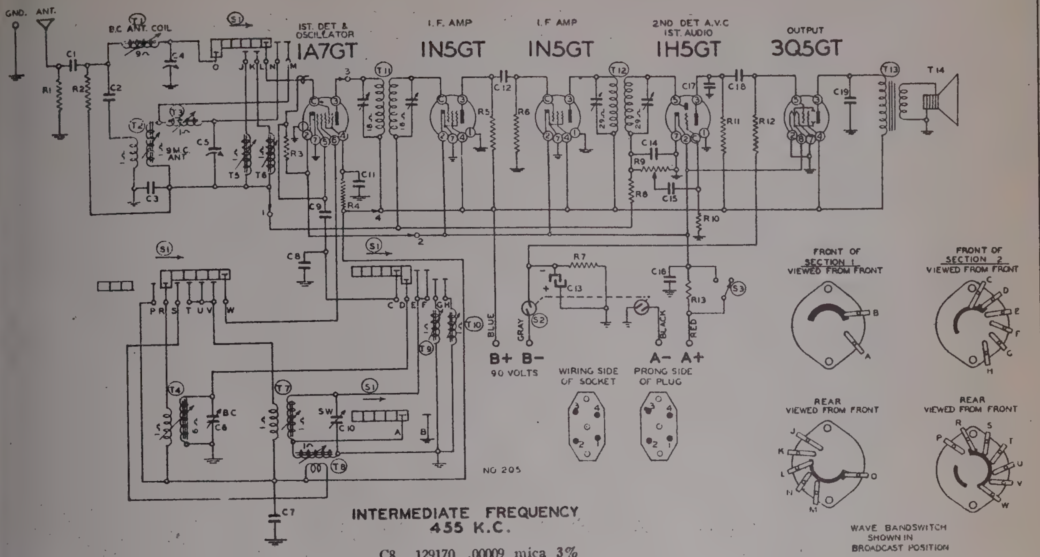
Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside. In the case of a running board antenna, the antenna lead shielding must extend all the way to the antenna.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed SEVERAL inches up into the PILLAR POST.

GAMBLE SKOGMO, INC.

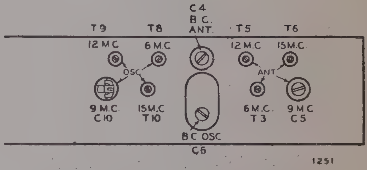
MODEL C509

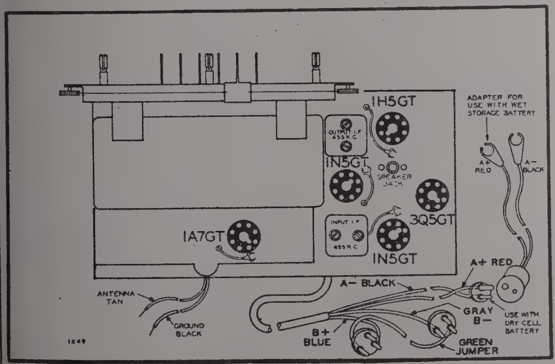


INTERMEDIATE FREQUENCY
455 K.C.

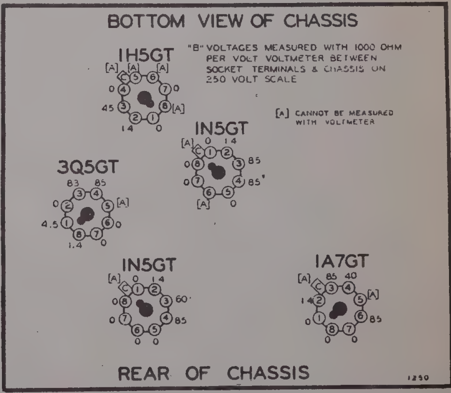
WAVE BANDSWITCH SHOWN IN BROADCAST POSITION

Code No.	Part No.	Description
		RESISTORS
R1	13012	50M ohm—⅓ w. 20%
R2	13020	100M ohm—⅓ w. 20%
R3	1309	200M ohm—⅓ w. 20%
R4	13094	50M ohm—⅓ w. 10%
R5	130176	20M ohm—⅓ w. 10%
R6	13019	1 megohm—⅓ w. 20%
R7	13079	400 ohm—⅓ w. 10%
R8	13038	2 megohm—⅓ w. 20%
R9	101236	Volume Control
R10	130223	10 megohm—⅓ w. 20%
R11	13011	250M ohm—⅓ w. 20%
R12	13019	1 megohm—⅓ w. 20%
R13	130325	1 ohm—⅓ w. 10%
	130326	2.3 ohm—1½ Watt 10% in "A" Cable Adapter
		CONDENSERS
C1	129158	.0002 mica 10%
C2	100112	.001 x 200 volt
C3	1009	.05 x 200 volt
C4	124138	B.C. ant. trimmer
C5	124138	9 mc. ant. trimmer
C6	124139	B.C. osc. trimmer
C7	10064	.25 x 200 volt
C8	129170	.00009 mica 3%
C9	1295	.0001 mica 20%
C10	124145	9 mc. osc. trimmer
C11	100124	.1 x 200 volt
C12	100112	.001 x 200 volt
C13	119116	20 mfd. x 25 volt lytic
C14	12912	.00025 mica 20%
C15	10025	.002 x 600 volt
C16	100104	.5 x 100 volt
C17	1295	.0001 mica, 20%
C18	10026	.02 x 400 volt
C19	10012	.003 x 600 volt
		MISCELLANEOUS
T1	111216	B.C. ant. coil
T2	111213	9 mc. ant. coil
T3	111212	6 mc. ant. coil
T4	110168	B.C. osc. coil
T5	111214	12 mc. ant. coil
T6	111215	15 mc. ant. coil
T7	110165	9 mc. osc. coil
T8	110164	6 mc. osc. coil
T9	110166	12 mc. osc. coil
T10	110167	15 mc. osc. coil
T11	108177C	Input I.F. complete
T12	108185B	Output I.F. complete
T13	105119	Output transformer
T14	114220	P.M. speaker
S1	125138	Band switch
S2		On-off switch on volume control
S3	12588B	Battery switch





BOTTOM VIEW OF CHASSIS



"B" VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS ON 250 VOLT SCALE

[A] CANNOT BE MEASURED WITH VOLTMETER

REAR OF CHASSIS

©John F. Rider, Publisher

MODEL 509
MODEL C800

GAMBLE SKOGMO, INC.

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

Setting the Pushbuttons MODELS 509 and C800

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

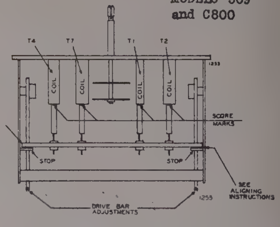
Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place, (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

MODEL 509

Power Consumption
A Battery - - - 300 MA
B Battery - - - 13.5 MA
Power Output - - - - 210 MW Undistorted
Sensitivity for 50 Milliwatt Output: 10 Microvolts Average
Selectivity - 38 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 535 to 1730 KC
49M Band - - - 5.9 to 6.1 MC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
Intermediate Frequency - - - - - 455 KC
Speaker - - - - - - 6 in. PM Dynamic

MODELS 509 and C800



IRON CORE ADJUSTMENT VIEW

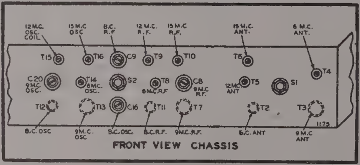
- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 1N5 (I.F.)	Broadcast	Set Dial at 1730 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 1A7	Broadcast	Set Dial at 1730 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C10 (See Trimmer on Top) C5	Osc. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T8 (See Trimmer View) T3	Osc. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T9 (See Trimmer View) T5	Osc. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T10 (See Trimmer View) T6	Osc. Ant.	Adjust to maximum output
BROADCAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1730 Kc.	(See Trimmer View) C6 ((See Trimmer View) C4	Osc. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Tune to Generator Sig.	Rotate Core T1 (See Iron Core Adjustment View)	Ant.	Adjust to maximum output

MODEL C800

Power Consumption - - - - - 100 Watts
Power Output - - - - 5 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 540 to 1600 KC
49M Band - - - 5.9 to 6.1 MC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
Intermediate Frequency - - - - - 455 KC
Speaker - - - - - 10 in. Electro Dynamic



TRIMMER VIEW

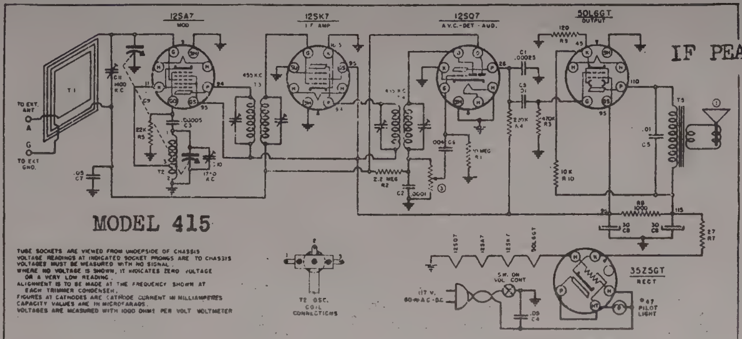
- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROADCAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

Model 415 is a 5-tube superheterodyne radio receiver for operation on a 117 volt A.C., 60 cycle or 117 volt D.C. supply.

This receiver covers a frequency range from 540 Kilocycles to 1750 Kilocycles (K.C.)



IF PEAK 455 KC

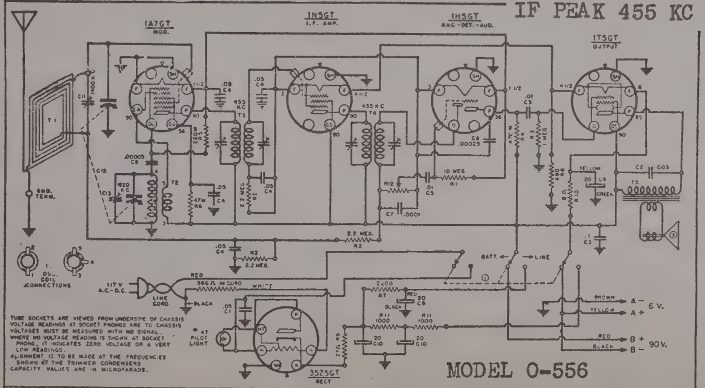
MODEL 415

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K Ohm " "
R 4	60-180	220K " " "
R 5	60-185	22 K " "
R 6	60-189	4700 " " "
R 7	60-220	27 " " "
R 8	60-198	1000 " 1/2 WATT "
R 9	60-648	120 " " "
R 10	60-547	10 K " 1 WATT "

CODE	PART NO	DESCRIPTION
C 1	504	.00025 MFD. MICA CONDENSER
C 2	1501	.0001 " " "
C 3	1503	.00005 " " "
C 4	[illegible]	.05 MFD. 400 V TUBULAR CONDENSER
C 5	16-119	.01 " " " "
C 6	16-174	.004 " " "
C 7	1822	.05 200 V. " "
C 8	18-266	30 X 30 MFD. 150 W.V. ELECTROLYTIC
C 9	19-171	2 GANG VARIABLE CONDENSER (ALSO C10)
C 11	20-129	TRIMMER (ON LOOP)

CODE	PART NO.	DESCRIPTION 1-51
T 1	82-22	LOOP ANTENNA
T 2	10-371	OSCILLATOR COIL
T 3	10-369	1ST. I.F. TRANSFORMER
T 4	10-370	2ND. I F TRANSFORMER
T 5	80-205	OUTPUT TRANSFORMER (ON SPKR.)
1	79-307	5" P M SPEAKER
2	80-152	TONE SWITCH
3	24-153	500K OHM VOLUME CONTROL (WITH SW.)



IF PEAK 455 KC

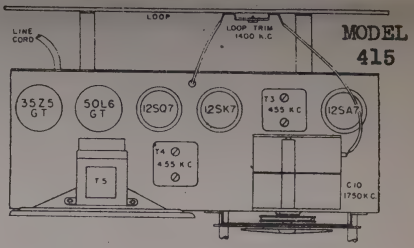
MODEL 0-556

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READINGS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO	DESCRIPTION
C 1	1607	.05 MFD. 400 V. TUBULAR COND
C 2	16-139	.003 " " " "
C 3	16-115	.1 " 200 V. " "
C 4	1622	.05 " " " "
C 5	16-121	.01 " " " "
C 6	1504	.00025 MFD. MICA CONDENSER
C 7	1501	.0001 " " "
C 8	1503	.00005 " " "
C 9	18-263	20 X 20 " 150 W V ELECTROLYTIC
C 10	18-262	20 X 20 " 150 W.V. "
C 11	20-129	TRIMMER ON LOOP
C 12	19-167	2 GANG VARIABLE COND. ALSO C 13

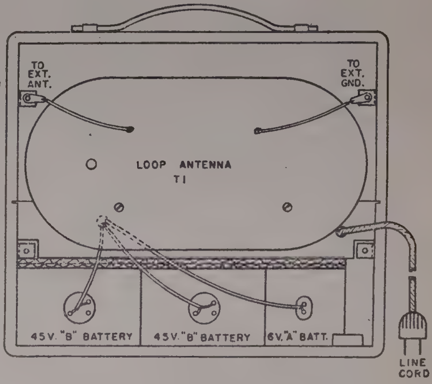
CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W. RESISTOR
R 2	60-179	2.2 " " "
R 3	60-195	1 " " "
R 4	60-178	470 M OHM " "
R 5	60-180	220 M " " "
R 6	60-177	47 M " " "
R 7	60-383	2200 " " "
R 8	60-319	680 " " "
R 9	60-220	27 " " "
R 10	60-128	8 " 1/2 W. "
R 11	60-644	1000 " 3 W. "
R 12	24-150	1 MEGOHM VOLUME CONTROL

CODE	PART NO	DESCRIPTION 0-55
T 1	82-20	LOOP ANTENNA
T 2	10-310	OSCILLATOR COIL
T 3	10-335	1 ST. I.F. TRANSFORMER
T 4	10-343	2 ND. " "
T 5	80-204	OUTPUT TRANSFORMER
1	69-151	POWER SWITCH
3	79-303	5" P.M. SPEAKER } ALTERNATIVE.
3	79-304	5" P.M. SPEAKER }

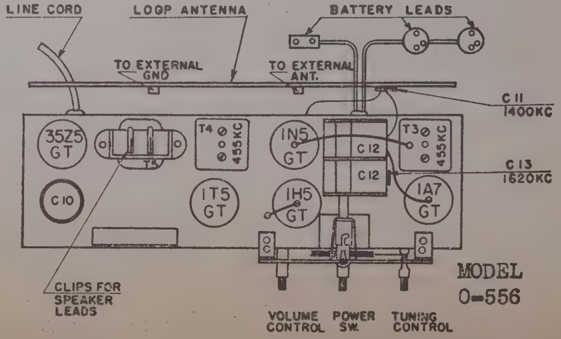


LOCATION OF PARTS ON TOP OF CHASSIS

CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION OF VOLUME VIII.

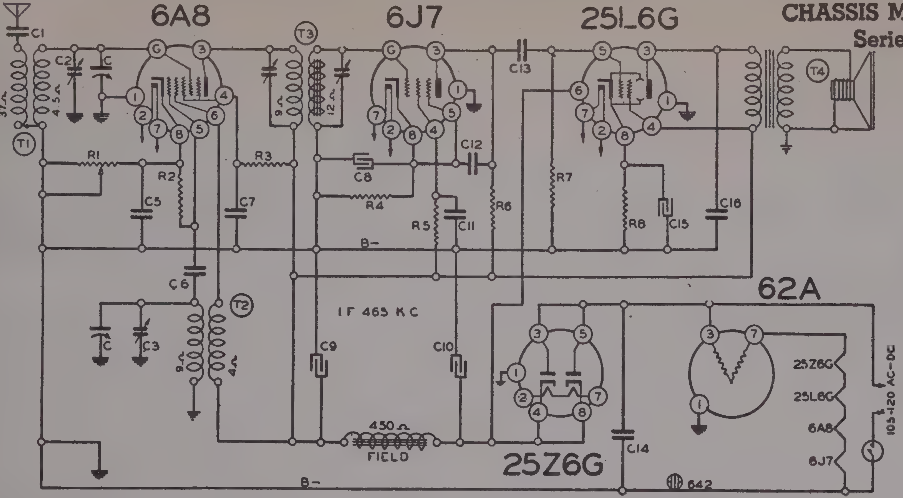


LOCATION OF PARTS IN CABINET



GAMBLE SKOGMO, INC.

CHASSIS MODEL 520
Series A



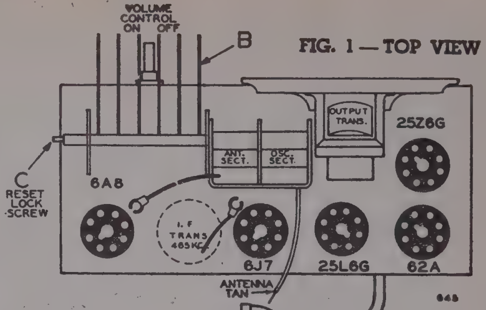


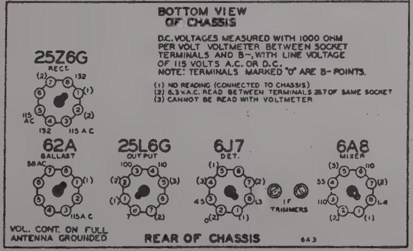
FIG. 1 — TOP VIEW

Power Consumption...45 Watts
Power Output..........800 Milliwatts Undistorted, 1300 Milliwatts Maximum

Broadcast Band A. C.-D. C. Superheterodyne Receiver

Frequency Range 530-1720 Kilocycles

I. F. Frequency 465 K. C.



D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-, WITH LINE VOLTAGE OF 115 VOLTS A.C. OR D.C.
NOTE: TERMINALS MARKED "0" ARE B- POINTS.

(1) NO READING (CONNECTED TO CHASSIS)
(2) 6.3 V.A.C. READ BETWEEN TERMINALS 2&7 OF SAME SOCKET
(3) CANNOT BE READ WITH VOLTMETER

FIG. 3

ALIGNMENT PROCEDURE

FREQUENCY RANGE
530 to 1720 K.C.

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6A8	Rotor full open (Plates out of mesh)	Two trimmers (See Fig. 3)	I. F.	Adjust to maximum output
BROADCAST BAND	1720 Kc.	100 mmf.	Antenna Lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	100 mmf.	Antenna Lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Broadcast Antenna	Adjust to maximum output

Code No.	Part No.	Description
		RESISTORS
R1	101138	20M ohm volume control
R2	13012	50M ohm—⅓ w.
R3	130194	35M ohm—⅓ w.
R4	13082	10M ohm—⅓ w.
R5	13038	2 megohm—⅓ w.
R6	13045	250M ohm—⅓ w.
R7	1303	500M ohm—⅓ w.
R8	130251	160 ohm—⅓ w.
		CONDENSERS
C	10287	2 gang variable condenser
C1	1292	.0005 mica
C2		Antenna Trimmer
C3		Oscillator Trimmer
C5	1009	.05 x 200 v.
C6	12912	.00025 mica
C7	1009	.05 x 200 v.
C8	11971	5 mfd. x 25 v. lytic
C9	11970	30 mfd. x 150 v. lytic
C10	11970	30 mfd. x 150 v. lytic
C11	10020	.1 x 200 v.
C12	1292	.0005 mica
C13	10026	.02 x 400 v.
C14	1001	.1 x 400 v.
C15	11970	40 mfd. x 25 w. v. lytic
C16	10095	.035 x 400 v.

C9, C10 and C15 in one unit, part no. 11970

Code No.	Part No.	Description
		PARTS
T1	111110	Antenna Coil
T2	11095	Oscillator Coil
T3	108123	I. F. Transformer—465 kc.
T4	114130	5 inch Dynamic Speaker

The tube complement of this chassis consists of the following octal base glass and metal tubes.

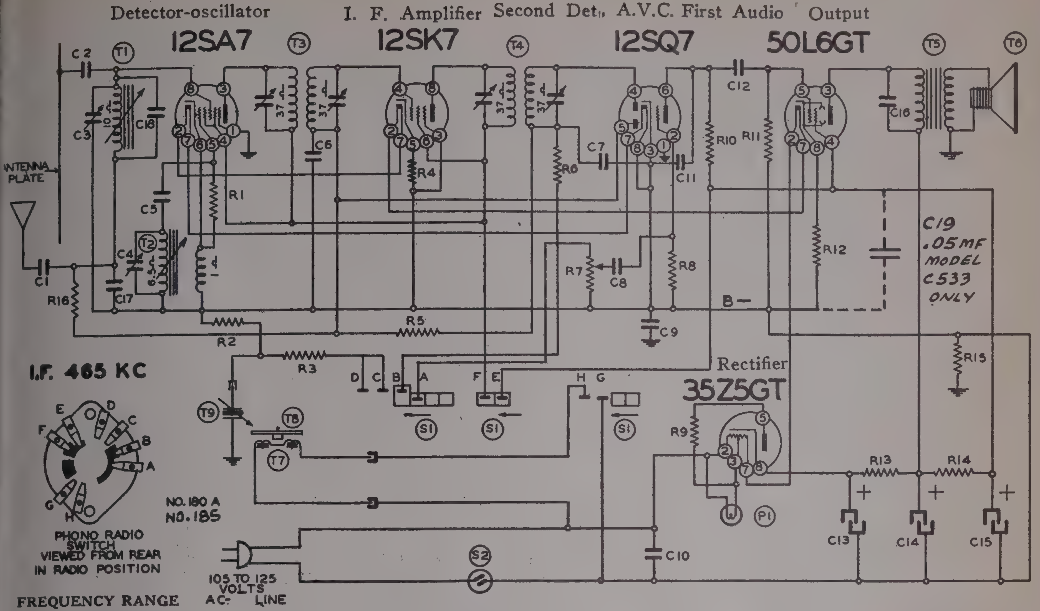
The type and function of each tube is as follows:

1—Type 6A8 Pentagrid Mixer, First Detector-oscillator.
1—Type 6J7 Second Detector.
1—Type 25L6G Beam Output Amplifier.
1—Type 25Z6G High Vacuum Rectifier.
1—Type 62A Ballast Tube.

FOR
TUNER ADJUSTMENTS
SEE
GAMBLE-SKOGMO
MODEL 527-A, VOLUME X
PAGE 10-8

GAMBLE SKOGMO, INC.

MODEL 533, Series B
Ser. No. OC371605B up,
MODEL C533, Series C



FREQUENCY RANGE
535 to 1690 K.C.

MODEL 533 Series B (Serial No. OC371605B and up)

Power Consumption........Radio Only 30 Watts
Power Output........900 Milliwatts Undistorted, 1.7 Watts Maximum

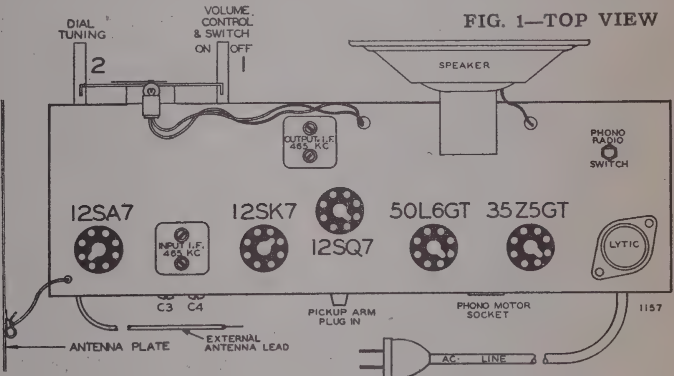
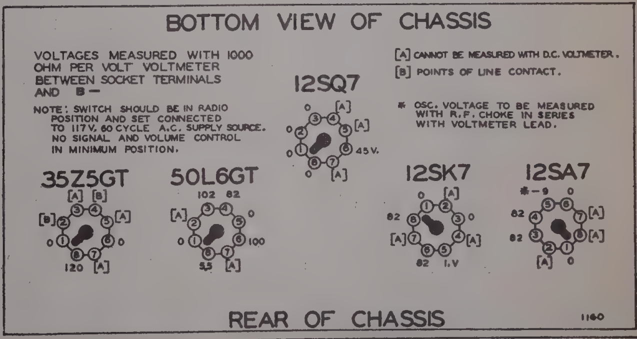


FIG. 1—TOP VIEW



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117V, 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.
[B] POINTS OF LINE CONTACT.

* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

12SQ7
0 [A] [A] 45 V. [A] 0 0 0
35Z5GT
[A] [B] [A] 0 [A] 120 0 [B]
50L6GT
102 82 0 100 [A] 5.5 0 [A]
12SK7
0 [A] 0 [A] 1. V 82 [A] 82
12SA7
*-9 0 [A] [A] 0 [A] 82 82
REAR OF CHASSIS
1160

3-40

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—⅓ w.
R2	130118	600M ohm—⅓ w.
R3	130118	600M ohm—⅓ w.
R4	13056	100 ohm—⅓ w.
R5	130170	3 megohm—⅓ w.
R6	13012	50M ohm—⅓ w.
R7	101217	½ megohm—volume control
R8	130257	5 megohm—⅓ w.
R9	130215	25 ohm—½ w.
R10	1309	200M ohm—⅓ w.
R11	13037	750M ohm—⅓ w.
R12	130166	150 ohm—⅓ w.
R13	13097	200 ohm—⅓ w.
R14	130287	1200 ohm—1 watt
R15	1309	200M ohm—⅓ w.
R16	1309	200M—⅓ w.
		CONDENSERS
C1	1295	.0001 Mica Condenser
C2	129114	.0003 mfd. mica
C3	124136	Antenna Trimmer
C4	124136	Oscillator Trimmer
C5	1295	.0001 mica
C6	1009	.05 x 200 v.
C7	1295	.0001 mica
C8	10025	.002 x 600 v.
C9	100119	.1 x 400 v.
C10	1001	.1 x 400 v.
C11	12912	.00025 mica
C12	10019	.006 x 600 v.
C13	11994	40 mfd. lytic—150 w. v.
C14	11994	20 mfd. lytic—150 w. v.
C15	11994	20 mfd. lytic—150 w. v.
C16	10011	.01 x 400 v.
C17	129162	.0008 Mica Condenser
C18	129163	.000025 Ceramicon Condenser
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
T1	112767	Antenna Coil—Permeability tuning assembly complete
T2	112767	Oscillator Coil
T3	108140F	Input I. F. Coil—465 kc.
T4	108145D	Output I. F. Coil—465 kc.
T5	105108	Output Transformer
T6	114193	5″ P.M. Speaker
T7	104206	Phono Motor
T8	12228	Turntable
T9	114194	Phono pick up arm
S1	125113	Phono Switch
S2		Switch on volume control
P1	107249	Pilot light T47
		T1 and T2 in same unit

MODEL 533, Series B
Ser. No. 0C371605B up
MODEL C533, Series C

GAMBLE SKOGMO, INC.

IMPORTANT: See Aligning Instructions

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 1)	Iron Cores All the way out	Trimmer (C4) (See Fig. 1)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Iron Cores All the way out	Trimmer (C3) (See Fig. 1)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Fig. 3)	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 1)	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Fig. 1)	Antenna	Check for tracking (See Note "B")

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control at minimum, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 117 volt 60 cycle A.C. line

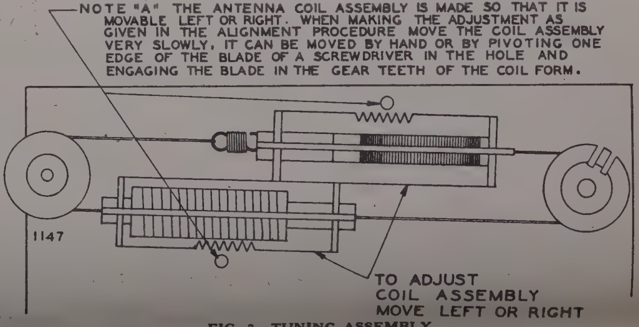
Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer. (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

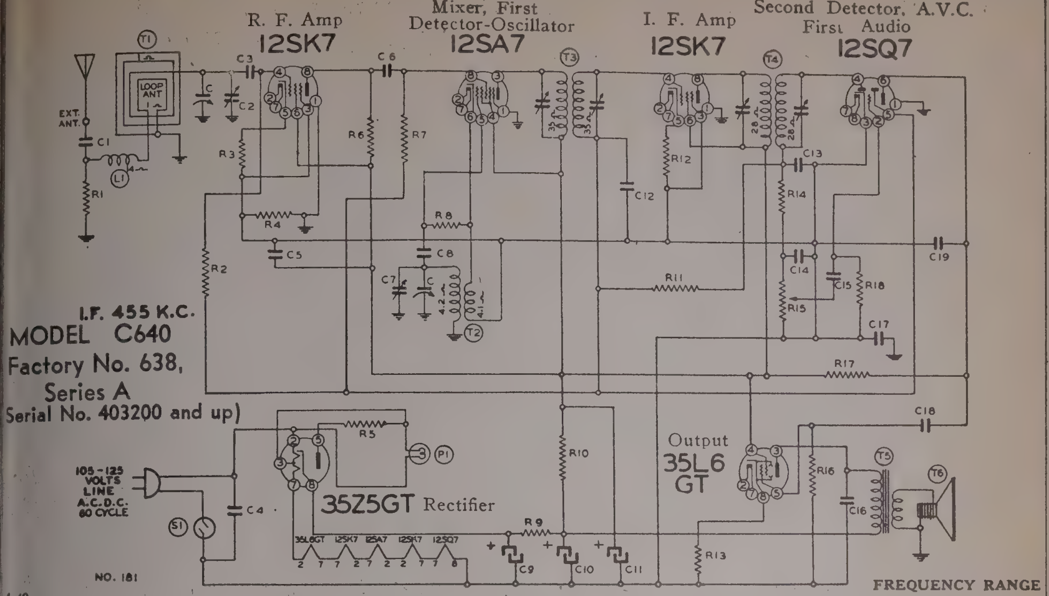

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY, IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.

TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

FIG. 3.—TUNING ASSEMBLY

GAMBLE SKOGMO, INC.

MODEL C640



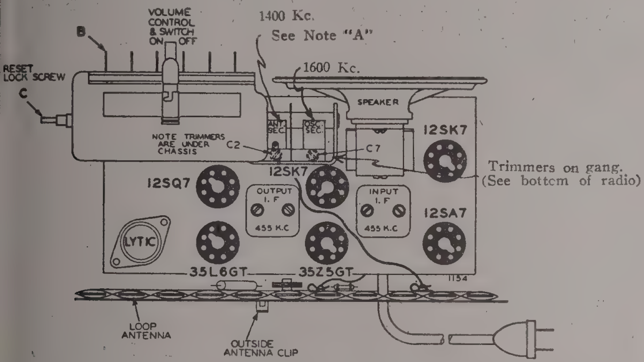
I.F. 455 K.C.
MODEL C640
Factory No. 638,
Series A
(Serial No. 403200 and up)

4-40

FREQUENCY RANGE
540 to 1600 K.C.

Power Consumption..........35 Watts

Power Output..........1 Watt Undistorted, 1.5 Watts Maximum



Trimmers on gang.
(See bottom of radio)

Code No.	Part No.	Description
		RESISTORS
R1	13018	4M ohm—⅓ w.
R2	13019	1 megohm—⅓ w.
R3	130168	100 ohm—⅓ w.
R4	130100	150M ohm—⅓ w.
R5	130215	25 ohm—½ w.
R6	130218	5M ohm—⅓ w.
R7	13020	100M ohm—⅓ w.
R8	13012	50M ohm—⅓ w.
R9	130296	200 ohm—1 w.
R10	130287	1200 ohm—1 w.
R11	130170	3 megohm—⅓ w.
R12	13024	400 ohm—⅓ w.
R13	130166	150 ohm—⅓ w.
R14	13012	50M ohm—⅓ w.
R15	101218	1 megohm volume control
R16	1303	500M ohm—⅓ w.
R17	1309	200M ohm—⅓ w.
R18	130257	5 megohm—⅓ w.
		CONDENSERS
C	102116	2 gang variable condenser
C1	10025	.002 x 600 v.
C2		B. C. Antenna Trimmer on Gang Con.
C3	1292	.0005 Mica
C4	1001	.1 x 400 v.
C5	1006	.25 x 200 v.
C6	1295	.0001 mica
C7		B. C. Oscillator Trimmer on Gang Con.
C8	1295	.0001 mica
C9	11994	40 mfd. lytic x 150 w. v.
C10	11994	20 mfd. lytic x 150 w. v.
C11	11994	20 mfd. lytic x 150 w. v.
C12	1009	.05 x 200 v.
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10025	.002 x 600 v.
C16	10026	.02 x 400 v.
C17	100110	.2 x 400 v.
C18	100106	.004 x 600 v.
C19	1295	.0001 mica
		C9, C10, C11 are in same unit
		C13, C14 are in same unit
		PARTS
T1	111180	Loop Antenna complete
T2	110152	Oscillator Coil
T3	108140H	Input I. F. Coil—455 Kc.
T4	108145	Output I. F. Coil—455 Kc.
T5	105104	Output Transformer
T6	114197	5" P. M. Speaker
L1	12310	Loading Coil
S1		On-off switch on volume control
P1	107249	T47 Pilot light bulb

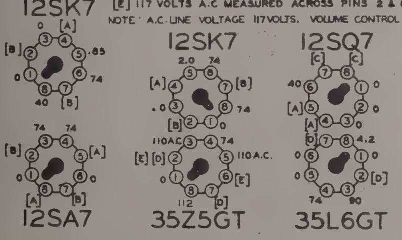
NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C MEASURED ACROSS PINS 7 & 8.
[D] 30 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[E] 117 VOLTS A.C MEASURED ACROSS PINS 2 & 6.

NOTE A.C. LINE VOLTAGE 117 VOLTS. VOLUME CONTROL AT MINIMUM.



REAR OF CHASSIS

1156

GAMBLE-SKOGMO, INC.

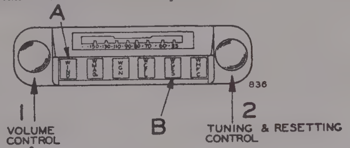
MODEL 678, Issue C

PROCEDURE FOR SETTING THE AUTOMATIC PUSHBUTTONS:

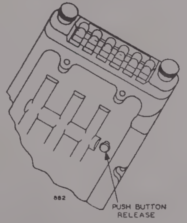
There are six pushbuttons on the Remote Tuner Unit by means of which six stations may be set up for automatic tuning (see B, Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.



678, Issue C
Fig. 2—Front View of Remote Tuner Unit



678, Issue C
Fig. 2A—
Bottom View of Remote Tuner Unit Showing Push Button Release Pin.

On the top of each pushbutton a slot is provided for inserting the call letter tabs, (see A, Fig. 2).

Insert the call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. Push the dial tuning knob **in** hard enough to make it **latch in.**
2. Rotate the dial tuning knob to the **left** (counter-clockwise), until the knob can not be turned any further **without forcing.**

   You will note that as the knob is rotated it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required to actually **start unlocking** the tuner mechanism. Beyond this point the knob will turn quite easily again until the tuner mechanism is **completely unlocked.** At this point do not force the knob any further. The tuner mechanism is now **unlocked.**

   (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)
3. Push in **all the way** any one of the pushbuttons and at the same time hold in **firmly** the dial tuning knob. **Both** the **dial tuning knob** and the **pushbutton** should **be pushed hard** enough to make them **stay latched in.** The reason for holding the dial tuning knob **in firmly** when the **pushbutton** is **pressed** in is due to the latching mechanism in the Remote Tuner unit which is so constructed to release the dial tuning knob entirely when a pushbutton is pressed in. When setting up stations for automatic tuning, however, it is necessary that **both** the **dial tuning knob** and the **pushbutton** be **latched in together.**
4. Press in on the **pushbutton which is latched in.** Holding it in **firmly**, tune in by **means** of the **dial tuning knob** the station indicated on the station call letter tab on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing in firmly on the pushbutton), until the station is clearest. The station will then be accurately tuned in.
5. Push in **all the way** another pushbutton, at the same time holding the dial tuning knob in so that **both** the **pushbutton** and the **dial tuning knob** are **latched in together.** Holding the pushbutton in **firmly**, tune in the station indicated on the call letter **tab on this pushbutton.**
6. Follow this procedure until you have tuned in all of your favorite stations.
7. When the last pushbutton has been properly set up, it is necessary to release it from the latched-in position before the tuner mechanism can be locked. To release this pushbutton, press the **pushbutton release pin** on the bottom of the tuner unit. This will trip the latching mechanism and all the **pushbuttons** will be **released** to **out** position, (See Fig. 2A).
8. Now, Press on the dial tuning knob hard enough to make it latch in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it.
   This will **lock the tuner mechanism** and all the stations that have been set up on the pushbuttons will be locked in place for automatic tuning.
9. Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

The **important** steps to remember when setting up stations on the pushbuttons for automatic tuning are:

1. **To unlock** the tuner mechanism press on the dial tuning knob hard enough to make it **stay latched in.** Rotate the dial tuning knob to the left (counterclockwise) until the knob cannot be turned any further without forcing it.
2. **To set a pushbutton.** Push in **all the way** and hold in **firmly** both the **pushbutton** and the **dial tuning knob** so that **both latch in.** Hold in **firmly** the pushbutton and tune in the station by means of the dial tuning knob. Set all the pushbuttons in the same manner.
3. **To release the last pushbutton** press the **pushbutton release pin** on the bottom of the tuner unit.
4. **To lock the tuner mechanism** push on the dial tuning knob hard enough to make it stay latched in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it. (NOTE: All the pushbuttons must be in **out position** when locking the tuner mechanism.)

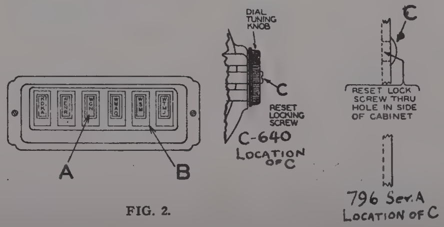


FIG. 2.

PROCEDURE FOR SETTING THE AUTOMATIC TUNER PUSH BUTTONS

MODEL C640 Model 796

1. Make a list of six stations you fune in regularly. There are six push buttons on the front of the radio by means of which six stations may be tuned automatically. (See "B," Fig. 2.)

2. Punch out the call letters of the stations you have selected from the set of station call letter tabs supplied.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner push buttons.

3. Stations may be set up in any sequence desired. Press any one of the automatic tuner push buttons down all the way.

4. Hold the push button down **firmly**, and tune set **very carefully** to station desired, until station is heard clearly and with maximum volume.

Release the push button.

5. Press down another automatic tuner push button. **Hold** it down FIRMLY and carefully tune in next station **desired.** Release this push button.

Follow this procedure until you have selected **all of your** favorite stations.

6. Now rotate the tuning knob to the right (clockwise) as far as it will turn, and with a coin (quarter), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner push buttons. (Note: Locking screw "C" is loose when radio is shipped from factory.)

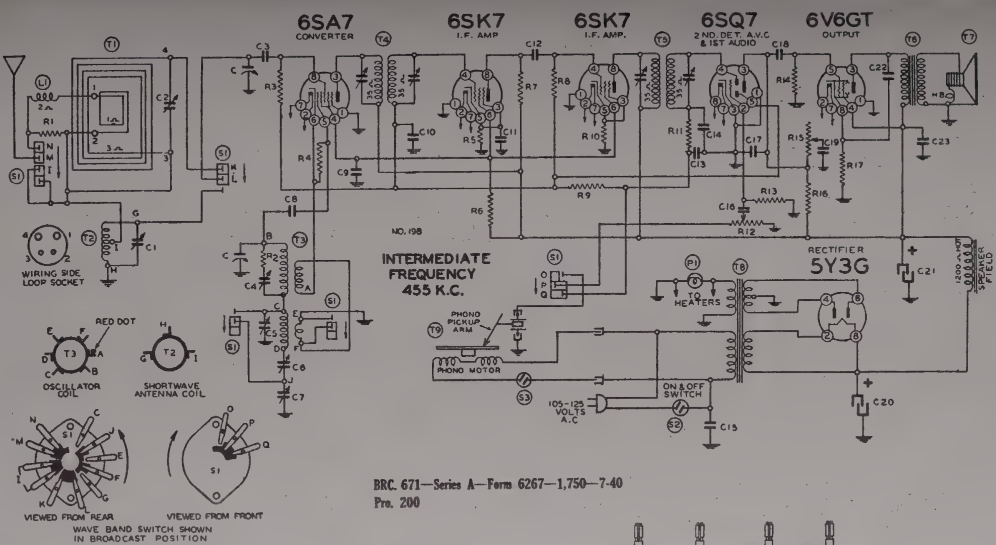
CHANGING STATIONS:

If you should desire to change any station you have selected to another, loosen the locking screw "C" one or two turns. Hold in push button on which the station is to be changed and tune in new station desired. Release the push button. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner buttons it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner push button pressed in.

Be sure to retighten the locking screw, otherwise the stations you have previously selected will not stay adjusted to the push buttons.

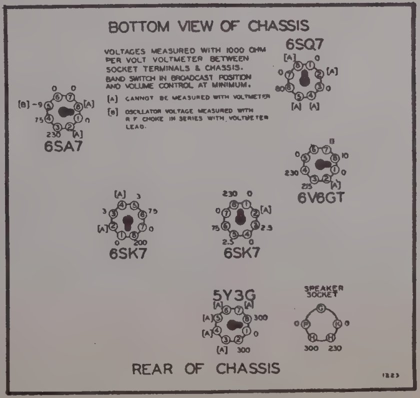
The set is now set up for automatic tuning.

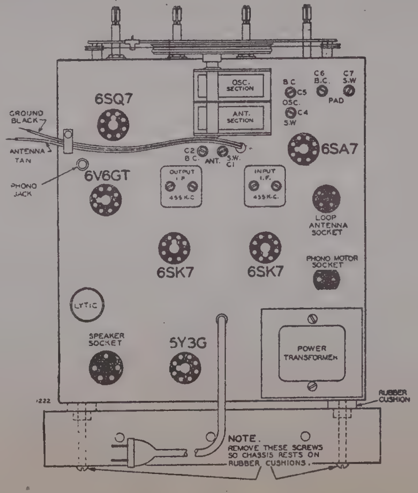
GAMBLE SKOGMO, INC.



BRC. 671—Series A—Form 6267—1,750—7-40

Pro. 200


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
BAND SWITCH IN BROADCAST POSITION AND VOLUME CONTROL AT MINIMUM.
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] OSCILLATOR VOLTAGE MEASURED WITH R F CHOKE IN SERIES WITH VOLTMETER LEAD.
6SA7
6SQ7
6V6GT
6SK7
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS



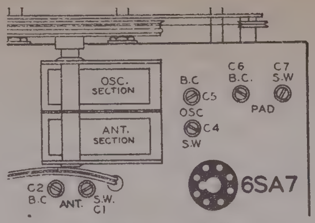
Code No.	Part No.	Description
		RESISTORS
R1	13071	4000 ohm—1/3 w.
R2	130128	20 ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130236	30M ohm—1/3 w.
R5	130283	750 ohm—1/3 w.
R6	130324	18M ohm—1 watt
R7	130218	5M ohm—1/3 w.
R8	13020	100M ohm—1/3 w.
R9	130170	3 megohm—1/3 w.
R10	130222	350 ohm—1/3 w.
R11	13012	50M ohm—1/3 w.
R12	101232	1 megohm volume control
R13	130223	10 megohm—1/3 w.
R14	1303	500M ohm—1/3 w.
R15	101231	1 megohm tone control
R16	130172	250M ohm—1/3 w.
R17	130323	270 ohm—1 watt
		CONDENSERS
C	102137	Two gang variable condenser
C1	124149	S. W. Antenna trimmer
C2	124149	B. C. Antenna trimmer
C3	1292	.0005 mica
C4	124142	S. W. Oscillator trimmer
C5	124142	B. C. Oscillator trimmer
C6	124146	B. C. Padding Condenser
C7	124146	S. W. Padding Condenser
C8	12960	150 mmfd. mica
C9	10013	.05 x 400 v.
C10	10022	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1292	.0005 mica
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10061	.02 x 600 v.
C16	10025	.002 x 600 v.
C17	12912	.00025 mica
C18	10026	.02 x 400 v.
C19	10071	.004 x 600 v.
C20	119115	16 mfd. x 400 w. v. lytic
C21	119115	16 mfd. x 400 w. v. lytic
C22	10019	.006 x 600 v.
C23	1001	.1 x 400 v.

C1 and C2 are in same unit C4 and C5 in same unit
C6 and C7 are in same unit C13 and C14 in same unit
C20 and C21 are in same unit

Code No.	Part No.	Description
		PARTS
T1	111208	Loop antenna assembly
T2	111184	S. W. Antenna Coil
T3	110154	B. C. and S. W. Oscillator Coil
T4	108169E	Input I. F. Coil—455 kc.
T5	108106U	Output I.F. Coil—455 kc.
T6	105118	Output Transformer
T7	114216	8" Electro Dynamic Speaker
T8	104225B	60 cycle power transformer
and	104238B	25 cycle power transformer
T9	104228	60 cycle Seeburg Record Changer and Phono Assembly
and	104229	25 cycle Seeburg Record Changer and Phono Assembly
S1	125132	Phono-band switch
S2		Switch on volume control
S3		Switch on record changer
L1	12312	R. F. Choke coil
P1	10794	Pilot light bulb No. T-44

TECHNICAL DATA—Model No. C671

Power Consumption Radio Only - - - - - - 70 Watts
Motor Only - - - - - - 20 Watts
Power Output - - - - - - - - 2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 15 Microvolts Average
Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC
Intermediate Frequency - - - - - - - - - 455 KC
Speaker - - - - - - - - - 8 in. Electro Dynamic



TRIMMER VIEW

Band and Phono Switch

This knob switches the tuning from the broadcast stations to the shortwave band, and also to the "Phono" position. Turn the knob to "Broadcast" for broadcast stations and to "Phono" to play records. The points marked 49M-31M-25M-20M-19M-16M on the dial scale are shortwave broadcast channels—The 49M and 31M channels are best during darkness—The other channels are best in daylight. Tune short waves very slowly.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1—mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Top View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External. Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Top View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 530 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." leads.

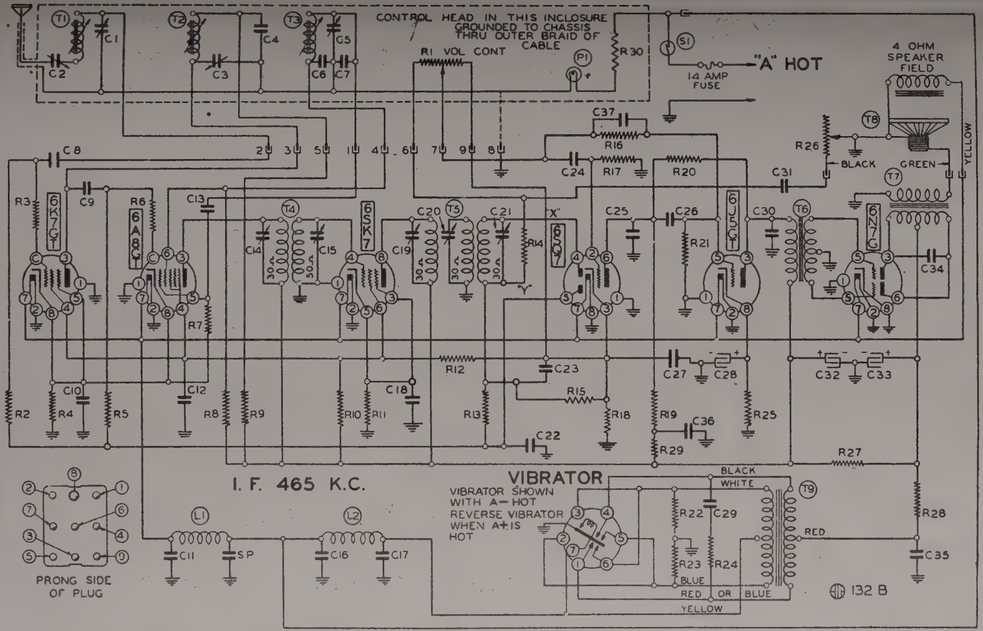
NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

GAMBLE-SKOGMO, INC.

MODEL 678, Issue C
Ser. No. 14302 up



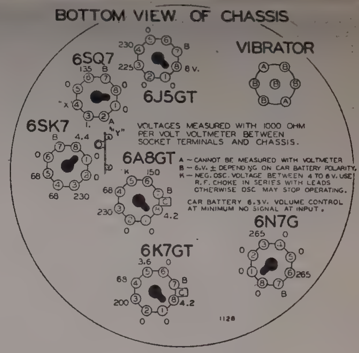

BOTTOM VIEW OF CHASSIS
VIBRATOR
6SQ7
6J5GT
6SK7
6A8GT
6N7G
6K7GT
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A – CANNOT BE MEASURED WITH VOLTMETER
B – 6.V. ± DEPENDING ON CAR BATTERY POLARITY.
K – NEG. OSC. VOLTAGE BETWEEN 4 TO 6 V. USE R.F. CHOKE IN SERIES WITH LEADS OTHERWISE OSC MAY STOP OPERATING.
CAR BATTERY 6.3V. VOLUME CONTROL AT MINIMUM NO SIGNAL AT INPUT.
1128

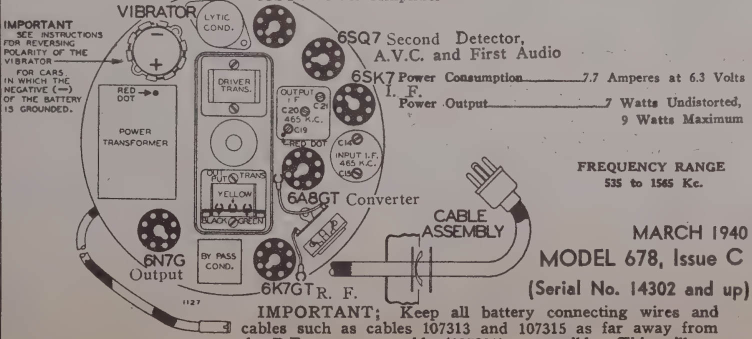
FIG. 5

CONDENSERS

C1	12483	Antenna Shunt Trimmer
C2	12481	Antenna Series Trimmer
C3	12480	R. F. Shunt Trimmer
C4	100102	.15 x 400 v.
C5	12480	Oscillator Shunt Trimmer
C6	129137	.0005 Mica
C7	129136	.00017 Mica
C8	12997	.00005 Ceramicon—5%
C9	1292	.0005 Mica
C10	11625	.05 x 200 v.
C11	1296	.002 Mica
C12	11625	.25 x 400 v.
C13	12912	.00025 Mica
C14		Plate Trimmer on Input I.F. Trans.
C15		Grid Trimmer on Input I.F. Trans.
C16	10031	.5 x 120 v.
C17	10031	.5 x 120 v.
C18	1009	.05 x 200 v.
C19		Plate Trimmer on Output I.F. Trans.
C20		Tertiary Trimmer on Output I.F. Trans.
C21		Grid Trimmer on Output I.F. Trans.
C22	11625	.05 x 200 v.
C23	1295	.0001 Mica
C24	10011	.01 x 400 v.
C25	1295	.0001 Mica
C26	10011	.01 x 400 v.
C27	10026	.02 x 400 v.
C28	11988	20 mfd.—25 w. v. lytic
C29	100101	.0055 x 1600
C30	129114	.0003 Mica
C31	10047	.002 x 600 v.
C32	11988	15 mfd.—450 w. v. lytic
C33	11988	15 mfd.—450 w. v. lytic
C34	100103	.004 x 800 v.
C35	1001	.1 x 400 volt
C36	10013	.05 x 400 v.
C37	12967	.00004 Mica

PARTS.

T1	111118	P. B. Antenna Coil Assembly Complete
T2	10949	P. B. R. F. Coil Assembly Complete
T3	110109	P.B. Oscillator Coil
T4	108120B	Input I.F. Coil—465 kc.
T5	108115B	Output I.F. Coil—465 kc.
T6	10584	Audio Driver Transformer
T7	10583	Output Transformer
T8	114155	8" Dynamic Speaker
T9	104158	Power Transformer
L1	10566	"A" Choke
L2	10519	"A' Choke
P1	10797	6-8 v. Pilot Light T51
S1		Off-on Switch on volume control
	1269	Vibrator (130 cycle synchronous)


IMPORTANT SEE INSTRUCTIONS FOR REVERSING POLARITY OF THE VIBRATOR FOR CARS IN WHICH THE NEGATIVE (—) OF THE BATTERY IS GROUNDED.
VIBRATOR
LYTIC COND.
RED DOT
POWER TRANSFORMER
DRIVER TRANS.
OUTPUT TRANS
YELLOW
BLACK
GREEN
OUTPUT I F C20 C21 465 K.C. C19
RED DOT
C14 INPUT I.F. 465 K.C. C15
BY PASS COND.
6J5GT Driver Amplifier
6SQ7 Second Detector, A.V.C. and First Audio
6SK7 I. F.
6A8GT Converter
6K7GT R. F.
6N7G Output
CABLE ASSEMBLY
1127

Power Consumption——7.7 Amperes at 6.3 Volts
Power Output——7 Watts Undistorted, 9 Watts Maximum

FREQUENCY RANGE
535 to 1565 Kc.

MARCH 1940
MODEL 678, Issue C
(Serial No. 14302 and up)

IMPORTANT; Keep all battery connecting wires and cables such as cables 107313 and 107315 as far away from the R.F. connector cable (107231) as possible. This will reduce any interference which may be present in these battery wires from being radiated back into the R.F. connector cable 107231.

Fig. 3—Top View of Chassis

RESISTORS

R1	101161	1.2 megohm volume control
R2	13019	1 megohm—⅓ w.
R3	130275	500 ohm—⅓ w.
R4	13079	400 ohm—⅓ w.
R5	13019	1 megohm—⅓ w.
R6	130275	500 ohm—⅓ w.
R7	13012	50M ohm—⅓ w.
R8	13012	50M ohm—⅓ w.
R9	13021	20M ohm—⅓ w.
R10	130196	30M ohm—1 watt
R11	130235	1500 ohm—⅓ w.
R12	1307	40M ohm—⅓ w.
R13	13019	1 megohm—⅓ w.
R14	13020	100M ohm—⅓ w.
R15	130118	600M ohm—⅓ w.
R16	130257	5 megohm—⅓ w.
R17	13019	1 megohm—⅓ w.
R18	130101	600 ohm—⅓ w.
R19	13011	250M ohm—⅓ w.
R20	13038	2 megohm—⅓ w.
R21	1303	500M ohm—⅓ w.
R22	130269	100 ohm—⅓ w.
R23	130269	100 ohm—⅓ w.
R24	13071	4M ohm—⅓ w.
R25	13092	1M ohm—⅓ w.
R26	101162	1 megohm tone control
R27	130199	1500 ohm Resistor—1 watt
R28	130231	75 ohm—⅓ w.
R29	13020	100M ohm—⅓ w.
R30	130299	10 ohm—⅓ w.

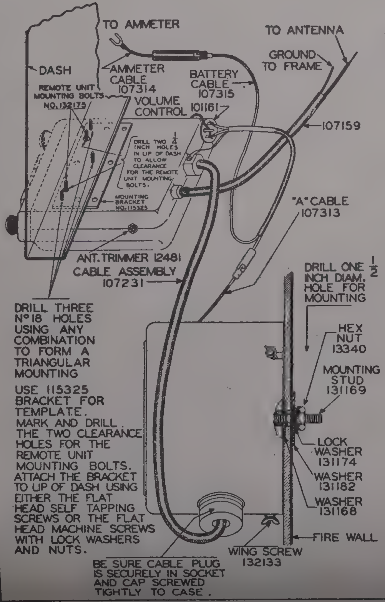
ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 125 mmf.

BAND	SIGNAL GENERATOR		Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna					
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	Trimmers C19, C20 (See Fig. 3)	Output I. F.	See note "A" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SK7	Set dial at 1400 Kc.	Trimmer C21 (See Fig. 3)	Output I. F.	See note "B" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6A8GT	Set dial at 1400 Kc.	Trimmers C14, C15 (See Fig. 3)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1565 Kc.	125 mmf.	Antenna lead	Set dial at 1565 Kc.	Trimmer C5 (See Fig. 4)	Oscillator	Adjust to maximum output
	1400 Kc.	125 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmers C1, C3 (See Fig. 4)	Antenna and R. F.	Adjust to maximum output
	600 Kc.	125 mmf.	Antenna lead	Set dial at 600 Kc.	Trimmer C2 (See Fig. 4)	Antenna series adj.	See note "C"


TO AMMETER
TO ANTENNA
GROUND TO FRAME
DASH
AMMETER CABLE 107314
BATTERY CABLE 107315
REMOTE UNIT MOUNTING BOLTS NO. 132175
VOLUME CONTROL 101161
107159
DRILL TWO 1/4 INCH HOLES IN LIP OF DASH TO ALLOW CLEARANCE FOR THE REMOTE UNIT MOUNTING BOLTS.
MOUNTING BRACKET NO. 115325
"A" CABLE 107313
ANT. TRIMMER 12481
CABLE ASSEMBLY 107231
DRILL ONE 1/2 INCH DIAM. HOLE FOR MOUNTING
HEX NUT 13340
MOUNTING STUD 131169
LOCK WASHER 131174
WASHER 131182
WASHER 131168
FIRE WALL
WING SCREW 132133
DRILL THREE Nº18 HOLES USING ANY COMBINATION TO FORM A TRIANGULAR MOUNTING
USE 115325 BRACKET FOR TEMPLATE.
MARK AND DRILL THE TWO CLEARANCE HOLES FOR THE REMOTE UNIT MOUNTING BOLTS.
ATTACH THE BRACKET TO LIP OF DASH USING EITHER THE FLAT HEAD SELF TAPPING SCREWS OR THE FLAT HEAD MACHINE SCREWS WITH LOCK WASHERS AND NUTS.
BE SURE CABLE PLUG IS SECURELY IN SOCKET AND CAP SCREWED TIGHTLY TO CASE.

NOTE "A" IMPORTANT: To align the output I. F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the diode tuned circuit. Connect the resistor as indicated by points "X" and "Y" on the circuit diagram and the bottom view of the radio chassis Fig. 5. A red dot on top of output I. F. can designates location of trimmer "C19."

NOTE "B" Before adjusting trimmer C21 disconnect the 10M ohm resistor. Under no circumstances re-adjust trimmers C19 or C20 after the 10M ohm resistor has been removed.

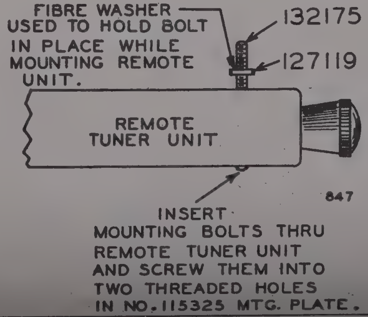
For alignment of the output I. F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used.

NOTE "C" Maximum gain for this adjustment depends on the capacity of the antenna system of the car in which the radio is installed. For the proper alignment of this adjustment see "Adjusting Antenna Trimmer," page 3.

ALIGNMENT OF THE IRON CORES

The iron cores for the antenna, R. F. and oscillator permeability coils have been very carefully adjusted at the factory and require no further adjustment, unless it becomes necessary to replace a coil, or if the adjustments have been tampered with.

The procedure for aligning the iron cores will be supplied with replacement coils when ordered.


FIBRE WASHER USED TO HOLD BOLT IN PLACE WHILE MOUNTING REMOTE UNIT.
132175
127119
REMOTE TUNER UNIT
847
INSERT MOUNTING BOLTS THRU REMOTE TUNER UNIT AND SCREW THEM INTO TWO THREADED HOLES IN NO. 115325 MTG. PLATE.

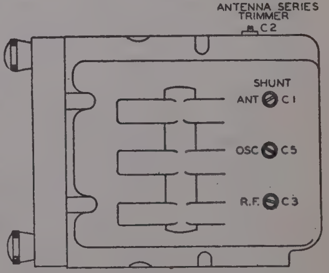


Fig. 4.—Bottom View of Remote Tuner

IMPORTANT—ADJUSTING ANTENNA TRIMMER:

Tune in any weak station between 600 and 800 kc.

Make sure that the antenna shunt trimmer on the Bottom of the Remote Tuner is turned all the way out (counter clockwise), (see adjustment "C1," Fig. 4)

Adjust antenna series trimmer on the side of the remote Tuner Unit. For maximum output. (See adjustment "C2," Fig. 4, Page 7).

NOTE: If resonance (maximum output) cannot be obtained within the range of the antenna series trimmer "C2," turn the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer "C1" on the bottom of the remote tuner unit for a peak of maximum output.

The above arrangement will cover any antenna capacity that is now in use.

MODEL 796, Series A
Ser. No. OC362500 up

GAMBLE-SKOGMO, INC.

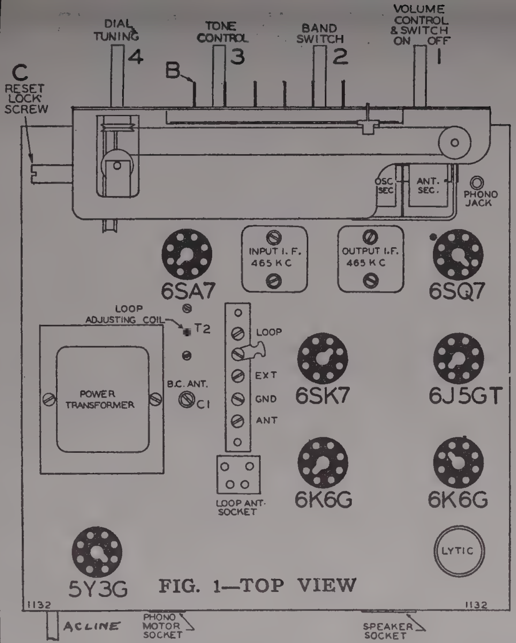
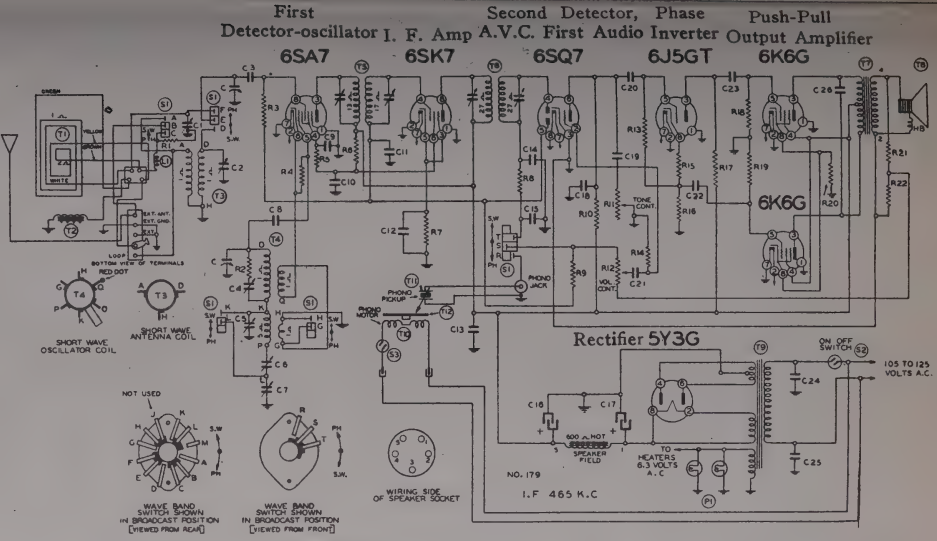


FIG. 1—TOP VIEW



FOR OTHER DATA SEE INDEX

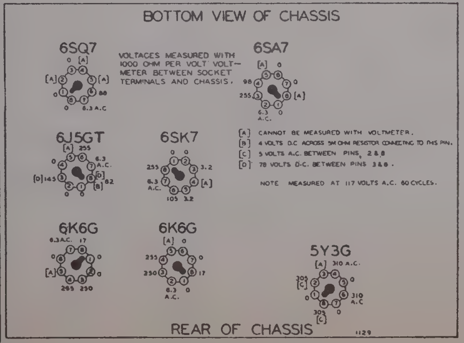
BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.4 to 18.3 MC.
Center Position	Broadcast	532 to 1570 KC.

Power Consumption (Radio Chassis only, less Phono Motor)............85 Watts
Power Output............4.5 Watts Undistorted, 6 Watts Maximum
Intermediate Frequency............465 K.C.

Model 796

Series A

(Serial No. OC362500 and up)



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 4 VOLTS D.C. ACROSS 5M OHM RESISTOR CONNECTING TO THIS PIN.
[C] 5 VOLTS A.C. BETWEEN PINS 2 & 8
[D] 78 VOLTS D.C. BETWEEN PINS 3 & 8.

NOTE MEASURED AT 117 VOLTS A.C. 60 CYCLES.

FIG. 3

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13018	4M ohm—⅓ w.
R2	130197	20 ohm—⅓ w.
R3	1304	3 megohm—⅓ w.
R4	130236	30M ohm—⅓ w.
R5	13092	1000 ohm—⅓ w.
R6	130116	15M ohm—1½ watt
R7	13083	300 ohm—⅓ w.
R8	130103	100M ohm—⅓ w.
R9	1304	3 megohm—⅓ w.
R10	13011	250M ohm—⅓ w.
R11	101216	1 megohm—tone control
R12	101215	1 megohm volume control
R13	1303	500M ohm—⅓ w.
R14	130257	5 megohm—⅓ w.
R15	130218	5M ohm—⅓ w.
R16	130103	100M ohm—⅓ w.
R17	130103	100M ohm—⅓ w.
R18	1303	500M ohm—⅓ w.
R19	1303	500M ohm—⅓ w.
R20	130227	250 ohm—1 watt
R21	130168	100 ohm—⅓ w.
R22	130197	20 ohm—⅓ w.
		CONDENSERS
C	102131	2 gang variable condenser
C1	124117	B.C. Antenna Trimmer
C2	124116	S.W. Antenna Trimmer
C3	1292	.0005 Mica
C4	124112	S.W. Oscillator Trimmer
C5	124112	B.C. Oscillator Trimmer
C6	124134	B.C. Series Pad
C7	124134	S.W. Series Pad
C8	12991	.00015 Mica
C9	10013	.05 x 400 v.
C10	1001	.1 x 400 v.
C11	1009	.05 x 200 v.
C12	1009	.05 x 200 v.
C13	1001	.1 x 400 v.
C14	129161	.0001 mica
C15	129161	.0001 mica
C16	119108	Lytic—16 mfd. 450 w.v.
C17	119108	Lytic—16 mfd. 450 w.v.
C18	12940	.0001 Mica
C19	100118	.008 x 600 v.
C20	10026	.02 x 400 v.
C21	10025	.002 x 600 v.
C22	10013	.05 x 400 v.
C23	10013	.05 x 400 v.
C24	10061	.02 x 600 v.
C25	10061	.02 x 600 v.
C26	10019	.006 x 600 v.

C4 and C5 are in same unit
C6 and C7 are in same unit
C14 and C15 are in same unit
C16 and C17 are in same unit

3-40

PARTS

T1	111165E	Loop Antenna Assembly
T2	111153	Loop Adjustable Coil
T3	111163	Short Wave Antenna Coil
T4	110150	B.C. S.W. Oscillator Coil
T5	108162B	Input I.F. Coil—465 kc.
T6	108132D	Output I.F. Coil—465 kc.
T7	10554E	Output Transformer
T8	114192	10" Electrodynamic speaker
T9	104170B	Power Transformer
S1	125112	Band Switch
S2		On-off Switch on Volume Control
P1	10794	(2) Pilot light Bulbs T44
L1	1239	R. F. Choke Coil
S3		Phono Motor Switch
T10 T11	104174	Phono Motor; Phono Pickup Arn Record Changer Complete
T12		Phono Turntable

MODEL 796, Series A
Ser. No. 0C362500 up

GAMBLE-SKOGMO, INC.

IMPORTANT: See Aligning Instructions.

ALIGNMENT PROCEDURE

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1570 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	532 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 532 K.C.	Trimmer C6 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Fig. 5)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2 (See Fig. 5)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1570 and 532 K. C.).

The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal. (See Fig. 1).

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

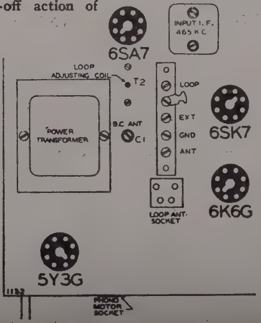


FIG. 5—TOP VIEW

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

It is important during loop alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

To remove the chassis from the cabinet, pull off the knobs and take out the 4 bolts holding the chassis flange to the control panel.

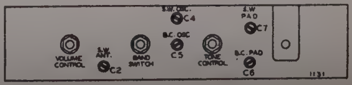
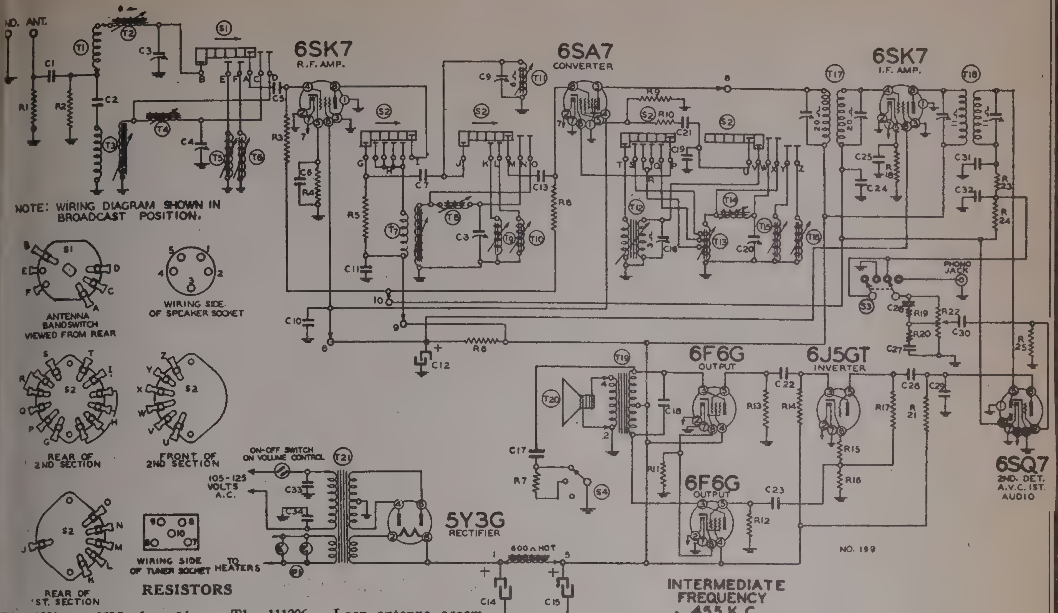


FIG. 4

GAMBLE-SKOGMO, INC.

MODEL C800


LD. ANT.
6SK7
R.F. AMP.
6SA7
CONVERTER
6SK7
I.F. AMP.
NOTE: WIRING DIAGRAM SHOWN IN BROADCAST POSITION.
ANTENNA BANDSWITCH VIEWED FROM REAR
WIRING SIDE OF SPEAKER SOCKET
REAR OF 2ND SECTION
FRONT OF 2ND SECTION
REAR OF 1ST SECTION
WIRING SIDE OF TUNER SOCKET
TO HEATERS
ON-OFF SWITCH ON VOLUME CONTROL
105-125 VOLTS A.C.
5Y3G
RECTIFIER
600 Ω HOT
6F6G
OUTPUT
6J5GT
INVERTER
6F6G
OUTPUT
6SQ7
2ND. DET. A.V.C. 1ST. AUDIO
PHONO JACK
NO. 199
INTERMEDIATE FREQUENCY 455 K.C.

RESISTORS

R1	1301	25M ohm—⅓ w.
R2	1301	25M ohm—⅓ w.
R3	13019	1 megohm—⅓ w
R4	130239	250 ohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	10662	12,500 ohm—3 w.
R7	13064	3500 ohm—⅓ w.
R8	13019	1 megohm—⅓ w.
R9	130232	25M ohm—⅓ w.
R10	130174	50 ohm—⅓ w.
R11	130220	300 ohm—1 w.
R12	1303	500M ohm—⅓ w.
R13	1303	500M ohm—⅓ w.
R14	130103	100M ohm—⅓ w
R15	130218	5M ohm—⅓ w.
R16	130103	100M ohm—⅓ w
R17	13019	1 megohm—⅓ w.
R18	13070	500 ohm—⅓ w.
R19	13011	250M ohm—⅓ w.
R20	130149	15M ohm—⅓ w.
R21	13011	250M ohm—⅓ w
R22	101233	Volume Control
R23	13012	50M ohm—⅓ w.
R24	1304	3 megohm—⅓ w.
R25	130257	5 megohm—⅓ w.

T1	111206	Loop antenna assem
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Oscillator Coil
T13	110157	9 mc. Oscillator Coil
T14	110156	6 mc. Oscillator Coil
T15	110158	12 mc. Oscillator Coil
T16	110159	15 mc. Oscillator Coil
T17	108177	Input I.F. Coil—455 kc.
T18	108176	Output I.F. Coil—455 kc.
T19	105111	Output Transformer
T20	114206	10" Dynamic Speaker
T21	104202B	Power Transformer—For 50-60 Cycle
or	104203B	Power Transformer—For 25 Cycle
S1	125118	Antenna Bandswitch
S2	125117	R.F. & Osc. Bandswitch
S3	125129	Radio-Phono Switch
S4	125130	Tone Control Switch
P1	10794	(2) 6-8 Volt Pilot Lights—T44

CONDENSERS

C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. Ant. Trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v.
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 mfd. x 350 w.v. lytic
C13	1292	.0005 mica
C14	119109	15.0 mfd. x 450 w.v. lytic
C15	119109	15.0 mfd. x 450 w.v. lytic
C16	124144	B.C. Oscillator Trimmer
C17	10013	.05 x 400 v.
C18	10071	.004 x 600 v.
C19	129167	.0002 silver mica
C20	124145	9 mc. Oscillator Trimmer
C21	12938	.00005 mica
C22	10013	.05 x 400 v.
C23	1009	.05 x 200 v.
C24	10026	.02 x 400 v.
C25	10020	.1 x 200 v.
C26	129114	.0003 mica
C27	100122	.03 x 200 v.
C28	10026	.02 x 400 v.
C29	12921	.0002 mica
C30	10019	.006 x 600 v.
C31	129165	.00005 mica
C32	129165	.00005 mica
C33	10061	.02 x 600 v.
C34	10061	.02 x 600 v.

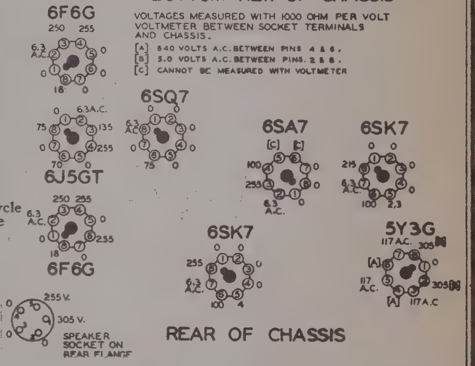
C12 and C14 and C15 in same unit
C31 and C32 in same unit

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

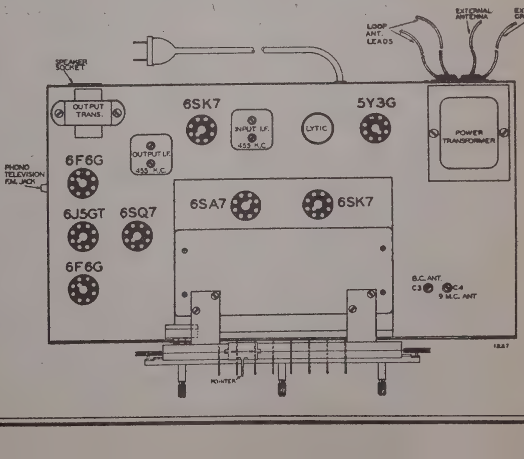
BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[A] 640 VOLTS A.C. BETWEEN PINS 4 & 6.
[B] 5.0 VOLTS A.C. BETWEEN PINS. 2 & 8.
[C] CANNOT BE MEASURED WITH VOLTMETER



REAR OF CHASSIS

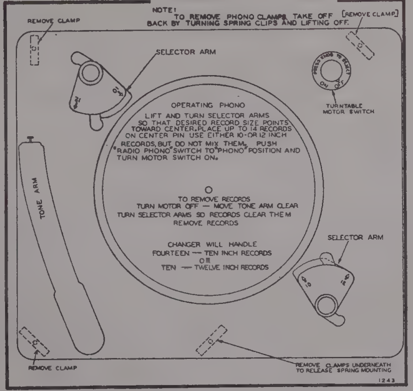


©John F. Rider, Publisher

GAMBLE-SKOGMO, INC.

Automatic Record Changer--Operating Instructions

MODELS C671 and C901


NOTE: TO REMOVE PHONO CLAMPS TAKE OFF BACK BY TURNING SPRING CLIPS AND LIFTING OFF.
REMOVE CLAMP
[REMOVE CLAMP]
SELECTOR ARM
PRESS KNOB TO REJECT
ON
OFF
TURNTABLE MOTOR SWITCH
OPERATING PHONO
LIFT AND TURN SELECTOR ARMS SO THAT DESIRED RECORD SIZE POINTS TOWARD CENTER. PLACE UP TO 14 RECORDS ON CENTER PIN USE EITHER 10- OR 12 INCH RECORDS, BUT DO NOT MIX THEM. PUSH "RADIO PHONO" SWITCH TO "PHONO" POSITION AND TURN MOTOR SWITCH ON.
TONE ARM
TO REMOVE RECORDS
TURN MOTOR OFF — MOVE TONE ARM CLEAR
TURN SELECTOR ARMS SO RECORDS CLEAR THEM
REMOVE RECORDS
CHANGER WILL HANDLE
FOURTEEN — TEN INCH RECORDS
OR
TEN — TWELVE INCH RECORDS
SELECTOR ARM
10
12
REMOVE CLAMP
REMOVE CLAMPS UNDERNEATH TO RELEASE SPRING MOUNTING
1243

Setting for Size of Record

The Changer plays up to fourteen 10" or ten 12" records at one loading. **All records must be the same size for each loading.**

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Loading

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

Starting the Changer

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph-radio knob, to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

How to Reject a Record

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

Playing Individual Records

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading," and set the machine in operation by means of the switch knob described under "Starting the Changer." In other words, play an individual record in the same manner as you would play a stack of that size.

Unloading

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

Turning Off Changer

Throw Changer switch knob to "OFF" position.

Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

If Changer is Left Running

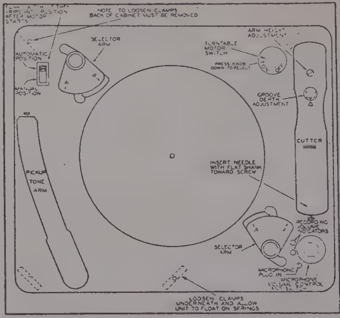
No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

Phonograph Needles

In general there are two types of needles which can be satisfactorily used on an Automatic Record Changer: those which require changing after approximately 12 records, and the so-called permanent type needles which are rated in terms of "hours of service." In no case should the manufacturers' claims for these needles be exceeded, since in all probability the needles are rated in terms of their maximum life.

Operating the Recorder

MODEL C901


TRIPS INTO POSITION AFTER MOTOR STARTS
NOTE TO LOOSEN CLAMPS BACK OF CABINET MUST BE REMOVED
AUTOMATIC POSITION
MANUAL POSITION
SELECTOR ARM
TURNTABLE MOTOR SWITCH
PRESS KNOB DOWN TO REJECT
ON
OFF
ARM HEIGHT ADJUSTMENT
GROOVE DEPTH ADJUSTMENT
CUTTER
PICKUP TONE ARM
INSERT NEEDLE WITH FLAT SHANK TOWARD SCREW
RECORDING VOLUME INDICATORS
SELECTOR ARM
MICROPHONE PLUG IN
MICROPHONE VOLUME CONTROL AND SWITCH
LOOSEN CLAMPS UNDERNEATH AND ALLOW UNIT TO FLOAT ON SPRINGS

NOTE—Some radios of this model are equipped with a recording arm on the record changer with which you can make your own records. If your radio has the recording unit follow the instructions below for making records.

The Mike volume control must be turned off (all the way left) except when recording with the microphone.

The two volume indicator lights along side the microphone volume control are used for setting the proper recording level. When recording radio programs the radio volume control should be adjusted so that the red indicator light remains off while the white continues to flicker. When recording with the microphone the lights should be adjusted in the same manner but using the microphone volume control.

Operating the Phono on Home Recordings

Turn radio on. Put phono switch in "Phono" position.

Push manual switch toward manual side to play home recordings.

Put your record on turntable and start motor. Place playback arm on record and control tone and volume with the radio volume and tone control knobs.

Be sure mike control is turned off when playing records.

Recording Radio Programs

Turn the radio on and tune in the program you wish to record. Put manual switch in manual position. Start motor and then gently lower cutting needle onto blank record, about ¼" from outer edge. Radio Volume will drop—Adjust volume control so red volume indicator light is off and white indicator light continues to flicker.

Microphone Recording

Turn the mike volume control well up. Phono pushbutton should be in "Phono" position. Put manual switch in manual position. Start motor, and set cutting needle gently on start of record. Adjust volume indicator lights the same as in recording radio programs.

NOTE: The cutting arm must be raised about three inches to move it freely across the record.

How to Make Perfect Recordings

Cutting Needle

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument should be level in all directions. To check this, place a small level, if you have one, on the turntable. If you do not have a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the cabinet until the machine is reasonably level.

Shavings

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

While cutting, gently brush the shavings from the left side of the record in, toward the center pin, allowing them to collect there until the recording is completed.

Do Not Use Too Much Volume

The most frequent cause of poor recordings is too much volume or overloading. If some passages of your recording are smooth and clear while others are raspy, rough and distorted, you are probably using too much volume. Overloading occurs most often on strong passages. The remedy is to reduce the volume slightly and watch the volume indicator lights.

Too little volume will show up when you play the record back. The volume control on playbacks will have to be turned up quite high and needle scratch will be excessive.

Cutting Arm Adjustments

The cutting arm is adjusted at the factory for proper operation, however, with various types of blanks this adjustment may sometimes have to be altered. With a blank record on the table, the height adjustment on the cutter arm should be adjusted so that the needle screw is centered in the slot when the needle rests on a blank record.

Several blank grooves should now be cut to see if the groove is the proper depth. The depth adjustment screw on the cutter arm will increase the depth of the groove if turned to the letter "H" and will decrease the groove if turned to the letter "L"—For a medium groove turn to "M".

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

A properly cut groove will leave a shaving just a little heavier than a human hair.

GAMBLE SKOGMO, INC.

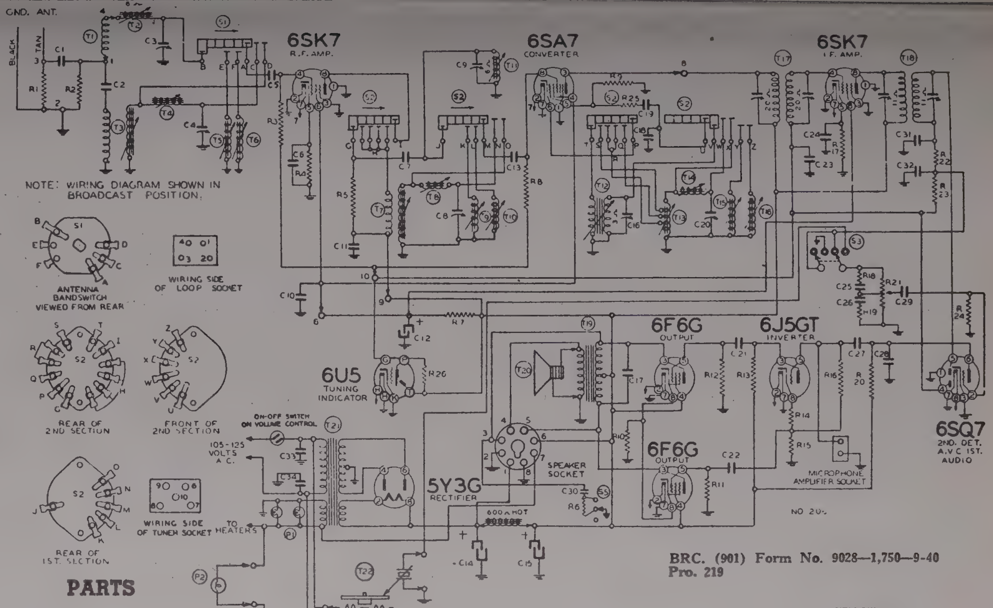
MODEL C901

Radio Set Schematic Ref. No.	Part No.	Description
RESISTORS		
R1	1301	25M ohm—1/3 w.
R2	1301	25M ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130239	250 ohm—1/3 w.
R5	130218	5M ohm—1/3 w.
R6	13064	3500 ohm—1/3 w.
R7	10662	12,500 ohm—3 w.
R8	13019	1 megohm—1/3 w.
R9	130232	25M ohm—1/3 w.
R10	130220	300 ohm—1 w.
R11	1303	500M ohm—1/3 w.
R12	1303	500M ohm—1/3 w.
R13	130103	100M ohm—1/3 w.
R14	130218	5M ohm—1/3 w.
R15	130103	100M ohm—1/3 w.
R16	13019	1 megohm—1/3 w.
R17	13070	500 ohm—1/3 w.
R18	13011	250M ohm—1/3 w.
R19	130149	15M ohm—1/3 w.
R20	13011	250M ohm—1/3 w.
R21	101233	1/2 megohm volume control and on-off switch.
R22	13012	50M ohm—1/3 w.
R23	1304	3 megohm—1/3 w.
R24	130257	5 megohm—1/3 w.
R25	130174	50 ohm—1/3 w.
R26	130110	1 megohm—1/10 w. in tuning indicator cable.
CONDENSERS		
C1	1292	.0005 mica
C2	10047	.002 x 600 v.—10%
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. trimmer
C9	124139	B.C. R.F. trimmer
R10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	119109	10.0 x 350 w.v.
C13	1292	.0005 mica
C14	119109	15.0 x 450 w.v.
C15	119109	15.0 x 450 w.v.
C16	124144	B.C. oscillator trimmer
C17	10071	.004 x 600 v.
C18	129167	.0002 silver mica
C19	12938	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	10013	.05 x 400 v.
C22	1009	.05 x 200 v.
C23	10026	.02 x 400 v.
C24	10020	.1 x 200 v.
C25	129114	.0003 mica
C26	100122	.03 x 200 v.
C27	10026	.02 x 400 v.
C28	12921	.0002 mica
C29	10019	.006 x 600 v.
C30	10013	.05 x 400 v.
C31	129165	.00005 mica
C32	129165	.00005 mica
C33	10061	.02 x 600 v. bakelite
C34	10061	.02 x 600 v. bakelite

C12, C14 and C15 in same unit.
C31 and C32 in same unit.

PARTS

T1	111210	Loop antenna assembly
T2	111195	B.C. antenna coil
T3	111190	9 mc. antenna coil
T4	111189	6 mc. antenna coil
T5	111191	12 mc. antenna coil
T3	111190	9 mc. antenna coil
T7	10959	9 mc. R.F. coil
T8	10958	6 mc. R.F. coil
T9	10960	12 mc. R.F. coil
T10	10961	15 mc. R.F. coil
T11	10962	B.C. R.F. coil
T12	110161	B.C. osc. coil
T13	110157	9 mc. oscillator coil
T14	110156	6 mc. oscillator coil
T15	110158	12 mc. oscillator coil
T16	110159	15 mc. oscillator coil
T17	108177	Input I.F. coil—455 kc.
T18	108176	Output I.F. coil—455 kc.
T19	105111	Output transformer
T20	114208	Speaker—Dynamic
T21	104202B	Power transformer—50-60 cycle
	104203B	Power transformer—25 cycle
T22	104234	Automatic record changer—60 cycle
	104232	Automatic record changer—25 cycle
	104233	Automatic record changer—50 cycle
S1	125118	Antenna bandswitch
S2	125117	R.F. & osc. bandswitch
S3	125129	Radio-phono switch
S4		Switch on record changer
S5	125130	Tone control switch
P1	10794	(2) 6-8 volt pilot lights T44
P2	10794	Indicator light T-44

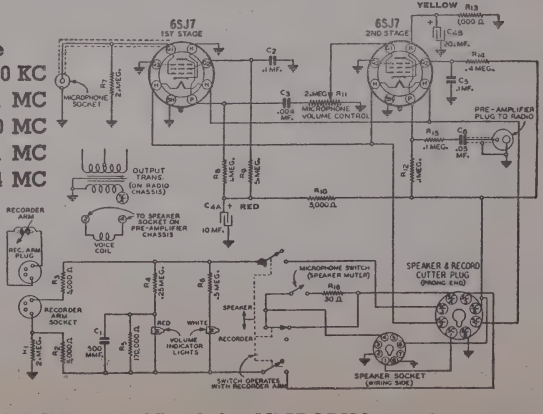


BRC. (901) Form No. 9028—1,750—9-40
Pro. 219

Tuning Frequency Range

Broadcast Band	540 to 1600 KC
49M Band	5.9 to 6.1 MC
31M Band	9.1 to 10 MC
25M Band	11.4 to 12.1 MC
19M Band	14.9 to 15.4 MC

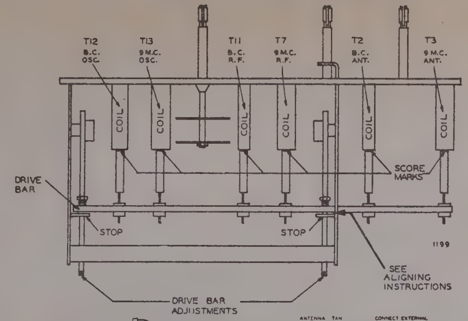
INTERMEDIATE FREQUENCY 455 K.C.

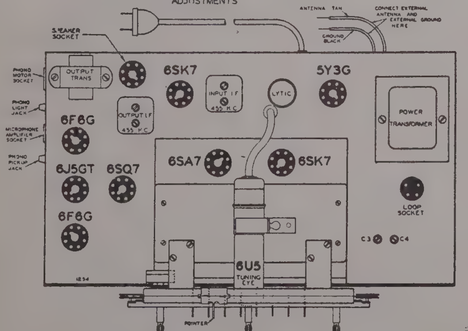

YELLOW
6SJ7
1ST STAGE
6SJ7
2ND STAGE
MICROPHONE SOCKET
MICROPHONE VOLUME CONTROL
PRE-AMPLIFIER PLUG TO RADIO
OUTPUT TRANS. (ON RADIO CHASSIS)
TO SPEAKER SOCKET ON PRE-AMPLIFIER CHASSIS
VOICE COIL
RECORDER ARM
REC. ARM PLUG
RECORDER ARM SOCKET
RED
WHITE
VOLUME INDICATOR LIGHTS
MICROPHONE SWITCH (SPEAKER MUTER)
SPEAKER
RECORDER
SWITCH OPERATES WITH RECORDER ARM
SPEAKER & RECORD CUTTER PLUG (PRONG END)
SPEAKER SOCKET (WIRING SIDE)

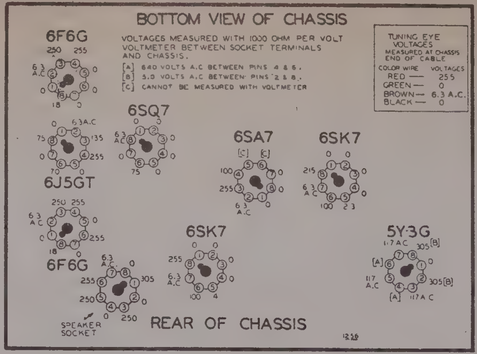
CIRCUIT DIAGRAM OF MICROPHONE AMPLIFIER

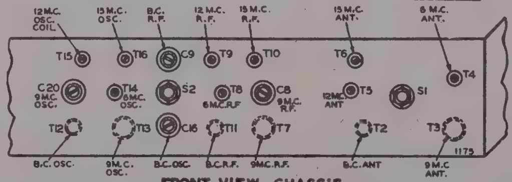
GAMBLE-SKOGMO, INC.

IRON CORE ADJUSTMENT VIEW






BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] 640 VOLTS A.C BETWEEN PINS 4 & 6.
[B] 5.0 VOLTS A.C BETWEEN PINS 2 & 8.
[C] CANNOT BE MEASURED WITH VOLTMETER
TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE
COLOR WIRE VOLTAGES
RED — 255
GREEN — 0
BROWN — 6.3 A.C.
BLACK — 0
6F6G
6SQ7
6J5GT
6SA7
6SK7
6SK7
6F6G
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS
1256



FRONT VIEW CHASSIS

Power Consumption, Radio only - - - 100 Watts
Power Output - - - - - 5 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

Television and Fm. Jack

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

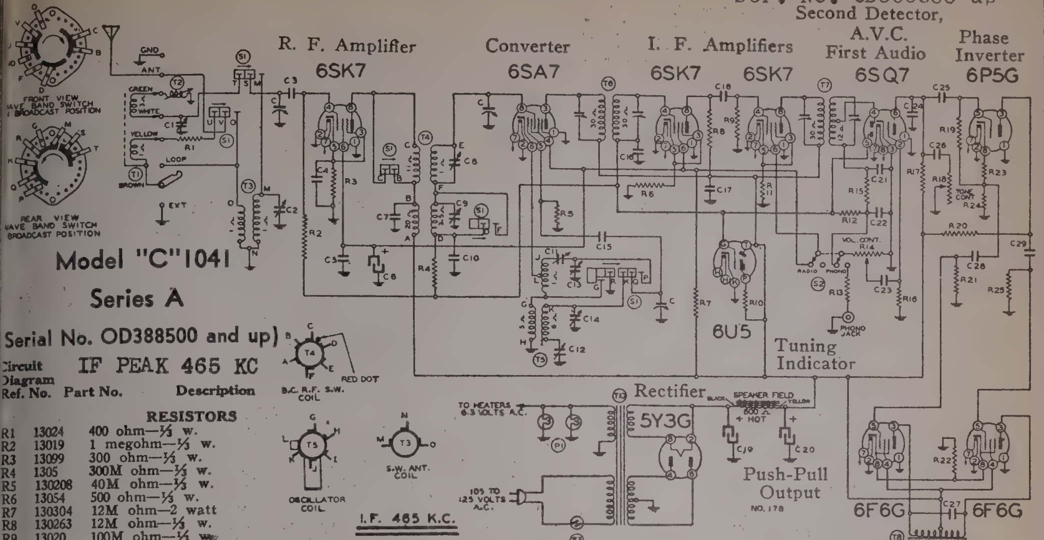
The jack marked phono-pickup jack in the chassis view will accommodate either the Phono or a television or FM converter.

Speaker 10 in. Electro Dynamic

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

GAMBLE SKOGMO, INC.

MODEL "C" 1041, Series A
Ser. No. OD388500 up



Model "C"1041

Series A

Serial No. OD388500 and up)

IF PEAK 465 KC

Circuit Diagram Ref. No.	Part No.	Description
RESISTORS		
R1	13024	400 ohm—⅓ w.
R2	13019	1 megohm—⅓ w.
R3	13099	300 ohm—⅓ w.
R4	1305	300M ohm—⅓ w.
R5	130208	40M ohm—⅓ w.
R6	13054	500 ohm—⅓ w.
R7	130304	12M ohm—2 watt
R8	130263	12M ohm—⅓ w.
R9	13020	100M ohm—⅓ w.
R10		1 megohm—in eye socket
R11	13054	500 ohm—⅓ w.
R12	130170	3 megohm—⅓ w.
R13	13019	1 megohm—⅓ w.
R14	101214	Volume Control (500M ohm)
R15	13012	50M ohm—⅓ w.
R16	130225	15 megohm—⅓ w.
R17	13011	250M ohm—⅓ w.
R18	101213	Tone Control—(1 Megohm)
R19	13019	1 megohm—⅓ w.
R20	13020	100M ohm—⅓ w.
R21	1303	500M ohm—⅓ w.
R22	130311	300 ohm—1 watt
R23	13022	5M ohm—⅓ w.
R24	13020	100M ohm—⅓ w.
R25	1303	500M ohm—⅓ w.
CONDENSERS		
C	102129	Three Gang Variable Condenser
C1	124132	B.C. Ant. Trimmer
C2	124117	SW Antenna Trimmer
C3	1292	.0005 Mica
C4	10020	.1 x 200 v.
C5	100117	.25 x 400 v.
C6	119106	10 mfd. lytic—350 w. v.
C7	129160	.0004 mica
C8	124131	S.W. R.F. Trimmer
C9	129131	B.C. R.F. Trimmers
C10	10026	.02 x 400 v.
C11	129156	.0024 Compression S.W. Pad
C12	129157	.000525 Compression B.C. Pad
C13	124130	S.W. Oscillator trimmer
C14	124130	B.C. Oscillator trimmer
C15	12939	.00005 Mica
C16	10026	.02 x 400 v.
C17	100117	.25 x 400 v.
C18	1292	.0005 mica
C19	119106	10 mfd. lytic—450 w. v.
C20	119106	15 mfd. lytic—450 w. v.
C21	1295	.0001 mica
C22	1295	.0001 mica
C23	10025	.002 x 600 v.
C24	12912	.00025 mica
C25	10026	.02 x 400 v.
C26	10011	.01 x 400 v.
C27	10071	.004 x 600 v.
C28	1009	.05 x 200 v.
C29	10013	.05 x 400 v.

C6, C19 and C20 in one unit
C8 and C9 in one unit
C13 and C14 in one unit

Circuit Diagram Ref. No.	Part No.	Description
PARTS		
T1	111154D	Loop Antenna Assembly
T2	111153	Loop Adjustable Coil
T3	111176	S.W. Antenna Coil
T4	10957	B.C. S.W. R.F. Coil
T5	110149	B.C. S.W. Oscillator Coil
T6	108169C	Input I.F.—465 kc.
T7	108130C	Output I.F.—465 kc.
T8	10554B	Output Transformer
T9	114136	10" Dynamic Speaker (600 Ohm Field)
T10	104202	Power Transformer
S1	125111	Wave Band Switch
S2	12570	Phono Switch
S3		On-off switch on volume control
P1	10794	(2) Pilot light bulbs T-44

Power Consumption 110 Watts (At 117 Volts 60 Cycles)

Power Output - - - - - 5 Watts Undistorted
7 Watts Maximum

Selectivity 35 KC Broad at 1000 Times Signal at 1000 KC

Sensitivity (for .5 Watts Output) - - - -
Broadcast Band—10 Microvolts Average
Shortwave Band—10 Microvolts Average

Tuning Frequency Range
540 to 1580 KC
5.5 to 18.5 MC

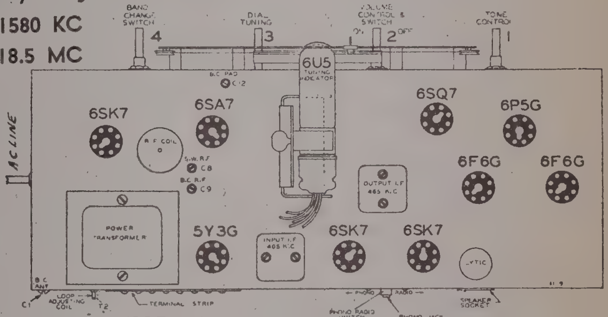
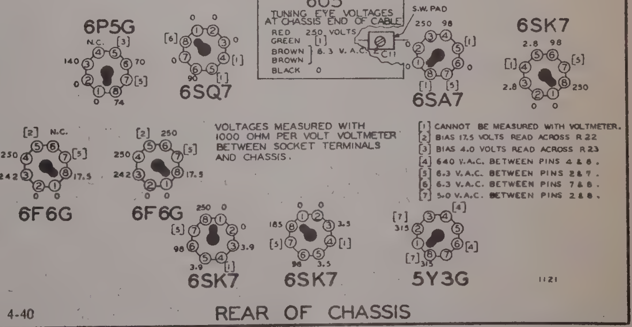


FIG. 2.—TOP VIEW

FIG. 6—BOTTOM VIEW OF CHASSIS



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[1] CANNOT BE MEASURED WITH VOLTMETER.
[2] BIAS 17.5 VOLTS READ ACROSS R 22
[3] BIAS 4.0 VOLTS READ ACROSS R 23
[4] 640 V.A.C. BETWEEN PINS 4 & 8.
[5] 6.3 V.A.C. BETWEEN PINS 2 & 7.
[6] 6.3 V.A.C. BETWEEN PINS 7 & 8.
[7] 5.0 V.A.C. BETWEEN PINS 2 & 8.

MODEL "C"1041, Series A
Ser. No. OD388500

GAMBLE-SKOGMO, INC.

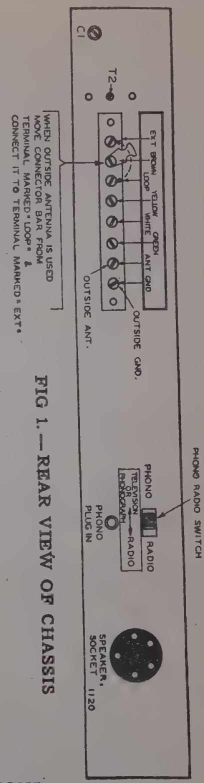


FIG 1.—REAR VIEW OF CHASSIS

IMPORTANT: SEE ALIGNING INSTRUCTIONS.

ALIGNMENT PROCEDURE

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C13 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmers C8, C2 (See Figs. 2 & 4)	Short Wave R. F. and S. W. Antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C11 (See Fig. 6)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C14 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	Trimmer C12 (See Fig. 2)	Broadcast oscillator series pad	Adjust to maximum output
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	Trimmer C9 (See Fig. 2)	Broadcast R. F.	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Fig. 2)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T2 (See Fig. 2)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 6SK7 R.F. Tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1580 and 540 K. C.).

The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal. (See Fig. 1).

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

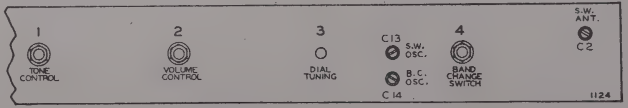


FIG. 4—FRONT OF CHASSIS

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. **No aligning adjustments should be attempted with the chassis in the cabinet.**

It is important during **loop alignment** that the loop antenna and the chassis be installed in the cabinet.

To remove the chassis from the cabinet, remove the two chassis mounting bolts which are used to hold the chassis to the cabinet shelf; take the knobs off their shafts and disconnect the loop antenna.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 117 volts A. C. on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

PHONOGRAPH CONNECTIONS:

A phonograph connector and switch are provided on the rear of the chassis. To operate: Insert plug on end of phonograph pick-up lead into connector on chassis—and move phonograph switch to "Phono" position.

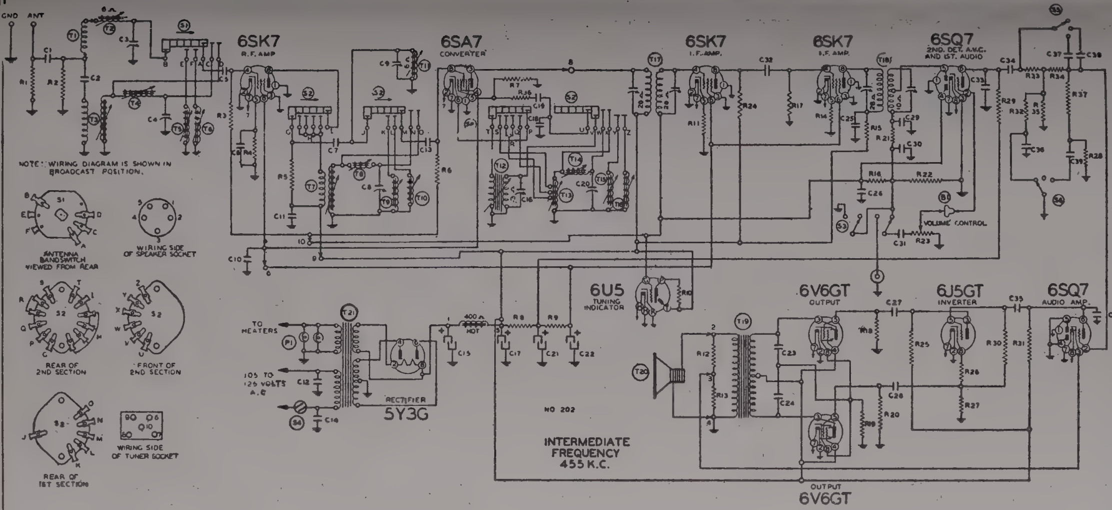
Volume and tone may be controlled by using the controls on the front of the radio.

TELEVISION CONNECTIONS:

Television will not be available for nation wide use for some time to come; however, Television audio connections are provided on this radio for the reception of Television sound. Connect audio output leads of television receiver to connector provided on rear of receiver chassis as shown in above illustration and snap switch to "Television" position.

GAMBLE-SKOGMO, INC.

MODEL C1100



No.	No.	Description
		RESISTORS
R1	130232	25M ohm—⅓ w.
R2	130232	25M ohm—⅓ w.
R3	13019	1 megohm—⅓ w.
R4	130239	250 ohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	13019	1 megohm—⅓ w.
R7	130232	25M ohm—⅓ w.
R8	130318	6M ohm—2 watt
R9	130319	10M—2 watt
R10		1 megohm in tuning indicator cable
R11	130200	700 ohm—⅓ w.
R12	13082	10M ohm—⅓ w.
R13	130235	1500 ohm—⅓ w.
R14	130235	1500 ohm—⅓ w.
R15	130192	2M ohm—⅓ w.
R16	13019	1 megohm—⅓ w.
R17	13020	100M ohm—⅓ w.
R18	1303	500M ohm—⅓ w.
R19	130317	250 ohm—2 watt
R20	1303	500M ohm—⅓ w.
R21	13020	100M ohm—⅓ w.
R22	130238	400M ohm—⅓ w.
R23	101234	500M ohm volume control and line switch (S4)
R24	13073	15M ohm—⅓ w.
R25	13094	50M ohm—⅓ w.
R26	130218	5M ohm—⅓ w.
R27	13094	50M ohm—⅓ w.
R28	1303	500M ohm—⅓ w.
R29	130172	250M ohm—⅓ w.
R30	1303	500M ohm—⅓ w.
R31	130172	250M ohm—⅓ w.
R32	1307	40M ohm—⅓ w.
R33	13080	150M ohm—⅓ w.
R34	130309	350M ohm—⅓ w.
R35	130172	250M ohm—⅓ w.
R36	130174	50 ohm—⅓ w.
R37	13080	150M ohm—⅓ w.
		CONDENSERS
C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. Antenna Trimmer
C4	124143	9 mc. Antenna Trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. Tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. Trimmer
C9	124139	B.C. R.F. Trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mfd. lytic
C16	124144	B.C. Oscillator Trimmer
C17	119112	30.0 mfd. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	12938	.00005 mica
C20	124145	9 mc. Oscillator Trimmer
C21	119112	10.0 mfd. lytic
C22	11969	16 mfd. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.
C26	10022	.05 x 200 v.
C27	10013	.05 x 400 v.
C28	1009	.05 x 200 v.
C29	129161	.0001 mica
C30	129161	.0001 mica
C31	10020	.1 x 200 v.
C32	1292	.0005 mica
C33	12912	.00025 mica
C34	1001	.1 x 400 v.
C35	10013	.05 x 400 v.
C36	100118	.008 x 600 v.
C37	12936	.0003 mica
C38	129166	.000125 mica
C39	10037	.003 x 600 v.
C40	12912	.00025 mica

C3 and C4 in same unit
C15, C17 and C21 in same unit
C29 and C30 in same unit

PARTS

T1	111207	Loop Antenna Assembly
T2	111195	B.C. Antenna Coil
T3	111190	9 mc. Antenna Coil
T4	111189	6 mc. Antenna Coil
T5	111191	12 mc. Antenna Coil
T6	111192	15 mc. Antenna Coil
T7	10959	9 mc. R.F. Coil
T8	10958	6 mc. R.F. Coil
T9	10960	12 mc. R.F. Coil
T10	10961	15 mc. R.F. Coil
T11	10962	B.C. R.F. Coil
T12	110161	B.C. Oscillator Coil
T13	110157	9 mc. Oscillator Coil
T14	110156	6 mc. Oscillator Coil
T15	110158	12 mc. Oscillator Coil
T16	110159	15 mc. Oscillator Coil
T17	108177B	Input I.F. Coil—455 Kc.
T18	108130E	Output I.F. Coil—455 Kc.
T19	105115	Output Transformer
T20	114207	12" Dynamic Speaker
T21	104217	Power Transformer—50-60 cycles
S1	125118	Antenna Bandswitch
S2	125117	R.F. Oscillator Bandswitch
S3	125133	Radio-phono Switch
S4		On-off Switch on volume control
S5	125130	Treble Switch
S6	125131	Bass Switch
P1	10794	2 6-8 Volts Pilot Lights T44
B1	11622	1.25 Volt Bias Cell

BRC (C1100) Series A Form No. 1129-2750—8-40

Pro. 203

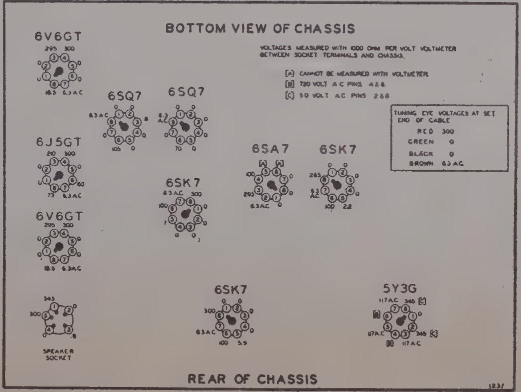
11 TUBE A. C.

5 BAND

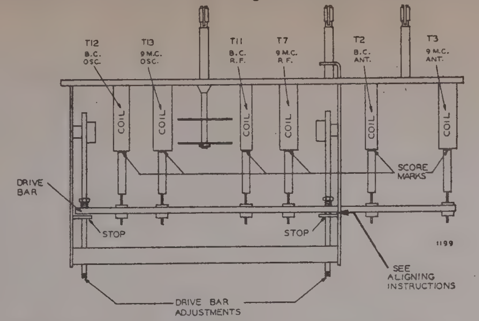
BUILT-IN AERIAL

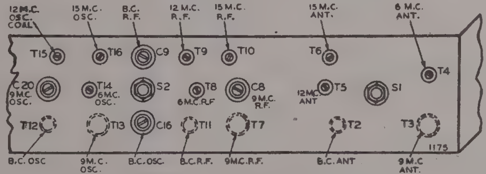
PUSHBUTTON

TUNING

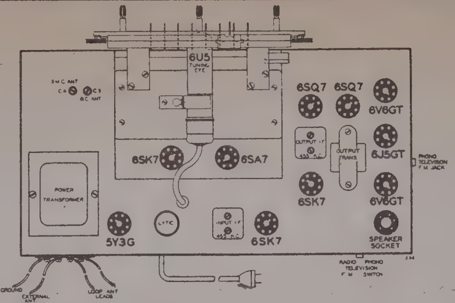

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 720 VOLT A C PINS 4 & 6
[C] 50 VOLT AC PINS 2 & 8
TUNING EYE VOLTAGES AT SET END OF CABLE
RED 300
GREEN 0
BLACK 0
BROWN 6.3 AC
6V6GT
6SQ7
6SQ7
6J5GT
6SA7
6SK7
6SK7
6V6GT
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS

IRON CORE ADJUSTMENT VIEW





FRONT VIEW CHASSIS



Power Consumption - - - - - 120 Watts
Power Output - - - - 10 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC
Intermediate Frequency - - - - - 455 KC
Speaker - - - - - 12 in. Electro Dynamic

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

Tuning Frequency Range

Broadcast Band - 540 to 1600 KC
49M Band - - - 5.9 to 6.1 MC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC

Phonograph-Television and Fm. Jack

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the chassis view—The radio-phono switch on the chassis will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the chassis view will accommodate either the Phono or a television or FM converter.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

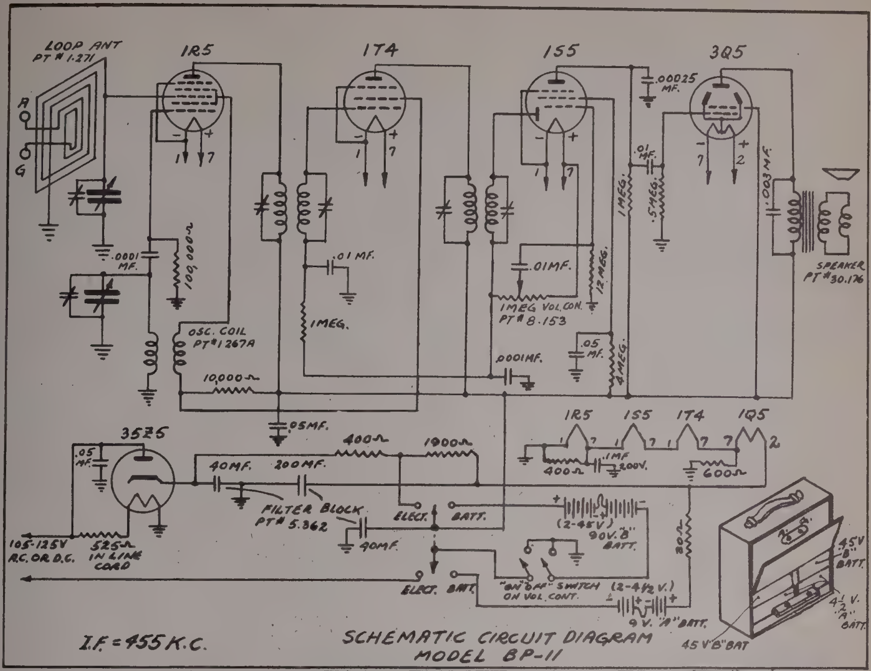
First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a guage). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

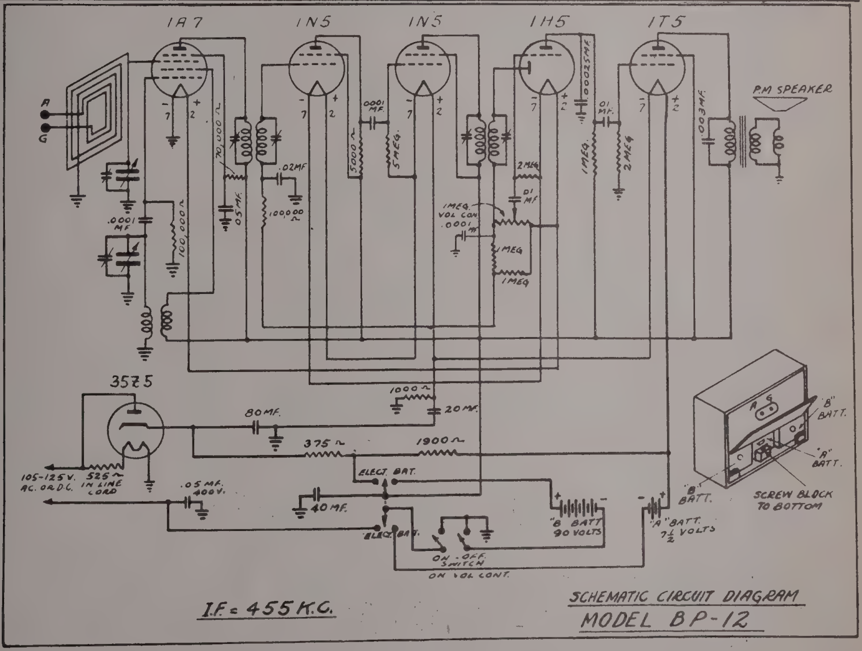
You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

GAROD RADIO CORP.

MODEL BP11
MODELS BP12,
BP12A, BP12B



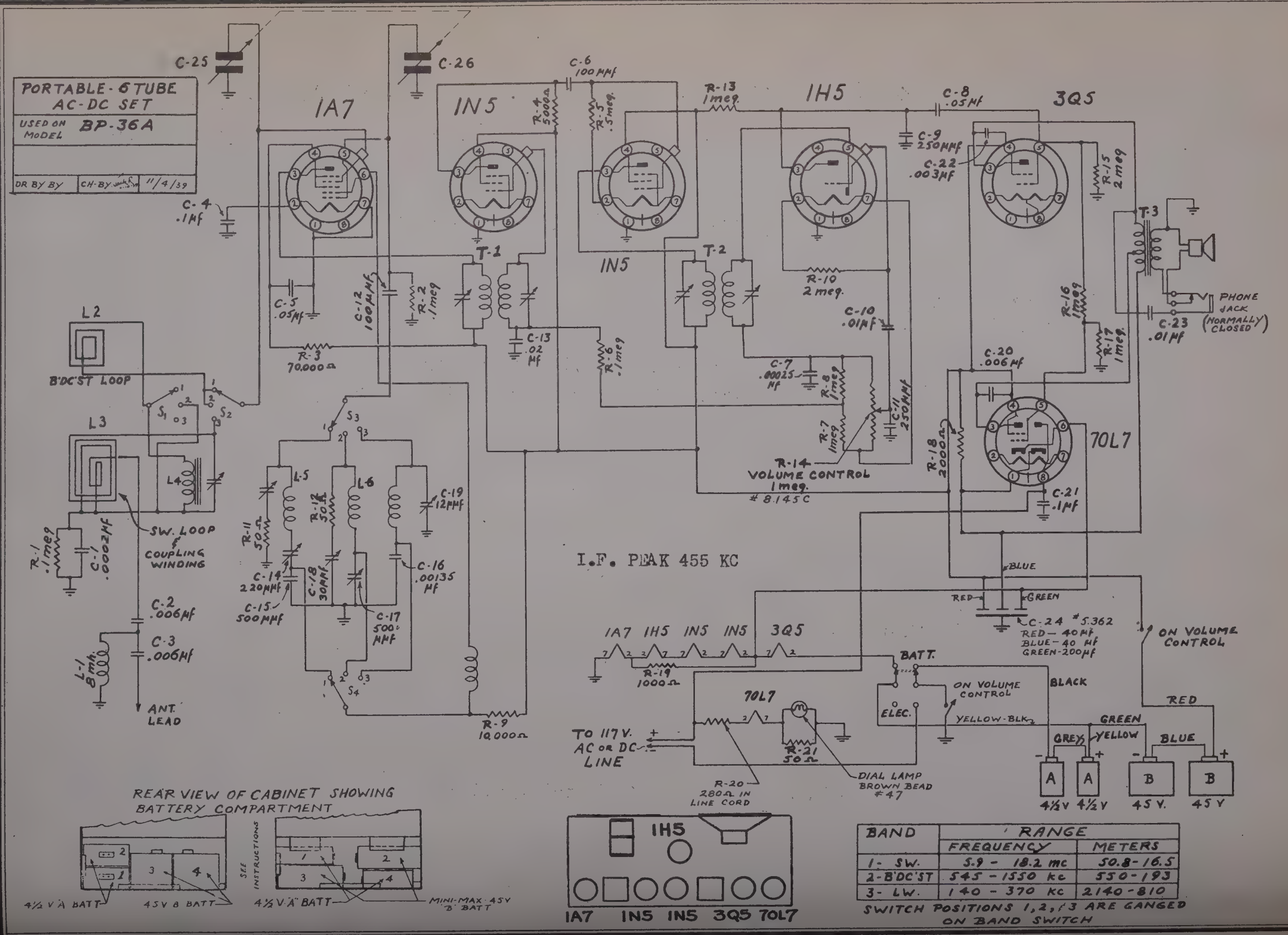
SCHEMATIC CIRCUIT DIAGRAM
MODEL BP-11



SCHEMATIC CIRCUIT DIAGRAM
MODEL BP-12

MODEL BP36A

GAROD RADIO CORP.

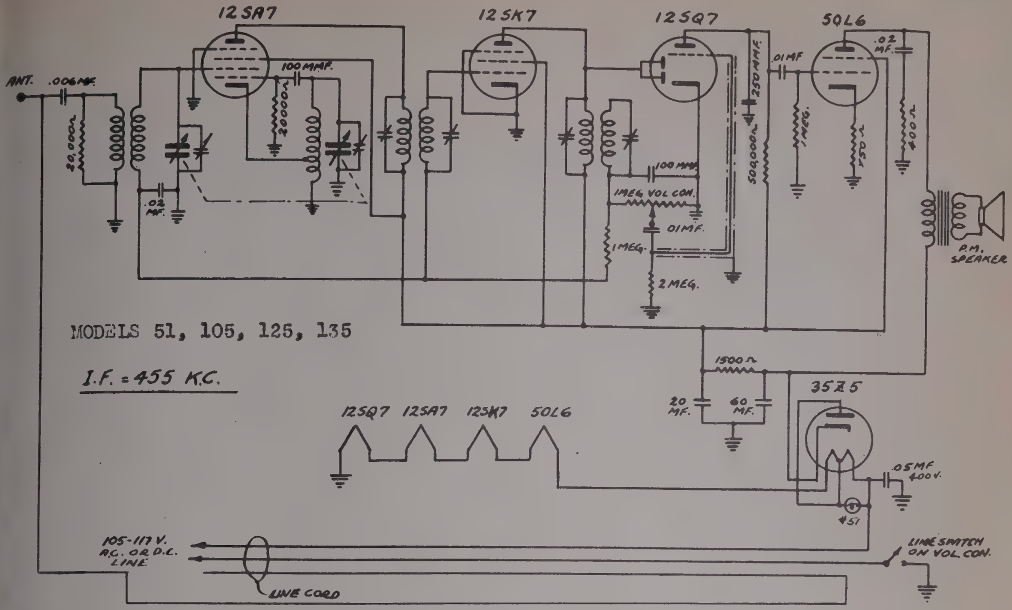


PORTABLE-6 TUBE AC-DC SET	
USED ON MODEL	BP-36A
DR BY BY	CH-BY 11/4/39

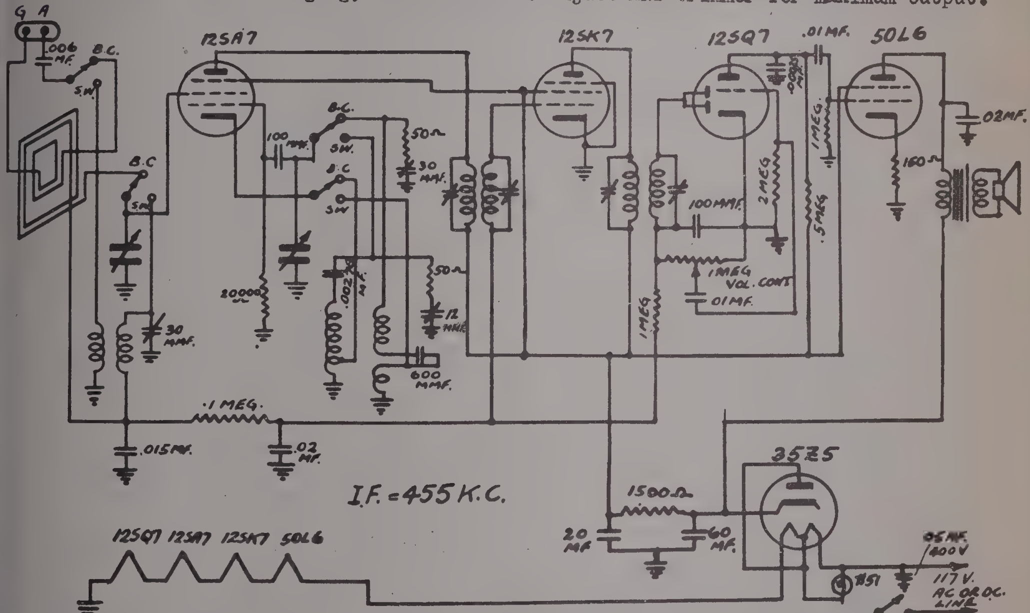
I.F. PEAK 455 KC

BAND	RANGE	
	FREQUENCY	METERS
1- SW.	5.9 - 18.2 mc	50.8-16.5
2-B'DC'ST	545 - 1550 kc	550-193
3- LW.	140 - 370 kc	2140-810

SWITCH POSITIONS 1,2,&3 ARE GANGED ON BAND SWITCH



Alignment: Peak i-f transformers at 455 kc. Set generator to 1500 kc and tune in with OSC trimmer on gang, front section. Adjust ANT trimmer for maximum output.

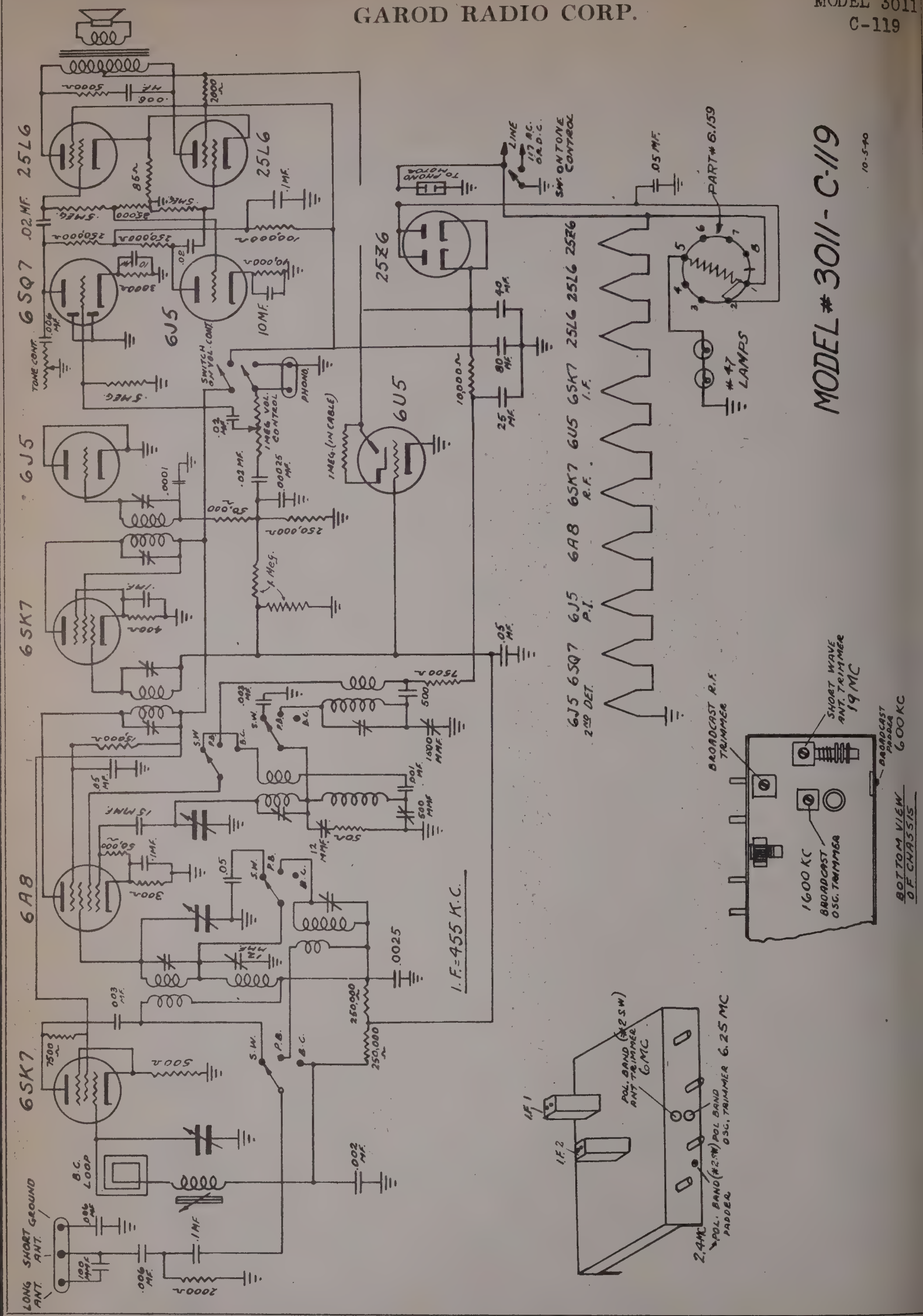


Alignment: Peak i.f. at 455 kc. Adjust B-C OSC trimmer (under chassis on apron) to 1500 kc. Adjust B-C padder (rear apron) to 600 kc. Set generator to 15 mc. Tune in. Set s-w OSC trimmer so that dial points to this frequnecy. Align s-w ANT trimmer (top of chassis on s-w ANT coil to right of gang condenser.)

SCHEMATIC WIRING DIAGRAM
MODELS 225A, 225B
245, 255, 265, 275, 285

GAROD RADIO CORP.

MODEL 3011
C-119



GAROD MODELS 399,4990; 1039,1049; 1540; 3109; 4123; 4124; 4410

ALIGNMENT

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at①455 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 2②4 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to③19 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the③19 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.6④mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator runing condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.6⑤mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity) be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1620⑥kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1620kc)⑥ Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial.⑦
The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

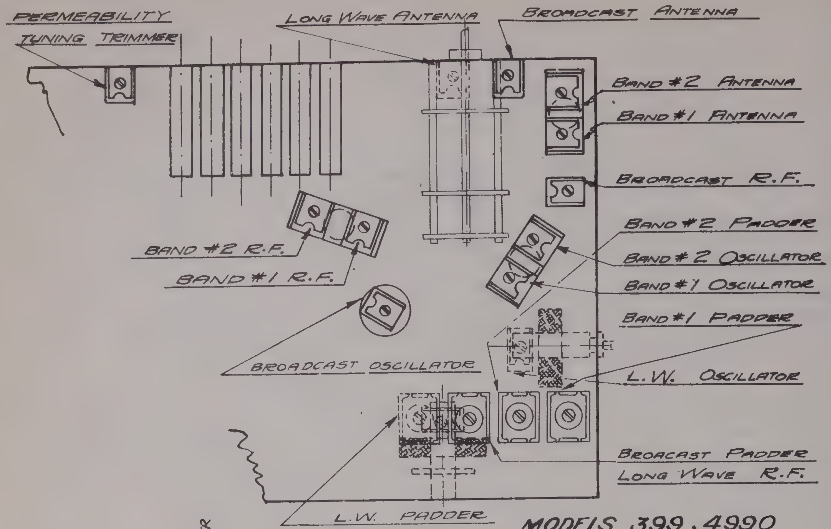
MODELS 1049, 1540, 4124, 4410 and 4990. (ONLY)
Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

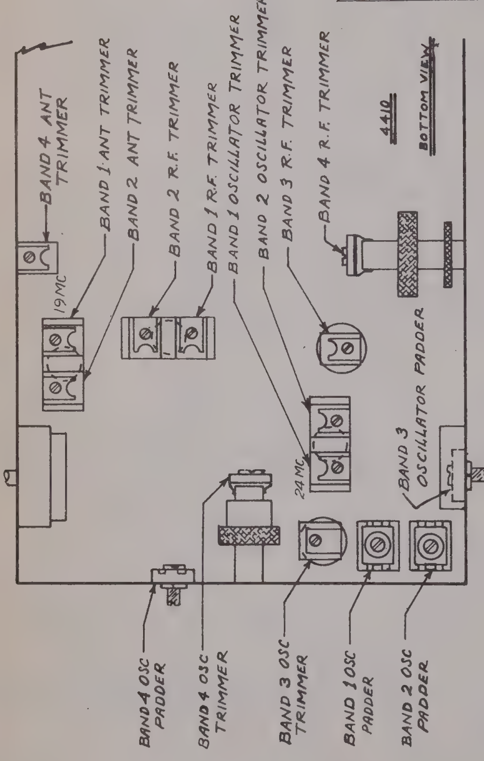
THIS NOTE REFERS TO MODELS 399,4990; 1039,1049; 1540; and 3109.
① 456KC ② 23MC ③ 21 MC ④ 7.2 MC ⑤ 7.4 MC ⑥ 1720 KC
⑦ REFERS TO MODELS 1039,1049; 1540; 3109:-
Then adjust the antenna and detector trimmers in the order indicated for maximum output.

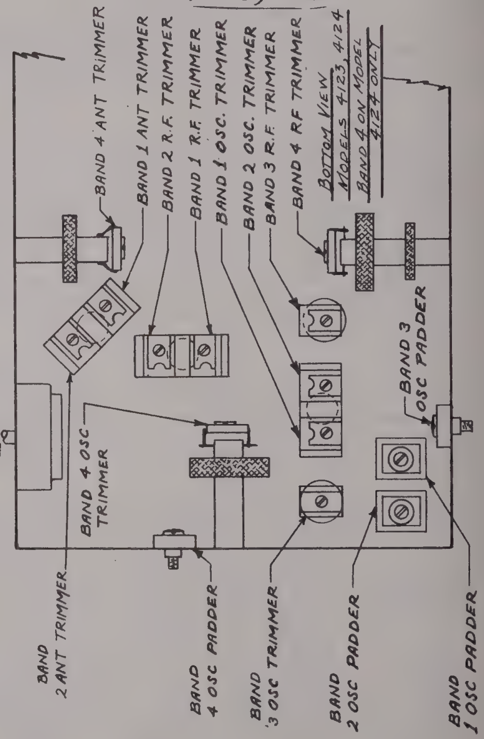
MODELS 399, 1039, 1049, 4990; 4123, 4124; 4410

GAROD RADIO CORP.



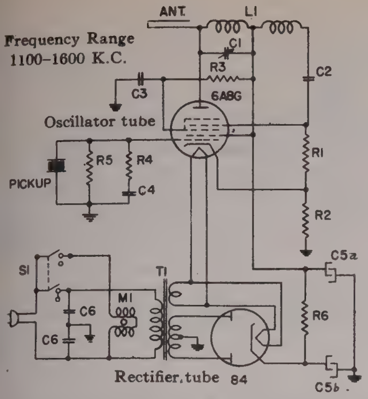
MODELS 399, 4990 1039, 1049





GENERAL ELECTRIC CO.

MODELS HE-100, HE-100-H, HE-100L, HE-100LH, HE-105, HE-105L



8-40

		M-1	Motor
1	300–850 mmf. tuning trimmer	R-1	120,000 ohms carbon resistor
2	100 mmf. mica capacitor	R-2	1200 ohms carbon resistor
3	0.1 mfd. paper capacitor	R-3	47,000 ohms carbon resistor
4	.005 mfd. paper capacitor	R-4	47,000 ohms carbon resistor
5a	10 mfd. dry electrolytic	R-5	1.0 megohm carbon resistor
5b	10 mfd. dry electrolytic	R-6	6800 ohms carbon resistor
6	.01–.01 mfd. line capacitor	S-1	Power switch
1	Oscillator coil	T-1	Power transformer

SPECIFICATIONS

Overall Dimensions

Model	JM-23
Height	6 1/16 inches
Width	14 5/8 inches
Depth	11 3/16 inches

lectrical Specifications

Rating	Power Supply (Volts)	Frequency (Cycles per Second)	Power Consumption (Watts)
A6	115–125	60	30
A5	115–125	50	30

Phonograph Mechanism

Motor	Constant-speed, self-starting
Pickup	Crystal
Turntable Speed	78 R.P.M.

GENERAL INFORMATION

The Model JM-23 Wireless Record Player is a two-tube ransmitter using a type 84 tube as a rectifier and a type A8G as an oscillator. Audio modulation is applied to the ontrol grid of the 6A8G from a properly loaded crystal pickup ircuit. The oscillator operates over a range of 1100–1600 ilocycles and the frequency is adjusted by the tuning rimmer (C-1). This trimmer is set to operate at approximate-y 1500 K.C. at the factory.

The turntable is driven at 78 revolutions per minute by constant-speed, self-starting induction motor. The motor s properly lubricated at the factory for long operation and hould not require attention under normal weather condiions.

The power control is a three-position switch. When this ontrol is turned to the extreme counterclockwise position, ll power is removed from the record player. When switched o the center position, power is applied to both the motor nd the transmitter. When turned to the extreme clockwise osition, power is still supplied to the transmitter but is emoved from the motor. This last position provides a means f stopping turntable rotation without letting the tubes cool own from operating temperature.

FREQUENCY ADJUSTMENT

To adjust the frequency of the oscillator turn the tuning rimmer which is accessible through a hole in the bottom cover ear the power control knob. This is a screwdriver control. lockwise rotation of the trimmer raises the frequency while ounterclockwise rotation lowers the frequency. Since the lectrical capacity of the hand may detune the transmitter omewhat if rested on the record player during adjustment, t is best to rest the record player on the edge of a table or ench with the tuning trimmer side of the record player just ar enough out from the edge to allow screwdriver adjustment of the tuning trimmer.

REPLACEMENT PARTS LIST

MODEL JM-23

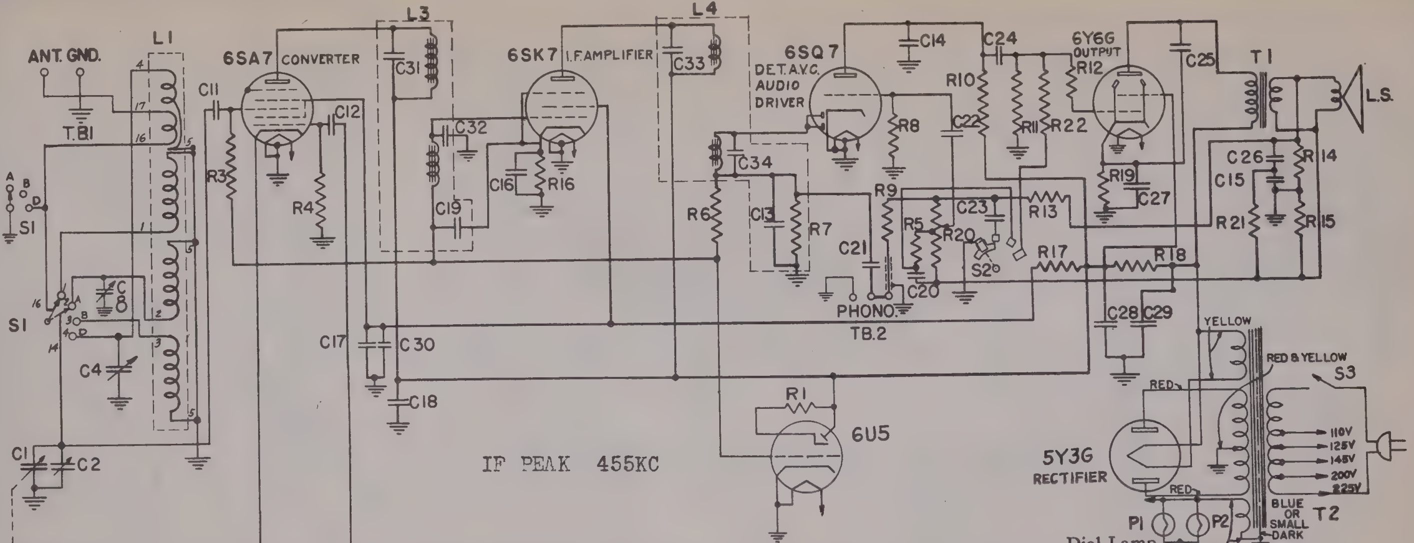
Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
RB-941	BOTTOM COVER—Cabinet bottom cover	$0.30
*RC-023	CAPACITOR—.005 mfd. 600 V. paper (C-4)	.25
*RC-059	CAPACITOR—.01-.01 mfd. line capacitor (C-6)	.55
*RC-096	CAPACITOR—0.1 mfd. 200 V. paper (C-3)	.30
*RC-319	CAPACITOR—100 mmf. mica (C-2)	.25
*RC-2002	CLAMP—Crystal clamp	.10
RC-2016	CLIP—Oscillator coil mounting clip (Pkg. 5)	.10
RC-2017	CATCH—Tone arm catch for securing to rest	.10
*RC-5150	CAPACITOR—10 mfd., 10 mfd. 200 V. dry electrolytic (C-5)	.70
*RC-6529	CAPACITOR—Trimmer capacitor (C-1)	.40
RC-8174	CORD—Power cord	.40
*RF-016	FOOT—Rubber foot for cabinet (Pkg. 3)	.05
*RG-016	GRID CAP—6A8G control grid cap (Pkg. 5)	$0.10
*RH-114	HAIRPIN COTTER—Swivel retaining cotter	.10
*RK-073	KNOB—Power switch control knob	.10
*RL-2019	COIL—Oscillator coil (L-1)	.40
RN-007	NUT—Speed nut for mounting motor assembly (Pkg. 3)	.10
RN-008	NUT—Power switch clamping nut (Pkg. 5)	.10
*RN-102	NEEDLE CUP—Rubber needle cup	.10
*RP-506	PICK-UP—Crystal pick-up	4.75
*RP-801	POST—Tone arm swivel post	.15
*RQ-1261	RESISTOR—1200 ohms ½ W. carbon (R-2) (Pkg. 5)	.70
*RQ-1279	RESISTOR—6800 ohms ½ W. carbon (R-6) (Pkg. 5)	.70
*RQ-1299	RESISTOR—47,000 ohms ½ W. carbon (R-3, 4) (Pkg. 5)	.70
*RQ-1309	RESISTOR—120,000 ohms ½ W. carbon (R-1) (Pkg. 5)	.70
*RQ-1331	RESISTOR—1.0 megohm ½ W. carbon (R-5) (Pkg. 5)	$0.70
*RR-940	REST—Tone arm rest	.15
*RS-200	SOCKET—6A8G tube socket (Pkg. 5)	.75
*RS-224	SOCKET—Type 84 tube socket (Pkg. 5)	.50
*RS-888	SCREW—Needle clamping screw	.10
RS-896	SCREW—Crystal clamp and catch screw (Pkg. 5)	.05
*RS-938	SWIVEL—Tone arm swivel assembly	.15
*RS-3058	SWITCH—Power control switch	.50
*RT-020	TRANSFORMER—Power transformer, 60 cycles (T-1)	2.20
RT-021	TRANSFORMER—Power transformer, 50 cycles	2.85
*RT-912	TONE ARM—Crystal tone arm	.65
*RW-114	WEIGHT—Tone arm weight	.05

Voltage Chart

Tubes	Plate to Gnd. Volts	Sreen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7 (R.F.)	215	98	4.7	6.3
6K8	Conv—230 Osc—105	98	4.7	6.3
6SK7 (I.F.)	215	98	3	6.3
6H6				6.3
6SF5	110		1	6.3
6J5G	100		4	6.3
6V6G	290	230	11.8	6.3
5U4G	277 a-c		300	5.1
6U5	170			6.3

MODEL HE-64L

GENERAL ELECTRIC CO.



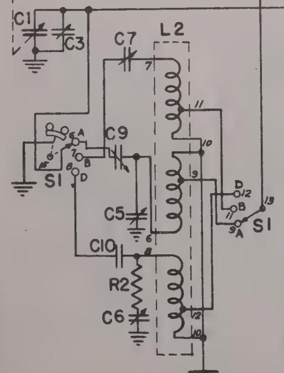
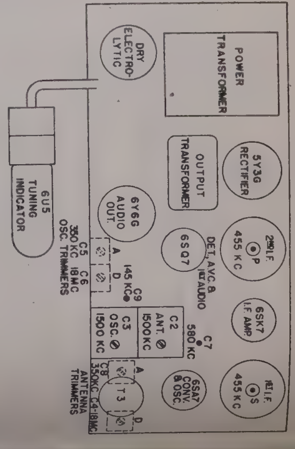
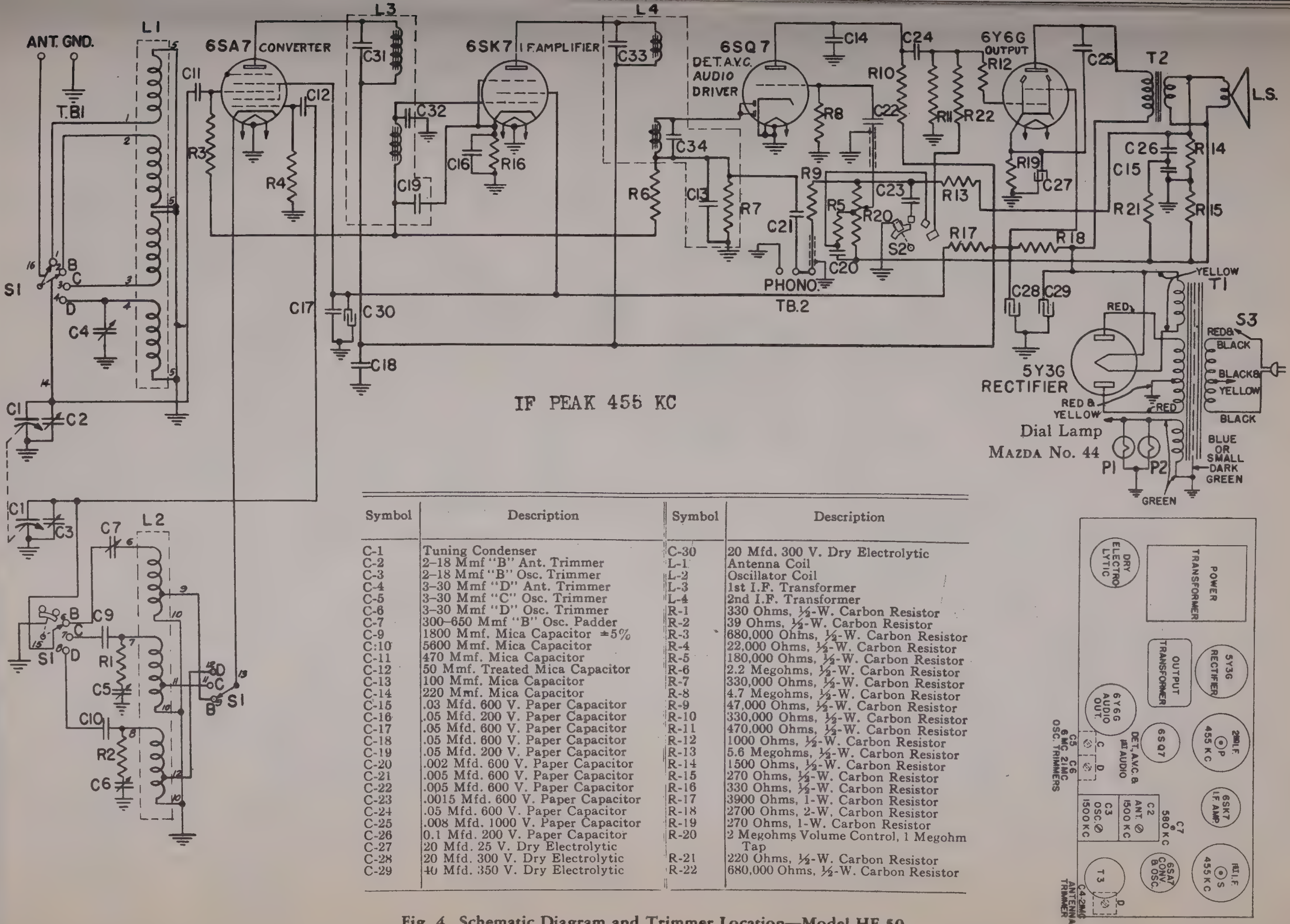


Fig. 8. Schematic Diagram and Trimmer Location—Model HE-64L

Symbol	Description	Symbol	Description
C-1	Tuning Condenser	C-30	20 Mfd. 300 V. Dry Electrolytic
C-2	2–18 Mmf. "B" Ant. Trimmer	L-1	Antenna Transformer
C-3	2–18 Mmf. "B" Osc. Trimmer	L-2	Oscillator Transformer
C-4	2–20 Mmf. "D" Ant. Trimmer	L-3	1st I.F. Transformer
C-5	3–30 Mmf. "A" Osc. Trimmer	L-4	2nd I.F. Transformer
C-6	3–30 Mmf. "D" Osc. Trimmer	R-1	1.0 Meg. ½-W. Carbon Resistor
C-7	300–650 Mmf. "B" Osc. Padder	R-2	39 Ohms, ½-W. Carbon Resistor
C-8	2–20 Mmf. "A" Ant. Trimmer	R-3	680,000 Ohms, ½-W. Carbon Resistor
C-9	75–150 Mmf. "A" Osc. Padder	R-4	22,000 Ohms, ½-W. Carbon Resistor
C-10	4300 Mmf. Mica ±5%	R-5	180,000 Ohms, ½-W. Carbon Resistor
C-11	470 Mmf. Mica Capacitor	R-6	2.2 Meg., ½-W. Carbon Resistor
C-12	50 Mmf. Mica Capacitor	R-7	330,000 Ohms, ½-W. Carbon Resistor
C-13	100 Mmf. Mica Capacitor	R-8	4.7 Meg., ½-W. Carbon Resistor
C-14	220 Mmf. Mica Capacitor	R-9	47,000 Ohms, ½-W. Carbon Resistor
C-15	.03 Mfd. 600 V. Paper Capacitor	R-10	330,000 Ohms, ½-W. Carbon Resistor
C-16	.05 Mfd. 200 V. Paper Capacitor	R-11	470,000 Ohms, ½-W. Carbon Resistor
C-17	.05 Mfd. 600 V. Paper Capacitor	R-12	1000 Ohms, ½-W. Carbon Resistor
C-18	.05 Mfd. 600 V. Paper Capacitor	R-13	5.6 Meg., ½-W. Carbon Resistor
C-19	.05 Mfd. 200 V. Paper Capacitor	R-14	1500 Ohms, ½-W. Carbon Resistor
C-20	.002 Mfd. 600 V. Paper Capacitor	R-15	270 Ohms, ½-W. Carbon Resistor
C-21	.005 Mfd. 600 V. Paper Capacitor	R-16	330 Ohms, ½-W. Carbon Resistor
C-22	.005 Mfd. 600 V. Paper Capacitor	R-17	3900 Ohms, 1-W. Carbon Resistor
C-23	.0015 Mfd. 600 V. Paper Capacitor	R-18	2700 Ohms, 2-W. Carbon Resistor
C-24	.05 Mfd. 600 V. Paper Capacitor	R-19	270 Ohms, 1-W. Carbon Resistor
C-25	.008 Mfd. 1000 V. Paper Capacitor	R-20	2.0 Meg. Vol. Control, 1 Megohm Tap
C-26	0.1 Mfd. 200 V. Paper Capacitor	R-21	220 Ohms, ½-W. Carbon Resistor
C-27	20 Mfd. 25 V. Dry Electrolytic	R-22	680,000 Ohms, ½-W. Carbon Resistor
C-28	20 Mfd. 300 V. Dry Electrolytic	P-1	Pilot Light Mazda No. 44
C-29	40 Mfd. 300 V. Dry Electrolytic	P-2	Pilot Light Mazda No. 44





Symbol	Description	Symbol	Description
C-1	Tuning Condenser	C-30	20 Mfd. 300 V. Dry Electrolytic
C-2	2–18 Mmf "B" Ant. Trimmer	L-1	Antenna Coil
C-3	2–18 Mmf "B" Osc. Trimmer	L-2	Oscillator Coil
C-4	3–30 Mmf "D" Ant. Trimmer	L-3	1st I.F. Transformer
C-5	3–30 Mmf "C" Osc. Trimmer	L-4	2nd I.F. Transformer
C-6	3–30 Mmf "D" Osc. Trimmer	R-1	330 Ohms, ½-W. Carbon Resistor
C-7	300–650 Mmf "B" Osc. Padder	R-2	39 Ohms, ½-W. Carbon Resistor
C-9	1800 Mmf. Mica Capacitor ±5%	R-3	680,000 Ohms, ½-W. Carbon Resistor
C-10	5600 Mmf. Mica Capacitor	R-4	22,000 Ohms, ½-W. Carbon Resistor
C-11	470 Mmf. Mica Capacitor	R-5	180,000 Ohms, ½-W. Carbon Resistor
C-12	50 Mmf. Treated Mica Capacitor	R-6	2.2 Megohms, ½-W. Carbon Resistor
C-13	100 Mmf. Mica Capacitor	R-7	330,000 Ohms, ½-W. Carbon Resistor
C-14	220 Mmf. Mica Capacitor	R-8	4.7 Megohms, ½-W. Carbon Resistor
C-15	.03 Mfd. 600 V. Paper Capacitor	R-9	47,000 Ohms, ½-W. Carbon Resistor
C-16	.05 Mfd. 200 V. Paper Capacitor	R-10	330,000 Ohms, ½-W. Carbon Resistor
C-17	.05 Mfd. 600 V. Paper Capacitor	R-11	470,000 Ohms, ½-W. Carbon Resistor
C-18	.05 Mfd. 600 V. Paper Capacitor	R-12	1000 Ohms, ½-W. Carbon Resistor
C-19	.05 Mfd. 200 V. Paper Capacitor	R-13	5.6 Megohms, ½-W. Carbon Resistor
C-20	.002 Mfd. 600 V. Paper Capacitor	R-14	1500 Ohms, ½-W. Carbon Resistor
C-21	.005 Mfd. 600 V. Paper Capacitor	R-15	270 Ohms, ½-W. Carbon Resistor
C-22	.005 Mfd. 600 V. Paper Capacitor	R-16	330 Ohms, ½-W. Carbon Resistor
C-23	.0015 Mfd. 600 V. Paper Capacitor	R-17	3900 Ohms, 1-W. Carbon Resistor
C-24	.05 Mfd. 600 V. Paper Capacitor	R-18	2700 Ohms, 2-W. Carbon Resistor
C-25	.008 Mfd. 1000 V. Paper Capacitor	R-19	270 Ohms, 1-W. Carbon Resistor
C-26	0.1 Mfd. 200 V. Paper Capacitor	R-20	2 Megohms Volume Control, 1 Megohm Tap
C-27	20 Mfd. 25 V. Dry Electrolytic		
C-28	20 Mfd. 300 V. Dry Electrolytic	R-21	220 Ohms, ½-W. Carbon Resistor
C-29	40 Mfd. 350 V. Dry Electrolytic	R-22	680,000 Ohms, ½-W. Carbon Resistor

Fig. 4. Schematic Diagram and Trimmer Location—Model HE-50

MODELS HE-50,
HE-64L, HE-540,
HE-640L

GENERAL ELECTRIC CO.

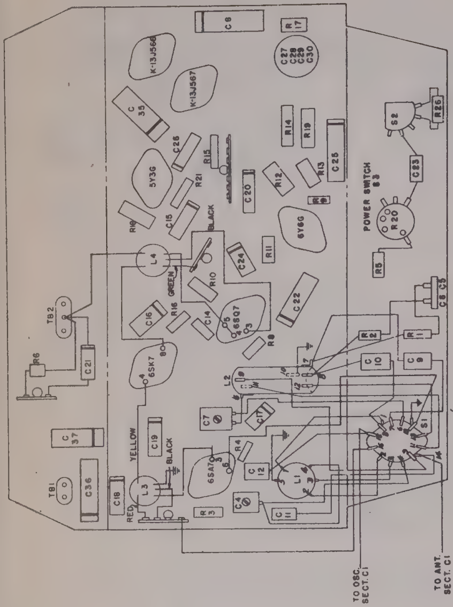


Fig. 7. Chassis Parts Layout—Model HE-540

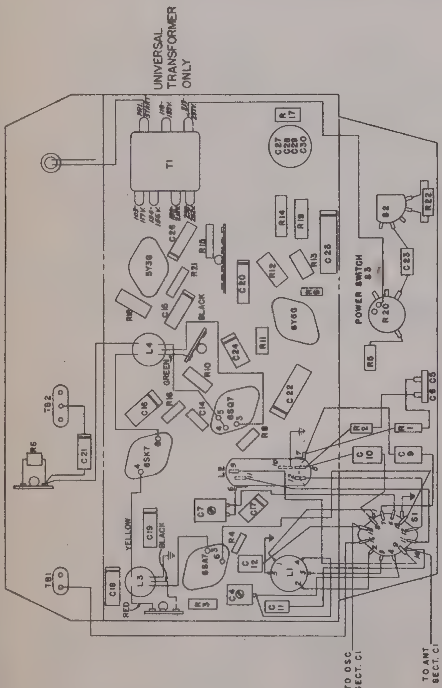


Fig. 6. Chassis Parts Layout—Model HE-50

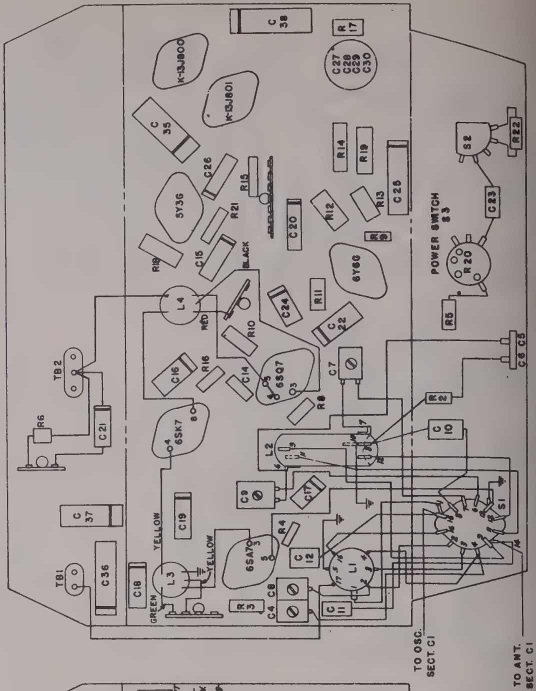


Fig. 11. Chassis Parts Layout—Model HE-640L

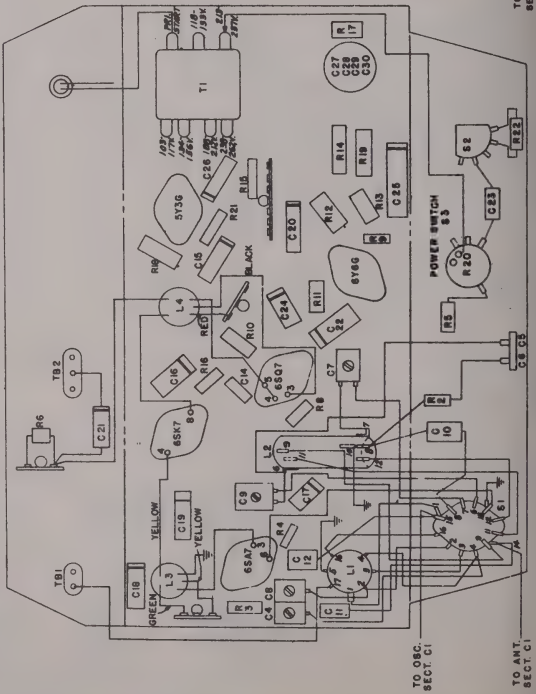


Fig. 10. Chassis Parts Layout—Model HE-64L

GENERAL ELECTRIC CO.

GENERAL INFORMATION

Models HE-50 and HE-540 are three-band receivers employing five General Electric Pre-tested Tubes in a superheterodyne circuit. Features of design include "Alnico" magnet dynamic speaker, beampower output, iron core I.F. transformers, single-ended tubes, and degenerative feedback. Model HE-50 is an A-C receiver available in three classes of voltage and frequency rating. Model HE-540 is an AC-DC receiver using an improved rectifier circuit.

Models HE-64L and HE-640L are similar to the above models except for tuning frequency coverage and incorporation of a tuning indicator. Model HE-64L is an A-C receiver while Model HE-640L is an AC-DC receiver.

Coil Data

All antenna and oscillator transformer switch terminals are numbered in Figs. 6, 7, 10, and 11 to facilitate in locating these common points on the schematic diagrams Figs. 4, 5, 8 and 9.

The following tables show the coils in use for the various positions of the band-change switch.

Models HE-50 and HE-540

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid	Oscillator Cathode
Band "B"	Section 1 to 5 of L1	Section 2 to 5 of L1	Section 6 to 10 of L2	Section 9 to 10 of L2
Band "C"	Section 2 to 5 of L1	Section 3 to 5 of L1	Section 7 to 10 of L2	Section 11 to 10 of L2
Band "D"	Section 3 to 5 of L1	Section 4 to 5 of L1	Section 8 to 10 of L2	Section 12 to 10 of L2

Models HE-64L and HE-640L

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid	Oscillator Cathode
Band "A"	Sections 16 to 17 and 1 to 5 of L1	Section 2 to 5 of L1	Section 6 to 10 of L2	Section 9 to 10 of L2
Band "B"	Sections 16 to 17 and 2 to 5 of L1	Section 3 to 5 of L1	Section 7 to 10 of L2	Section 11 to 10 of L2
Band "D"	Section 16 to 17 of L1	Section 4 to 5 of L1	Section 8 to 10 of L2	Section 12 to 10 of L2

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

NOTE:—In no case should the magnet be removed from the assembly position as it will lose magnetism.

Phonograph Connections

Figs. 1a and 1b show simple methods for connecting a crystal or high impedance magnetic pickup into the receiver circuit for the reproduction of phonograph recordings. S-1 is a triple-pole, double-throw switch. A suitable loading circuit composed of a resistor or resistor and capacitor network should be used across the pickup leads when using a crystal type unit. It is very important that the pickup leads have a shield such as copper braid to prevent hum interference. This shield should be connected to the chassis ground.

Remove the jumper between phono-terminals 1 and 2 and make connections as shown in Fig. 1a and 1b.

When the pickup is connected as shown, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

COIL RESISTANCE DATA

Coil	Model	Section	Resistance Measured Between Points	Resistance (Ohms)
Antenna	HE-50, 540	B Primary	1 and 5	22
		B Secondary	2 and 5	5
		C Secondary	3 and 5	.9
		D Secondary	4 and 5	.02
Antenna	HE-64L, 640L	A Primary	1 and 5	110
		A Secondary	2 and 5	26
		B Secondary	3 and 5	5
		D Secondary	4 and 5	.03
		D Primary	16 and 17	.2
Oscillator	HE-50, 540	B Band Coil	6 and 10	3
		C Band Coil	7 and 10	.8
		D Band Coil	8 and 10	.02
Oscillator	HE-64L, 640L	A Band Coil	6 and 10	10
		B Band Coil	7 and 10	3
		D Band Coil	8 and 10	.03
1st I.F. Transformer	All Models	Primary		9 to 12
		Secondary		15 to 19
2nd I.F. Transformer	All Models	Primary		14 to 18
		Secondary		7 to 9
Output Transformer	All Models	Primary		265
		Secondary		.4
Power Transformer	HE-50, 64L	Primary		
		110 V. Tap		7
		125 V. Tap		8
		200 V. Tap		9
		225 V. Tap		20
		250 V. Tap		24
		Secondary		
		Red to Red		250
		Green to Green		.5
		Yellow to Yellow		.5

Symbol	Description	Stock No.
S-1	Triple-pole, double-throw switch	RS-366
R-1	330,000 ohm resistor	RQ-1319

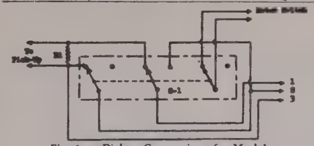


Fig. 1a. Pickup Connections for Models HE-50 and HE-64L

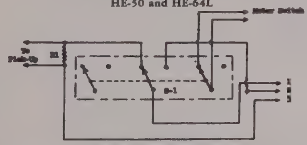


Fig. 1b. Pickup Connections for Models HE-540 and HE-640L

10-39

Alignment Procedure

The alignment is given in table form on this page. Use a standard I.R.E dummy antenna in making all R.F. alignments (see Fig. 2).

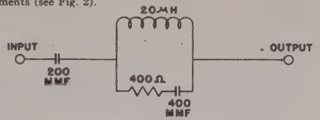


Fig. 2. Standard I.R.E. Dummy Antenna

I.F. transformers are double, permeability tuned with adjusting shafts at top and bottom of shield cans.

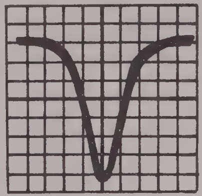


Fig. 3. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

ALIGNMENT PROCEDURE

I. F. ALIGNMENT — OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (Bottom of Shield Can) 2nd I.F. Pri. (Top of Shield Can)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to phono terminal No. 2. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 3. It may be necessary to retrim 2nd I.F. transformers for final adjustment
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (Top of Shield Can) 1st I.F. Pri. (Bottom of Shield Can)	

I. F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (Bottom of Shield Can) 2nd I.F. Pri. (Top of Shield Can)	Gang condenser plates closed—connect output meter across voice coil—keep signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (Top of Shield Can) 1st I.F. Pri. (Bottom of Shield Can)	

R. F. ALIGNMENT—MODELS HE-50 AND HE-540

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang condenser plates. Adjust pointer to first line at left end of tuning scale. Connect meter output across voice coil.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmer for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-7)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
4. Band "B"	Repeat Operation 2				
5. Band "C"	6. M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-5)	Peak trimmer for maximum output while rocking the gang condenser. Image—910 K.C. below signal.
6. Band "D"	21 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-4)	The image of "D" band signal should be heard 910 K.C. below the input signal when (C-6) is on proper peak. Example: 21 M.C. image is at 20.09 M.C. Peak (C-4) while rocking the gang condenser.

Continued

ALIGNMENT PROCEDURE (Continued)

R. F. ALIGNMENT—MODELS HE-64L AND HE-640L

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang condenser plates. Adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmers for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-7)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
4. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmers for maximum output with a low input signal.
5. Band "A"	350 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-5) Ant. (C-8)	Peak trimmers for maximum output with a low input signal.
6. Band "A"	145 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-9)	Adjust padder for maximum output in the vicinity of 145 K.C. while rocking the gang condenser.
7. Band "A"	Repeat Operation 5				
8. Band "D"	18 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-4)	The image of "D" band signal should be heard 910 K.C. below the input signal when (C-6) is on proper peak. Example: 18 M.C. image is at 17.09. M.C. Peak (C-4) while rocking the gang condenser.

Voltage Chart (Models HE-50 and HE-64L)

Tubes	Plate to Gnd Volts	Screen to Gnd Volts	Cathode to Gnd Volts	Filament Volts
6SA7	132	96	0	6.4
6SK7	132	96	3.3	6.4
6SQ7	66*		0	6.4
6Y6G	171	132	13	6.4
5Y3G	198 (AC)		183 (DC)	5.0
6U5**	132			6.4

5Y3G Cathode Current—67 ma.
Above voltages measured at 110 volts line on 103–117 volt tap.
*Use a high resistance voltmeter.
**Used only on HE-64L.

Voltage Chart (Models HE-540 and HE-640L)

Tubes	Plate to Gnd. Volts	Screen to Gnd Volts	Cathode to Gnd Volts	Filament Volts
6SA7	144	100	0	6.5
6SK7	144	100	3	6.5
6SQ7	62*		0	6.5
25C6G	204	144	13. 8	25
25Z6G	216 (AC)		218 (DC)	25
6U5**	144			6.5

25Z6G Cathode Current—71.4 ma.
240 volts line A.C.
*Use a high resistance voltmeter.
**Used only on HE-640L.

Physical Specifications:

Models	HE-50, HE-540	HE-64L, HE-640L
Height	10¾ inches	11½ inches
Width	17⅛ inches	19 inches
Depth	8 inches	8 inches

Tuning Frequency Range

Models HE-50 and HE-540
- Band "B" .... 540–1700 K.C.
- Band "C" .... 2200–7000 K.C.
- Band "D" .... 7000–22000 K.C.

Models HE-64L and HE-640L
- Band "A" .... 140–400 K.C.
- Band "B" .... 540–1700 K.C.
- Band "D" .... 5800–18000 K. C.

Intermediate Frequency .... 455 K.C.

Electrical Power Output	HE-50, HE-64L	HE-540, HE-640L
Undistorted	2.7 watts	3.5 watts
Maximum	5.0 watts	7.0 watts

Loud-speaker—"Alnico" Magnet Dynamic

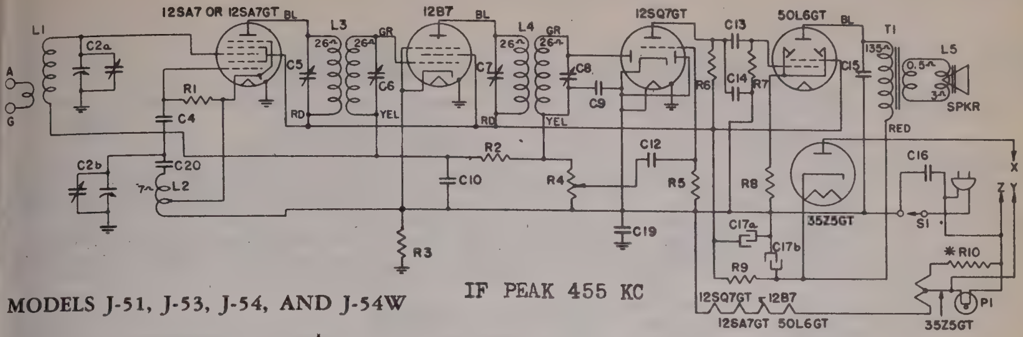
Cone Diameter .... 6½ inches
Voice Coil Impedance (400 cycles) ... 3.5 ohms

Electrical Specifications

Model	Rating	Power Supply (Volts)	Frequency (Cycles on A.C.)	Power Consumption (Watts)
HE-50	A	103–117 118–133	50–60	65
	C	103–117 118–133	25–60	65
	V	103–117 118–133 134–156 188–212 213–237 238–262	50–60	65
HE-540 HE-640L		200–240 A-C or D-C	25–100	100
HE-64L	V	103–117 118–133 134–155 188–212 213–237 238–262	50–60	65

GENERAL ELECTRIC CO.

MODELS J-51,
J-53, J-54, J-54W



MODELS J-51, J-53, J-54, AND J-54W

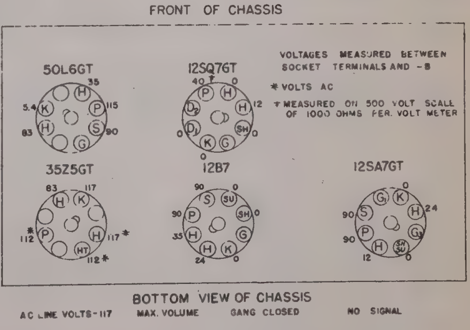
*"A" rated receivers have "X" connected to "Y" and R-10 is shorted. "C" rated receivers have "X" connected to "Z."

PARTS DESCRIPTION LIST

Symbol	Description	Symbol	Description	Symbol	Description
C2a	Antenna section of tuning condenser	C17b	40 mfd. 150 V. dry electrolytic	R4	0.5 megohms volume control
C2b	Oscillator section of tuning condenser	C19	0.2 mfd. paper capacitor	R5	4.7 megohms carbon resistor
C4	47 mmf. mica capacitor	C20	.01 mfd. paper capacitor	R6	470,000 ohms carbon resistor
C9	470 mmf. mica capacitor	L1	Beam-a-Scope	R7	470,000 ohms carbon resistor
C10	.05 mfd. paper capacitor	L2	Oscillator Coil	R8	150 ohms carbon resistor
C12	.005 mfd. paper capacitor	L3	1st. I.F. transformer	R9	1200 ohms 1 W. carbon resistor
C13	.005 mfd. paper capacitor	L4	2nd I.F. transformer	R10	13 ohms carbon resistor
C14	330 mmf. mica capacitor	P1	Dial lamp, MAZDA No. 47	S1	Power switch
C15	.01 mfd. paper capacitor	R1	33,000 ohms carbon resistor	T1	Output transformer
C16	.05 mfd. paper capacitor	R2	2.2 megohms carbon resistor		
C17a	30 mfd. 150 V. dry electrolytic	R3	470,000 ohms carbon resistor		

REPLACEMENT PARTS LIST

Stock No.	Description	List Price
*RB-008	BOARD—Terminal board (2 lug)	$0.10
*RB-626	BUSHING—Tuning shaft bushing	.10
RB-945	BACK COVER—Cabinet back cover for Model J-51	.15
RB-946	BACK COVER—Cabinet back cover for Model J-53	.15
RB-947	BACK COVER—Cabinet back cover for Models J-54 and J-54W	.15
*RB-1015	BOARD—Terminal board (1 lug)	.10
*RB-1102	BRACKET—Tuning condenser bracket	.10
RB-1112	BRACKET—Beam-a-Scope bracket	.10
*RC-023	CAPACITOR—.005 mfd. 600 V. paper (C-12, 13)	.25
*RC-039	CAPACITOR—.01 mfd. 600 V. paper (C-15, 20)	.25
*RC-072	CAPACITOR—.05 mfd. 200 V. paper (C-10)	.25
*RC-092	CAPACITOR—.05 mfd. 600 V. paper (C-16)	.30
RC-130	CAPACITOR—0.2 mfd. 400 V. paper (C-19)	.30
*RC-216	CAPACITOR—47 mmf. mica (C-4)	.25
*RC-274	CAPACITOR—330 mmf. mica (C-14)	.30
*RC-293	CAPACITOR—470 mmf. mica (C-9)	.30
*RC-863	CORD—Power cord	.65
RC-2019	CUSHION—Pointer guide plate spacer cushions (Pkg. 5)	.10
RC-2020	CUSHION—Mounting cushion for dial scale (Pkg. 5)	.10
RC-5163	CAPACITOR—30 mfd. 150 V., 40 mfd. 150 V., dry electrolytic (C-17a, 17b)	.65
RC-7031	CONDENSER—Tuning condenser and drum assembly (Drum pressed on to condenser shaft) (C-2a, 2b)	1.95
RC-7032	CONDENSER—Tuning condenser for use on Models with detachable drum (C-2a, -2b)	1.80
RC-8177	CORD—Tuning drive cord	.20
*RC-9011	CONE ASSEMBLY—Speaker cone assembly	.90
RD-158	DIAL—Dial scale for Models J-51 and J-53	.60
RD-159	DIAL—Dial scale for Models J-54 and J-54W	.40
RD-421	DRUM—Drum, hub and setscrew assembly	.30
RE-086	ESCUTCHEON—Dial escutcheon	.40
*RF-205	FASTENER—Fastener for mounting cabinet back on Models J-54 and J-54W (Pkg. 10)	.10
RF-206	FASTENER—Beam-a-Scope—bracket fastener (Pkg. 5)	.10
RF-207	FASTENER—Cabinet back fastener for Models J-51 and J-53 (Pkg. 5)	.10
*RH-111	HAIRPIN COTTER—Tuning shaft retaining cotter (Pkg. 10)	.05
RK-090	KNOB—Control knob and spring (Model J-54)	.10
RK-091	KNOB—Control knob and spring (Models J-51, J-53)	.10
RK-094	KNOB—Control knob and spring (Model J-54W)	.20
RL-530	BEAM-A-SCOPE—Beam-a-Scope assembly (L-1)	.80
*RL-2025	COIL—Oscillator coil (L-2)	.30
RM-511	MASK—Dial back plate reflector mask	.05
RN-009	NUT—Speed nut for mounting dial scale on Models J-54 and J-54W (Pkg. 5)	.10
RN-010	NUT—Speed nut for mounting dial scale on Models J-51 and J-53 (Pkg. 5)	.10
*RTN-001	NUT—Bushing retaining nut (Pkg. 5)	.10
RP-188	PLATE—Pointer guide plate assembly	.70
RP-189	POINTER—Dial scale pointer	.15
RP-322	PULLEY—Pointer cord pulley and stud (Pkg. 5)	.10
RQ-1214	RESISTOR—13 ohms ¼ W. carbon (R-10) (Pkg. 5)	$0.70
*RQ-1239	RESISTOR—150 ohms ½ W. carbon (R-8) (Pkg. 5)	.70
*RQ-1295	RESISTOR—33,000 ohms ½ W. carbon (R-1) (Pkg. 5)	.70
*RQ-1323	RESISTOR—470,000 ohms ½ W. carbon (R-3, 6, 7) (Pkg. 5)	.70
*RQ-1339	RESISTOR—2.2 megohms ½ W. carbon (R-2) (Pkg. 5)	.70
*RQ-1347	RESISTOR—4.7 megohms ½ W. carbon (R-5) (Pkg. 5)	.70
*RQ-1460	RESISTOR—1200 ohms 1 W. carbon (R-9)	.20
*RS-238	SOCKET—Octal tube socket	.15
*RS-263	SOCKET—12B7 tube socket	.15
RS-284	SOCKET—Dial light socket assembly	.20
*RS-432	SPRING—Drive cord tension spring (Pkg. 5)	.20
*RS-444	SPRING—Control knob tension spring (Pkg. 10)	.10
RS-1035	SPEAKER—5-inch dynapower speaker and output transformer assembly	2.50
RS-9006	SHAFT—Tuning shaft	.05
*RT-353	TRANSFORMER—2nd I.F. transformer (L-4)	.70
RT-359	TRANSFORMER—1st I.F. transformer (L-3)	.70
*RT-482	TRANSFORMER—Output transformer (T-1)	.90
*RT-955	TERMINAL—Antenna or ground terminal (Pkg. 5)	.10
RV-097	VOLUME CONTROL—0.5-megohm volume control (R-4)	1.45
RZ-174	CABINET—Cabinet for Model J-54	18.00
RZ-175	CABINET—Cabinet for Model J-54W	33.00



Socket Voltages

* Used on previous receivers. (Prices Subject to Change without Notice)

MODELS J-51, J-53, J-54, and J-54W

SERVICE DATA

Over-all Dimensions

Model	J-51	J-53	J-54, J-54W
Height	8 5/16 inches	8 5/16 inches	7½ inches
Width	12½ inches	14½ inches	10⅝ inches
Depth	6½ inches	6¾ inches	6 3/16 inches

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Con-sumption (Watts)
A	115 AC or DC	40–60	30
C	115 AC or DC	25	30

Tuning Control Drive Ratio......................14:1

Tuning Frequency Range.................540–1600 KC

Intermediate Frequency.......................455 KC

Electrical Power Output (117 line volts)

Undistorted	1.5 watts
Maximum	2.5 watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside Cone Diameter	5 inches
Voice Coil Impedance (400 cycles)	3.5 ohms

Tubes

Converter and Oscillator	GE-12SA7GT
I.F. Amplifier	GE-12B7
Det., Aud., A.V.C.	GE-12SQ7GT
Audio Output	GE-50L6GT
Rectifier	GE-35Z5GT
Dial Lamp	Mazda No. 47

GENERAL INFORMATION

Models J-51, J-53, J-54 and J-54W are compact, five-tube superheterodyne receivers which can be operated from either an AC or DC source of power. Model J-51 and J-53 cabinets are in matched walnut veneers. Model J-54 and J-54W cabinets are plastic in oak and gray-white respectively. All models incorporate the following design features: Built-in Beam-a-Scope, 5-inch dynapower speaker, increased dial length, automatic volume control, and beam power output.

The glass tubes used in the converter and detector stages are interchangeable with metal tubes if the receiver is realigned following the change.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	455 KC
R.F.	1650 and 1500 KC

The location of all trimmers is shown in Fig. 1.

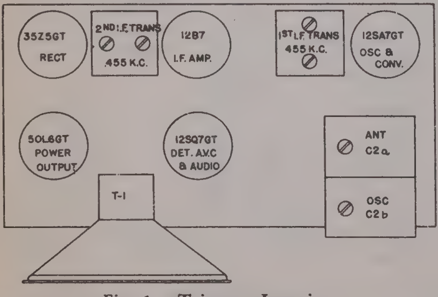


Fig. 1. Trimmer Location

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

To insert the R.F. signal use either a standard I.R.E. dummy antenna between the signal generator and the receiver antenna post, or loop-couple the generator signal to the receiver Beam-a-Scope. A distance of two feet between generator loop and receiver Beam-a-Scope will insure freedom from over-coupling. When using an I.R.E. dummy antenna for R.F. alignment, do not connect the signal generator ground to the receiver chassis.

With the gang condenser wide open, align oscillator trimmer (C-2b) to 1650 KC. Change generator signal to 1500 KC, tune receiver to the signal and peak antenna trimmer (C-2a) for maximum output.

Precaution

If the signal generator is AC operated use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains — Gain*

Antenna Post to Converter Grid	4.0 at 1000 KC
R.F. on Converter Grid to I.F. on I.F. Amplifier Grid	40 at 1000 KC
I.F. on Converter Grid to I.F. on I.F. Amplifier Grid	50 at 455 KC
I.F. Amplifier Grid to Detector Plate	50 at 455 KC

(2) 0.15-volt, 400-cycle signal across the volume control will give ½-watt speaker output.* (Volume control turned to maximum.)

(3) Average DC voltage developed across oscillator grid resistor (R-1)..........................15 volts

* Variations of ± 20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

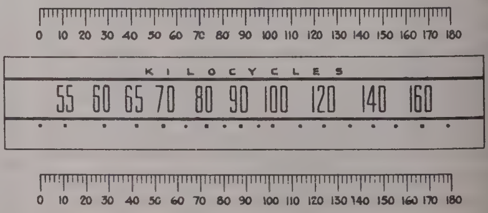
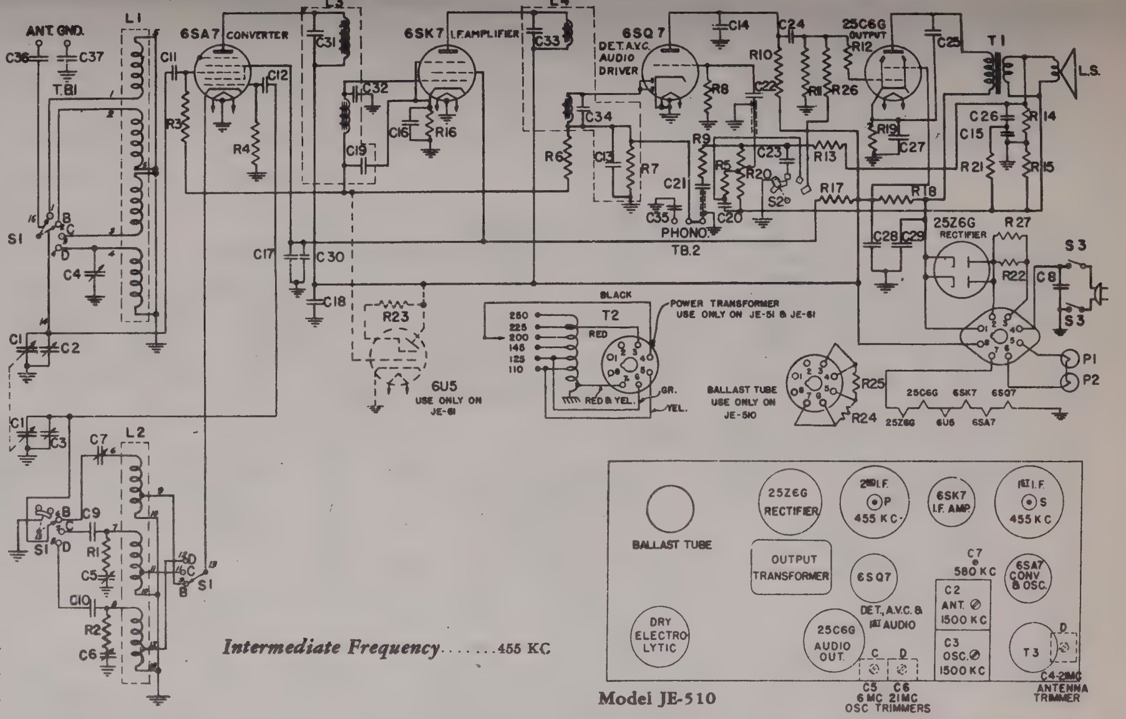


Fig. 2. Frequency-degree Reference Chart

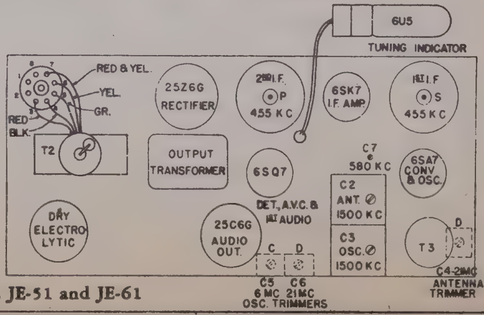
GENERAL ELECTRIC CO.

Symbol	Description
C-1	Tuning Condenser
C-2	2-18 Mmf. B Antenna Trimmer
C-3	2-18 Mmf. B Oscillator Trimmer
C-4	3-30 Mmf. D Antenna Trimmer
C-5	3-30 Mmf. C Oscillator Trimmer
C-6	3-30 Mmf. D Oscillator Trimmer
C-7	300-675 Mmf. B Oscillator Padder
C-8	.02 Mfd. 600 V. Paper Capacitor
C-9	1800 Mmf. ±5% Mica Capacitor
C-10	5600 Mmf. ±5% Mica Capacitor
C-11	470 Mmf. Mica Capacitor
C-12	47 Mmf. Mica Capacitor
C-13	100 Mmf. Mica Capacitor
C-14	220 Mmf. Mica Capacitor
C-15	.03 Mfd. 600 V. Paper Capacitor
C-16	.05 Mfd. 200 V. Paper Capacitor
C-17	.05 Mfd. 600 V. Paper Capacitor
C-18	.05 Mfd. 600 V. Paper Capacitor
C-19	.05 Mfd. 200 V. Paper Capacitor
C-20	.002 Mfd. 600 V. Paper Capacitor
C-21	.005 Mfd. 600 V. Paper Capacitor
C-22	.02 Mfd. 600 V. Paper Capacitor
C-23	.0015 Mfd. 600 V. Paper Capacitor
C-24	.05 Mfd. 600 V. Paper Capacitor
C-25	.008 Mfd. 1000 V. Paper Capacitor
C-26	.1 Mfd. 200 V. Paper Capacitor
C-27	20 Mfd. 25 V. Dry Electrolytic
C-28	50 Mfd. 250 V. Dry Electrolytic
C-29	40 Mfd. 300 V. Dry Electrolytic
C-30	20 Mfd. 250 V. Dry Electrolytic
C-35	.25 Mfd. 400 V. Paper Capacitor
C-36	.01 Mfd. 600 V. Paper Capacitor
C-37	.01 Mfd. 600 V. Paper Ccpacitor
L-1	Antenna Coil
L-2	Oscillator Coil
L-3	1st I.F. Transformer
L-4	2nd I.F. Transformer
P-1	Dial Light Mazda No. 44
P-2	Dial Light Mazda No. 44
R-1	330 Ohms ½ W. Carbon Resistor
R-2	39 Ohms ½ W. Carbon Resistor
R-3	680,000 Ohms ½ W. Carbon Resistor
R-4	22,000 Ohms ½ W. Carbon Resistor
R-5	180,000 Ohms ½ W. Carbon Resistor (JE-51, -510 Only)
R-5	330,000 Ohms ½ W. Carbon Resistor (JE-61 Only)
R-6	2.2 Megohms ½ W. Carbon Resistor
R-7	330,000 Ohms ½ W. Carbon Resistor
R-8	4.7 Megohms ½ W. Carbon Resistor
R-9	47,000 Ohms ½ W. Carbon Resistor
R-10	330,000 Ohms ½ W. Carbon Resistor
R-11	470,000 Ohms ½ W. Carbon Resistor
R-12	1000 Ohms ½ W. Carbon Resistor
R-13	5.6 Megohms ½ W. Carbon Resistor
R-14	1500 Ohms ½ W. Carbon Resistor
R-15	270 Ohms ½ W. Carbon Resistor
R-16	330 Ohms ½ W. Carbon Resistor
R-17	3900 Ohms 1 W. Carbon Resistor
R-18	3300 Ohms 2 W. Carbon Resistor
R-19	270 Ohms 1 W. Carbon Resistor
R-20	2 Megohms, 1 Megohm Tap, Volume Control
R-21	220 Ohms ½ W. Carbon Resistor
R-22	330 Ohms 2 W. Carbon Resistor
R-23	1 Megohm ½ W. Carbon Resistor
R-24	160 Ohms 15 W. Ballast Resistor
R-25	463 Ohms 55 W. Ballast Resistor
R-26	680,000 Ohms ½ W. Carbon Resistor
R-27	330 Ohms 2 W. Carbon Resistor
S-1	Band Change Switch
S-2	Tone Control Switch
S-3	Power Switch
T-1	Output Transformer
T-2	Power Transformer



Intermediate Frequency.......455 KC

Model JE-510



Models JE-51 and JE-61

Fig. 4. Schematic Diagram and Trimmer Location
Models JE-51, JE-510 and JE-61

Tuning Frequency Range

Models JE-51, JE-510 and JE-61

Band "B"	540-1600 K.C.
Band "C"	2200-7000 K.C.
Band "D"	7000-22000 K.C.

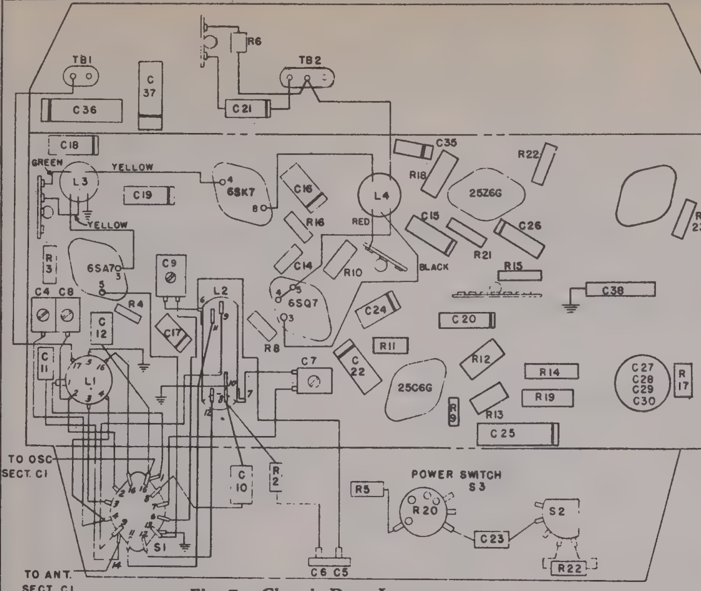


Fig. 7. Chassis Parts Layout
Model JE-61L

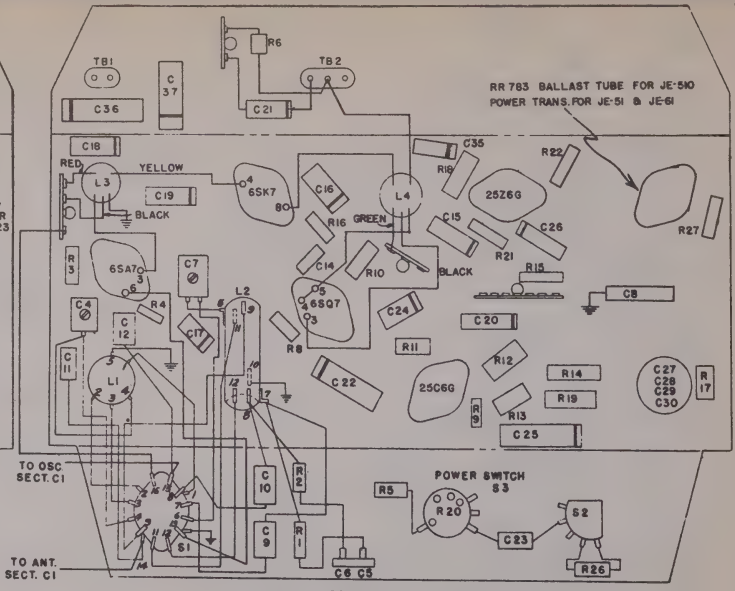


Fig. 6. Chassis Parts Layout
Models JE-51, JE-510 and JE-61

Electrical Specifications

Model	Rating	Power Supply (Voltage Tap)	Power Supply (Voltage Range)	Frequency (Cycles on A.C.)	Power Consumption (Watts)
JE-51 JE-61L	V	110	103–117	50–60*	65
		125	118–133		
		145	134–156		
		200	188–212		
		225	213–237		
		250	238–262		
JE-510			200–240 A.C.orD.C.	25–100	100
JE-61	V	110	103–117	50–60*	65
		125	118–133		
		145	134–155		
		200	188–212		
		225	213–237		
		250	238–262		
	C	110	103–117	25–60	65
		125	118–133		

PHYSICAL SPECIFICATIONS

Models	JE-51, JE-510	JE-61, JE-61L
Height	10 5/16 inches	11⅝ inches
Width	19⅜ inches	22¼ inches
Depth	8⅞ inches	9 inches

Drive Ratio..............................22:1

Electrical Power Output	JE-51, JE-510	JE-61, JE-61L
Undistorted	2.7 watts	3.0 watts
Maximum	5.0 watts	6.0 watts

Tone Control..............................3-position

Loud-speaker—"Alnico" Magnet Dynamic

Cone Diameter............JE-51, JE-510—6½ inches
JE-61, JE-61L—8 inches

Voice Coil Impedance (400 cycles)......3.5 ohms

*"V" rated receivers may be operated on 40 cycles provided the power supply voltage is reduced so as not to exceed the following equivalents: 110 volts on the 125-volt tap or 200 volts on the 225-volt tap.

Tubes

Models JE-51, JE-510	
Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud. AVC	GE-6SQ7
Power Output	GE-25C6G
Rectifier	GE-25Z6G
Dial Lamp	(2) Mazda No. 44

Models JE-61, JE-61L	
Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud. AVC	GE-6SQ7
Power Output	GE-25C6G
Rectifier	GE-25Z6G
Tuning Indicator	GE-6U5
Dial Lamp	(2) Mazda No. 44

GENERAL ELECTRIC CO.

MODELS JE-51,
JE-510, JE-61,
JE-61L

VOLTAGE CHART

Tubes	Plate to Gnd Volts	Screen to Gnd Volts	Cathode to Gnd Volts	Filament Volts
6SA7	153	106	0	6.3
6SK7	153	106	3	6.3
6SQ7	62*		0	6.3
25C6G	221	153	14	25
25Z6G	220 (A.C.)		236 (D.C.)	25
6U5**	153			6.3

25Z6G Cathode Current—80 ma.
240 volts line A.C. (225-volt tap on JE-51, JE-61 and JE-61L).

* Use a high resistance voltmeter.

** Used only on Models JE-61 and JE-61L.

SPECIAL SERVICE INFORMATION

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to Converter Grid at

250 K.C.	6.0
1000 K.C.	4.0
4000 K.C.	3.2
18000 K.C.	2.4

(b) R.F. on Converter Grid to I.F. on 6SK7 Grid at

250 K.C.	25
1000 K.C.	36
4000 K.C.	30
18000 K.C.	28

(c) I.F. on Converter Grid to I.F. on 6SK7 Grid at

455 K.C.	55

(2) Voltage across the diode load to give ½ watt speaker output at

400 Cycles	.066*

(3) DC voltage developed across oscillator grid resistor (R4) at

250 K.C.	9.8*
1000 K.C.	8.6*
4000 K.C.	9.7*
18000 K.C.	7.7*

* Variations of +10%, −20% are permissible.

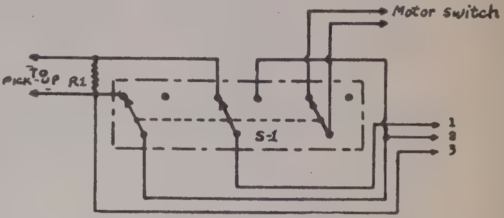


Fig. 1. Pick-up Connections

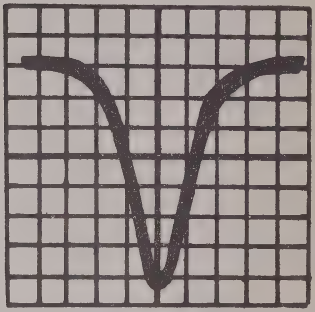


Fig. 3. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

COIL RESISTANCE DATA

Coil	Model	Section	Resistance Measured Between Points	Resistance (Ohms)
Antenna	JE-51, 510, 61	B Primary	1 and 5	22
		B Secondary	2 and 5	5
		C Secondary	3 and 5	.9
		D Secondary	4 and 5	.02
Antenna	JE-61L	A Primary	1 and 5	110
		A Secondary	2 and 5	26
		B Secondary	3 and 5	5
		D Secondary	4 and 5	.03
		D Primary	16 and 17	.2
Oscillator	JE-51, 510, 61	B Band Coil	6 and 10	3
		C Band Coil	7 and 10	.8
		D Band Coil	8 and 10	.02
Oscillator	JE-61L	A Band Coil	6 and 10	10
		B Band Coil	7 and 10	3
		D Band Coil	8 and 10	.03
1st I.F. Transformer	All Models	Primary		9 to 12
		Secondary		15 to 19
2nd I.F. Transformer	All Models	Primary		14 to 18
		Secondary		7 to 9
Output Transformer	All Models	Primary		265
		Secondary		.4
Power Transformer	JE-51, 61, 61L	Primary		
		110 V. Tap		7
		125 V. Tap		8
		200 V. Tap		9
		225 V. Tap		20
		250 V. Tap		24
		Secondary		
		Red to Red		250
		Green to Green		.5
		Yellow to Yellow		.5

GENERAL INFORMATION

Models JE-51 and JE-510 are three-band receivers employing five General Electric Pre-tested Tubes in a superheterodyne circuit. These receivers are equipped with the new inclined "Visualux Dial" and luminescent pointer which assures ease in tuning. Additional design features include phonograph and television sound terminals, Tone Monitor circuit, low volume audio compensation, automatic volume control, iron-core I.F. transformers, anti-drift design, and the new Dynapower speaker.

Models JE-61 and JE-61L are similar to the above models in design except for inclusion of a cathode ray tuning indicator, different audio bass compensation and substitution of an eight-inch Dynapower speaker in place of the six and a half inch speaker. Model JE-61L also is provided with a long-wave band (140 to 400 K.C.) in place of the "C" band on Model JE-61.

CHASSIS REMOVAL

NOTE: Before attempting to slide the chassis out of the cabinet on these models free the drive cord from the dial pointer. A drop or two of cement may have been used to hold the pointer securely to the cord. This can be loosened with the fingernail or a pointed tool. Then press down on the cord until it can be moved to the rear underneath the hook in the pointer.

POWER SUPPLY

The receivers are equipped with the new plug-in type power supply which permits practically instantaneous conversion to DC operation. Simply remove the power transformer and replace with a plug-in type ballast resistor. Refer to the data given under "Conversion for Special Line Voltages."

The new power transformer is provided with 6 voltage taps. Instant tap switching is made by a simple pin plug and jack device. For correct operation measure the power supply voltage. Note which voltage range covers this voltage (see Electrical Specifications) and using the corresponding tap insert the plug in the jack.

PRECAUTION—When using a power transformer with any one of these models be sure a clean solid connection is maintained between transformer frame and chassis. Use of lock-washers between transformer and chassis will assure a clean contact. A poor connection may result in overvoltage on the tube filaments.

CONVERSION FOR SPECIAL LINE VOLTAGES

The JE-51, -510, -61 and -61L can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors, the audio output on lower power-supply voltages will be reduced.

220 Volts Ac/Dc—(range 200-240)

Remove transformer from chassis of JE-51-, -61 and -61L and substitute ballast resistor RR-783 in socket previously occupied by transformer plug. Relabel sets with correct cabinet label supplied with resistor RR-783, as follows:

JE-51 relabel JE-510
JE-61 relabel JE-61-W
JE-61L relabel JE-61L-W.

115 Volts Dc—(range 105-129)

Remove transformer from chassis of JE-51, -61 and -61L or ballast RR-783 from JE-510; insert following respective ballast tubes and relabel sets with correct cabinet label supplied with new ballast resistor.

Model	Remove	Insert Ballast	Relabel
JE-51	Transformer	RR-785	JE-510-Z
JE-510	Ballast RR-783	RR-785	JE-510-Z
JE-61	Transformer	RR-786	JE-61-Z
JE-61L	Transformer	RR-786	JE-61L-Z

180 Volts Dc—(Voltage regulation for fluctuating line volts 145-215)

Remove transformer from chassis of JE-51, -61 and -61L or ballast RR-783 from JE-510; insert following ballast tubes and relabel sets with correct cabinet label supplied with new ballast resistor.

Model	Remove	Insert Ballast	Relabel
JE-51	Transformer	RR-784	JE-510-Y
JE-510	Ballast RR-783	RR-784	JE-510-Y
JE-61	Transformer	RR-787	JE-61-Y
JE-61L	Transformer	RR-787	JE-61L-Y

Coil Data

All antenna and oscillator transformer switch terminals are numbered in Figs. 6 and 7 to facilitate in locating these common points on the schematic diagrams Figs. 4 and 5.

The following tables show the coils in use for the various positions of the band-change switch.

Models JE-51, JE-510 and JE-61

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid	Oscillator Cathode
Band "B"	Section 1 to 5 of L1	Section 2 to 5 of L1	Section 6 to 10 of L2	Section 9 to 10 of L2
Band "C"	Section 2 to 5 of L1	Section 3 to 5 of L1	Section 7 to 10 of L2	Section 11 to 10 of L2
Band "D"	Section 3 to 5 of L1	Section 4 to 5 of L1	Section 8 to 10 of L2	Section 12 to 10 of L2

Model JE-61L

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid	Oscillator Cathode
Band "A"	Sections 16 to 17 and 1 to 5 of L1	Section 2 to 5 of L1	Section 6 to 10 of L2	Section 9 to 10 of L2
Band "B"	Sections 16 to 17 and 2 to 5 of L1	Section 3 to 5 of L1	Section 7 to 10 of L2	Section 11 to 10 of L2
Band "D"	Section 16 to 17 of L1	Section 4 to 5 of L1	Section 8 to 10 of L2	Section 12 to 10 of L2

Phonograph or Television Sound Connections

Fig. 1 shows a simple method for connecting a crystal or high impedance magnetic pick-up into the receiver circuit for the reproduction of phonograph recordings. S-1 is a triple-pole, double-throw switch. A suitable loading circuit composed of a resistor, or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This shield should be connected to the chassis ground.

Remove the jumper between phono-terminals 1 and 2 and make connections as shown in Fig. 1.

A television sound channel may be connected in place of the crystal pick-up. No loading resistor is required.

When the pick-up or television sound channel is connected as shown, the regular radio volume and tone controls work for both radio and phonograph-television sound reproduction. The following are suggested parts:

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly. Assembly instructions accompany each replacement cone.

NOTE: In no case should the magnet be removed from the assembly position as it will lose magnetism.

Symbol	Description	Stock No.
S-1	Triple-pole, double-throw switch	RS-366
R-1	330,000 ohm resistor	RQ-1319

Alignment Procedure

Use a standard I.R.E. dummy antenna in making all R.F. alignments (see Fig. 2).

I.F. transformers are double, permeability-tuned with adjusting shafts at top and bottom of shield cans.

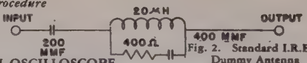


Fig. 2. Standard I.R.E. Dummy Antenna

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch	Input. Freq.	Point of Input	Dummy Antenna	Inductor or Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Pri. and Sec.	Gang condenser plates closed—connect audio input of oscilloscope to ground and to phono terminal No. 2. Adjust iron-core inductors simultaneously, using two insulated handle screwdrivers, for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 3. It may be necessary to retrim 2nd I.F. transformers for final adjustment.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Pri. and Sec.	

I.F. ALIGNMENT WITH OUTPUT METER

Band Switch	Input. Freq.	Point of Input	Dummy Antenna	Inductor or Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Pri. and Sec.	Gang condenser plates closed—connect output meter across voice coil—keep signal low and volume control on as far as possible. Adjust iron-core inductors for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Pri. and Sec.	

R.F. ALIGNMENT—MODELS JE-51, JE-510, AND JE-61

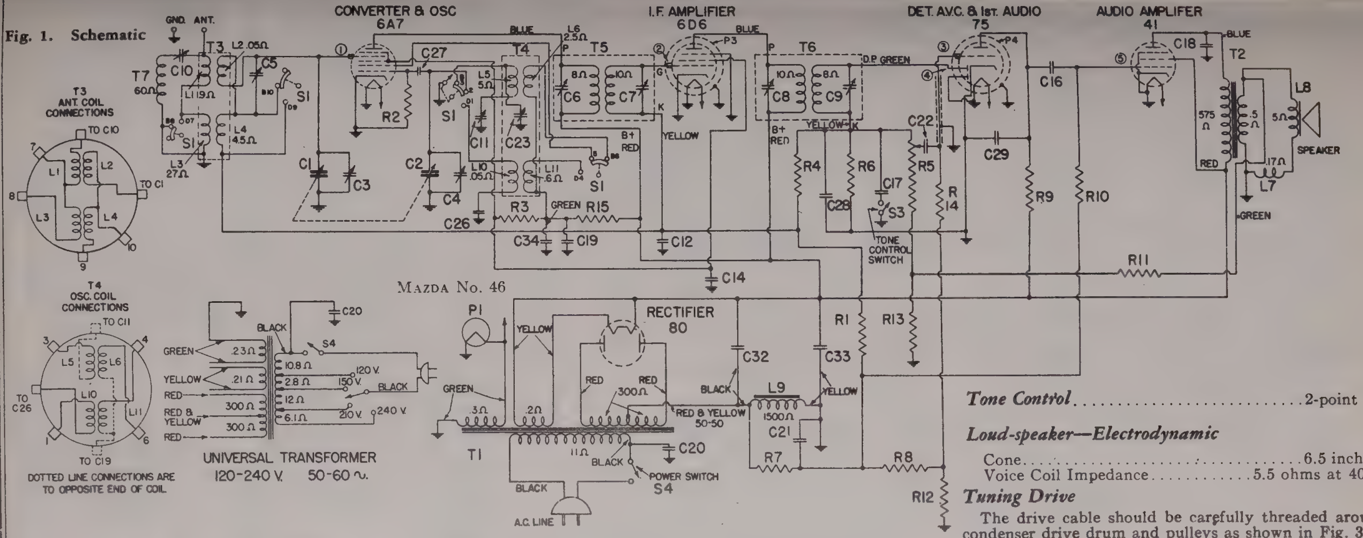
Band Switch	Input. Freq.	Point of Input	Dummy Antenna	Inductor or Trimmer	Comments
1. Band "B"					Close gang condenser plates. A special alignment scale is glued to the back side of pulley frame adjacent to pointer cord. With paper clip or drop of paint mark point on cord which is in line with last thin line on right side of scale (viewed from rear of chassis). The selected edge of the paper clip or the drop of paint will serve as a pointer for performing the following R.F. alignment. Connect meter across voice coil.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmer for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-7)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
4. Band "B"	Repeat Operation 2				
5. Band "C"	6 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-5)	Peak trimmer for maximum output while rocking the gang condenser. Image—910 K.C. below signal.
6. Band "D"	21 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-4)	The image of "D" band signal should be heard 910 K.C. below the input signal when (C-6) is on proper peak. Example: 21 M.C. image at is 20.09 M.C. Peak (C-4) while rocking the gang condenser.

R.F. ALIGNMENT—MODEL JE-61L

Band Switch	Input. Freq.	Point of Input	Dummy Antenna	Inductor or Trimmer	Comments
1. Band "B"					Close gang condenser plates. A special alignment scale is glued to the back side of pulley frame adjacent to pointer cord. With paper clip or drop of paint mark point on cord which is in line with last thin line on right side of scale (viewed from rear of chassis). The selected edge of the paper clip or the drop of paint will serve as a pointer for performing the following R.F. alignment. Connect meter across voice coil.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmers for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-7)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
4. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-3) Ant. (C-2)	Peak trimmers for maximum output with a low input signal.
5. Band "A"	350 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-5) Ant. (C-8)	Peak trimmers for maximum output with a low input signal.
6. Band "A"	145 K.C. with Modulation	Antenna Post	I.R.E.	Osc. padder (C-9)	Adjust padder for maximum output in the vicinity of 145 K.C. while rocking the gang condenser.
7. Band "A"	Repeat Operation 5				
8. Band "D"	18 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-4)	The image of "D" band signal should be heard 910 K.C. below the input signal when (C-6) is on the proper peak. Example: 18 M.C. image is at 17.09 M.C. Peak (C-4) while rocking the gang condenser.

GENERAL ELECTRIC CO.

Fig. 1. Schematic



Tone Control..............................2-point

Loud-speaker—Electrodynamic

Cone................................6.5 inches
Voice Coil Impedance............5.5 ohms at 400 cycles

Tuning Drive

The drive cable should be carefully threaded around the condenser drive drum and pulleys as shown in Fig. 3.

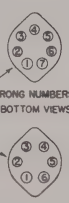
SYMBOL	DESCRIPTION	
C32	DRY ELEC CAPACITOR	12 MFD.
C33	DRY ELEC. CAPACITOR	8 MFD.
C34	DRY ELEC. CAPACITOR	4 MFD.
R1	CARBON RESISTOR	10 MEG. Ω
R2	↕	47000 Ω
R3	↕	15000 Ω
R4	CARBON RESISTOR	2.2 MEG. Ω
R5	VOLUME CONTROL	2.0 MEG. Ω
R6	CARBON RESISTOR	470000 Ω
R7	↕	1.0 MEG. Ω
R8	↕	220000 Ω
R9	↕	330000 Ω
R10	↕	680000 Ω
R11	↕	220 Ω
R12	↕	15000 Ω
R13	↕	68 Ω
R14	↕	1.5 MEG. Ω
R15	CARBON RESISTOR	4700 Ω

SYMBOL	DESCRIPTION	
C1	TUNING CAPACITOR	R.F. SECTION
C2	TUNING	OSC. SECTION
C3	TRIMMER	R.F.
C4	↕	OSC.
C5	↕	5-40 MMF.
C6	↕	100-230 MMF.
C7	↕	50-135 MMF.
C8	↕	50-135 MMF.
C9	↕	100-230 MMF.
C10	TRIMMER	30-70 MMF.
C11	PADDER	350-550 MMF.
C12	PAPER	.05 MFD.
C14	↕	.05 MFD.
C16	↕	.005 MFD.
C17	↕	.002 MFD.
C18	↕	.008 MFD.
C19	↕	.05 MFD.
C20	↕	.01 MFD.
C21	↕	.5 MFD.
C22	PAPER	.005 MFD.
C23	TRIMMER	5-40 MMF.
C26	MICA	2850 MMF.
C27	↕	50 MMF.
C28	↕	500 MMF.
C29	MICA CAPACITOR	250 MMF.

CONDITIONS OF TEST
POWER SWITCH OFF

APPROX. RESISTANCE MEASUREMENTS

RESIS. TO GROUND	TUBE	SOCKET PRONG
① 2.6 MEG. Ω	6A7	GRID CAP
② 2.6 MEG. Ω	6D6	GRID CAP
③ 1.5 MEG. Ω	75	GRID CAP
④ 470000 Ω	75	4
⑤ 870000 Ω	41	4



Tuning Frequency Range

Band "B"...............540-1720 kc.
Band "C"...............5,800-18,000 kc.

Intermediate Frequency....455 kc.

Electrical Output

Undistorted..........................2.3 watts
Maximum..............................3.5 watts

SOCKET VOLTAGES

Tube No.		Plate to Ground Volts—D.C.	Screen Grid to Ground Volts—D.C.	Cathode to Ground Volts—D.C.	Cathode Current M.A.	Heater Volts A.C.
6A7	Oscillator	176	105	0	14.8	6.3
	Converter	230				
6D6 1st I.F. Amp.		230	105	0	10	6.3
75 Det A.V.C. 1st audio		100 *		0	.16	6.3
41 Output		215	230	0	29	6.3
80 Rectifier		300/600 RMS		315 to B-	54	

A-C line voltage 120. No signal input. 1000 ohms per-volt meter. Dial pointer at 530 K.C. *Measured on 500-volt scale.

10-38

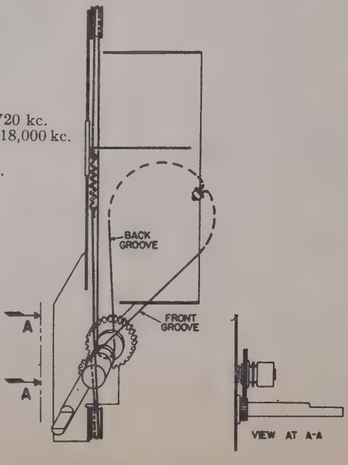


Fig. 3. Dial Mechanism

GENERAL ELECTRIC CO.

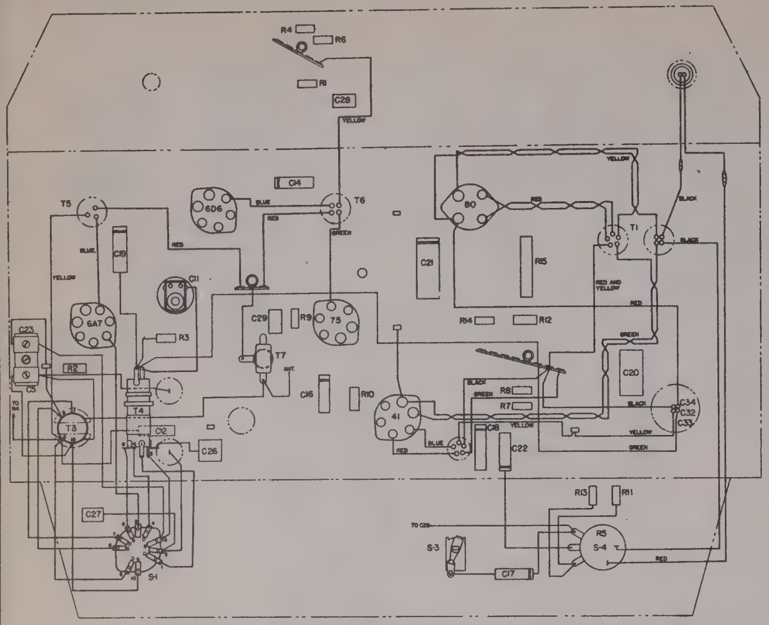


Fig. 4. Chassis Parts Layout

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–125	50–60	60
V	115–125 140–155 190–220 220–250	40–60	65

NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 110 on the 115–125-volt tap or 200 volts on the 190–220-volt tap.

GENERAL INFORMATION

This two-band receiver employs five General Electric Pre-tested tubes in a superheterodyne circuit. The circuit incorporates a wave trap and a two-point tone control.

A signal from the antenna is coupled by the antenna transformer to the control grid of the 6A7 oscillator and converter tube. After conversion to 455 kc. the signal is amplified at this frequency by the intermediate frequency amplifier which employs two double tuned I.F. transformers.

The diode part of the 75 tube is used as a detector and provides the avc voltage. The 75 tube is resistance-coupled to the 41 pentode amplifier output tube.

Minimum bias is supplied for all tubes except the 75 by the voltage drop over the resistance R-8 and R-12. Bias for the 75 tube is supplied by the voltage drop over R-12.

Negative feed back is used to improve the tone of reproduction. In this circuit, voltage is fed back from the voice coil circuit to a tap on the volume control. This feed-back voltage is out of phase with the input voltage to the audio amplifier. Engineers have shown that the resulting degeneration reduces distortion arising in the audio amplifier and extends the tone range.

ALIGNMENT PROCEDURE

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set the test oscillator to 455 kc. and connect one output lead to the receiver chassis and the other through a .05 Mfd. condenser to the control grid of the 6A7. Do not remove the grid lead from the 6A7 as this would remove the minimum bias from this tube. Keep the test oscillator output as low as possible to give a readable output. The four I.F. trimmers (see Fig. 2.) should be adjusted in the following sequence for maximum output.

1. Secondary trimmer (C-9) } on second I.F. transformer
2. Primary trimmer (C-8) }
3. Secondary trimmer (C-7) } on first I.F. transformer
4. Primary trimmer (C-6) }

Wave Trap Alignment

Leave the test oscillator set to 455 kc and connect one output lead to the receiver chassis and the other through a 250 Mmf. condenser in series with 400 ohms to the receiver antenna lead. Adjust C-10 for minimum output.

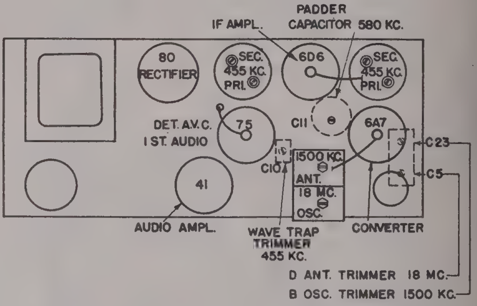


Fig. 2. Trimmer Location

R.F. Alignment

A careful examination of the diagram, Fig. 1, will disclose that the "D" band, oscillator trimmer C-4 must first be set before any adjustment of the broadcast oscillator trimmer C-23 can be made. The image of any signal on "D" band should be tuned in 910 kc. below the input signal when C-4 is on the correct peak. Example: 18 mc. image is at 17.09 mc.

Use the same dummy antenna (250 Mmf. and 400 ohms) as used for the wave-trap alignment.

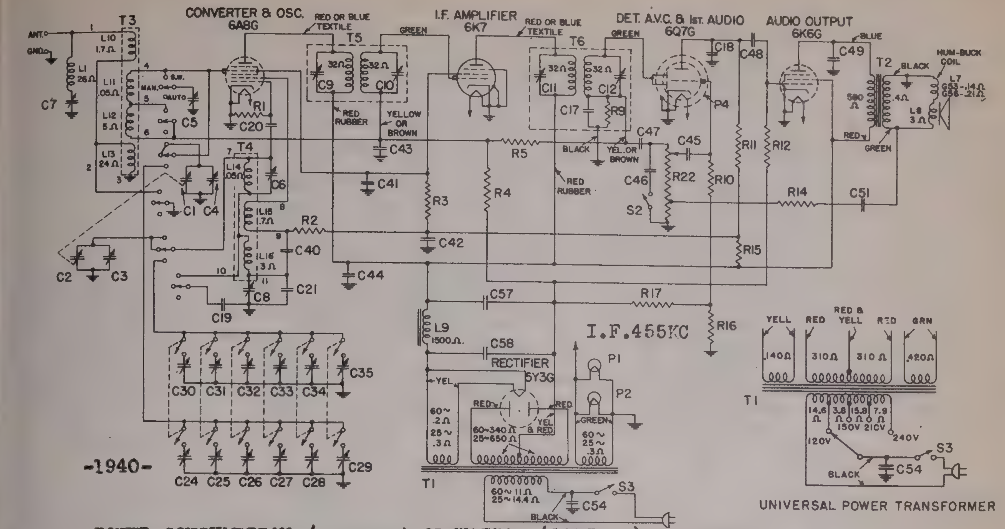
Rock the gang condenser when peaking the trimmers (C-11 or C-5).

	Band Switch	Signal Frequency	Adjust Trimmer
1.	"D"	18 mc.	C-4 (only)
2.	"B"	1500 kc.	C-23 and C-3
3.	"B"	580 kc.	C-11
4.	"B"	1500 kc.	C-23 and C-3
5.	"D"	18 mc.	C-5

NOTE: Be sure that the setting of C-4 made in No. 1 is not disturbed during any other part of the alignment. If it is changed the whole R.F. alignment procedure should be repeated.

GENERAL ELECTRIC CO.

MODEL GE-53



POWER CONSUMPTION (LABEL A) 65 WATTS, (LABEL V) 70 WATTS

Symbol	Description	Symbol	Description	Symbol	Description
C5	R. F. Trimmer Capacitor, "D" Band	C40	Paper Capacitor, 0.001 Mfd.	R10	Carbon Resistor, 2.2 Megohms
C6	Osc. Trimmer Capacitor, "D" Band	C41	Paper Capacitor, 0.05 Mfd.	R11	Carbon Resistor, 330,000 Ohms
C8	Osc. Padder Condenser, "B" Band	C42	Electrolytic Capacitor, 4.0 mfd.	R12	Carbon Resistor, 330,000 Ohms
C17	Mica Capacitor, 470 Mmf.	C43	Paper Capacitor, 0.05 Mfd.	R14	Carbon Resistor, 22,000 Ohms
C18	Mica Capacitor, 330 Mmf.	C44	Paper Capacitor, 0.05 Mfd.	R15	Carbon Resistor, 3900 Ohms
C19	Mica Capacitor, 3900 Mmf.	C45	Paper Capacitor, 0.01 Mfd.	R16	Carbon Resistor, 22 Ohms
C20	Mica Capacitor, 47 Mmf.	C46	Paper Capacitor, 0.001 Mfd.	R17	Carbon Resistor, 330 Ohms
C21	Mica Capacitor, 370 Mmf.	C47	Paper Capacitor, 0.005 Mfd.	R22	Volume Control, 2 Megohms, tap at 15,000 Ohms
C24	Mica Trimmer, 165-450 Mmf.	C48	Paper Capacitor, 0.005 Mfd.		
C25	Mica Trimmer, 95-345 Mmf.	C49	Paper Capacitor, 0.012 Mfd.	T1	Power Transformers
C26	Mica Trimmer, 80-235 Mmf.	C51	Paper Capacitor, 0.1 Mfd.	T2	Output Transformer
C27	Mica Trimmer, 35-175 Mmf.	C54	Molded Paper Capacitor, 0.01 Mfd.	L8	Speaker, 6½ Inches (G-53)
C28	Mica Trimmer, 30-115 Mmf.	C57	Dry Electrolytic Capacitor, 8 Mfd.		Speaker, 12 Inches (G-56)
C29	Mica Trimmer, 11-60 Mmf.	C58	Dry Electrolytic Capacitor, 8 Mfd.	S1	Band Switch
C30	Mica Trimmer, 165-450 Mmf.	R1	Carbon Resistor, 47,000 Ohms	S2	Tone Control Switch
C31	Mica Trimmer, 95-345 Mmf.	R2	Carbon Resistor, 4700 Ohms	S3	Power Switch (Part of Volume Control)
C32	Mica Trimmer, 80-235 Mmf.	R3	Carbon Resistor, 18,000 Ohms		
C33	Mica Trimmer, 35-175 Mmf.	R4	Carbon Resistor, 10 Megohms	S4	Push-button Switches
C34	Mica Trimmer, 30-115 Mmf.	R5	Carbon Resistor, 1.5 Megohms		
C35	Mica Trimmer, 11-60 Mmf.	R9	Carbon Resistor, 470,000 Ohms		

SOCKET VOLTAGES

Tube No.		Plate to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Cathode to Ground Volts D.C.	Cathode Current M.A. D.C.	Heater Volts A.C.
6A8G	Converter	236	95	0	12.2	6.5
	Oscillator	186	....			
6K7		236	95	0	8.7	6.5
6Q7G		84 *	....	0	0.4	6.5
6K6G		220	236	0	30.1	6.5
5Y3G		....	......	320	51.4	5.3

A-C line voltage—120. No signal input. 1000 ohms per volt meter. Dial pointer at 530 kc. on "B" band.
* Measured on 500-volt scale.

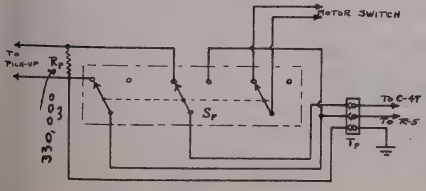
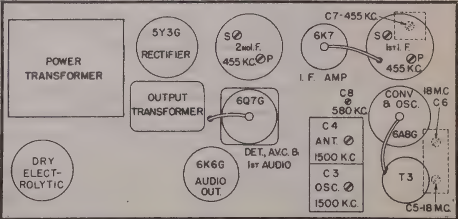


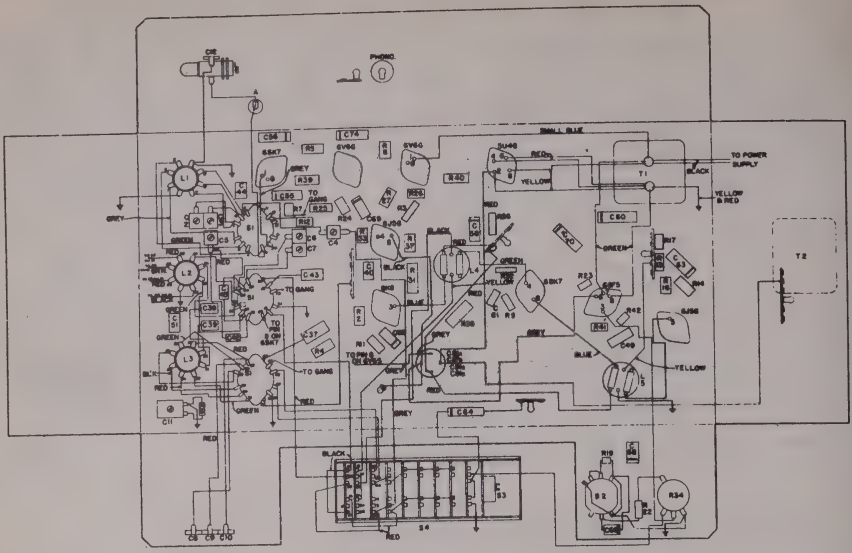
Fig. 1. Pick-up Connections

FOR
OTHER
DATA
SEE
INDEX



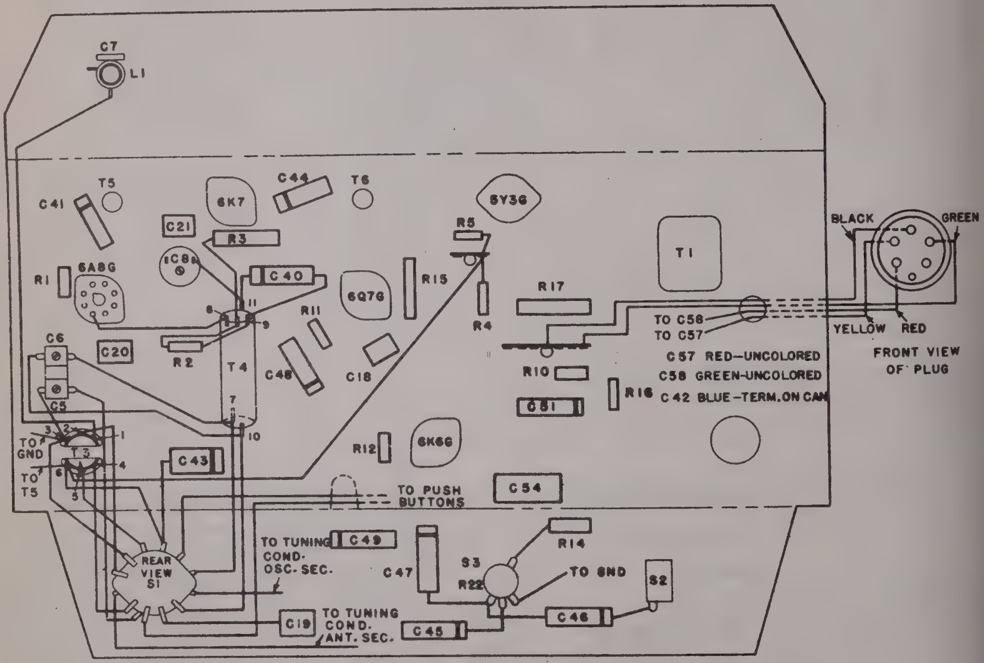
MODELS GE-53,
JE-101, JE-107

GENERAL ELECTRIC CO.



Chassis Parts Layout

Models JE-101 and 107

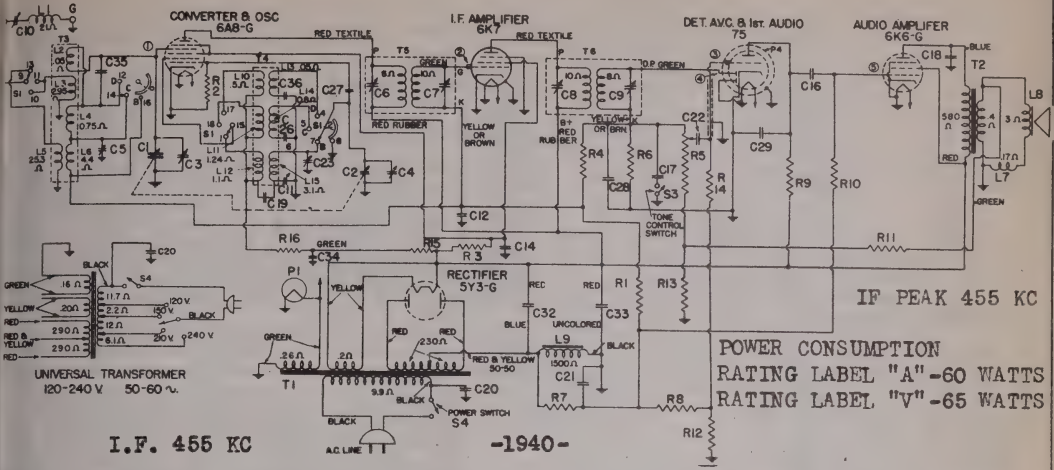


Chassis Parts Layout

MODEL GE-53

MODEL GE-54

GENERAL ELECTRIC CO.



IF PEAK 455 KC

POWER CONSUMPTION
RATING LABEL "A"-60 WATTS
RATING LABEL "V"-65 WATTS

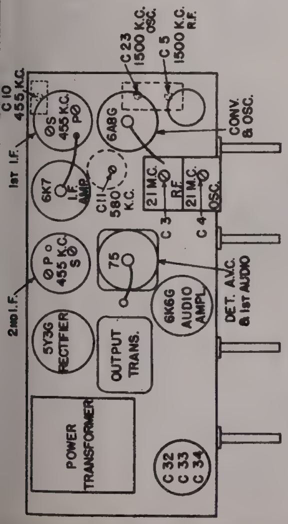
I.F. 455 KC

-1940-

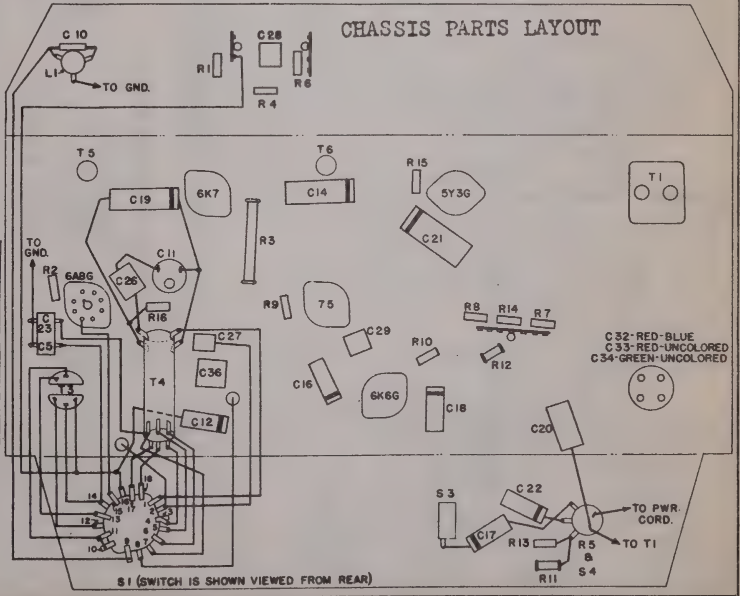
SYMBOL	DESCRIPTION
C-1	Tuning Capacitor R.F. Section
C-2	Tuning Capacitor Osc. Section
C-3	Trimmer Capacitor R.F. Section
C-4	Trimmer Capacitor Osc. Section
C-5	Trimmer Capacitor 5-40 MMF.
C-6	Trimmer Capacitor 80-225 MMF.
C-7	Trimmer Capacitor 45-125 MMF.
C-8	Trimmer Capacitor 45-125 MMF.
C-9	Trimmer Capacitor 80-225 MMF.
C-10	Trimmer Capacitor 45-100 MMF.
C-11	Padder Capacitor 350-550 MMF.
C-12	Paper Capacitor .05 MFD.
C-14	Paper Capacitor .05 MFD.
C-16	Paper Capacitor .005 MFD.
C-17	Paper Capacitor .002 MFD.
C-18	Paper Capacitor .008 MFD.
C-19	Paper Capacitor .01 MFD.
C-20	Paper Capacitor .01 MFD.
C-21	Paper Capacitor .5 MFD.
C-22	Paper Capacitor .005 MFD.
C-23	Trimmer Capacitor 5-40 MMF.
C-26	Mica Capacitor 1800 MMF.
C-27	Mica Capacitor 50 MMF.
C-28	Mica Capacitor 470 MMF.
C-29	Mica Capacitor 220 MMF.
C-32	Dry Elec. Capacitor 12 MFD.
C-33	Dry Elec. Capacitor 8 MFD.
C-34	Dry Elec. Capacitor 4 MFD.
C-35	Mica Capacitor 20 MMF.
C-36	Mica Capacitor 3400 MMF.
R-1	Carbon Resistor 10 Megohms
R-2	Carbon Resistor 47000 Ohms
R-3	Carbon Resistor 33000 Ohms
R-4	Carbon Resistor 2.2 Megohms
R-5	Volume Control 2.0 Megohms
R-6	Carbon Resistor 470000 Ohms
R-7	Carbon Resistor 1.0 Megohms
R-8	Carbon Resistor 220000 Ohms
R-9	Carbon Resistor 330000 Ohms
R-10	Carbon Resistor 680000 Ohms
R-11	Carbon Resistor 220 Ohms
R-12	Carbon Resistor 15000 Ohms
R-13	Carbon Resistor 68 Ohms
R-14	Carbon Resistor 1.5 Megohms
R-15	Carbon Resistor 10000 Ohms
R-16	Carbon Resistor 4700 Ohms
S-1	Band Change Switch
S-3	Tone Control Switch
S-4	Power Switch
L-1	Wave Trap Coil
T-3	Ant. Coil "B-C-D"
T-4	Osc. Coil "B-C-D"
T-5	1st I.F. Transformer
T-6	2nd I.F. Transformer
L-7	Speaker Hum Coil
L-8	Speaker Voice Coil 3 Ohms
L-9	Speaker Field Coil 1500 Ohms Cold
	Loud-speaker 6½ in.
T-1	Power Transformer {60 cycles Universal
T-2	Output Transformer
P-1	No. 46 MAZDA Pilot Lamp
P-4	Tube Shield

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

FOR OTHER DATA
SEE INDEX



Trimmer Location


CHASSIS PARTS LAYOUT

MODEL JE-61L

GENERAL ELECTRIC CO.

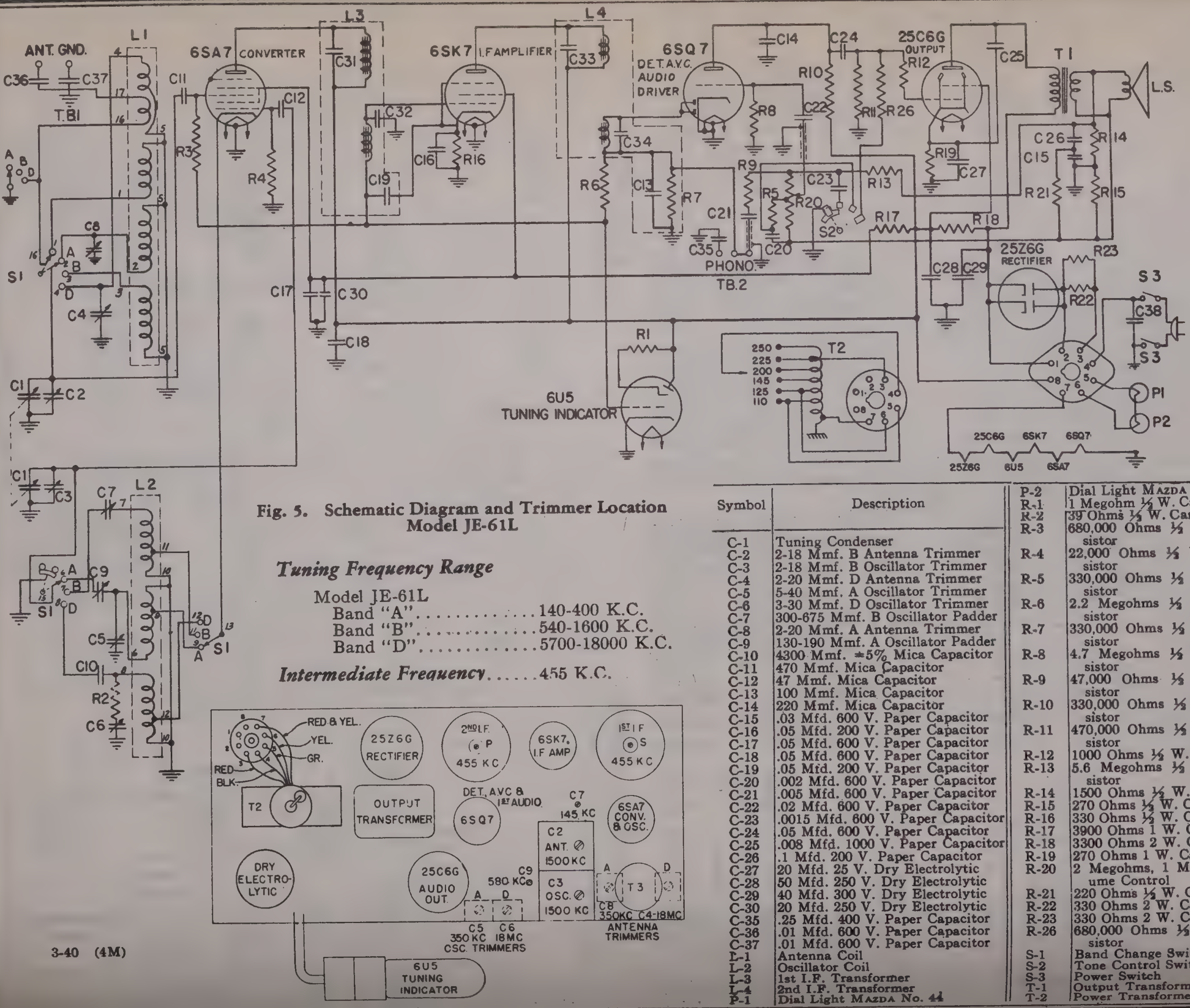


Fig. 5. Schematic Diagram and Trimmer Location Model JE-61L

Tuning Frequency Range

Model JE-61L
Band "A"..............140-400 K.C.
Band "B"..............540-1600 K.C.
Band "D"..............5700-18000 K.C.

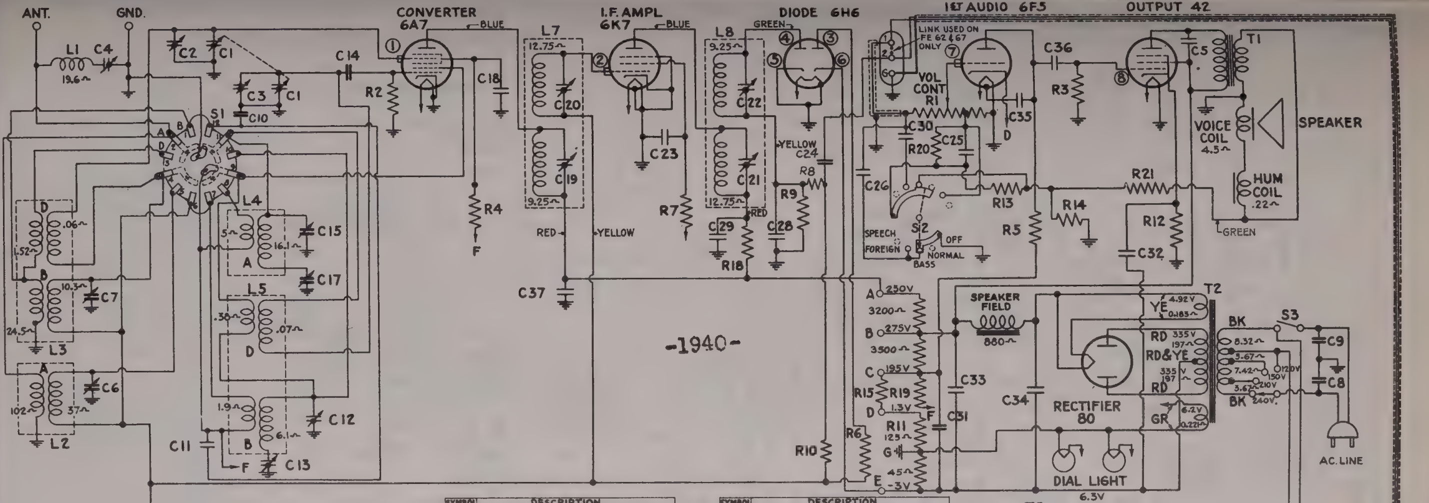
Intermediate Frequency......455 K.C.

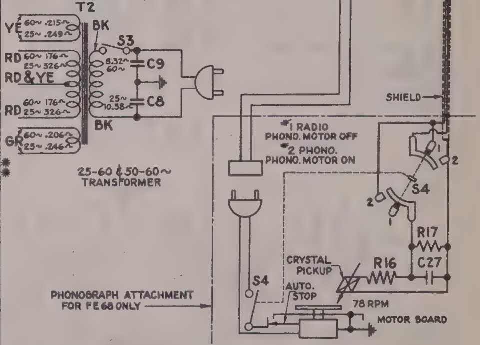
Symbol	Description
C-1	Tuning Condenser
C-2	2-18 Mmf. B Antenna Trimmer
C-3	2-18 Mmf. B Oscillator Trimmer
C-4	2-20 Mmf. D Antenna Trimmer
C-5	5-40 Mmf. A Oscillator Trimmer
C-6	3-30 Mmf. D Oscillator Trimmer
C-7	300-675 Mmf. B Oscillator Padder
C-8	2-20 Mmf. A Antenna Trimmer
C-9	130-190 Mmf. A Oscillator Padder
C-10	4300 Mmf. ±5% Mica Capacitor
C-11	470 Mmf. Mica Capacitor
C-12	47 Mmf. Mica Capacitor
C-13	100 Mmf. Mica Capacitor
C-14	220 Mmf. Mica Capacitor
C-15	.03 Mfd. 600 V. Paper Capacitor
C-16	.05 Mfd. 200 V. Paper Capacitor
C-17	.05 Mfd. 600 V. Paper Capacitor
C-18	.05 Mfd. 600 V. Paper Capacitor
C-19	.05 Mfd. 200 V. Paper Capacitor
C-20	.002 Mfd. 600 V. Paper Capacitor
C-21	.005 Mfd. 600 V. Paper Capacitor
C-22	.02 Mfd. 600 V. Paper Capacitor
C-23	.0015 Mfd. 600 V. Paper Capacitor
C-24	.05 Mfd. 600 V. Paper Capacitor
C-25	.008 Mfd. 1000 V. Paper Capacitor
C-26	.1 Mfd. 200 V. Paper Capacitor
C-27	20 Mfd. 25 V. Dry Electrolytic
C-28	50 Mfd. 250 V. Dry Electrolytic
C-29	40 Mfd. 300 V. Dry Electrolytic
C-30	20 Mfd. 250 V. Dry Electrolytic
C-35	.25 Mfd. 400 V. Paper Capacitor
C-36	.01 Mfd. 600 V. Paper Capacitor
C-37	.01 Mfd. 600 V. Paper Capacitor
L-1	Antenna Coil
L-2	Oscillator Coil
L-3	1st I.F. Transformer
L-4	2nd I.F. Transformer
P-1	Dial Light MAZDA No. 44
P-2	Dial Light MAZDA No. 44
R-1	1 Megohm ½ W. Carbon Resistor
R-2	39 Ohms ½ W. Carbon Resistor
R-3	680,000 Ohms ½ W. Carbon Resistor
R-4	22,000 Ohms ½ W. Carbon Resistor
R-5	330,000 Ohms ½ W. Carbon Resistor
R-6	2.2 Megohms ½ W. Carbon Resistor
R-7	330,000 Ohms ½ W. Carbon Resistor
R-8	4.7 Megohms ½ W. Carbon Resistor
R-9	47,000 Ohms ½ W. Carbon Resistor
R-10	330,000 Ohms ½ W. Carbon Resistor
R-11	470,000 Ohms ½ W. Carbon Resistor
R-12	1000 Ohms ½ W. Carbon Resistor
R-13	5.6 Megohms ½ W. Carbon Resistor
R-14	1500 Ohms ½ W. Carbon Resistor
R-15	270 Ohms ½ W. Carbon Resistor
R-16	330 Ohms ½ W. Carbon Resistor
R-17	3900 Ohms 1 W. Carbon Resistor
R-18	3300 Ohms 2 W. Carbon Resistor
R-19	270 Ohms 1 W. Carbon Resistor
R-20	2 Megohms, 1 Megohm Tap, Volume Control
R-21	220 Ohms ½ W. Carbon Resistor
R-22	330 Ohms 2 W. Carbon Resistor
R-23	330 Ohms 2 W. Carbon Resistor
R-26	680,000 Ohms ½ W. Carbon Resistor
S-1	Band Change Switch
S-2	Tone Control Switch
S-3	Power Switch
T-1	Output Transformer
T-2	Power Transformer

3-40 (4M)

GENERAL ELECTRIC CO.

MODELS FE62, FE67, FE68



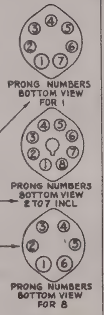


CONDITIONS OF TEST

WAVE SWITCH ON A BAND
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GND.	TUBE	SOCKET PRONG
①	2.4 MEG.^	CONV. GRID	CAP
②	2.4 MEG.^	1ST I.F GRID	CAP
③	2.5 MEG.^	DIODE PLATE	PRONG-3
④	220,000^	DIODE PLATE	PRONG-5
⑤	GROUNDED	DIODE CATH.	PRONG-8
⑥	45^	DIODE CATH.	PRONG-4
⑦	0-2 MEG.^ VOL. CONT	1ST AUDIO GRID	CAP
⑧	470,000^	OUTPUT GRID	PRONG-4


PRONG NUMBERS BOTTOM VIEW FOR 1
PRONG NUMBERS BOTTOM VIEW 2 TO 7 INCL
PRONG NUMBERS BOTTOM VIEW FOR 8

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES MEASURED WITH ANT. & GND TERMINALS SHORTED AND 120V ON PRI.

Model FE-68

Rating Label	Power Consumption (Watts)
V6	105
V5	105

Models FE-62 and FE-67

Rating Label	Power Consumption (Watts)
A	75
C	80
V	80

SYMBOL	DESCRIPTION	
C1	TUNING CAPACITOR	10-450 MMF
C2	"D" ANT TRIMMER	2-20 MMF
C3	"D" OSC TRIMMER	2-20 MMF
C4	WAVE TRAP TRIMMER	75 MMF
C5	PAPER CAPACITOR	.01 MF
C6	"A" ANT. TRIMMER	4-30 MMF
C7	"B" ANT. TRIMMER	4-30 MMF
C8	PAPER CAPACITOR	.01 MF
C9	PAPER	.01 MF
C10	MICA	3600 MMF
C11	PAPER CAPACITOR	.001 MF
C12	"B" OSC. TRIMMER	4-30 MMF
C13	"B" PADDER TRIMMER	350-550 MMF
C14	MICA CAPACITOR	50 MMF
C15	"A" OSC. TRIMMER	5-45 MMF
C16	PAPER CAPACITOR	.1 MF
C17	"A" PADDER TRIMMER	100-175 MMF
C18	PAPER CAPACITOR	.01 MF
C19	1ST I.F. PRI. TRIMMER	100-230 MMF
C20	1ST I.F. SEC.	50-135 MMF
C21	2ND I.F. PRI.	50-135 MMF
C22	2ND I.F. SEC. TRIMMER	100-230 MMF
C23	PAPER CAPACITOR	.01 MF
C24	PAPER	.004 MF
C25	PAPER	.002 MF
C26	PAPER	.001 MF
C27	MICA	500 MMF ✱
C28	MICA	250 MMF
C29	PAPER	.05 MF
C30	MICA	200 MMF
C31	DRY ELECT.	8 MF
C32	DRY ELECT.	10 MF
C33	DRY ELECT.	8 MF
C34	DRY ELECT.	12 MF
C35	MICA	250 MMF
C36	PAPER	.001 MF
C37	PAPER CAPACITOR	.05 MF

SYMBOL	DESCRIPTION	
R1	VOL. CONT. 2 MEG. TAP AT	450,000^
R2	CARBON RESISTOR	47,000^
R3		470,000^
R4		27,000^
R5		470,000^
R6		100,000^
R7		68,000^
R8		68,000^
R9		220,000^
R10	CARBON	2.2 MEG^
R11	CANDOHM	
R12	MOULDED	410^
R13	CARBON	220,000^
R14		100,000^
R15		20,000^
R16		270,000^ ✱
R17		220,000^ ✱
R18		2,200^
R19		3,900^
R20		1 MEG
R21	CARBON RESISTOR	470,000^
L1	WAVE TRAP COIL	
L2	"A" ANT. COIL	
L3	"D-B" ANT. COIL	
L4	"A" OSC. COIL	
L5	"D-B" OSC. COIL	
L7	1ST I.F. TRANS. COIL	
L8	2ND I.F. TRANS. COIL	
S1	BAND CHANGE SWITCH	
S2	TONE CONTROL SWITCH	
S3	POWER SWITCH	
S4	PHONO.-RADIO SWITCH	✱
T1	OUTPUT TRANS.	
T2	POWER TRANS.	

✱ USED ON MODEL FE 68 ONLY

Tuning Frequency Range

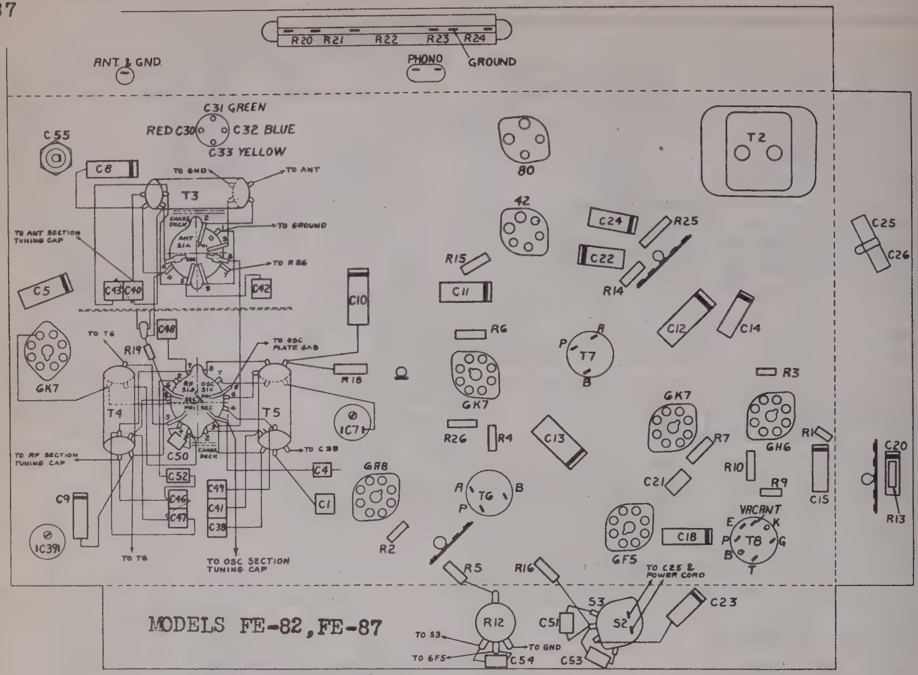
Band "A"	140-370 kc
Band "B"	540-1600 kc
Band "D"	5800-22,000 kc

Intermediate Frequency .... 455 kc

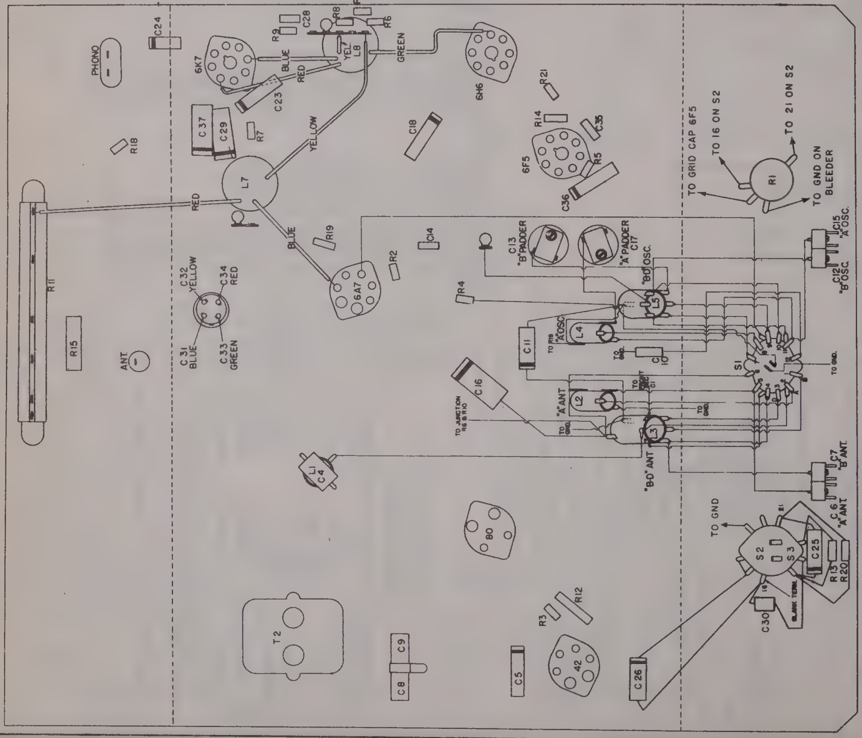
FOR OTHER DATA SEE INDEX

MODELS FE-62,
FE-67, FE-68
MODELS FE-82,
FE-87

GENERAL ELECTRIC CO.



MODELS FE-82, FE-87



Chassis Parts Layout

MODELS FE-62, FE-67, FE-68

Symbol	Description
C1	Tuning condenser
C2A	"B" band antenna trimmer
C2B	"B" band oscillator trimmer
C2C	"D" band antenna trimmer
C2D	"D" band oscillator trimmer
C3	"B" oscillator padder
C8	6 mmf. mica capacitor
C9	100 mmf. mica capacitor
C10	47 mmf. mica capacitor
C11	3600 mmf. ±5% mica capacitor
C12	220 mmf. mica capacitor
C13	220 mmf. mica capacitor
C14	0.1 mfd. paper capacitor
C15	.05 mfd. paper capacitor
C16	.015 mfd. paper capacitor
C17	.005 mfd. paper capacitor
C18	.005 mfd. paper capacitor
C19	.05 mfd. paper capacitor
C20	.01 mfd. paper capacitor
C21	.05 mfd. paper capacitor
C22	0.1 mfd. paper capacitor
C23	.01 mfd. paper capacitor
C24	0.1 mfd. paper capacitor
C25	.01 mfd. paper capacitor
C26	30 mfd. 250 V. dry electrolytic
C27A	40 mfd. 250 V. dry electrolytic
C27B	20 mfd. 250 V. dry electrolytic
L1	"B" band Beam-a-Scope
L2	"D" band Beam-a-Scope
L3	Oscillator coil
P1	Dial lamp, Mazda No. 44
P2	Dial lamp, Mazda No. 44
R1	0.5 megohm volume control
R2	1000 ohms carbon resistor
R3	1.0 megohm carbon resistor
R4	33,000 ohms carbon resistor
R5	27 ohms carbon resistor
R6	470,000 ohms carbon resistor
R7	2.2 megohms carbon resistor
R8	22,000 ohms carbon resistor
R9	4.7 megohms carbon resistor
R10	100,000 ohms carbon resistor
R11	1.0 megohm carbon resistor
R12	3300 ohms carbon resistor
R13	39,000 ohms carbon resistor
R14	470,000 ohms carbon resistor
R15	220 ohms carbon resistor
R16	3900 ohms 5 W. wire wound resistor
R17	30 ohms 2 W. wire wound resistor
R18	BL42D ballast resistor
S1	Band switch
S2	Power switch
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer

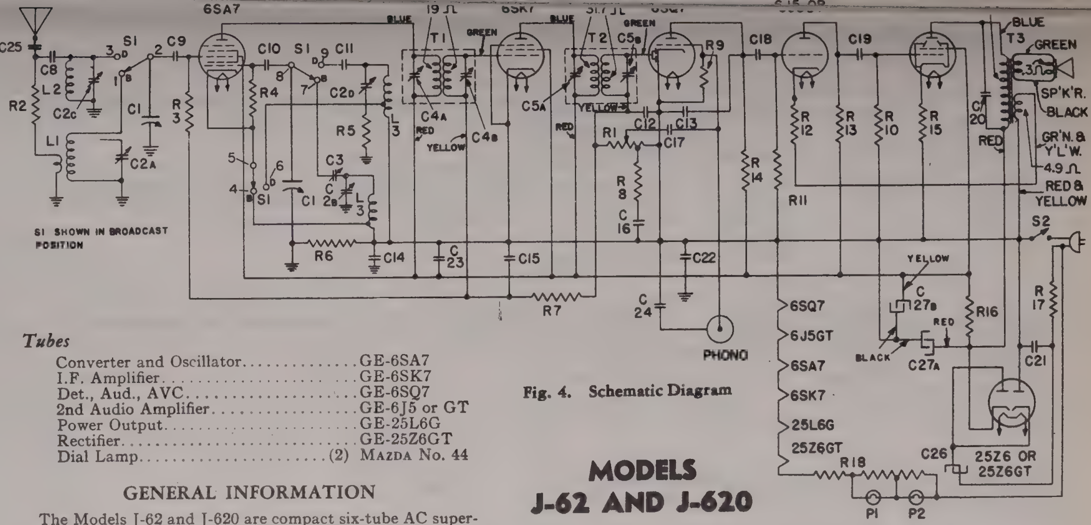


Fig. 4. Schematic Diagram

Tubes

Converter and Oscillator..............GE-6SA7
I.F. Amplifier..............GE-6SK7
Det., Aud., AVC..............GE-6SQ7
2nd Audio Amplifier..............GE-6J5 or GT
Power Output..............GE-25L6G
Rectifier..............GE-25Z6GT
Dial Lamp..............(2) Mazda No. 44

MODELS J-62 AND J-620

GENERAL INFORMATION

The Models J-62 and J-620 are compact six-tube AC superheterodyne receivers employing General Electric Pre-tested Tubes. Features of design include dual built-in Beam-a-Scopes, visualux dial, voltage-doubling rectifier system, broadcast and short-wave coverage, and automatic volume control.

Both models are Underwriters' approved and use the same chassis. Model J-62 has a mahogany cabinet. Model J-620 uses a bleached mahogany cabinet.

If an excessive amount of hum is noticed while the receiver is operating, reverse the power plug in the receptacle.

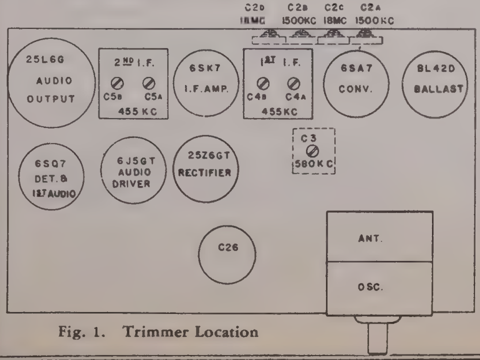


Fig. 1. Trimmer Location

SPECIFICATIONS

Electrical Rating

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
115 AC	25-60	55

Tuning Frequency Range

Band "B"..............540–1600 KC
Band "D"..............5800–18,000 KC

Intermediate Frequency..............455 KC

Electrical Power Output (117 Line Volts)

Undistorted..............3 watts
Maximum..............4.5 watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside Cone Diameter..............5 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

SPECIAL SERVICE INFORMATION

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

(1) Stage Gains*

Antenna Post to Converter Grid at 1000 KC	4.3
Converter Grid to 6SK7 Grid at 1000 KC	35
Converter Grid to 6SK7 Grid at 455 KC	42
6SK7 Grid to 6SQ7 Diode Plate at 455 KC	100

(2) Audio Gain

A 400-cycle signal of .06 volts across the volume control will give approximately ½-watt speaker output. (Volume control turned to maximum.)

(3) DC voltage developed across oscillator grid resistor (R-4) averages at

1000 KC	10.5
10,000 KC	8.0

* Variations of +10%, −20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

CHASSIS REMOVAL

NOTE: Care must be exercised in removing either the cabinet back or the chassis to avoid changing the shape of either the short-wave or broadcast loops. These loops are factory formed to give a certain inductance and any alterations in the loops in the field will throw the chassis out of alignment.

To remove the chassis proceed as follows: Pry loose the four fasteners which hold the cabinet back in position. Disconnect the speaker leads from the speaker terminals. Unscrew the woodscrew which secures the short-wave loop to the cabinet. Remove the three chassis bolts and knobs. The chassis is now free from the cabinet.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	455 KC
Band "B"	1500 and 580 KC
Band "D"	18,000 and 6000 KC

The location of trimmers for the above models is shown in Fig. 1. All R.F. trimmers are accessible through holes in the back cover or through the bottom of the cabinet.

I.F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Completely close the gang condenser plates and set the dial pointer to the first dial mark at the low end of the scale. Turn the band switch to "B" band (counterclockwise).

Set test oscillator to 455 KC and apply signal to the control grid of the 6SA7 tube through a .05 mfd. capacitor. Keep the test oscillator output as low as a readable meter reading will permit. Adjust all I.F. trimmers for maximum meter reading.

R.F. Alignment

The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are available through holes in the bottom deck and back of the cabinet. Metal objects such as meters, tools, etc., should not be placed near the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

Set the signal generator to 1500 KC. Align (C-2B) to the signal while the dial pointer is on the 1500 KC mark. Peak (C-2A) for maximum output. Change signal to 580 KC and tune receiver to signal. Peak (C-3) on the 580 KC signal by rocking the gang condenser. Retrim at 1500 KC.

Turn the band switch to "D" band. Align (C-2D) at 18 MC. Peak (C-2C) while rocking the gang condenser. The image of the 18 MC signal should be heard at 17.09 MC when (C-2D) is on the proper peak. Change signal to 6 MC and retune the receiver. Check the receiver for increased output at the 6 MC point by pinching or separating slightly the turns of wire in the short-wave Beam-a-Scope mounted on the side of the chassis. Retrim at 18 MC.

If the chassis is to be aligned outside of the cabinet it will no longer be possible to use the dial scale as a tuning reference since the dial scale is fastened to the cabinet. Use must be made, therefore, of a 0–180° calibrated scale which is cemented to the back of the dial reflector plate. From the reference chart Fig. 3 the degree readings for corresponding frequency settings may be obtained by laying a straight edge across the chart perpendicular to the line of figures and sliding the straight edge along to the various frequency settings desired. The degree readings will be found on either of the degree scales. To use these degree readings, first completely close the gang condenser plates and then slide pointer along the cord until the inside edge of the right-hand pointer-guide clip is in line with the 0° mark. (See Fig. 2.) By using this edge of the clip as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until this edge of the clip is in line with 160° the receiver will be tuned to 1500 KC on the broadcast band. The alignment may now proceed as previously described.

NOTE: After moving the pointer along the cord to use one of the guide clips as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

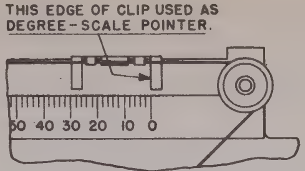


Fig. 2. Pointer-guide-clip Setting with Gang Condenser Closed

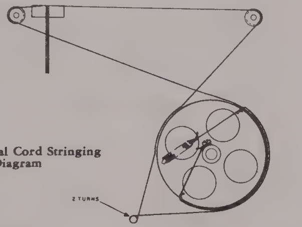


Fig. 7. Dial Cord Stringing Diagram

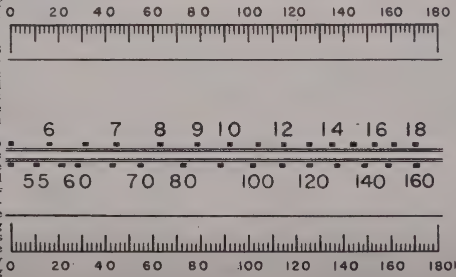


Fig. 3. Frequency-degree Reference Chart

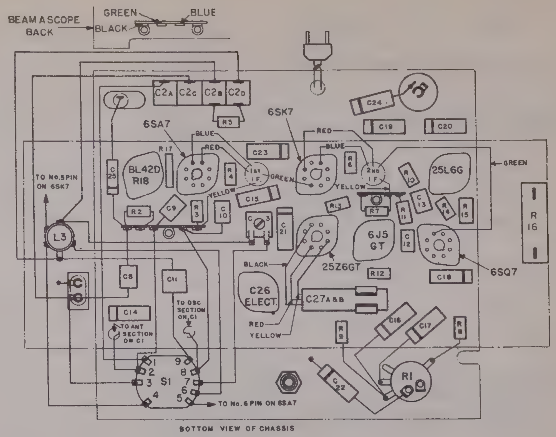
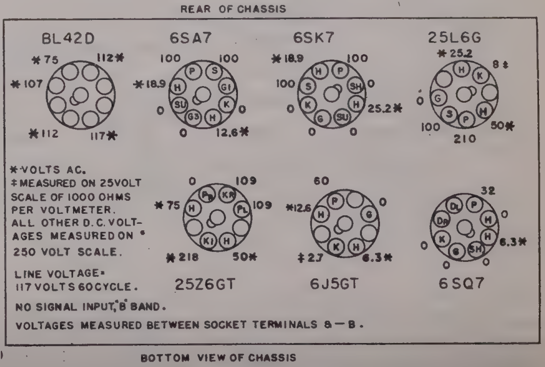


Fig. 5. Chassis Parts Layout

NOTE: The oscillator coil and band-switch terminals are numbered in the Chassis Parts Layout, Fig. 5, to assist in locating the corresponding numbered joints on the Schematic Diagram, Fig. 4. This numbering will also assist in rewiring if the coil or switch is replaced.



*VOLTS AC.
‡MEASURED ON 25VOLT SCALE OF 1000 OHMS PER VOLTMETER.
ALL OTHER D.C. VOLTAGES MEASURED ON 250 VOLT SCALE.
LINE VOLTAGE= 117 VOLTS 60CYCLE.
NO SIGNAL INPUT, "B" BAND.
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS 8 — B.

Fig. 6. Socket Voltages

SOCKET VOLTAGES

MODELS FE-82, FE-87

Tube No.		Plate to Ground Volts D-c	Screen Grid to Ground Volts D-c	Cathode to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6K7 R.F. Amplifier		232	97	0	7.5	6.3
6A8	Oscillator	180	....	0	10.6	6.3
	Converter	232	97	0		
6K7 1st I.F. Amp.		232	95	"A" & "B" band 6 "D" band 3	"A" & "B" band 1.5 "D" band 3.4	6.3
6K7 2nd I.F. Amp.		245	95	3.52	5.7	6.3
6F5 Audio Amplifier		110*	....	1.3	.24	6.3
42 Output		236	252	16	39.0	6.3
80 Power Rectifier		342/684 Rms.	....	345	75	5.0

A-C line voltage 115 on primary 115-volt tap. No signal input. 1000 ohms per voltmeter. Dial pointer at 530 kc.

* Measured on 500-volt scale.

SOCKET VOLTAGES

MODELS FE-112, FE-116, FE-119

Tube No.	Plate to Ground Volts DC	Screen Grid to Ground Volts DC	Cathode to Ground Volts DC	Cathode Current M.A.	Heater Volts AC
6K7 R.F. Amplifier	230	95	0	7.1	6.5
6J5-G Oscillator	195	..	0	11.0	6.5
6L7 Converter	235	90	0	7.7	6.5
6K7 1st I.F. Amp.	230	95	0	6.7	6.5
6K7 2nd I.F. Amp.	205	95	3.3	8.6	6.5
6F5 Audio Amp.	170	..	1.5	0.5	6.5
6L6-G Output	300	240	14.0	59.0	6.5
6U5 Tuning Indicator	...	195 (Target)	0	4.0	6.5
5Z3 Power Rectifier	345 A.C.	...	368	110	5.1

A-C line voltage 125 volts on primary 125-volt tap.
1000 ohms per-voltmeter. Dial pointer 5500 kc. on "D-1" band. No signal.

SOCKET VOLTAGES

MODELS FE-62, FE-67, FE-68

Tube No.		Plate to Ground Volts D-C	Screen Grid to Ground Volts D-C	Cathode to Ground Volts D-C	Cathode Current M.A.	Heater Volts A-C
6A7	Oscillator	175	....	0	10.4	6.5
	Converter	236	95	0		
6K7 I.F. Amplifier		220	105	0	10.6	6.5
6H6 Det. and AVC	Bias Section	....	....	−3.4	....	6.5
	Signal Section	....	....	....		
6F5 Audio Amplifier		98*	....	1.3	0.2	6.5
42 Output		253	272	16.7	39.8	6.5
80 Power Rectifier		680/340 R.M.S.	....	340 D-C	68.3	5.0

A-C line voltage 120—No signal input—1000 ohms per volt meter—dial pointer at 540 K.C.

* Measured on 500-volt scale.

VOLTAGE CHART
Model JE-81

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7 (R.F.)	135	95	2.6	6.4
6K8	Conv.—135 Osc.—75	95	2.6	6.4
6SK7 (I.F.)	135	95	3	6.4
6J5G/6J5GT	0		0	6.4
6SQ7	80		1	6.4
6Y6G	210	135	13	6.4
5Y3G	460 V.A.C. Plate to Plate		220	5.1
6U5	135		0	6.4

Line Volts—110 AC on 110-volt tap—Pointer set at 560 KC on "B" band. No signal input.

5Y3G Cathode Current—80 ma.

VOLTAGE CHART
Model JE-810

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7 (R.F.)	135	95	2.5	6.4
6K8	Conv.—135 Osc.—75	95	2.5	6.4
6SK7 (I.F.)	135	95	3.2	6.4
6J5G/6J5GT	0		0	6.4
6SQ7	40		1	6.4
25C6G	200	135	13	25.5
25Z6G			210	25.5
6U5	135		0	6.4

Line Volts—240 AC or DC—Pointer set at 560 KC on "B" band.

No signal input.

25Z6G Cathode Current—85 ma.

Filament voltages on Model JE-810 will seldom be equal for same heater ratings, as tubes are in series and heater resistance varies from tube to tube.

VOLTAGE CHART (Model HE-74 and HE-74L)

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7	135	90	4	6.5
6K8	Conv.—135 Osc.—95	90	3	6.5
6SK7	125	90	3	6.5
6SQ7	70		1	6.5
6Y6G	190	135	13.5	6.5
5Y3G	460 V. AC Plate to Plate		210	5.1
6U5	135		0	6.5

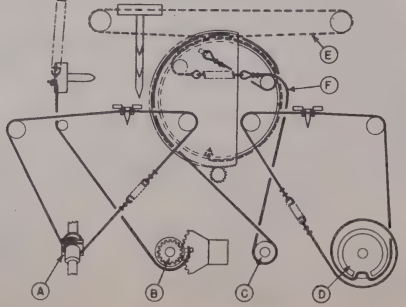
Line Volts—110 AC on 110-volt tap—Pointer set at 560 K.C. on "B" band—No signal input.
5Y36 Cathode Current—98 mils.

VOLTAGE CHART (Models HE-740 and HE-740L)

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7	145	95	4.3	6.1
6K8	Conv.—145 Osc.—136	95	2.9	6.1
6SK7	135	95	3.2	6.6
6SQ7	78		1.0	6.8
25C6G	210	145	13	26.5
25Z6G			220	26.5
6U5	145		1.0	6.5

Line Volts—240 AC or DC—Pointer set at 560 K.C. on "B" band—No signal input.
25Z6G Cathode Current—100 mils.

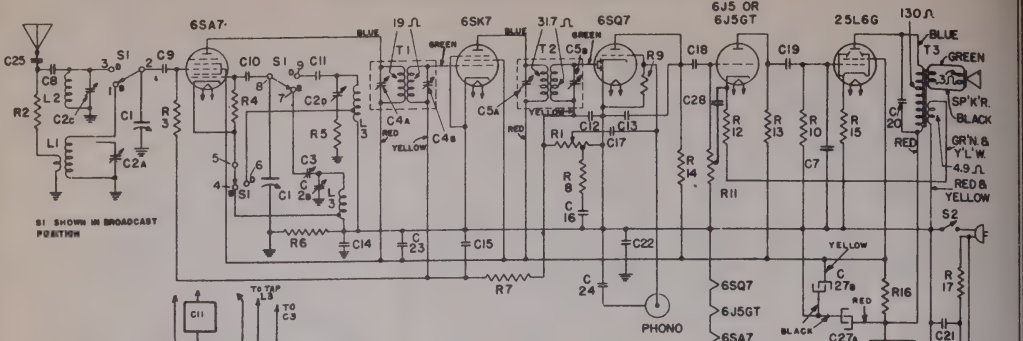
HE-74, HE-74L, HE-740, HE-740L

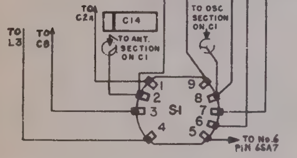


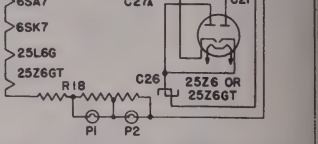
Dial Drive Mechanism

MODEL J63

GENERAL ELECTRIC CO.



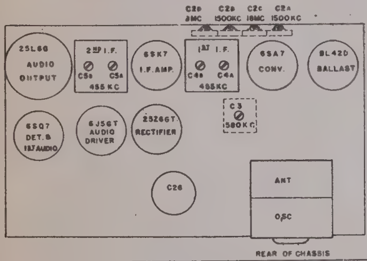


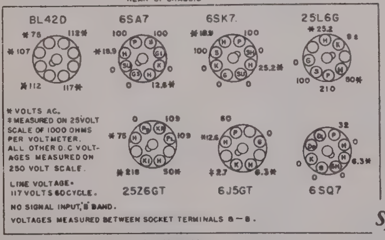


Symbol	Description
C1	Tuning condenser
C2A	"B" band antenna trimmer
C2B	"B" band oscillator trimmer
C2C	"D" band antenna trimmer
C2D	"D" band oscillator trimmer
C3	"B" oscillator padder
C7	220 mmf. mica capacitor
C8	6 mmf. mica capacitor
C9	100 mmf. mica capacitor
C10	47 mmf. mica capacitor
C11	3600 mmf. ±5% mica capacitor
C12, 13	220 mmf. mica capacitor

Symbol	Description
C14	0.1 mfd. paper capacitor
C15	.05 mfd. paper capacitor
C16	.015 mfd. paper capacitor
C17, 18	.005 mfd. paper capacitor
C19	.05 mfd. paper capacitor
C20	.01 mfd. paper capacitor
C21	.05 mfd. paper capacitor
C22	0.1 mfd. paper capacitor
C23	.01 mfd. paper capacitor
C24	0.1 mfd. paper capacitor
C25	.01 mfd. paper capacitor
C26	30 mfd. 250 V. dry electrolytic
C27A	40 mfd. 250 V. dry electrolytic
C27B	20 mfd. 250 V. dry electrolytic
C28	.01 mfd. paper capacitor
L1	"B" band Beam-a-Scope
L2	"D" band Beam-a-Scope
L3	Oscillator coil
R1	0.5 megohm volume control
R2	1000 ohms carbon resistor
R3	1.0 megohm carbon resistor
R4	33,000 ohms carbon resistor
R5	27 ohms carbon resistor

Symbol	Description
R6	470,000 ohms carbon resistor
R7	2.2 megohms carbon resistor
R8	22,000 ohms carbon resistor
R9	4.7 megohms carbon resistor
R10	100,000 ohms carbon resistor
R11	1.0 megohm tone control
R12	3300 ohms carbon resistor
R13	39,000 ohms carbon resistor
R14	470,000 ohms carbon resistor
R15	220 ohms carbon resistor
R16	3900 ohms 5 W. wire wound resistor
R17	30 ohms 2 W. wire wound resistor
R18	BL42D ballast resistor
S1	Band switch
S2	Power switch
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer




BL42D
6SA7
6SK7
25L6G
25Z6GT
6J5GT
6SQ7
* VOLTS AC.
‡ MEASURED ON 25 VOLT SCALE OF 1000 OHMS PER VOLTMETER.
ALL OTHER D.C. VOLTAGES MEASURED ON 250 VOLT SCALE.
LINE VOLTAGE-117 VOLTS 60 CYCLE.
NO SIGNAL INPUT, B BAND.
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & — B.

BOTTOM VIEW OF CHASSIS

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C5A & C5B
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4a & C4b
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C3**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2b (Osc.)
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2a (Ant.)
6	REPEAT STEP 3			
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C2d * (Osc.)
8	Capacity Coupled	18 MC	"SW" Band 18 MC	C2c** (Ant.)

* Use minimum capacity peak.
** Rock gang condenser when making alignment.

Electrical Rating

115 Volts, 25-60 cycles AC; or 115 volts DC . . . . .55 watts

Tuning Frequency Range

Broadcast Band . . . . .540-1600 KC
Short-wave Band . . . . .5800-18,000 KC

Intermediate Frequency . . . . .455 KC.

Electrical Power Output (117 line volts)

Undistorted . . . . .3 watts
Maximum . . . . .4.5 watts

Loud-speaker—Alnico Magnet Dynamic

Outside Cone Diameter . . . . .5 inches
Voice Coil Impedance (400 cycles) . . . . .3.5 ohms

Special Service Information

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

(1) Stage gains
Antenna Post to Converter Grid—4.3 at 1000 KC
Converter Grid to 6SK7 Grid—42 at 455 KC
6SK7 Grid to 6SQ7 Diode Plate—100 at 455 KC

(2) Audio gain
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 10.5 volts at 1000 KC or 8.0 volts at 10,000 KC.

* Variations of +10 or −20% permissible.

GENERAL ELECTRIC CO.

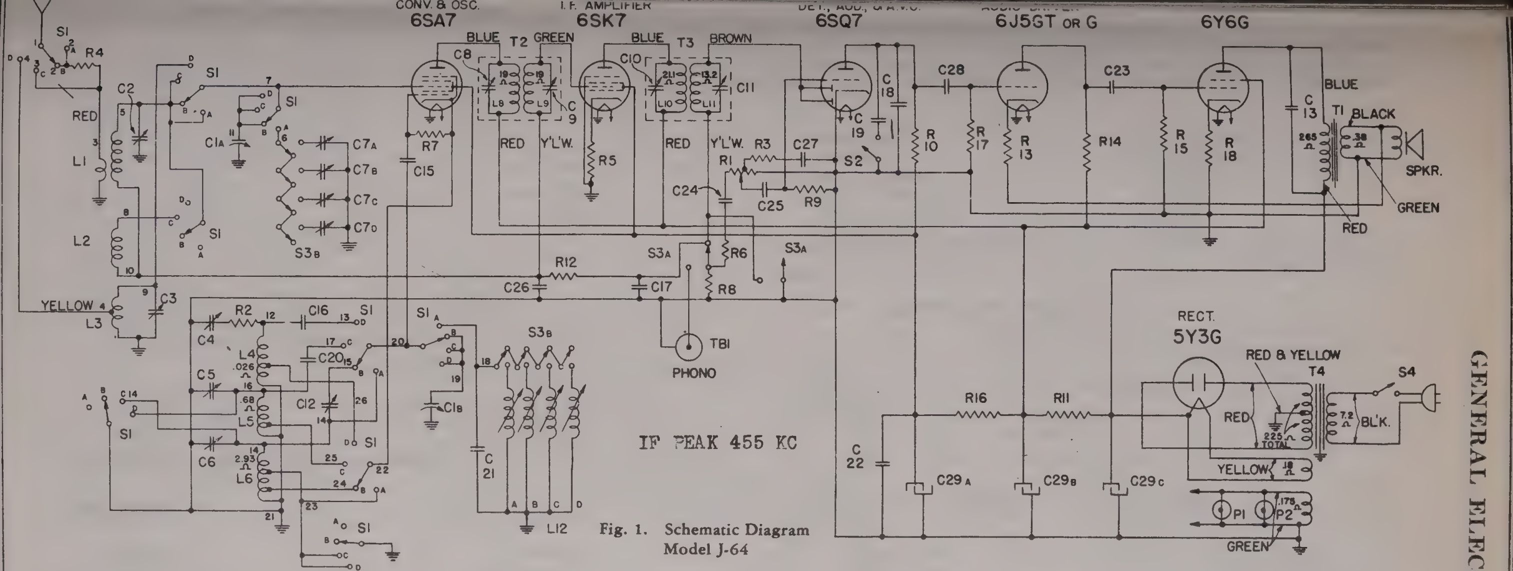
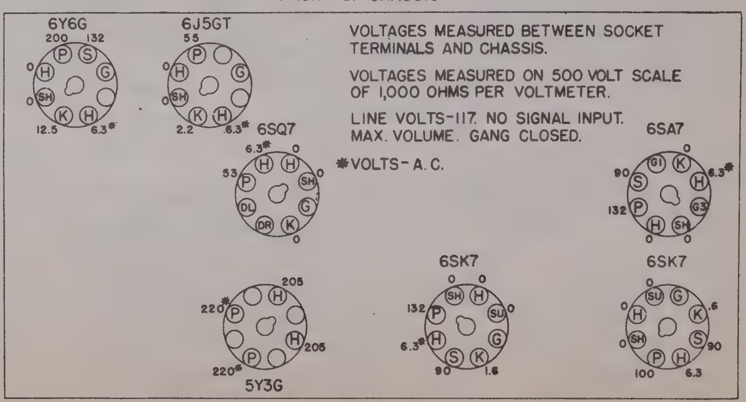


Fig. 1. Schematic Diagram Model J-64

FRONT OF CHASSIS



VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

VOLTAGES MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLTMETER.

LINE VOLTS-117. NO SIGNAL INPUT. MAX. VOLUME. GANG CLOSED.

*VOLTS - A. C.

BOTTOM VIEW OF CHASSIS

Fig. 5. Socket Voltages

Symbol	Description	Symbol	Description
C1A	Antenna section of tuning condenser	L6	"BC" band oscillator coil
C1B	Oscillator section of tuning condenser	L12	Station selector coil strip
C2	"BC" band antenna trimmer	P1	Dial lamp, MAZDA No. 44
C3	"SW2" band antenna trimmer	P2	Dial lamp, MAZDA No. 44
C4	"SW2" band oscillator trimmer	R1	2 megohm volume control
C5	"SW1" band oscillator trimmer	R2	18 ohms carbon resistor
C6	"BC" band oscillator trimmer	R3	100,000 ohms carbon resistor
C7	Station selector antenna trimmers	R4	1000 ohms carbon resistor
C12	"BC" band padding trimmer	R5	150 ohms carbon resistor
C13	.01 mfd. paper capacitor	R6	47.000 ohms carbon resistor
C15	47 mmf. mica capacitor	R7	39.000 ohms carbon resistor
C16	.008 mfd. polystyrene capacitor	R8	470.000 ohms carbon resistor
C17	220 mmf. mica capacitor	R9	4.7 megohms carbon resistor
C18	150 mmf. mica capacitor	R10	330.000 ohms, carbon resistor
C19	.002 mfd. paper capacitor	R11	2700 ohms 2 W carbon resistor
C20	2400 mmf. ±5% mica capacitor.	R12	2.2 megohms carbon resistor
C21	750 mmf. ±5% silvered mica capacitor	R13	3300 ohms carbon resistor
C22	.01 mfd. paper capacitor	R14	100.000 ohms carbon resistor
C23	.01 mfd. paper capacitor	R15	330.000 ohms carbon resistor
C24	.005 mfd. paper capacitor	R16	3300 ohms 1 W carbon resistor
C25	.02 mfd. paper capacitor	R17	470.000 ohms carbon resistor
C26	.05 mfd. paper capacitor	R18	270 ohms 1 W carbon resistor
C27	.005 mfd. paper capacitor	S1	Band switch
C28	.005 mfd. paper capacitor	S2	Tone control
C29A	10 mfd. 250 V. dry electrolytic	S3A	Phono-FM-Tel switch
C29B	15 mfd. 250 V. dry electrolytic	S3B	Touch tuning switches
C29C	30 mfd. 250 V. dry electrolytic	S4	Power switch on tone control
L1	"BC" and "SW1" band Beam-a-Scope	T1	Output transformer
L2	"SW1" band antenna coil	T2	1st I.F. transformer
L3	"SW2" band Beam-a-Scope	T3	2nd I.F. transformer
L4	"SW2" band oscillator coil	T4	50–60-cycle power transformer
L5	"SW1" band oscillator coil	or T4	25-cycle power transformer

MODEL J64

GENERAL ELECTRIC CO.

SPECIFICATIONS

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
A	110–125	50–60	75
C	110–125	25	85

Tuning Frequency Range

Broadcast Band	540–1600 KC
Short-wave Band No. 1	2300–7000 KC
Short-wave Band No. 2	7000–22,000 KC

Intermediate Frequency.......................455 KC

Electrical Power Output

Undistorted	2.85 watts
Maximum	4.5 watts

Tone Control.................................3-position

Loud-speaker—"Alnico" Magnet Dynamic

Outside Cone Diameter	6½ inches
Voice Coil Impedance	3.5 ohms

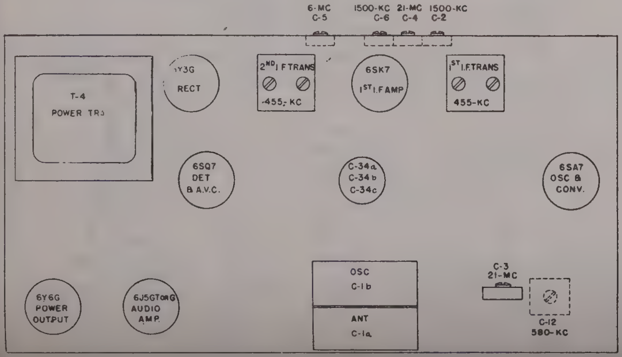


Fig. 4. Tube and Trimmer Location

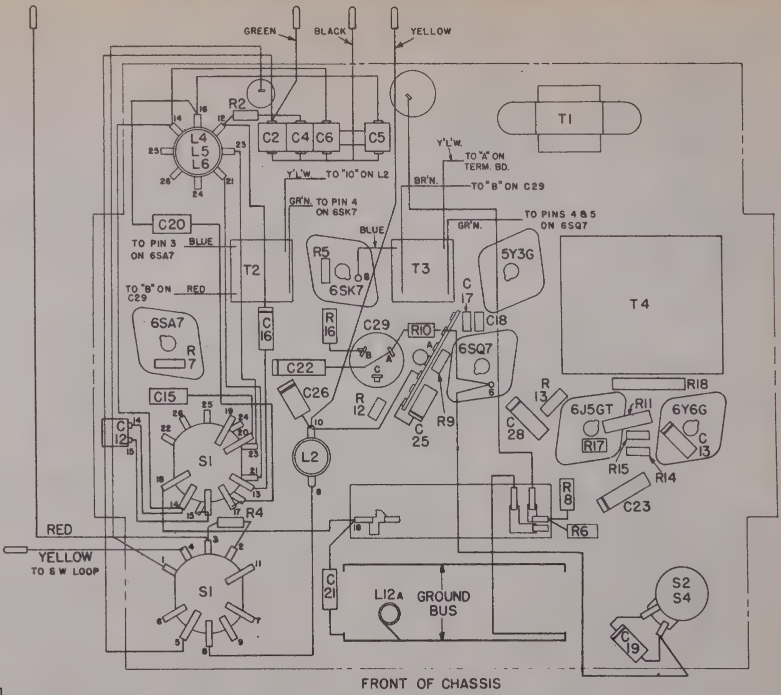


Fig. 6. Chassis Parts Layout

Tubes

Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud., AVC	GE-6SQ7
Audio Driver	GE-6J5GT
Audio Output	GE-6Y6G
Rectifier	GE-5Y3G
Dial Lamp	(2) Mazda No. 44

Note: The oscillator coil and band-switch terminals are numbered in the Chassis Parts Layout, Fig. 6, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 1. This numbering will also assist in rewiring if the coil or switch is replaced. I.F. transformer connections are shown as an aid in replacement.

GENERAL INFORMATION

Model J-64 is a six-tube, superheterodyne receiver designed to operate from an alternating-current power supply. The receiver incorporates the latest developments in radio of which the General Electric Dual Beam-a-Scopes are notable. Broadcast and short-wave No. 1 signals are selected by the Beam-a-Scope which is mounted on the cabinet back. Short-wave No. 2 signals are selected by the Beam-a-Scope which is mounted on the cabinet above the chassis. Additional features include single-ended tubes, iron-core oscillator station-selector coils, four feathertouch tuning station keys, one Phono-Frequency Modulation-Television key, tone monitor circuit and automatic volume control.

Phono-FM-Tel

This receiver is equipped with a pin jack on the rear apron of the chassis and a Phono-FM-Tel key for adapting it to use with record players, frequency modulation converters and television picture receivers with sound converters. General Electric plug, Stock No. RP-145, fits the pin jack.

Setting Up the Receiver

The following remarks will assist the serviceman in correctly setting up this receiver for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.
(2) The black speaker lead should be connected to the speaker terminal which is grounded to the speaker frame.
(3) A method of setting up station keys which will assure driftproof adjustments is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

Chassis or Beam-a-Scope Removal

NOTE: Care must be exercised in removing either the cabinet back or the chassis to avoid changing the shape of either the short-wave or broadcast loop. These loops are factory formed to give a certain inductance and any alterations in the loops in the field will throw the chassis out of alignment.

When disconnecting the short-wave loop leads from the loop, be sure to support the loop while pulling off the connections. Failure to support the loop may cause the staples to loosen and result in the loop rattling in the cabinet.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

NOTE—In no case should the magnet be removed from the assembled position.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains *
  (a) Antenna Post to Converter Grid at
    1000 KC.......................................3.7
    4000 KC.......................................2.8
    18,000 KC.....................................2.0
  (b) R.F. on Converter Grid to I.F. on 1st I.F. Grid at
    1000 KC.......................................35
    4000 KC.......................................35
    18,000 KC.....................................50
  (c) I.F. on Converter Grid to I.F. on 1st I.F. Grid at
    455 KC..45
  (d) I.F. Amplifier Grid to Detector Plate at
    455 KC..65
(2) Voltage across Volume Control to give ½-watt Speaker Output at
    400 cycles....................................04 volts
(3) DC Voltage Developed across Oscillator Grid Resistor (R-7) at
    1000 KC.......................................13
    4000 KC.......................................11
    18,000 KC.....................................9

* Variations of ± 20 per cent permissible. All readings obtained with enough input signal to give ½-watt speaker output.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form below. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are available through holes in the bottom deck and back of the cabinet as shown in Fig. 3. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

R.F. Alignment
With Chassis Outside of Cabinet

R.F. alignment can be performed only on the "BC" and "SW1" bands with the chassis outside of the cabinet. Any alignment attempted on "SW2" band will not be satisfactory. The same relative position between the chassis and "BC" Beam-a-Scope should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of a 0–180° calibrated scale which is cemented to the back of the dial reflector plate. From the reference chart Fig. 7 the degree readings for corresponding frequency settings may be obtained by laying a straight edge across the chart perpendicular to the line of figures and sliding the straight edge along to the various frequency settings desired. The degree readings will be found on either of the degree scales. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the left-hand edge of the pointer-guide slide lines up with the 0° mark. By using this left-hand edge (as viewed from the rear) of the slide as the degree-scale pointer the receiver may be tuned to any frequency. Example: By setting the left-hand edge of the slide to 158° the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW1" band alignment procedure is the same as outlined in steps 2 to 6 inclusive of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed or the "BC" and "SW1" bands the chassis should be mounted in the cabinet and "SW2" band alignment checked as described in steps 7 to 9 of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

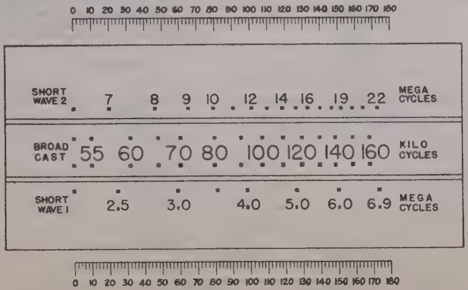


Fig. 7. Frequency-degree Reference Chart

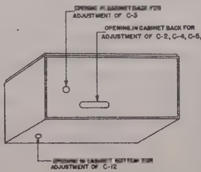

ADJUSTMENT OF C-3
OPENING IN CABINET BACK FOR ADJUSTMENT OF C-2, C-4, C-5, C-6.
ADJUSTMENT OF C-12

Fig. 3. Cabinet Holes for Trimmer Adjustment

ALIGNMENT CHART

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. Trimmers C-10, 11	Gang condenser plates closed. Depress any station key other than Phono-FM-Tel key. Connect audio input of oscilloscope to chassis ground and junction of R6 and R8. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Green lead on cabinet back terminal board and chassis gnd.	.05 mfd. or larger	1st I.F. Trimmers C-8, 9	

I.F. Alignment with Output Meter

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC with Modulation	Green lead on cabinet back terminal board and chassis gnd.	.05 mfd. or larger	2nd I.F. Trimmers C-10, 11 1st I.F. Trimmers C-8, 9	Gang condenser plates closed. Depress any key other than Phono-FM-Tel key. Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.

R.F. Alignment
With Chassis Mounted in Cabinet

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal" position.
2. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Set pointer to 1500 KC and tune in signal with (C-6). Peak output with (C-2).
3. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-12)	Set pointer to 580 KC and peak signal while rocking gang condenser.
4. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Retrim for maximum output.
5. Repeat operation 3 if "BC" band trimmers are badly out of alignment.					
6. "SW 1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-5)	Set pointer to 6 MC and peak signal while rocking gang condenser.
7. "SW 2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-4) Ant. (C-3)	Set pointer to 21 MC and tune in signal with (C-4). Peak output with (C-3) while rocking gang condenser. When (C-4) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
8. "SW 2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions. Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope phosphor-bronze strap connector closer or farther away from the ground lead. The moving should be done with an insulated rod or stick.
9. Repeat operation 7 if the Beam-a-Scope leads are moved in operation 8.					

NOTE: After moving the pointer along the cord to use the left-hand edge as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

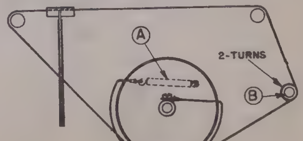


Fig. 2. Dial Drive Stringing Diagram

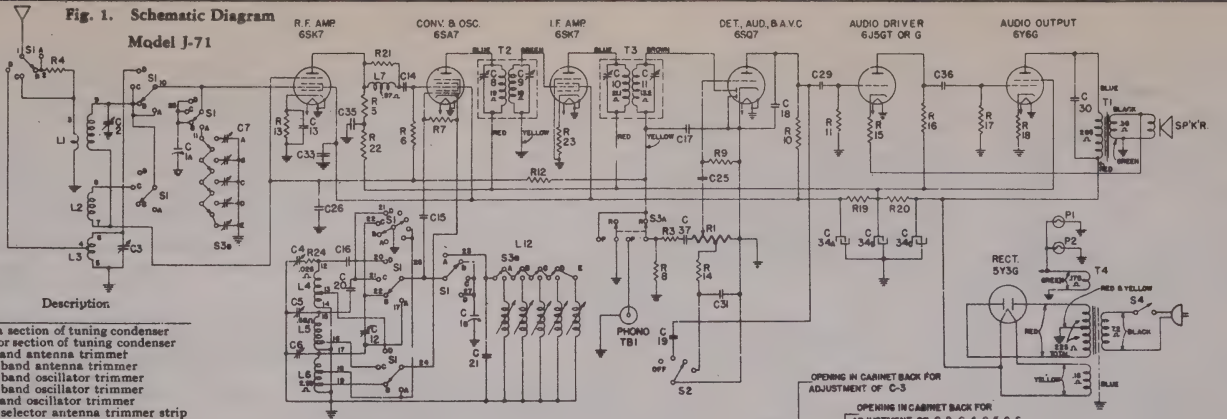


Fig. 1. Schematic Diagram

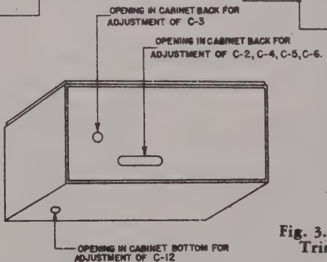
Model J-71

Symbol	Description
C1A	Antenna section of tuning condenser
C1B	Oscillator section of tuning condenser
C2	"BC" band antenna trimmer
C3	"SW2" band antenna trimmer
C4	"SW2" band oscillator trimmer
C5	"SW1" band oscillator trimmer
C6	"BC" band oscillator trimmer
C7	Station selector antenna trimmer strip
C12	'BC" band padding trimmer
C13	.01 mfd. paper capacitor
C14	100 mmf. mica capacitor
C15	47 mmf. mica capacitor
C16	.008 mfd. paper capacitor
C17	220 mmf. mica capacitor
C18	150 mmf. mica capacitor
C19	.002 mfd. paper capacitor
C20	2400 mmf. ±5% mica capacitor
C21	750 mmf. silvered mica capacitor
C25	.02 mfd. paper capacitor
C26	.05 mfd. paper capacitor
C29	.005 mfd. paper capacitor
C30	.01 mfd. paper capacitor
C31	.005 mfd. paper capacitor
C33	.01 mfd. paper capacitor
C34A	10 mfd. 250 V. dry electrolytic
C34B	15 mfd. 250 V. dry electrolytic
C34C	30 mfd. 250 V. dry electrolytic
C35	.01 mfd. paper capacitor
C36	.01 mfd. paper capacitor
C37	.005 mfd. paper capacitor
L1	"BC" Band Beam-a-Scope
L2	"SW1" band antenna coil
L3	"SW2" band Beam-a-Scope
L4	"SW2" band oscillator coil
L5	"SW1" band oscillator coil
L6	"BC" band oscillator coil
L7	R.F. interstage coil
L12	Station selector oscillator coils
P1	Dial lamp, Mazda No. 44
P2	Dial lamp, Mazda No. 44
R1	2 megohm volume control
R3	47,000 ohms carbon resistor
R4	1000 ohms carbon resistor
R5	3300 ohms carbon resistor
R6	47,000 ohms carbon resistor
R7	22,000 ohms carbon resistor
R8	470,000 ohms carbon resistor
R9	4.7 megohms carbon resistor
R10	330,000 ohms carbon resistor
R11	470,000 ohms carbon resistor
R12	2.2 megohms carbon resistor
R13	47 ohms carbon resistor
R14	100,000 ohms carbon resistor
R15	3300 ohms carbon resistor
R16	100,000 ohms carbon resistor
R17	330,000 ohms carbon resistor
R18	270 ohms 1 W. carbon resistor
R19	3300 ohms 1 W. carbon resistor
R20	1800 ohms 2 W. carbon resistor
R21	10,000 ohms carbon resistor
R22	1000 ohms carbon resistor
R23	150 ohms carbon resistor
R24	27 ohms carbon resistor

Model J-71 is a seven-tube, superheterodyne receiver designed to operate from an alternating current power supply. The receiver incorporates the latest developments in radio, among which are the General Electric Dual Beam-a-Scopes. Broadcast and short-wave No. 1 signals are selected by the Beam-a-Scope which is mounted at one end of the cabinet. Short-wave No. 2 signals are selected by the Beam-a-Scope which is mounted on the cabinet above the chassis. Additional features include single-ended tubes, iron-core oscillator station selector coils, five feathertouch tuning station keys, one Phono-Frequency Modulation-Television key, tone monitor circuit and automatic volume control.

Phono-FM-Tel

This receiver is equipped with a pin jack on the rear apron of the chassis and a Phono-FM-Tel key for adapting it to use with record players, frequency modulation converters, and television picture receivers with sound converters. General Electric plug, Stock No. RP-145, fits the pin jack.


OPENING IN CABINET BACK FOR ADJUSTMENT OF C-3
OPENING IN CABINET BACK FOR ADJUSTMENT OF C-2, C-4, C-5, C-6.
OPENING IN CABINET BOTTOM FOR ADJUSTMENT OF C-12

S1	Band switch
S2	Tone control switch
S3A	Phono switch
S3B	Station selector switch
S4	Power switch
T1	Output transformer
T2	1st I.F. transformer
T3	2nd I.F. transformer
T4	Power transformer

Fig. 3. Cabinet Holes for Trimmer Adjustment

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
A	110–125	50–60	75
C	110–125	25	85

Tuning Frequency Range

Broadcast Band....................540–1600 KC
Short-wave Band No. 1..............2300–6900 KC
Short-wave Band No. 2..............6900–22,000 KC

Intermediate Frequency...............455 KC

Electrical Power Output

Undistorted............................2.85 watts
Maximum.................................4.5 watts

Tone Control..........................3-position

Loud-speaker—"Alnico" Magnet Dynamic

Outside Cone Diameter...............6½ inches
Voice Coil Impedance................3.5 ohms

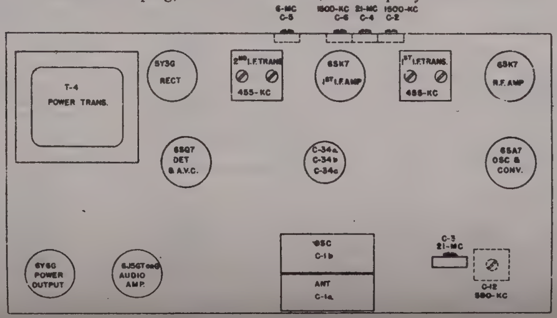


Fig. 4. Tube and Trimmer Location

©John F. Rider, Publisher

ALIGNMENT PROCEDURE

The alignment procedure is given in table form below. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are available through holes in the bottom deck and back of the cabinet as shown in Fig. 3. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

R.F. Alignment
With Chassis Outside of Cabinet

R.F. alignment can be performed only on the "BC" and "SW1" bands with the chassis outside of the cabinet. Any alignment attempted on "SW2" band will not be satisfactory. The same relative position between the chassis and broadcast loop should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of a 0-180° calibrated scale which is cemented to the back of the dial reflector plate. From the reference chart Fig. 7 the degree readings for corresponding frequency settings may be obtained by laying a straight edge across the chart perpendicular to the line of figures and sliding the straight edge along to the various frequeney settings desired. The degree readings will be found on either of the degree scales. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the left-hand edge of the pointer-guide slide lines up with the 0° mark. By using this left-hand edge (as viewed from the rear) of the slide as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until the left-hand edge of the slide is in line with 158°, the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW1" band alignment procedure is the same as outlined in steps 2 to 6 inclusive of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed on the "BC" and "SW1" bands the chassis should be mounted in the cabinet and "SW2" band alignment checked as described in steps 7 to 9 of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

Note: After moving the pointer along the cord to use the left-hand edge as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

Chassis or Beam-a-Scope Removal

Note: Care must be exercised in removing the chassis to avoid changing the shape of either the short-wave or broadcast loops. These loops are factory formed to give a certain inductance and any alterations in the loops in the field will throw the chassis out of alignment.

When disconnecting the short-wave loop leads from the loop, be sure to support the loop while pulling off the connections. Failure to support the loop may cause the staples to loosen and result in the loop rattling in the cabinet.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

Note—In no case should the magnet be removed from the assembled position.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R.F. Grid at

1000 KC	5.5
4000 KC	2.5
18,000 KC	2.5

(b) R.F. Grid to Converter Grid at

1000 KC	5.5
4000 KC	3.0
18,000 KC	2.0

(c) R. F. on Converter Grid to I.F, on 1st I.F. Grid at

1000 KC	.50
4000 KC	.50
18,000 KC	.45

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at

455 KC	60

(e) I.F. Amplifier Grid to Detector Plate at

455 KC	55

(2) Voltage across Volume Control to Give ½-watt Speaker Output at

400 cycles	.04 volts

(3) DC Voltage Developed across Oscillator Grid Resistor (R-7) at

1000 KC	8.3
4000 KC	7.8
18,000 KC	4.6

* Variations of ± 20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. Trimmers C-10, 11.	Gang condenser plates closed. Depress any station key other than Phono-FM-Tel key. Connect audio input of oscilloscope to chassis ground and junction of R3 and R8. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Green lead on "BC" Beam-a-Scope terminal board and chassis ground.	.05 mfd. or larger	1st I.F. Trimmers C-8, 9	

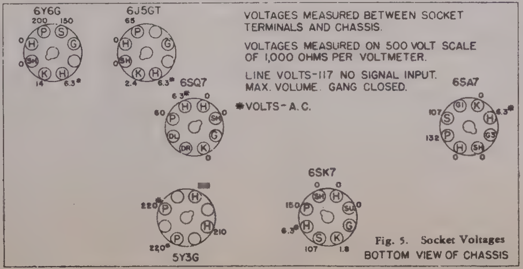
I.F. Alignment with Output Meter

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC with Modulation	Green lead on "BC" Beam-a-Scope terminal board and chassis ground.	.05 mfd. or larger	2nd I.F. Trimmers C-10, 11. 1st I.F. Trimmers C-8, 9	Gang condenser plates closed. Depress any key other than Phono-FM-Tel key. Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.

R.F. Alignment
With Chassis Mounted in Cabinet

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal" position.
2. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Set pointer to 1500 KC and tune in signal with (C-6). Peak output with (C-2).
3. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-12)	Set pointer to 580 KC and peak signal while rocking gang condenser.
4. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Retrim for maximum output.
5. Repeat operation 3 if "BC" band trimmers are badly out of alignment.					
6. "SW 1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-5)	Set pointer to 6 MC and peak signal while rocking gang condenser.
7. "SW 2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-4) Ant. (C-3)	Set pointer to 21 MC and tune in signal with (C-4). Peak output with (C-3) while rocking gang condenser. When (C-4) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
8. "SW 2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions. Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope phosphor-bronze lead closer or farther away from the black lead. The moving should be done with an insulated rod or stick.
9. Repeat operation 7 if the Beam-a-Scope leads are moved in operation 8.					

FRONT OF CHASSIS



VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

VOLTAGES MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLTMETER.

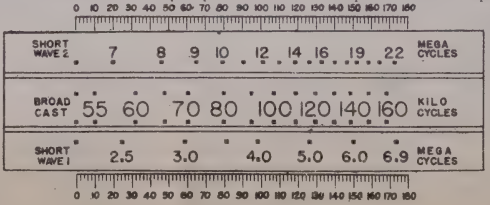
LINE VOLTS-117 NO SIGNAL INPUT. MAX. VOLUME. GANG CLOSED.

*VOLTS - A.C.

Fig. 5. Socket Voltages BOTTOM VIEW OF CHASSIS

Fig. 7.

Frequency-degree Reference Chart



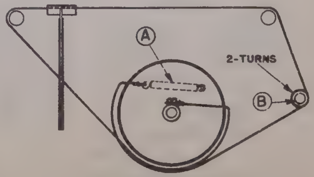
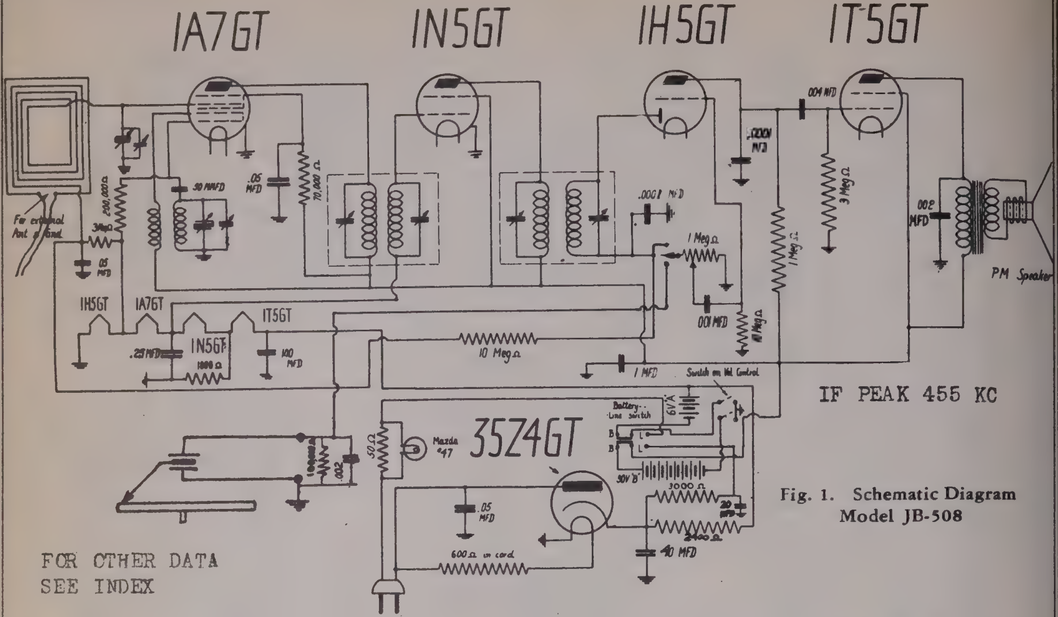


Fig. 2. Dial Drive Stringing Diagram



IF PEAK 455 KC

Fig. 1. Schematic Diagram Model JB-508

FOR OTHER DATA
SEE INDEX

MODEL J-71

Tubes

R.F. Amplifier	GE-6SK7
Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud., AVC	GE-6SQ7
Audio Driver	GE-6J5GT
Audio Output	GE-6Y6G
Rectifier	GE-5Y3G
Dial Lamp	(2) MAZDA No. 44

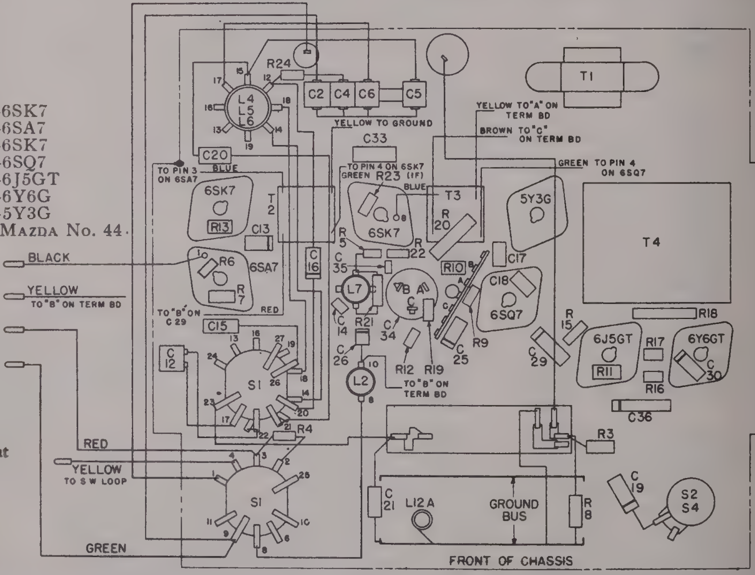


Fig. 6. Chassis Parts Layout

Note: The oscillator coil and band-switch terminals are numbered in the Chassis Parts Layout, Fig. 6, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 1. This numbering will also assist in rewiring if the coil or switch is replaced. I.F. transformer connections are shown as an aid in replacement.

SETTING UP THE RECEIVER

The following remarks will assist the serviceman in correctly setting up this receiver for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.

(2) The black speaker lead should be connected to the speaker terminal which is grounded to the speaker frame.

(3) A method of setting up station keys which will assure driftproof adjustments is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

GENERAL ELECTRIC CO.

SERVICE DATA

ver-all Dimensions

Model	JB-508	JB-513, JB-514
Height	9½ inches	11 inches
Width	14 inches	14½ inches
Depth	15 inches	5 inches
Wt. with batteries	19½ lbs.	13¾ lbs.

uning Control Drive Ratio........................6:1

lectrical Specifications

1. AC or DC Power Supply—105-125 Volts—40-60 cycles on AC
2. Battery Power Supply
   6 Volt "A" Supply, 90 Volt "B" supply

   Recommended batteries for 275-hour life (Maximum daily operation—4 hours)
   - (a) "A" Battery—one Eveready No. 747 or equivalent
   - (b) "B" Batteries—two Eveready No. 482 or equivalent

Tuning Frequency Range................540—1700 KC

Intermediate Frequency..................455 KC

Maximum Power Output................200 Milliwatts

Loudspeaker—Alnico Magnet Dynamic

Outside Cone Diameter......................5 inches

Voice Coil Impedance (400 cycles)...........3.5 ohms

Tubes

Converter and Oscillator	GE-1A7GT
I.F. Amplifier	GE-1N5GT
Det:, Aud., AVC	GE-1H5GT
Power Output	GE-1T5GT

BATTERY AND TUBE INSTALLATION

Models JB-513 and JB-514

The batteries may be installed or replaced without removing the Beam-a-Scope antenna from the chassis. Place the two "B" batteries on the bottom of the cabinet with the terminal sockets facing each other. Place the "A" battery on top of the "B" batteries with its terminal socket toward the left.

To replace tubes it is necessary to detach the Beam-a-Scope from the supporting blocks. Do not strain the two leads connected to the Beam-a-Scope.

Model JB-508

To install or replace batteries remove the five wood screws which hold the motorboard in place, and raise the panel. (Note—The motor crank must be removed from the crank socket before the panel can be raised.) The panel can be freed if the two plug connectors are pulled out of the socket terminals in the chassis apron.

Access to the battery compartment having been made, loosen the battery block held by the wing nuts. Place the two "B" batteries in the bottom sections, terminals inward, and insert the two 3-prong plug connectors. The "A" battery is placed on top of the "B" batteries with terminal toward the removable block and the 2-prong plug connector attached. Replace the battery block and tighten the wing nuts.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.....455 KC   Broadcast—1700 and 1500 KC

General Alignment Notes

This receiver must be removed from the carrying case in order to perform the alignment. Special care must be exercised to place the batteries, Beam-a-Scope and chassis in the same relative positions with respect to one another as these components occupied in the case; otherwise, alignment will not be satisfactory. When aligning Model JB-508 the radio-phono switch must be on "radio."

Rectifier

Models JB-508, JB-513..............GE-35Z4GT

Model JB-514......................GE-117Z6GT

GENERAL INFORMATION

The Models JB-513 and JB-514 are portable, five-tube, superheterodyne receivers which are designed to operate on any one of three types of power supplies as listed under electrical specifications. Features of design include power selector switch, built-in Beam-a-Scope, 5-inch dynapower speaker and automatic volume control. Model JB-508 and JB-513 have a dial light which operates when the receiver is connected to an AC or DC power supply.

The Model JB-508 is a portable radio-phonograph combination employing a radio chassis similar to JB-513. The phonograph consists of a spring-wound Swiss motor and crystal pick-up. The Swiss motor will play two 10-inch records with one winding. A speed regulator controls the speed above and below 78 R.P.M.

Model JB-514 has full Underwriters' approval.

To switch these models from battery to external power supply operation, open the small door in the side of the cabinet, slide the button switch to "Line," which is to the right, and insert the cord plug in a power supply of the proper voltage and frequency. The button switch selects the battery or line power supply.

When these models are working on batteries, they will perform as soon as turned "on." However, when operating on an external power supply, sufficient time must be allowed for the tubes to become heated. When operating from a DC source of power, it is necessary to insert the power plug with the proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

Outside antenna connections may be made to two black leads available in the chassis compartment.

I.F. Alignment

With batteries, Beam-a-Scope and chassis in position for alignment as mentioned above, connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 KC. Attach the test oscillator output leads to the two flexible leads of the Beam-a-Scope antenna. Keep the test oscillator output as low as a readable meter reading will permit. Adjust all I.F. trimmers for maximum output.

R.F. Alignment

Connect the signal generator output leads to the two flexible leads on the receiver Beam-a-Scope. Adjust the signal generator to 1700 KC and set the tuning condenser to minimum capacity. Turn the trimmer screw of the cut section of the tuning condenser (oscillator) until the signal is tuned in on the receiver. Change the signal to 1500 KC, retune the tuning condenser to this frequency and adjust the trimmer screw of the antenna section for maximum output.

VOLTAGE CHART

(Receiver connected to 120 Volt AC line)

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Filament to Gnd. Volts	Filament Volts
1A7GT	92	38	3.2	1.6
1N5GT	92	92	4.8	1.6
1H5GT	10		1.6	1.6
1T5GT	88	92	6.4	1.6
35Z4GT*	120 AC		125 Cathode to Gnd.	30
117Z6GT**	120 AC		125 Cathode to Gnd.	120 AC

* Used only in Models JB-513 and JB-508.

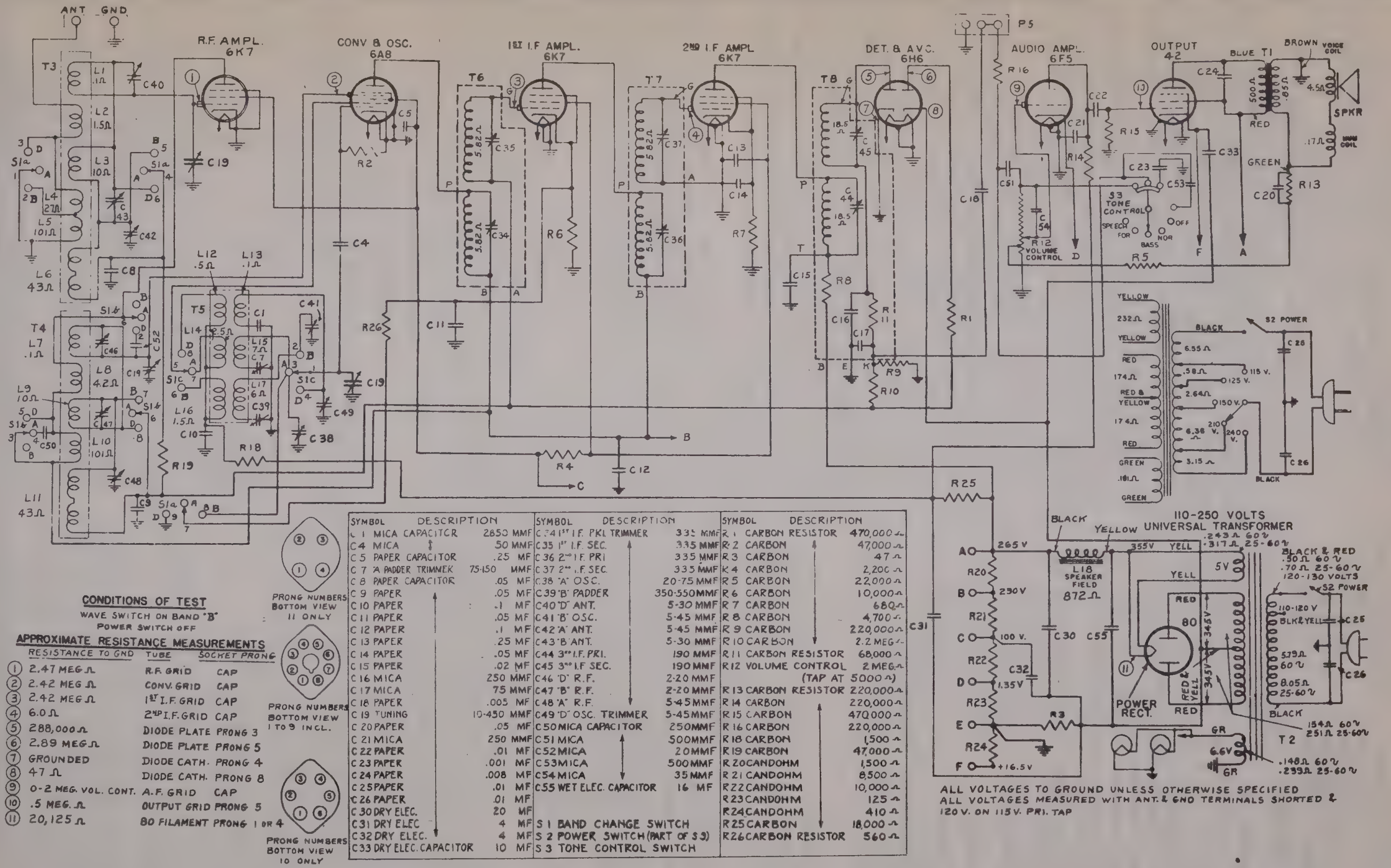
**Used only in Model JB-514.

Line—120 Volts AC.

Maximum Volume—Gang Closed—No signal input.

All voltages measured to chassis ground in Models JB-508 and JB-513.

Voltages measured to B minus in Model JB-514.



ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES MEASURED WITH ANT. & GND TERMINALS SHORTED & 120 V. ON 115 V. PRI. TAP

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION	
C 1	MICA CAPACITOR	2850 MMF	C 34	1ST I.F. PRI. TRIMMER	335 MMF	R 1	CARBON RESISTOR	470,000 Ω
C 4	MICA	50 MMF	C 35	1ST I.F. SEC.	335 MMF	R 2	CARBON	47,000 Ω
C 5	PAPER CAPACITOR	.25 MF	C 36	2ND I.F. PRI	335 MMF	R 3	CARBON	47 Ω
C 7	'A' PADDER TRIMMER	75-150 MMF	C 37	2ND I.F. SEC.	335 MMF	R 4	CARBON	2,200 Ω
C 8	PAPER CAPACITOR	.05 MF	C 38	'A' OSC.	20-75 MMF	R 5	CARBON	22,000 Ω
C 9	PAPER	.05 MF	C 39	'B' PADDER	350-550 MMF	R 6	CARBON	10,000 Ω
C 10	PAPER	.1 MF	C 40	'D' ANT.	5-30 MMF	R 7	CARBON	680 Ω
C 11	PAPER	.05 MF	C 41	'B' OSC.	5-45 MMF	R 8	CARBON	4,700 Ω
C 12	PAPER	.1 MF	C 42	'A' ANT.	5-45 MMF	R 9	CARBON	220,000 Ω
C 13	PAPER	.25 MF	C 43	'B' ANT.	5-30 MMF	R 10	CARBON	2.2 MEG Ω
C 14	PAPER	.05 MF	C 44	3RD I.F. PRI.	190 MMF	R 11	CARBON RESISTOR	68,000 Ω
C 15	PAPER	.02 MF	C 45	3RD I.F. SEC.	190 MMF	R 12	VOLUME CONTROL	2 MEG Ω
C 16	MICA	250 MMF	C 46	'D' R.F.	2-20 MMF		(TAP AT 5000 Ω)	
C 17	MICA	75 MMF	C 47	'B' R.F.	2-20 MMF	R 13	CARBON RESISTOR	220,000 Ω
C 18	PAPER	.005 MF	C 48	'A' R.F.	5-45 MMF	R 14	CARBON	220,000 Ω
C 19	TUNING	10-450 MMF	C 49	'D' OSC. TRIMMER	5-45 MMF	R 15	CARBON	470,000 Ω
C 20	PAPER	.05 MF	C 50	MICA CAPACITOR	250 MMF	R 16	CARBON	220,000 Ω
C 21	MICA	250 MMF	C 51	MICA	500 MMF	R 18	CARBON	1,500 Ω
C 22	PAPER	.01 MF	C 52	MICA	20 MMF	R 19	CARBON	47,000 Ω
C 23	PAPER	.001 MF	C 53	MICA	500 MMF	R 20	CANDOHM	1,500 Ω
C 24	PAPER	.008 MF	C 54	MICA	35 MMF	R 21	CANDOHM	8,500 Ω
C 25	PAPER	.01 MF	C 55	WET ELEC. CAPACITOR	16 MF	R 22	CANDOHM	10,000 Ω
C 26	PAPER	.01 MF				R 23	CANDOHM	125 Ω
C 30	DRY ELEC.	20 MF				R 24	CANDOHM	410 Ω
C 31	DRY ELEC	4 MF	S 1	BAND CHANGE SWITCH		R 25	CARBON	18,000 Ω
C 32	DRY ELEC.	4 MF	S 2	POWER SWITCH (PART OF S 3)		R 26	CARBON RESISTOR	560 Ω
C 33	DRY ELEC. CAPACITOR	10 MF	S 3	TONE CONTROL SWITCH				

CONDITIONS OF TEST

WAVE SWITCH ON BAND "B"
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GND	TUBE	SOCKET PRONG
①	2.47 MEG Ω	R.F. GRID	CAP
②	2.42 MEG Ω	CONV. GRID	CAP
③	2.42 MEG Ω	1ST I.F. GRID	CAP
④	6.0 Ω	2ND I.F. GRID	CAP
⑤	288,000 Ω	DIODE PLATE	PRONG 3
⑥	2.89 MEG Ω	DIODE PLATE	PRONG 5
⑦	GROUNDED	DIODE CATH.	PRONG 4
⑧	47 Ω	DIODE CATH.	PRONG 8
⑨	0-2 MEG. VOL. CONT.	A.F. GRID	CAP
⑩	.5 MEG. Ω	OUTPUT GRID	PRONG 5
⑪	20,125 Ω	80 FILAMENT	PRONG 1 OR 4

POWER CONSUMPTION-- 95 WATTS

Tuning Frequency Range

Band "A"	140-380 kc.
Band "B"	540-1620 kc.
Band "D"	5800-18,000 kc.
Intermediate Frequency	455 kc.

FOR OTHER DATA
SEE INDEX

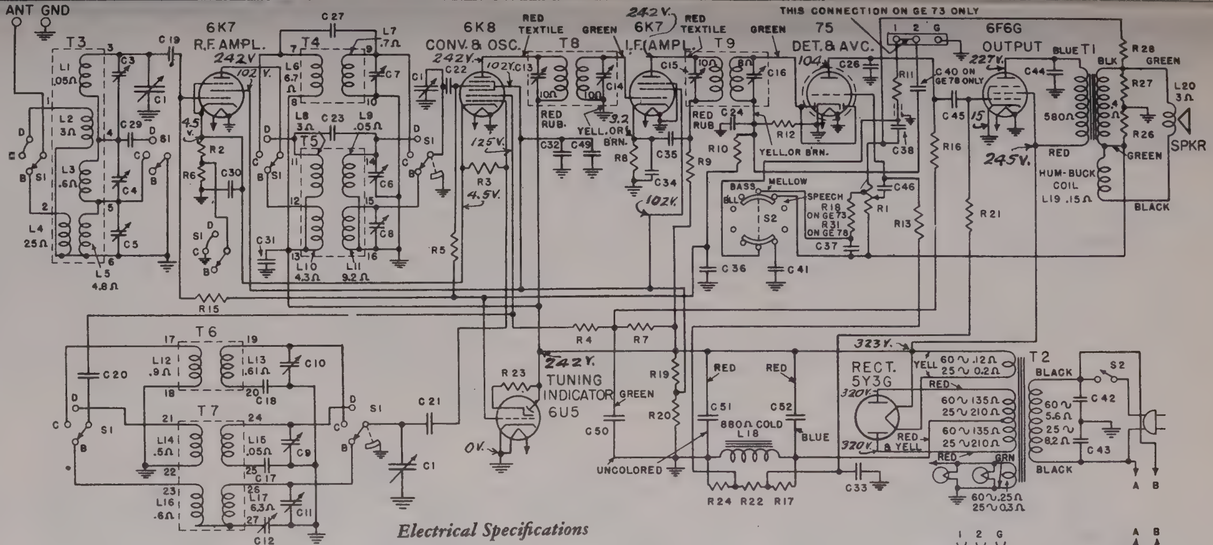
-1940-

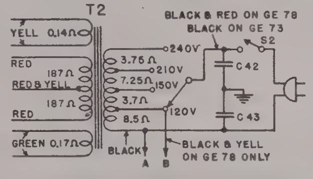
Electrical Output

Undistorted	2.5 watts
Maximum	5.0 watts

Loud-speaker—Electrodynamic

Cone:	Model FE-82	8 inch
	Model FE-87	12 inch
Voice Coil Impedance		5.5 ohms at 400 cycles





UNIVERSAL POWER TRANSFORMER

Electrical Specifications

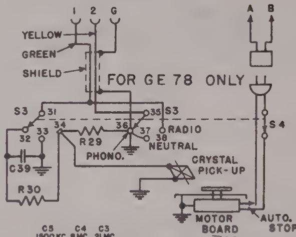
Model GE-73
Rating "A," 115–125 volts, 50–60 cycles, 80 watts
Rating "V," 115–250 volts, 50–60 cycles, 85 watts
Model GE-78
Rating "V-6," 115–250 volts, 60 cycles, 115 watts
Rating "V-5," 115–250 volts, 50 cycles, 115 watts
Rating "C-4," 115–125 volts, 40 cycles, 115 watts

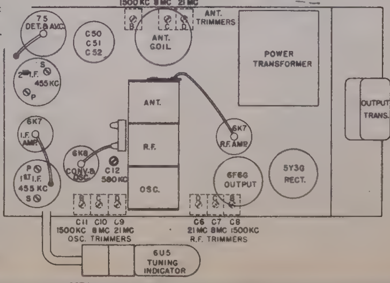
COMPONENTS MARKED WITH (*) ON LIST BELOW ARE USED IN MODEL GE-78 ONLY.

-1940-

I.F. 455 KC

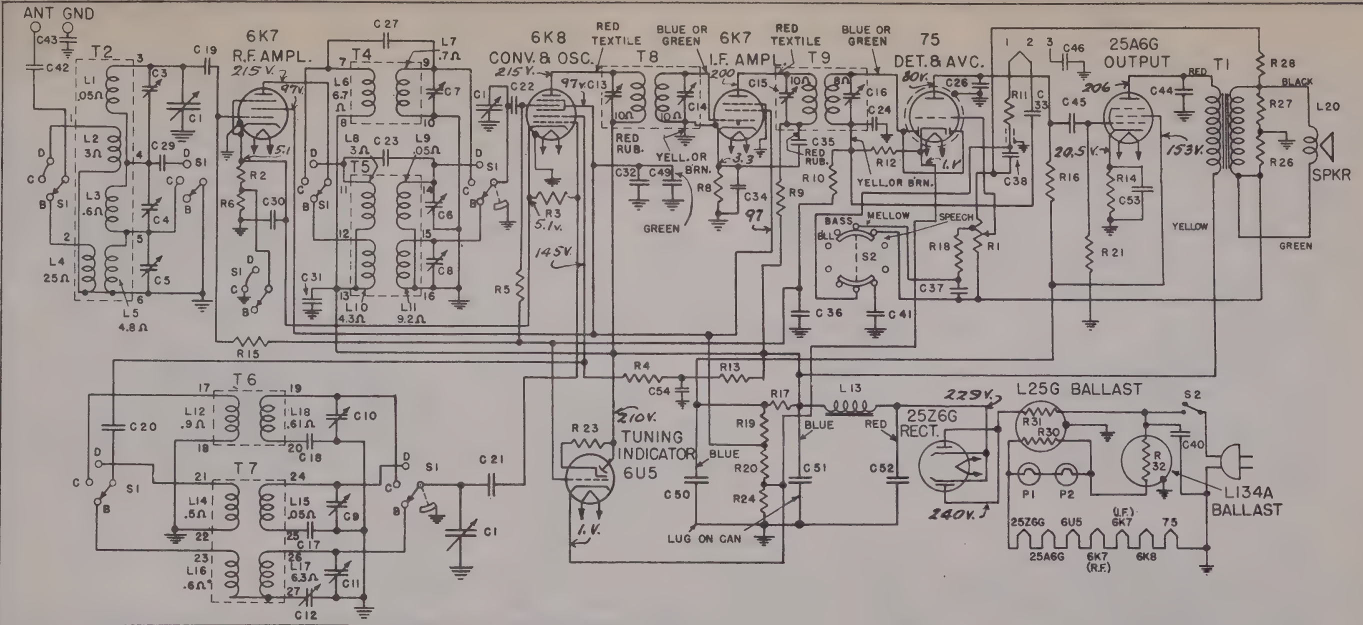
FOR OTHER DATA SEE INDEX





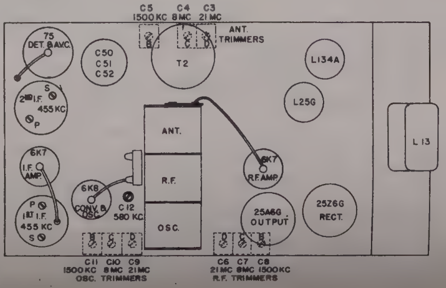
Symbol	Description	Symbol	Description	Symbol	Description
C1	450 Mmf. Tuning Condenser	*C40	.5 Mfd. Paper Capacitor	R10	2.2 Megohm Carbon Resistor
C3, C4, C5	Antenna Trimmer Capacitor	C41	.0015 Mfd. Paper Capacitor	R11	47,000 Ohm Carbon Resistor
C6, C7, C8	R.F. Trimmer Capacitor	C42, C43	.01 Mfd. Paper Capacitor	R12	330,000 Ohm Carbon Resistor
C9, C10, C11	Oscillator Trimmer Capacitor	C44	.008 Mfd. Paper Capacitor	R13	2.2 Megohm Carbon Resistor
C12	400–650 Mmf. Padder Capacitor	C45, C46	.05 Mfd. Paper Capacitor	R15	560,000 Ohm Carbon Resistor
C17	2400 Mmf. Mica Capacitor	C49	8 Mfd. Dry Electrolytic Capacitor	R16	330,000 Ohm Carbon Resistor
C18	1600 Mmf. Mica Capacitor	C50, C51, C52	Filter Dry Electrolytic Capacitor	R17	390,000 Ohm Carbon Resistor
C19 C20	390 Mmf. Mica Capacitor	T1	Output Transformer	R18	100,000 Ohm Carbon Resistor
C21	50 Mmf. Mica Capacitor	T2	Power Transformer	R19	8,200 Ohm Carbon Resistor
C22	390 Mmf. Mica Capacitor	S1	Band Change Switch	R20	15,000 Ohm Carbon Resistor
C23	15 Mmf. Mica Capacitor	S2	Tone and Power Switch	R21	470,000 Ohm Carbon Resistor
C24	100 Mmf. Mica Capacitor	*S3	Phono-Radio Switch	R22	82,000 Ohm Carbon Resistor
C26	220 Mmf. Mica Capacitor	R1	2.0 Megohm Volume Control	R23	1.0 Megohm Carbon Resistor
C27	15 Mmf. Mica Capacitor	R2	120 Ohm Carbon Resistor	R24	8,200 Ohm Carbon Resistor
C29	.0045 Mfd. Paper Capacitor	R3	47,000 Ohm Carbon Resistor	R26	22 Ohm, Carbon Resistor
C30, C31, C32	.05 Mfd. Paper Capacitor	R4	2,200 Ohm Carbon Resistor	R27	100 Ohm Carbon Resistor
C33	.25 Mfd. Paper Capacitor	R5	560,000 Ohm Carbon Resistor	R28	3.3 Megohm Carbon Resistor
C34, C35, C36	.05 Mfd. Paper Capacitor	R6	180 Ohm Carbon Resistor	*R29	100,000 Ohm Carbon Resistor
C37	.003 Mfd. Paper Capacitor	R7	15,000 Ohm Carbon Resistor	*R30	47,000 Ohm Carbon Resistor
C38	.005 Mfd. Paper Capacitor	R8	330 Ohm Carbon Resistor	*R31	220,000 Ohm Carbon Resistor
*C39	.001 Mfd. Paper Capacitor	R9	2200 Ohm Carbon Resistor		

GENERAL ELECTRIC CO.



Symbol	Description	Symbol	Description
C1	450 Mmf. Tuning Condenser	S1	Band Change Switch
C3, C4, C5	Antenna Trimmer Capacitor	S2	Tone and Power Switch
C6, C7, C8	R.F. Trimmer Capacitor	R1	2.0 Megohm Volume Control
C9, C10, C11	Oscillator Trimmer Capacitor	R2	120 Ohm Carbon Resistor
C12	400–650 Mmf. Padder Capacitor	R3	47,000 Ohm Carbon Resistor
C17	2400 Mmf. Mica Capacitor	R4	2,200 Ohm Carbon Resistor
C18	1600 Mmf. Mica Capacitor	R5	560.000 Ohm Carbon Resistor
C19, C20	390 Mmf. Mica Capacitor	R6	180 Ohm Carbon Resistor
C21	50 Mmf. Mica Capacitor	R8	470 Ohm Carbon Resistor
C22	390 Mmf. Mica Capacitor	R9	2200 Ohm Carbon Resistor
C23	15 Mmf. Mica Capacitor	R10	2.2 Megohm Carbon Resistor
C24	100 Mmf. Mica Capacitor	R11	47,000 Ohm Carbon Resistor
C26	220 Mmf. Mica Capacitor	R12	330,000 Ohm Carbon Resistor
C27	15 Mmf. Mica Capacitor	R13	10,000 Ohm Carbon Resistor
C29	.0045 Mfd. Paper Capacitor	R14	470 Ohm Carbon Resistor
C30, C31, C32	.05 Mfd. Paper Capacitor	R15	560,000 Ohm Carbon Resistor
C33	.01 Mfd. Paper Capacitor	R16	330,000 Ohm Carbon Resistor
C34, C35, C36	.05 Mfd. Paper Capacitor	R17	2,200 Ohm Carbon Resistor
C37	.004 Mfd. Paper Capacitor	R18	100,000 Ohm Carbon Resistor
C38	.005 Mfd. Paper Capacitor	R19	3,300 Ohm Carbon Resistor
C40	.05 Mfd. Paper Capacitor	R20	10,000 Ohm Carbon Resistor
C41	.0015 Mfd. Paper Capacitor	R21	470,000 Ohm Carbon Resistor
C42, C43	.01 Mfd. Paper Capacitor	R23	1.0 Megohm Carbon Resistor
C44	.008 Mfd. Paper Capacitor	R24	82 Ohm Carbon Resistor
C45	.05 Mfd. Paper Capacitor	R26, R27	100 Ohm Carbon Resistor
C46	.25 Mfd. Paper Capacitor	R28	1.2 Megohm Carbon Resistor
C49–C52	Dry Electrolytic Filter Capacitor	R30, R31	Ballast resistance, L25G
C53	10 Mfd. Dry Electrolytic Capacitor	R32	455 Ohm 50 W. W.W. Resistor
C54	8 Mfd. Dry Electrolytic Capacitor		
T1	Output Transformer		

Model GDE-73
220–240 volts A.C., 40–100 cycles, 105 watts
220–240 volts D.C., 105 watts

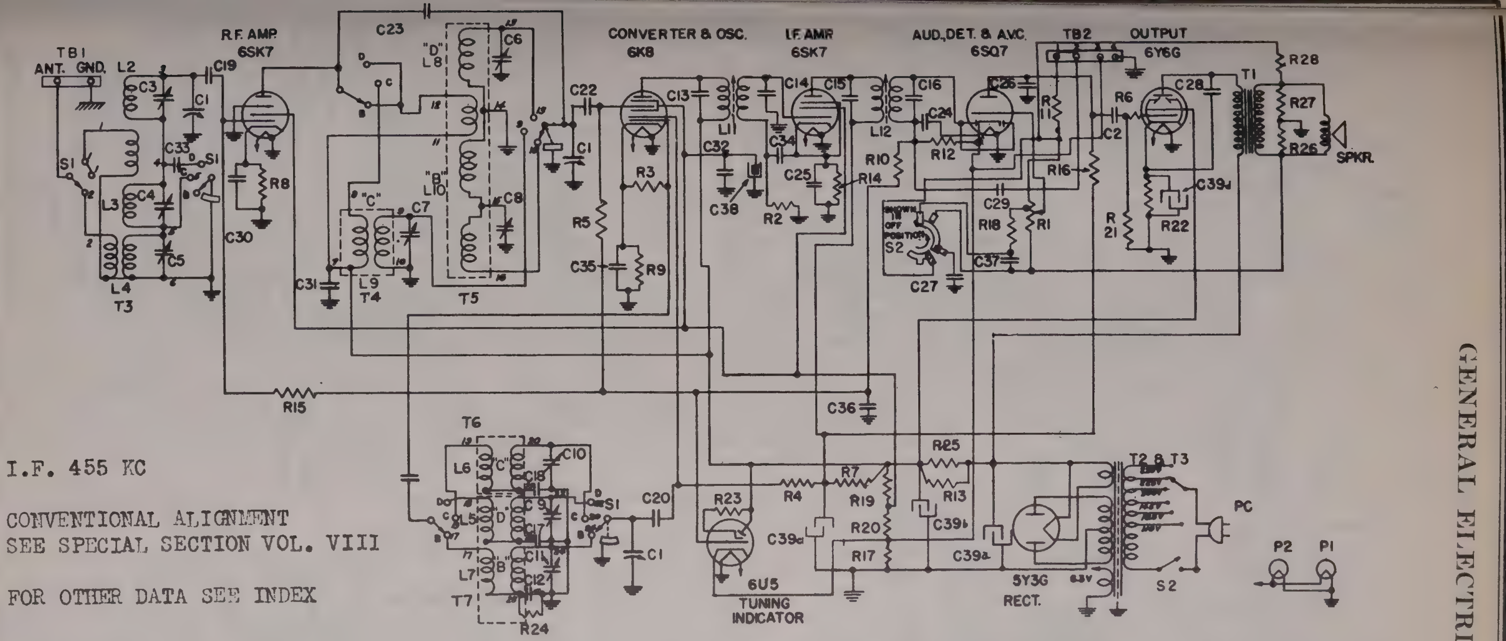


-1940-
I.F. 455 KC

FOR OTHER DATA
SEE INDEX

MODEL FE-74

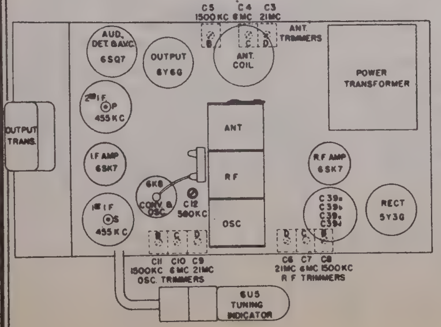
GENERAL ELECTRIC CO.



I.F. 455 KC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

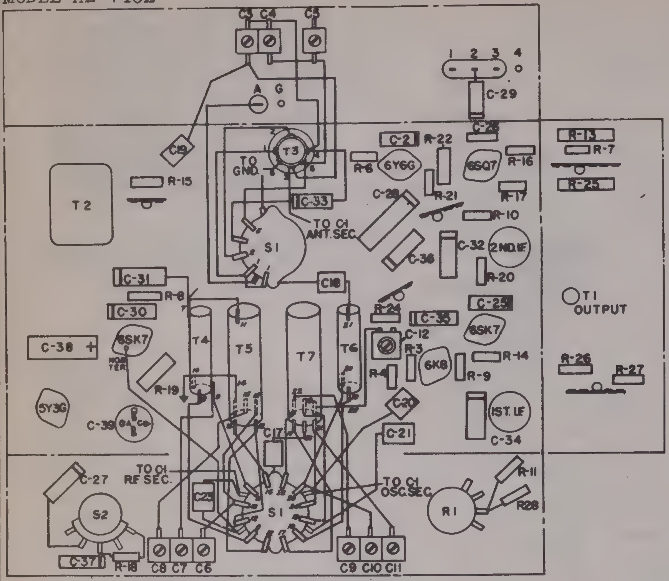
FOR OTHER DATA SEE INDEX



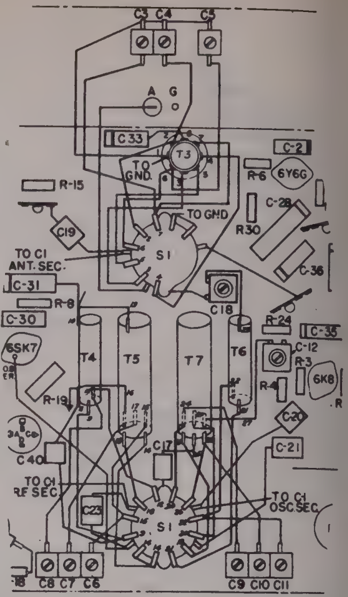
Symbol	Description	Symbol	Description	Symbol	Description
C1	450 Mmf. Tuning Condenser	C28	.03 Mfd. 1500 V. Paper	R7	1,000 Ohms, ½-w. Carbon
C2	.05 Mfd. 600 V. Paper	C29	.002 Mfd. 600 V. Paper	R8	560 Ohms, ½-w. Carbon
C3	5-40 Mmf. "D" Ant. Trimmer	C30	.05 Mfd. 200 V. Paper	R9	220 Ohms, ½-w. Carbon
C4	3-30 Mmf. "C" Ant. Trimmer	C31	.05 Mfd. 600 V. Paper	R10	2.2 Megohms, ½-w. Carbon
C5	2-20 Mmf. "B" Ant. Trimmer	C32	.05 Mfd. 600 V. Paper	R11	47,000 Ohms, ½-w. Carbon
C6	3-30 Mmf. "D" R.F. Trimmer	C33	.006 Mfd. 600 V. Paper ±5%	R12	330,000 Ohms, ½-w. Carbon
C7	3-30 Mmf. "C" R.F. Trimmer	C34	.05 Mfd. 200 V. Paper	R13	3,900 Ohms, 2-w. Carbon
C8	3-30 Mmf. "B" R.F. Trimmer	C35	.05 Mfd. 200 V. Paper	R14	330 Ohms, ½-w. Carbon
C9	3-30 Mmf. "D" Osc. Trimmer	C36	.05 Mfd. 200 V. Paper	R15	560,000 Ohms, ½-w. Carbon
C10	3-30 Mmf. "C" Osc. Trimmer	C37	.003 Mfd. 600 V. Paper	R16	330,000 Ohms, ½-w. Carbon
C11	5-45 Mmf. "B" Osc. Trimmer	C38	8 Mfd. 250 V. Dry Elec.	R17	150 Ohms, ½-w. Carbon
C12	300-650 Mmf. "B" Osc. Padder	C39a	40 Mfd. 350 V. Dry Elec.	R18	220,000 Ohms, ½-w. Carbon
C17	2800 Mmf. Mica ±5%	C39b	20 Mfd. 300 V. Dry Elec.	R19	2,700 Ohms, 2-w. Carbon
C18	1600 Mmf. Mica ±5%	C39c	20 Mfd. 300 V. Dry Elec.	R20	15,000 Ohms, 1-w. Carbon
C19	470 Mmf. Mica	C39d	20 Mfd. 25 V. Dry Elec.	R21	470,000 Ohms, ½-w. Carbon
C20	470 Mmf. Mica	P1	Pilot Light, MAZDA No. 44	R22	220 Ohms, 2-w. Carbon ±5%
C21	50 Mmf. Mica	P2	Pilot Light, MAZDA No. 44	R23	1.0 Megohms, ½-w. Carbon
C22	470 Mmf. Mica	R1	2.0 Megohms Volume Control	R24	5,600 Ohms, ½-w. Carbon
C23	10 Mmf. Mica	R2	330,000 Ohms, ½-W. Carbon	R25	3,900 Ohms, 2-w. Carbon
C24	100 Mmf. Mica	R3	33,000 Ohms, ½-W. Carbon	R26	22 Ohms, ½-w. Carbon
C25	.04 Mfd. 600 V. Paper	R4	15,000 Ohms, ½-W. Carbon	R27	100 Ohms, ½-w. Carbon
C26	220 Mmf. Mica	R5	560,000 Ohms, ½-W. Carbon	R28	5.6 Megohms, ½-w. Carbon
C27	.00075 Mfd. 600 V. Paper	R6	1,000 Ohms, ½-W. Carbon		

MODEL HE-74
MODEL HE-74L
MODEL HE-740
MODEL HE-740L

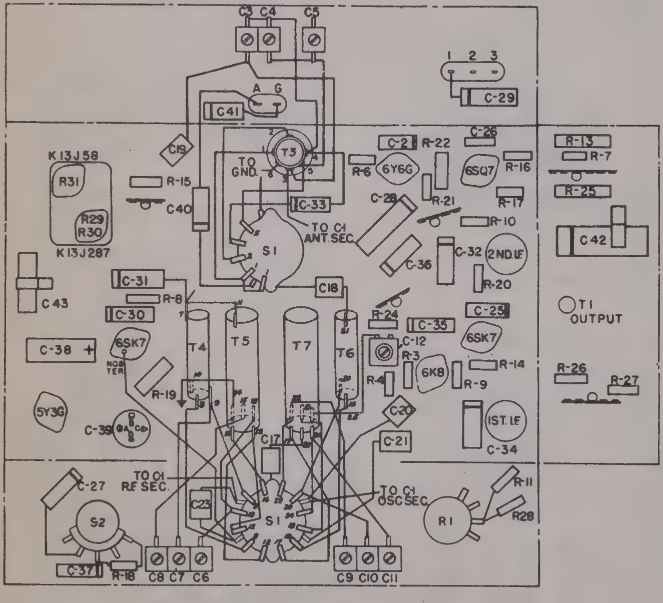
GENERAL ELECTRIC CO.



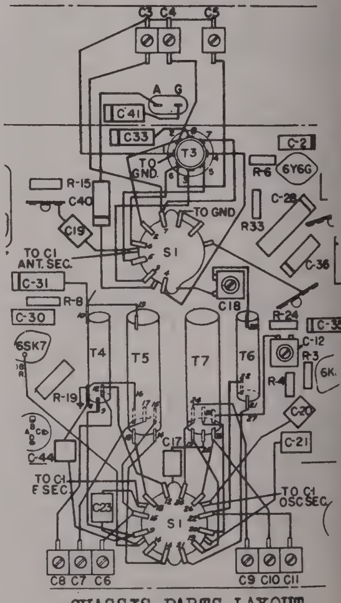
CHASSIS PARTS LAYOUT
MODEL HE-74



CHASSIS PARTS LAYOUT
(PARTIAL)
MODEL HE-74L
BALANCE SAME AS HE-74



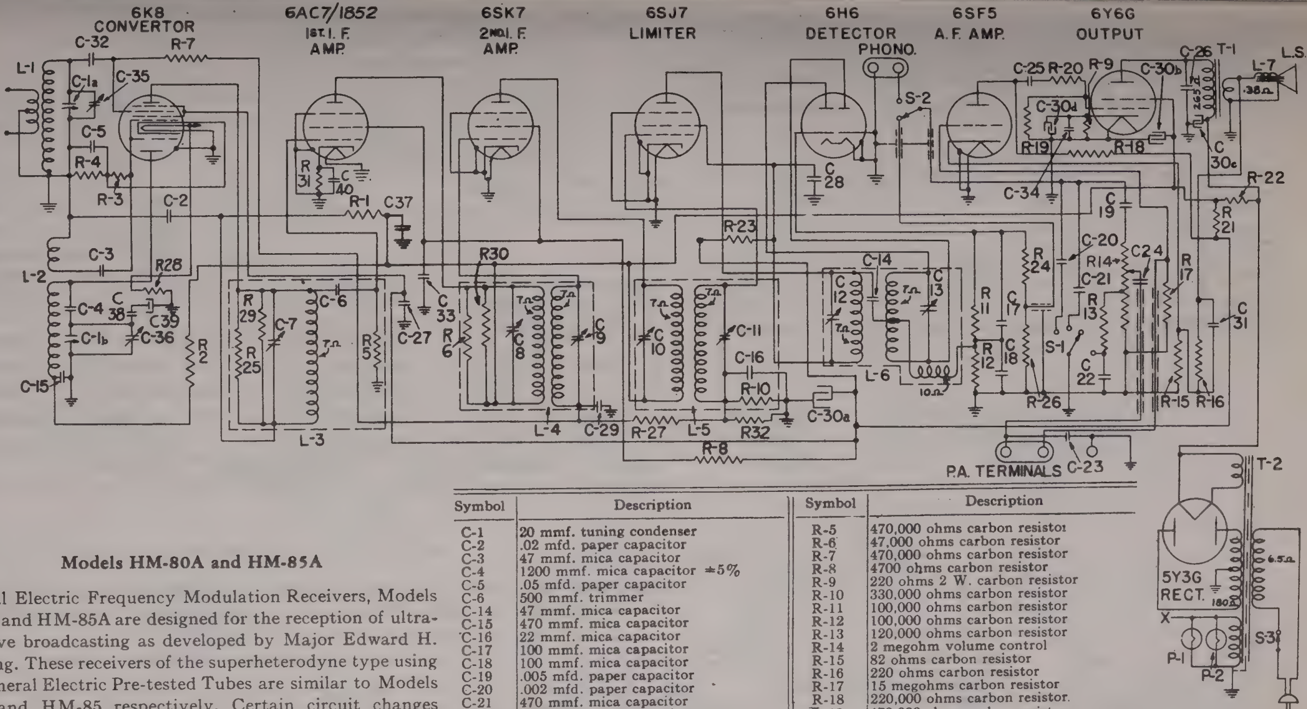
CHASSIS PARTS LAYOUT
MODEL HE-740



CHASSIS PARTS LAYOUT
MODEL HE-740L
(PARTIAL)
BALANCE SAME AS HE740

GENERAL ELECTRIC CO.

MODELS HM-80A
HM-85A



Models HM-80A and HM-85A

General Electric Frequency Modulation Receivers, Models HM-80A and HM-85A are designed for the reception of ultra-short-wave broadcasting as developed by Major Edward H. Armstrong. These receivers of the superheterodyne type using eight General Electric Pre-tested Tubes are similar to Models HM-80 and HM-85 respectively. Certain circuit changes have been incorporated in the Models HM-80A and HM-85A to increase sensitivity, improve limiter action, and assure greater stability. A revised schematic diagram and additional replacement parts list are incorporated in this sheet.

For specifications, general information and alignment procedure, refer to HM -80 Service Notes. The tube complement is altered by the substitution of a 6AC7/1852 in place of the 6SK7 1st I.F. amplifier tube.

OSCILLATOR DRIFT CORRECTION NETWORK

The placement of the parts comprising this network materially affects the amount of oscillator drift correction. For maximum performance the positions of the 47-ohm, 1-watt resistor (R-28) and the 5-mmf. compensating capacitor (C-39) should be adjusted until they are parallel and separated by exactly $\frac{1}{16}$ inch.

Symbol	Description
C-1	20 mmf. tuning condenser
C-2	.02 mfd. paper capacitor
C-3	47 mmf. mica capacitor
C-4	1200 mmf. mica capacitor ±5%
C-5	.05 mfd. paper capacitor
C-6	500 mmf. trimmer
C-14	47 mmf. mica capacitor
C-15	470 mmf. mica capacitor
C-16	22 mmf. mica capacitor
C-17	100 mmf. mica capacitor
C-18	100 mmf. mica capacitor
C-19	.005 mfd. paper capacitor
C-20	.002 mfd. paper capacitor
C-21	470 mmf. mica capacitor
C-22	.002 mfd. paper capacitor
C-23	220 mmf. mica capacitor
C-24	.005 mfd. paper capacitor
C-25	.05 mfd. paper capacitor
C-26	.005 mfd. paper capacitor
C-27	.005 mfd. paper capacitor
C-28	.05 mfd. paper capacitor
C-29	.05 mfd. paper capacitor
C-30a	20 mfd. 250 V. dry electrolytic
C-30b	20 mfd. 250 V. dry electrolytic
C-30c	40 mfd. 250 V. dry electrolytic
C-30d	20 mfd. 25 V. dry electrolytic
C-31	0.1 mfd. paper capacitor
C-32	470 mmf. mica capacitor
C-33	0.1 mfd. paper capacitor
C-34	.05 mfd. paper capacitor
C-35	2-15 mmf. antenna trimmer
C-36	7-23 mmf. air trimmer
C-37	.05 mfd. paper capacitor
C-38	20 mmf. mica capacitor
C-39	5 mmf. compensating capacitor
C-40	.01 mfd. paper capacitor
R-1	2200 ohms carbon resistor
R-2	6800 ohms carbon resistor
R-3	47,000 ohms carbon resistor
R-4	330 ohms carbon resistor

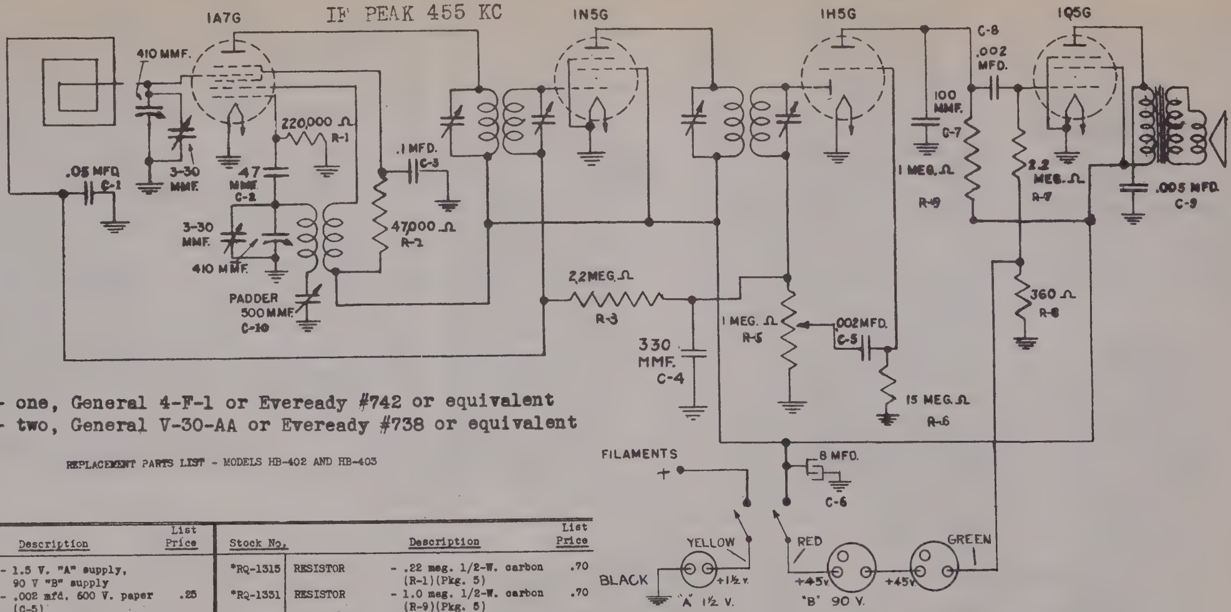
Symbol	Description
R-5	470,000 ohms carbon resistor
R-6	47,000 ohms carbon resistor
R-7	470,000 ohms carbon resistor
R-8	4700 ohms carbon resistor
R-9	220 ohms 2 W. carbon resistor
R-10	330,000 ohms carbon resistor
R-11	100,000 ohms carbon resistor
R-12	100,000 ohms carbon resistor
R-13	120,000 ohms carbon resistor
R-14	2 megohm volume control
R-15	82 ohms carbon resistor
R-16	220 ohms carbon resistor
R-17	15 megohms carbon resistor
R-18	220,000 ohms carbon resistor.
R-19	470,000 ohms carbon resistor
R-20	1500 ohms carbon resistor
R-21	2200 ohms 1 W. carbon resistor
R-22	1600 ohms 3½ W. wire wound resistor
R-23	2200 ohms carbon resistor
R-24	100,000 ohms carbon resistor
R-25	33,000 ohms carbon resistor
R-26	220,000 ohms carbon resistor
R-27	2.2 megohms carbon resistor
R-28	47 ohms 1 W. carbon resistor
R-29	33,000 ohms carbon resistor
R-30	47,000 ohms carbon resistor
R-31	150 ohms carbon resistor
R-32	100,000 ohms carbon resistor
S-1	Tone switch
S-2	Phono switch
S-3	Power switch—on S-2
L-1	Antenna transformer
L-2	Oscillator transformer
L-3	1st I.F. transformer
L-4	2nd I.F. transformer
L-5	I.F. limiter
L-6	Discrim. transformer
P-1	Dial lamp, Mazda No. 44
P-2	Dial lamp, Mazda No. 44

FOR MODEL HM-80
SEE INDEX

FOR OTHER DATA
SEE INDEX

MODELS HB-402
HB-403

GENERAL ELECTRIC CO.



"A" supply - one, General 4-F-1 or Eveready #742 or equivalent
"B" supply - two, General V-30-AA or Eveready #738 or equivalent

REPLACEMENT PARTS LIST - MODELS HB-402 AND HB-403

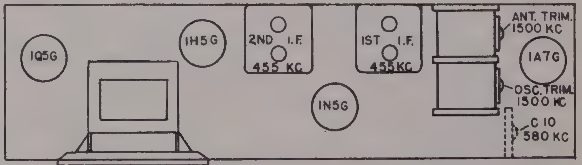
Stock No.		Description	List Price
RB-325	BATTERY	- 1.5 V. "A" supply, 90 V "B" supply	
*RC-011	CAPACITOR	- .002 mfd. 600 V. paper (C-5)	.25
*RC-023	CAPACITOR	- .005 mfd. 600 V. paper (C-9)	.25
*RC-072	CAPACITOR	- .05 mfd. 200 V. paper (C-1)	.25
*RC-102	CAPACITOR	- 0.1 mfd. 100 V. paper (C-3)	.30
RC-232	CAPACITOR	- 47 mmf. mica (C-2)	.25
*RC-235	CAPACITOR	- 100 mmf. mica (C-7)	.25
*RC-274	CAPACITOR	- 330 mmf. mica (C-4)	.30
RC-743	CONDENSER	- Tuning Condenser	2.15
RC-5131	CAPACITOR	- 8 mfd. 150 V. dry electrolytic (C-6)	.55
RC-6508	CAPACITOR	- Oscillator padding capacitor (C-10)	.30
RC-8119	CABLE	- Tuning drive cord and spring	.15
RD-107	DIAL	- Dial scale	.30
RL-286	COIL	- Oscillator coil	.40
RL-503	LOOP	- Antenna loop	1.20
RP-126	POINTER	- Dial pointer	.15
RQ-1248	RESISTOR	- 360 ohms, 1/2-W. carbon (R-8)(Pkg. 5)	.70
*RQ-1299	RESISTOR	- 47,000 ohms, 1/2-W. carbon (R-2)(Pkg. 5)	.70

Stock No.		Description	List Price
*RQ-1315	RESISTOR	- .22 meg. 1/2-W. carbon (R-1)(Pkg. 5)	.70
*RQ-1331	RESISTOR	- 1.0 meg. 1/2-W. carbon (R-9)(Pkg. 5)	.70
*RQ-1339	RESISTOR	- 2.2 meg. 1/2-W. carbon (R-3)(Pkg. 5)	.70
*RQ-1365	RESISTOR	- 15 meg. 1/4 W. carbon (R-6)(Pkg. 5)	.70
*RS-238	SOCKET	- Octal tube socket	.15
RS-874	SCREW	- Ornamental wood screw for cabinet back (Pkg.10)	.15
RS-923	SHAFT	- Tuning drive shaft	.10
RS-1010	SPEAKER	- 4-inch permanent magnet speaker	3.25

Stock No.		Description	List Price
RT-311	TRANSFORMER	- 1st IF transformer	1.80
RT-312	TRANSFORMER	- 2nd IF transformer	1.30
RV-066	VOLUME CONTROL	- 1 meg. volume control (R-5)	.80
RW-036	WINDOW	- Dial scale window	.20

*Used on previous receivers.

(Prices subject to change without notice.)



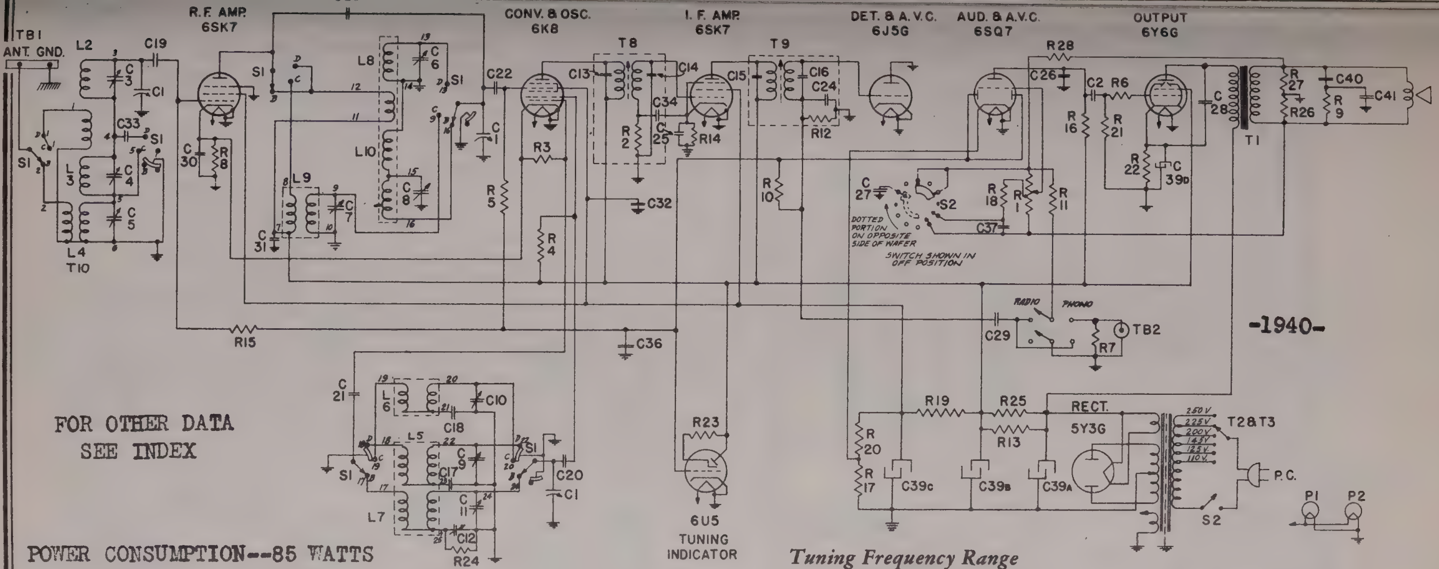
TRIMMER LOCATION FIG. 1

ALIGNMENT FREQUENCIES .... IF - 455 KC Broadcast - 1500 KC and 580 KC

NOTE:- The chassis must be removed from the carrying case when aligning. Since the location of the back cover, loop, chassis and battery affect alignment considerably, the position of these components when aligning should duplicate that found in the carrying case. A non-metallic object should be used to hold the back cover-loop assembly in position during alignment.

GENERAL ELECTRIC CO.

MODELS JE-81
JE-810



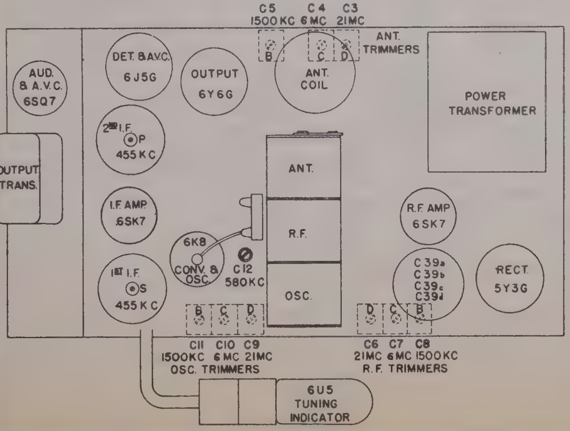
FOR OTHER DATA SEE INDEX

POWER CONSUMPTION--85 WATTS

Tuning Frequency Range

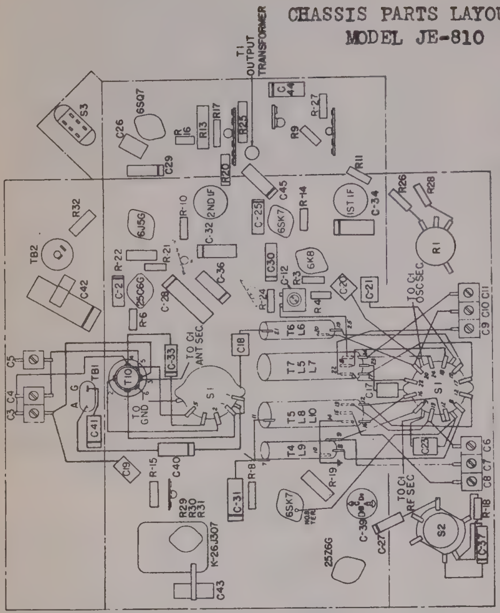
Intermediate Frequency..........................455 K.C.

Band "B"..........................540–1600 K.C.
Band "C"..........................2200-7000 K.C.
Band "D"..........................7000–22,000 K.C.



Symbol	Description	Symbol	Description	Symbol	Description
C1	Tuning Condenser	C31	.05 Mfd. 600 V. Paper	R4	22,000 Ohms Carbon
C2	.05 Mfd. 600 V. paper.	C32	.05 Mfd. 600 V. Paper	R5	560,000 Ohms Carbon
C3	5–40 Mmf. "D" Ant. Trimmer	C33	.006 Mfd. 600 V. Paper	R6	1000 Ohms Carbon
C4	3–30 Mmf. "C" Ant. Trimmer	C34	.05 Mfd. 200 V. Paper	R7	220,000 Ohms Carbon
C5	2–20 Mmf. "B" Ant. Trimmer	C36	.05 Mfd. 200 V. Paper	R8	120 Ohms Carbon
C6	3–30 Mmf. "D" R.F. Trimmer	C37	.002 Mfd. 600 V. Paper	R9	220 Ohms Carbon
C7	3–30 Mmf. "C" R.F. Trimmer	C39a	40 Mfd. 300 V. Dry Electrolytic	R10	2.2 Megohms Carbon
C8	3–30 Mmf. "B" R.F. Trimmer	C39b	50 Mfd. 250 V. Dry Electrolytic	R11	47,000 Ohms Carbon
C9	3–30 Mmf. "D" Osc. Trimmer	C39c	20 Mfd. 250 V. Dry Electrolytic	R12	330,000 Ohms Carbon
C10	3–30 Mmf. "C" Osc. Trimmer	C39d	20 Mfd. 25 V. Dry Electrolytic	R13	4700 Ohms 2 W. Carbon
C11	5–45 Mmf. "B" Osc. Trimmer	C40	0.1 Mfd. 200 V. Paper	R14	330 Ohms Carbon
C12	300–650 Mmf. "B" Osc. Padder.	C41	.05 Mfd. 200 V. Paper	R15	560,000 Ohms Carbon
C17	2800 Mmf. ±5% Mica	L2	"D" Antenna Coil	R16	330,000 Ohms Carbon
C18	1600 Mmf. ±5% Mica	L3	"C" Antenna Coil	R17	150 Ohms Carbon
C19	470 Mmf. Mica	L4	"B" Antenna Coil	R18	120,000 Ohms Carbon
C20	470 Mmf. Mica	L5	"D" Oscillator Coil	R19	2700 Ohms 2 W. Carbon
C21	47 Mmf. Mica	L6	"C" Oscillator Coil	R20	15,000 Ohms 1 W. Carbon
C22	470 Mmf. Mica	L7	"B" Oscillator Coil	R21	470,000 Ohms Carbon
C23	10 Mmf. L.P.F. Mica	L8	"D" R.F. Coil	R22	270 Ohms 2 W. Carbon
C24	100 Mmf. Mica	L9	"C" R.F. Coil	R23	1.0 Megohm Carbon
C25	.05 Mfd. 200 V. Paper	L10	"B" R.F. Coil	R24	5600 Ohms Carbon
C26	220 Mmf. Mica	P1	Dial Lamp, Mazda No. 44	R25	4700 Ohms 2 W. Carbon
C27	.002 Mfd. 600 V. Paper	P2	Dial Lamp, Mazda No. 44	R26	270 Ohms Carbon
C28	.008 Mfd. 1000 V. Paper	R1	2.0 Megohms Volume Control	R27	1500 Ohms Carbon
C29	.002 Mfd. 600 V. Paper	R2	330,000 Ohms Carbon	R28	6.8 Megohms Carbon
C30	.05 Mfd. 200 V. Paper	R3	33,000 Ohms Carbon		

GENERAL ELECTRIC CO.



CHASSIS PARTS LAYOUT
MODEL JE-810

SPECIAL SERVICE INFORMATION

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R.F. Amplifier Grid at

1000 KC	4.4
4000 KC	2.6
18,000 KC	2.2

(b) R.F. Amplifier Grid to Converter Grid at

1000 KC	6.0
4000 KC	12.0
18,000 KC	8.2**

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at

1000 KC ("B" Manual)	40.0
4000 KC	35.0
18,000 KC	35.0

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at

455 KC ("B" Manual—Gang Closed)	42.0

(e) I.F. Amplifier Grid to Detector Grid at

455 KC	117.0

(2) Voltage Across Volume Control to Give ½-watt Speaker Output at

400 Cycles	0.075*

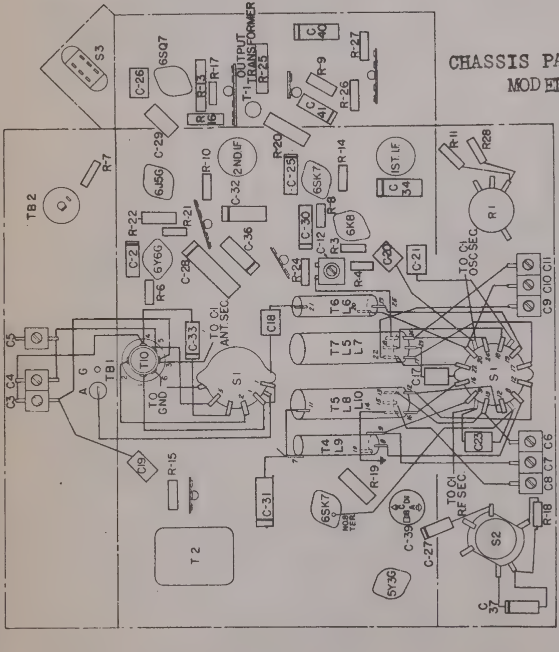
(3) DC voltage developed across oscillator grid resistor (R-3) with the gang closed.

"B" Band	7.6*
"C" Band	6.2*
"D" Band	5.1*

* Variations of +10%, −20% are permissible.

** On "D" band, stray oscillator voltage may upset reading.

CHASSIS PARTS LAYOUT
MODEL JE-81



Chassis Parts Layout
Model JE-81

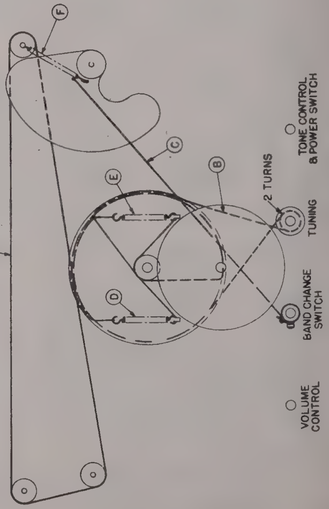
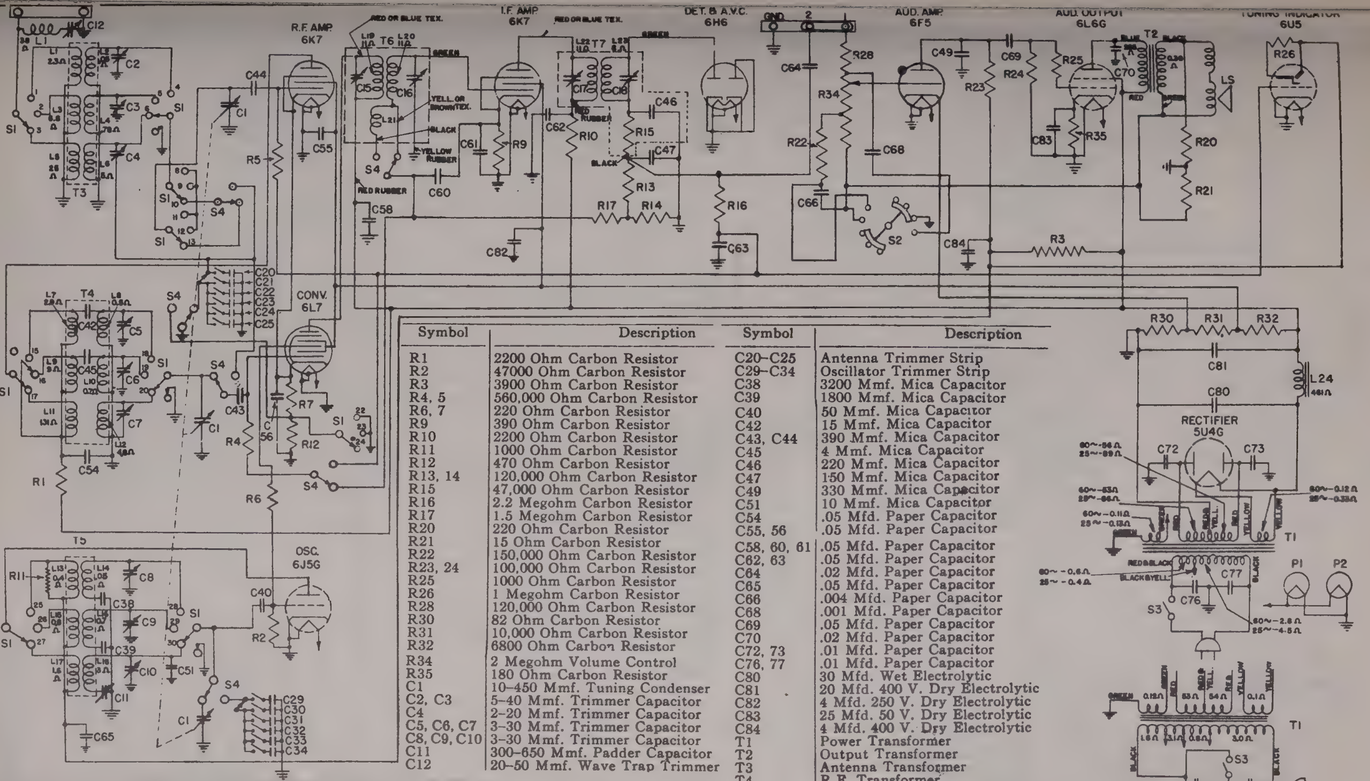


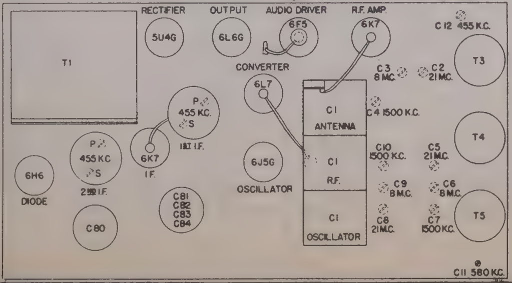
Fig. 7. Dial Cord Stringing Diagram

GENERAL ELECTRIC CO.



UNIVERSAL TRANSFORMER

Symbol	Description	Symbol	Description
R1	2200 Ohm Carbon Resistor	C20–C25	Antenna Trimmer Strip
R2	47000 Ohm Carbon Resistor	C29–C34	Oscillator Trimmer Strip
R3	3900 Ohm Carbon Resistor	C38	3200 Mmf. Mica Capacitor
R4, 5	560,000 Ohm Carbon Resistor	C39	1800 Mmf. Mica Capacitor
R6, 7	220 Ohm Carbon Resistor	C40	50 Mmf. Mica Capacitor
R9	390 Ohm Carbon Resistor	C42	15 Mmf. Mica Capacitor
R10	2200 Ohm Carbon Resistor	C43, C44	390 Mmf. Mica Capacitor
R11	1000 Ohm Carbon Resistor	C45	4 Mmf. Mica Capacitor
R12	470 Ohm Carbon Resistor	C46	220 Mmf. Mica Capacitor
R13, 14	120,000 Ohm Carbon Resistor	C47	150 Mmf. Mica Capacitor
R15	47,000 Ohm Carbon Resistor	C49	330 Mmf. Mica Capacitor
R16	2.2 Megohm Carbon Resistor	C51	10 Mmf. Mica Capacitor
R17	1.5 Megohm Carbon Resistor	C54	.05 Mfd. Paper Capacitor
R20	220 Ohm Carbon Resistor	C55, 56	.05 Mfd. Paper Capacitor
R21	15 Ohm Carbon Resistor	C58, 60, 61	.05 Mfd. Paper Capacitor
R22	150,000 Ohm Carbon Resistor	C62, 63	.05 Mfd. Paper Capacitor
R23, 24	100,000 Ohm Carbon Resistor	C64	.02 Mfd. Paper Capacitor
R25	1000 Ohm Carbon Resistor	C65	.05 Mfd. Paper Capacitor
R26	1 Megohm Carbon Resistor	C66	.004 Mfd. Paper Capacitor
R28	120,000 Ohm Carbon Resistor	C68	.001 Mfd. Paper Capacitor
R30	82 Ohm Carbon Resistor	C69	.05 Mfd. Paper Capacitor
R31	10,000 Ohm Carbon Resistor	C70	.02 Mfd. Paper Capacitor
R32	6800 Ohm Carbon Resistor	C72, 73	.01 Mfd. Paper Capacitor
R34	2 Megohm Volume Control	C76, 77	.01 Mfd. Paper Capacitor
R35	180 Ohm Carbon Resistor	C80	30 Mfd. Wet Electrolytic
C1	10–450 Mmf. Tuning Condenser	C81	20 Mfd. 400 V. Dry Electrolytic
C2, C3	5–40 Mmf. Trimmer Capacitor	C82	4 Mfd. 250 V. Dry Electrolytic
C4	2–20 Mmf. Trimmer Capacitor	C83	25 Mfd. 50 V. Dry Electrolytic
C5, C6, C7	3–30 Mmf. Trimmer Capacitor	C84	4 Mfd. 400 V. Dry Electrolytic
C8, C9, C10	3–30 Mmf. Trimmer Capacitor	T1	Power Transformer
C11	300–650 Mmf. Padder Capacitor	T2	Output Transformer
C12	20–50 Mmf. Wave Trap Trimmer	T3	Antenna Transformer
		T4	R.F. Transformer
		T5	Oscillator Transformer
		S1	Band Change Switch
		S2	Tone Control Switch
		S3	Power Switch



IF PEAK 455 KC

Rating Label	Power Consumption
A	105
C	110
V	110

-1940-

I.F. 455 KC

FOR OTHER DATA SEE INDEX

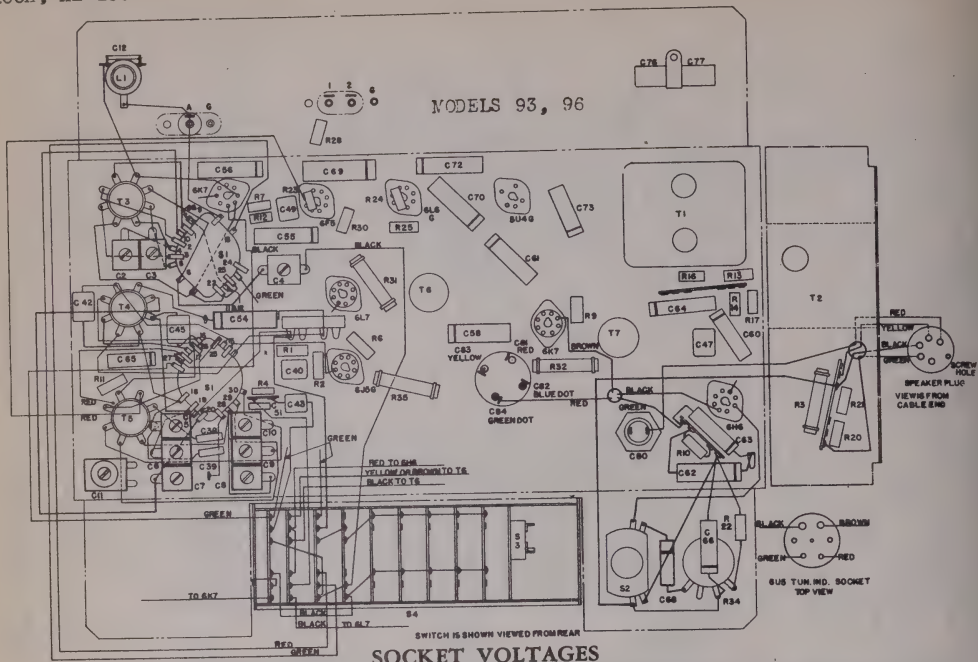
Loud-speaker—Electrodynamic

	GE-93	GE-96
Outside Cone Diameter	8 in.	12 in.
Voice Coil Impedance	3.5 ohms at 400 cycles	
Field Coil Resistance	460 ohms (cold)	

MODELS GE-93, GE-96
MODELS HE-100,
HE-100H, HE-105

GENERAL ELECTRIC CO.

MODELS HE-100L,
HE-100LH, HE-105L



SOCKET VOLTAGES

GE-93, GE-96

Tube No.	Plate to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Cathode to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R.F.	225	105	5.8	3.6	6.4
6L7	235	105	5.8	5.2	6.4
6J5G	190	. . .	0	10.5	6.4
6K7 I.F.	215	105	3.6	9.5	6.4
6F5	* 120	. . .	0.9	0.7	6.4
6L6G	220	235	12	70	6.4
6U5	Target 190	. . .	. . .	1.5	6.4
5U4G	280/280 A.C. RMS	. . .	298	110	5.1

A.C. line voltage—125. No signal input. 1000 ohms per volt meter. Dial pointer at 550 K.C. on "B" band.
*Measured on 500-volt scale.

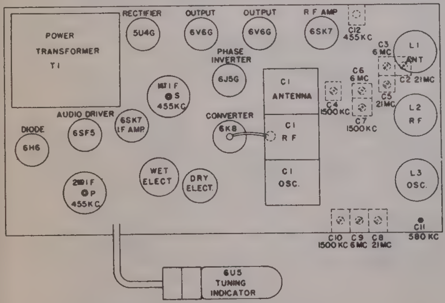


Fig. 4. Trimmer Location
Models HE-100, HE-100H, HE-105

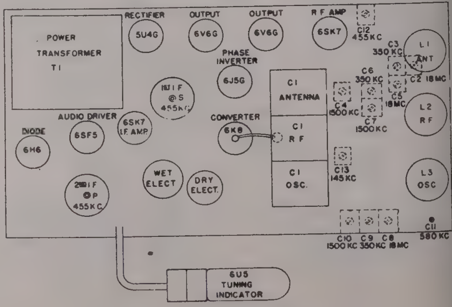
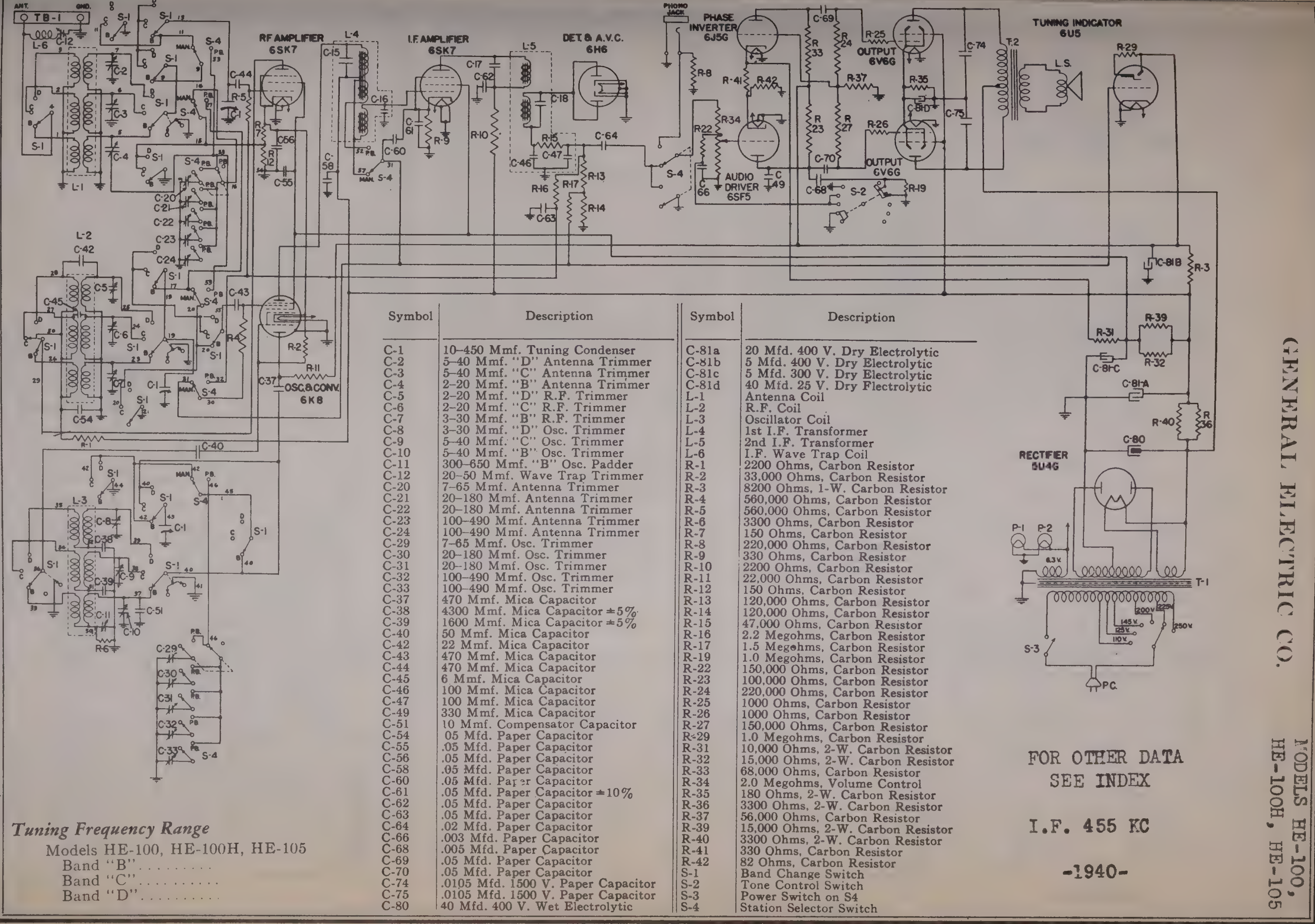


Fig. 5. Trimmer Location
Models HE-100L, HE-100LH, HE-105L

GENERAL ELECTRIC CO.

MODELS HE-100, HE-100H, HE-105



Symbol	Description	Symbol	Description
C-1	10–450 Mmf. Tuning Condenser	C-81a	20 Mfd. 400 V. Dry Electrolytic
C-2	5–40 Mmf. "D" Antenna Trimmer	C-81b	5 Mfd. 400 V. Dry Electrolytic
C-3	5–40 Mmf. "C" Antenna Trimmer	C-81c	5 Mfd. 300 V. Dry Electrolytic
C-4	2–20 Mmf. "B" Antenna Trimmer	C-81d	40 Mfd. 25 V. Dry Flectrolytic
C-5	2–20 Mmf. "D" R.F. Trimmer	L-1	Antenna Coil
C-6	2–20 Mmf. "C" R.F. Trimmer	L-2	R.F. Coil
C-7	3–30 Mmf. "B" R.F. Trimmer	L-3	Oscillator Coil
C-8	3–30 Mmf. "D" Osc. Trimmer	L-4	1st I.F. Transformer
C-9	5–40 Mmf. "C" Osc. Trimmer	L-5	2nd I.F. Transformer
C-10	5–40 Mmf. "B" Osc. Trimmer	L-6	I.F. Wave Trap Coil
C-11	300–650 Mmf. "B" Osc. Padder	R-1	2200 Ohms, Carbon Resistor
C-12	20–50 Mmf. Wave Trap Trimmer	R-2	33,000 Ohms, Carbon Resistor
C-20	7–65 Mmf. Antenna Trimmer	R-3	8200 Ohms, 1-W. Carbon Resistor
C-21	20–180 Mmf. Antenna Trimmer	R-4	560,000 Ohms, Carbon Resistor
C-22	20–180 Mmf. Antenna Trimmer	R-5	560,000 Ohms, Carbon Resistor
C-23	100–490 Mmf. Antenna Trimmer	R-6	3300 Ohms, Carbon Resistor
C-24	100–490 Mmf. Antenna Trimmer	R-7	150 Ohms, Carbon Resistor
C-29	7–65 Mmf. Osc. Trimmer	R-8	220,000 Ohms, Carbon Resistor
C-30	20–180 Mmf. Osc. Trimmer	R-9	330 Ohms, Carbon Resistor
C-31	20–180 Mmf. Osc. Trimmer	R-10	2200 Ohms, Carbon Resistor
C-32	100–490 Mmf. Osc. Trimmer	R-11	22,000 Ohms, Carbon Resistor
C-33	100–490 Mmf. Osc. Trimmer	R-12	150 Ohms, Carbon Resistor
C-37	470 Mmf. Mica Capacitor	R-13	120,000 Ohms, Carbon Resistor
C-38	4300 Mmf. Mica Capacitor ±5%	R-14	120,000 Ohms, Carbon Resistor
C-39	1600 Mmf. Mica Capacitor ±5%	R-15	47,000 Ohms, Carbon Resistor
C-40	50 Mmf. Mica Capacitor	R-16	2.2 Megohms, Carbon Resistor
C-42	22 Mmf. Mica Capacitor	R-17	1.5 Megohms, Carbon Resistor
C-43	470 Mmf. Mica Capacitor	R-19	1.0 Megohms, Carbon Resistor
C-44	470 Mmf. Mica Capacitor	R-22	150,000 Ohms, Carbon Resistor
C-45	6 Mmf. Mica Capacitor	R-23	100,000 Ohms, Carbon Resistor
C-46	100 Mmf. Mica Capacitor	R-24	220,000 Ohms, Carbon Resistor
C-47	100 Mmf. Mica Capacitor	R-25	1000 Ohms, Carbon Resistor
C-49	330 Mmf. Mica Capacitor	R-26	1000 Ohms, Carbon Resistor
C-51	10 Mmf. Compensator Capacitor	R-27	150,000 Ohms, Carbon Resistor
C-54	.05 Mfd. Paper Capacitor	R-29	1.0 Megohms, Carbon Resistor
C-55	.05 Mfd. Paper Capacitor	R-31	10,000 Ohms, 2-W. Carbon Resistor
C-56	.05 Mfd. Paper Capacitor	R-32	15,000 Ohms, 2-W. Carbon Resistor
C-58	.05 Mfd. Paper Capacitor	R-33	68,000 Ohms, Carbon Resistor
C-60	.05 Mfd. Paper Capacitor	R-34	2.0 Megohms, Volume Control
C-61	.05 Mfd. Paper Capacitor ±10%	R-35	180 Ohms, 2-W. Carbon Resistor
C-62	.05 Mfd. Paper Capacitor	R-36	3300 Ohms, 2-W. Carbon Resistor
C-63	.05 Mfd. Paper Capacitor	R-37	56,000 Ohms, Carbon Resistor
C-64	.02 Mfd. Paper Capacitor	R-39	15,000 Ohms, 2-W. Carbon Resistor
C-66	.003 Mfd. Paper Capacitor	R-40	3300 Ohms, 2-W. Carbon Resistor
C-68	.005 Mfd. Paper Capacitor	R-41	330 Ohms, Carbon Resistor
C-69	.05 Mfd. Paper Capacitor	R-42	82 Ohms, Carbon Resistor
C-70	.05 Mfd. Paper Capacitor	S-1	Band Change Switch
C-74	.0105 Mfd. 1500 V. Paper Capacitor	S-2	Tone Control Switch
C-75	.0105 Mfd. 1500 V. Paper Capacitor	S-3	Power Switch on S4
C-80	40 Mfd. 400 V. Wet Electrolytic	S-4	Station Selector Switch

Tuning Frequency Range

Models HE-100, HE-100H, HE-105
Band "B"..........
Band "C"..........
Band "D"..........

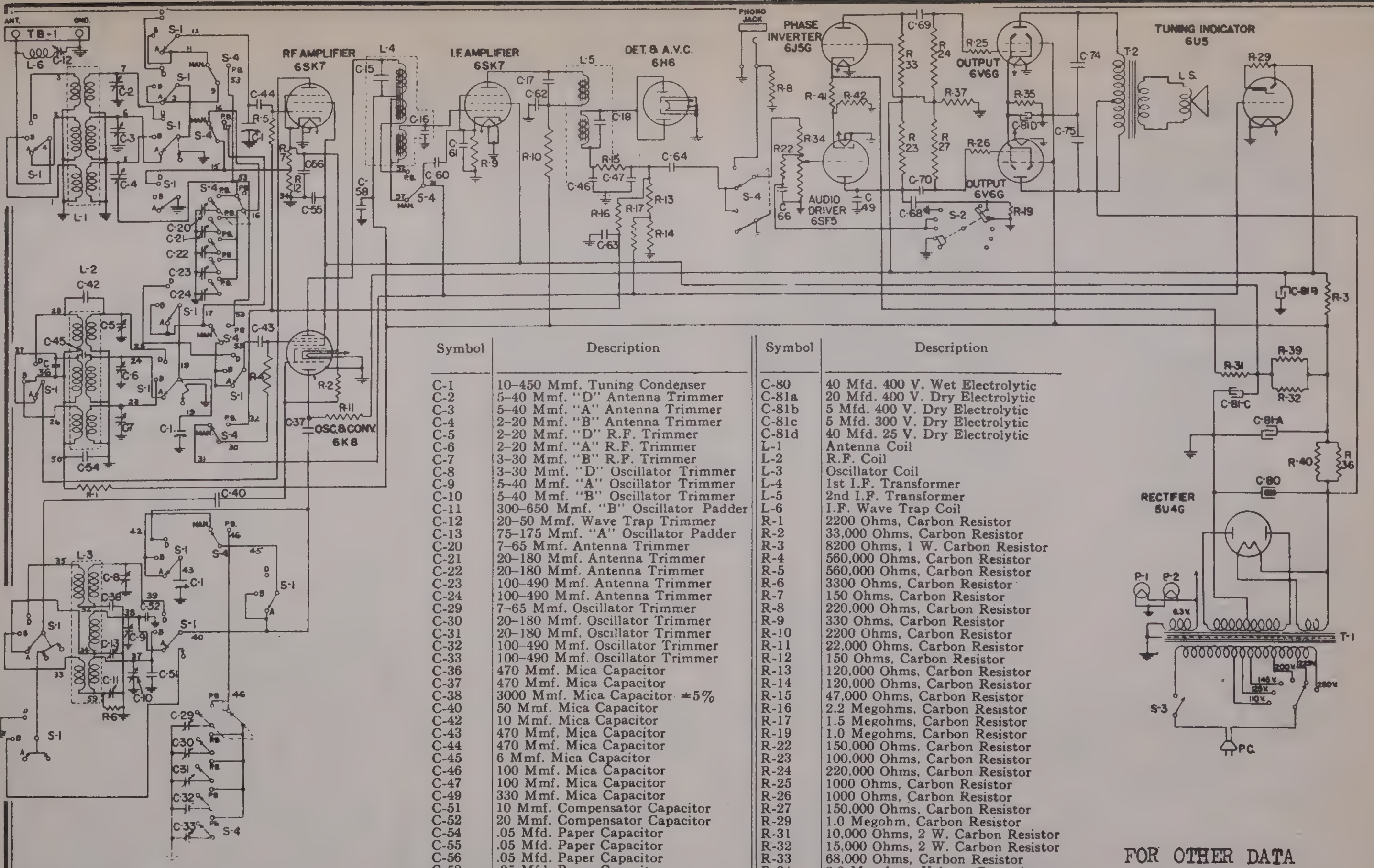
FOR OTHER DATA
SEE INDEX

I.F. 455 KC

-1940-

MODELS HE-100L,
HE-100LH, HE-105L

GENERAL ELECTRIC CO.



Symbol	Description	Symbol	Description
C-1	10–450 Mmf. Tuning Condenser	C-80	40 Mfd. 400 V. Wet Electrolytic
C-2	5–40 Mmf. "D" Antenna Trimmer	C-81a	20 Mfd. 400 V. Dry Electrolytic
C-3	5–40 Mmf. "A" Antenna Trimmer	C-81b	5 Mfd. 400 V. Dry Electrolytic
C-4	2–20 Mmf. "B" Antenna Trimmer	C-81c	5 Mfd. 300 V. Dry Electrolytic
C-5	2–20 Mmf. "D" R.F. Trimmer	C-81d	40 Mfd. 25 V. Dry Electrolytic
C-6	2–20 Mmf. "A" R.F. Trimmer	L-1	Antenna Coil
C-7	3–30 Mmf. "B" R.F. Trimmer	L-2	R.F. Coil
C-8	3–30 Mmf. "D" Oscillator Trimmer	L-3	Oscillator Coil
C-9	5–40 Mmf. "A" Oscillator Trimmer	L-4	1st I.F. Transformer
C-10	5–40 Mmf. "B" Oscillator Trimmer	L-5	2nd I.F. Transformer
C-11	300–650 Mmf. "B" Oscillator Padder	L-6	I.F. Wave Trap Coil
C-12	20–50 Mmf. Wave Trap Trimmer	R-1	2200 Ohms, Carbon Resistor
C-13	75–175 Mmf. "A" Oscillator Padder	R-2	33,000 Ohms, Carbon Resistor
C-20	7–65 Mmf. Antenna Trimmer	R-3	8200 Ohms, 1 W. Carbon Resistor
C-21	20–180 Mmf. Antenna Trimmer	R-4	560,000 Ohms, Carbon Resistor
C-22	20–180 Mmf. Antenna Trimmer	R-5	560,000 Ohms, Carbon Resistor
C-23	100–490 Mmf. Antenna Trimmer	R-6	3300 Ohms, Carbon Resistor
C-24	100–490 Mmf. Antenna Trimmer	R-7	150 Ohms, Carbon Resistor
C-29	7–65 Mmf. Oscillator Trimmer	R-8	220,000 Ohms, Carbon Resistor
C-30	20–180 Mmf. Oscillator Trimmer	R-9	330 Ohms, Carbon Resistor
C-31	20–180 Mmf. Oscillator Trimmer	R-10	2200 Ohms, Carbon Resistor
C-32	100–490 Mmf. Oscillator Trimmer	R-11	22,000 Ohms, Carbon Resistor
C-33	100–490 Mmf. Oscillator Trimmer	R-12	150 Ohms, Carbon Resistor
C-36	470 Mmf. Mica Capacitor	R-13	120,000 Ohms, Carbon Resistor
C-37	470 Mmf. Mica Capacitor	R-14	120,000 Ohms, Carbon Resistor
C-38	3000 Mmf. Mica Capacitor ±5%	R-15	47,000 Ohms, Carbon Resistor
C-40	50 Mmf. Mica Capacitor	R-16	2.2 Megohms, Carbon Resistor
C-42	10 Mmf. Mica Capacitor	R-17	1.5 Megohms, Carbon Resistor
C-43	470 Mmf. Mica Capacitor	R-19	1.0 Megohms, Carbon Resistor
C-44	470 Mmf. Mica Capacitor	R-22	150,000 Ohms, Carbon Resistor
C-45	6 Mmf. Mica Capacitor	R-23	100,000 Ohms, Carbon Resistor
C-46	100 Mmf. Mica Capacitor	R-24	220,000 Ohms, Carbon Resistor
C-47	100 Mmf. Mica Capacitor	R-25	1000 Ohms, Carbon Resistor
C-49	330 Mmf. Mica Capacitor	R-26	1000 Ohms, Carbon Resistor
C-51	10 Mmf. Compensator Capacitor	R-27	150,000 Ohms, Carbon Resistor
C-52	20 Mmf. Compensator Capacitor	R-29	1.0 Megohm, Carbon Resistor
C-54	.05 Mfd. Paper Capacitor	R-31	10,000 Ohms, 2 W. Carbon Resistor
C-55	.05 Mfd. Paper Capacitor	R-32	15,000 Ohms, 2 W. Carbon Resistor
C-56	.05 Mfd. Paper Capacitor	R-33	68,000 Ohms, Carbon Resistor
C-58	.05 Mfd. Paper Capacitor	R-34	2.0 Megohms, Volume Control
C-60	.05 Mfd. Paper Capacitor	R-35	180 Ohms, 2 W. Carbon Resistor
C-61	.05 Mfd. Paper Capacitor ±10%	R-36	3300 Ohms, 2 W. Carbon Resistor
C-62	.05 Mfd. Paper Capacitor	R-37	56,000 Ohms, Carbon Resistor
C-63	.05 Mfd. Paper Capacitor	R-39	15,000 Ohms, 2 W. Carbon Resistor
C-64	.02 Mfd. Paper Capacitor	R-40	3300 Ohms, 2 W. Carbon Resistor
C-66	.003 Mfd. Paper Capacitor	R-41	330 Ohms, Carbon Resistor
C-68	.005 Mfd. Paper Capacitor	R-42	82 Ohms, Carbon Resistor
C-69	.05 Mfd. Paper Capacitor	S-1	Band Change Switch
C-70	.05 Mfd. Paper Capacitor	S-2	Tone Control Switch
C-74	.0015 Mfd. 1500 V. Paper Capacitor	S-3	Power Switch on S-4
C-75	.0015 Mfd. 1500 V. Paper Capacitor	S-4	Station Selector Switch

TUNING FREQUENCY RANGE

Models HE-100L, HE-100LH, HE-105L
Band "A"..............140–400 K.C.
Band "B"..............540–1600 K.C.
Band "D"..............5700–18,000 K.C.

FOR OTHER DATA
SEE INDEX

I.F. 455 KC

-1940-

©John F. Rider, Publisher

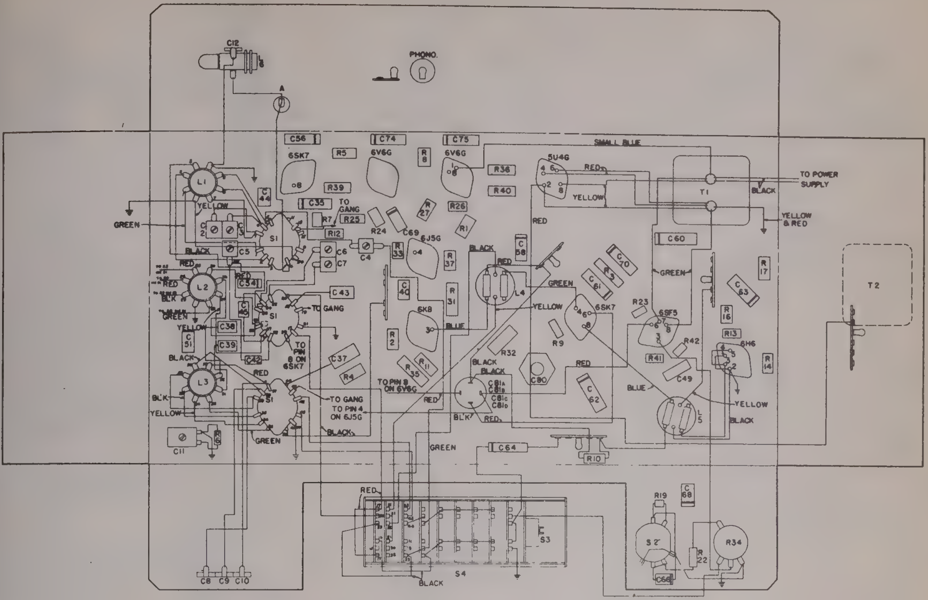


Fig. 8. Chassis Parts Layout
Models HE-100, HE-100H, HE-105

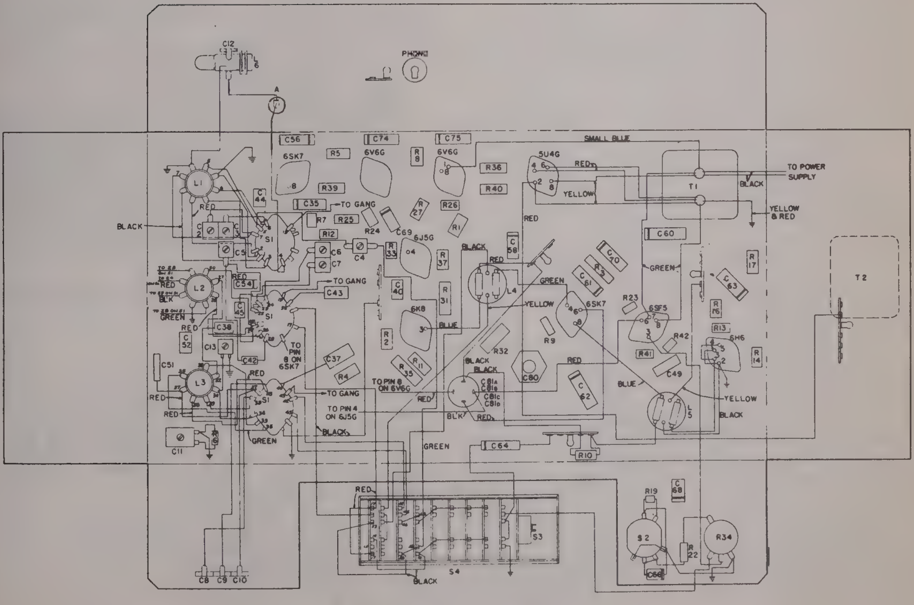
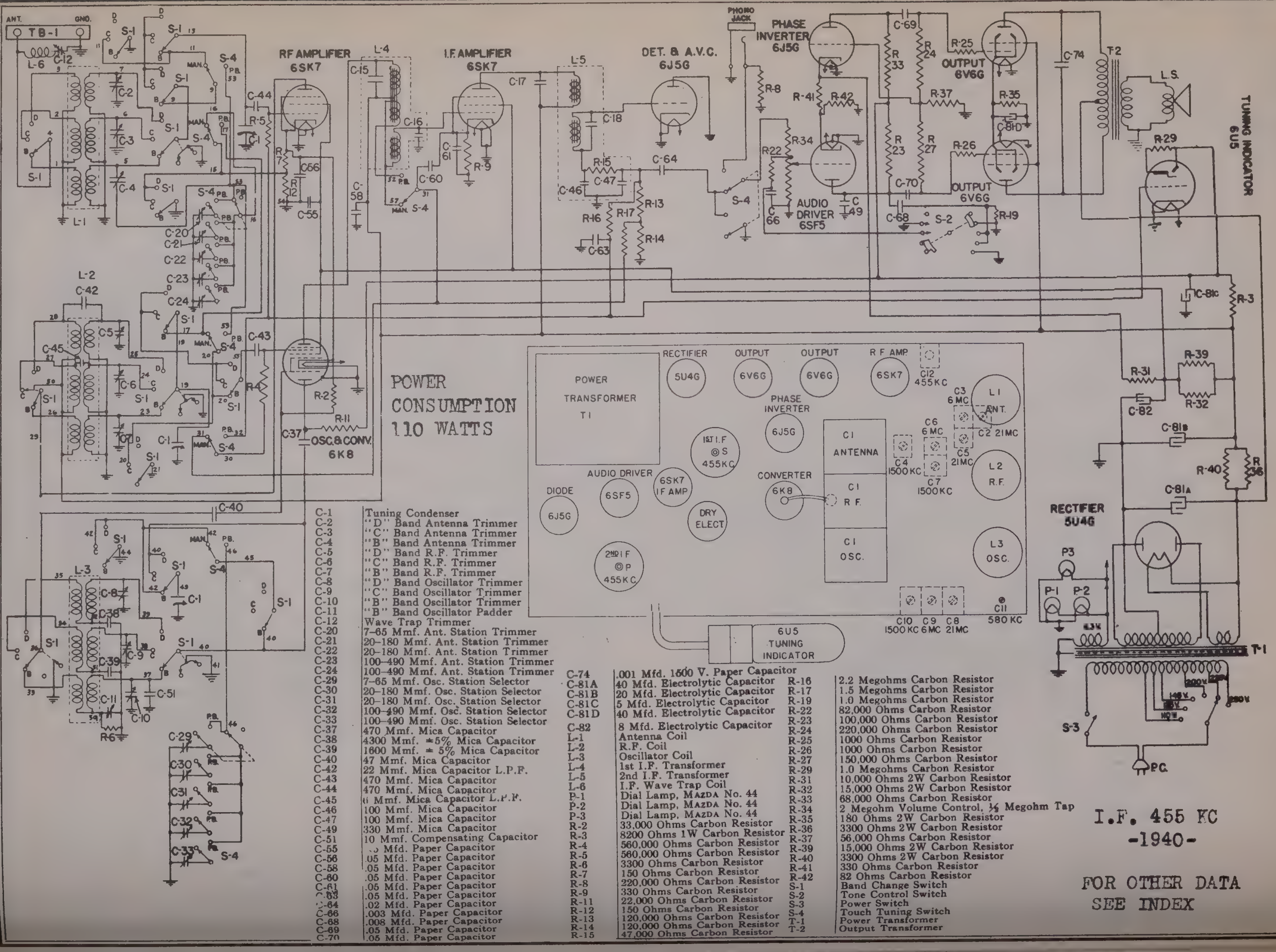


Fig. 9. Chassis Parts Layout
Models HE-100L, HE-100LH, HE-105L

MODELS VE-101
VE-107

GENERAL ELECTRIC CO.



POWER CONSUMPTION 110 WATTS

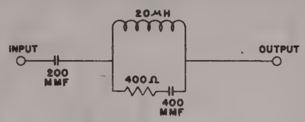
C-1	Tuning Condenser
C-2	"D" Band Antenna Trimmer
C-3	"C" Band Antenna Trimmer
C-4	"B" Band Antenna Trimmer
C-5	"D" Band R.F. Trimmer
C-6	"C" Band R.F. Trimmer
C-7	"B" Band R.F. Trimmer
C-8	"D" Band Oscillator Trimmer
C-9	"C" Band Oscillator Trimmer
C-10	"B" Band Oscillator Trimmer
C-11	"B" Band Oscillator Padder
C-12	Wave Trap Trimmer
C-20	7–65 Mmf. Ant. Station Trimmer
C-21	20–180 Mmf. Ant. Station Trimmer
C-22	20–180 Mmf. Ant. Station Trimmer
C-23	100–490 Mmf. Ant. Station Trimmer
C-24	100–490 Mmf. Ant. Station Trimmer
C-29	7–65 Mmf. Osc. Station Selector
C-30	20–180 Mmf. Osc. Station Selector
C-31	20–180 Mmf. Osc. Station Selector
C-32	100–490 Mmf. Osc. Station Selector
C-33	100–490 Mmf. Osc. Station Selector
C-37	470 Mmf. Mica Capacitor
C-38	4300 Mmf. ± 5% Mica Capacitor
C-39	1600 Mmf. ± 5% Mica Capacitor
C-40	47 Mmf. Mica Capacitor
C-42	22 Mmf. Mica Capacitor L.P.F.
C-43	470 Mmf. Mica Capacitor
C-44	470 Mmf. Mica Capacitor
C-45	6 Mmf. Mica Capacitor L.P.F.
C-46	100 Mmf. Mica Capacitor
C-47	100 Mmf. Mica Capacitor
C-49	330 Mmf. Mica Capacitor
C-51	10 Mmf. Compensating Capacitor
C-55	.05 Mfd. Paper Capacitor
C-56	.05 Mfd. Paper Capacitor
C-58	.05 Mfd. Paper Capacitor
C-60	.05 Mfd. Paper Capacitor
C-61	.05 Mfd. Paper Capacitor
C-63	.05 Mfd. Paper Capacitor
C-64	.02 Mfd. Paper Capacitor
C-66	.003 Mfd. Paper Capacitor
C-68	.008 Mfd. Paper Capacitor
C-69	.05 Mfd. Paper Capacitor
C-70	.05 Mfd. Paper Capacitor
C-74	.001 Mfd. 1600 V. Paper Capacitor
C-81A	40 Mfd. Electrolytic Capacitor
C-81B	20 Mfd. Electrolytic Capacitor
C-81C	5 Mfd. Electrolytic Capacitor
C-81D	40 Mfd. Electrolytic Capacitor
C-82	8 Mfd. Electrolytic Capacitor
L-1	Antenna Coil
L-2	R.F. Coil
L-3	Oscillator Coil
L-4	1st I.F. Transformer
L-5	2nd I.F. Transformer
L-6	I.F. Wave Trap Coil
P-1	Dial Lamp, MAZDA No. 44
P-2	Dial Lamp, MAZDA No. 44
P-3	Dial Lamp, MAZDA No. 44
R-2	33,000 Ohms Carbon Resistor
R-3	8200 Ohms 1W Carbon Resistor
R-4	560,000 Ohms Carbon Resistor
R-5	560,000 Ohms Carbon Resistor
R-6	3300 Ohms Carbon Resistor
R-7	150 Ohms Carbon Resistor
R-8	220,000 Ohms Carbon Resistor
R-9	330 Ohms Carbon Resistor
R-11	22,000 Ohms Carbon Resistor
R-12	150 Ohms Carbon Resistor
R-13	120,000 Ohms Carbon Resistor
R-14	120,000 Ohms Carbon Resistor
R-15	47,000 Ohms Carbon Resistor
R-16	2.2 Megohms Carbon Resistor
R-17	1.5 Megohms Carbon Resistor
R-19	1.0 Megohms Carbon Resistor
R-22	82,000 Ohms Carbon Resistor
R-23	100,000 Ohms Carbon Resistor
R-24	220,000 Ohms Carbon Resistor
R-25	1000 Ohms Carbon Resistor
R-26	1000 Ohms Carbon Resistor
R-27	150,000 Ohms Carbon Resistor
R-29	1.0 Megohms Carbon Resistor
R-31	10,000 Ohms 2W Carbon Resistor
R-32	15,000 Ohms 2W Carbon Resistor
R-33	68,000 Ohms Carbon Resistor
R-34	2 Megohm Volume Control, ½ Megohm Tap
R-35	180 Ohms 2W Carbon Resistor
R-36	3300 Ohms 2W Carbon Resistor
R-37	56,000 Ohms Carbon Resistor
R-39	15,000 Ohms 2W Carbon Resistor
R-40	3300 Ohms 2W Carbon Resistor
R-41	330 Ohms Carbon Resistor
R-42	82 Ohms Carbon Resistor
S-1	Band Change Switch
S-2	Tone Control Switch
S-3	Power Switch
S-4	Touch Tuning Switch
T-1	Power Transformer
T-2	Output Transformer

I.F. 455 KC
-1940-

FOR OTHER DATA
SEE INDEX

ALIGNMENT PROCEDURE

MODELS JE-101, JE-107, HE-100, HE-100H,
HE-100L, HE-100LH, HE-105, HE-105L



Standard I.R.E. Dummy Antenna

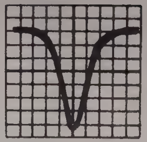


Fig. 2. Sharp Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

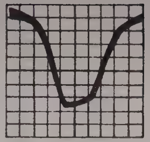


Fig. 3. Broad Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Frequency	Point of Input	Dummy Antenna	Inductor or Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. pri. and sec.	Gang condenser plates closed—manual key depressed—connect audio input of oscilloscope to ground and to junction of C-64, R-13 and R-16. Adjust two iron-core inductors of each I.F. transformer simultaneously using two insulated screw drivers. The resultant curve should be single and symmetrical as shown in Fig. 2.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 mfd. or larger	1st I.F. pri. and sec.	
3. Band "B"	455 K.C. Sweep	Converter Grid	.05 mfd. or larger		Check broad I.F. curve by pressing station key. If broad curve is not single and symmetrical (see Fig. 3) readjust I.F. trimmers slightly.
4. Band "B"	455 K.C. Sweep	Antenna Post	I.R.E.	C-12	Align wave trap for minimum amplitude.

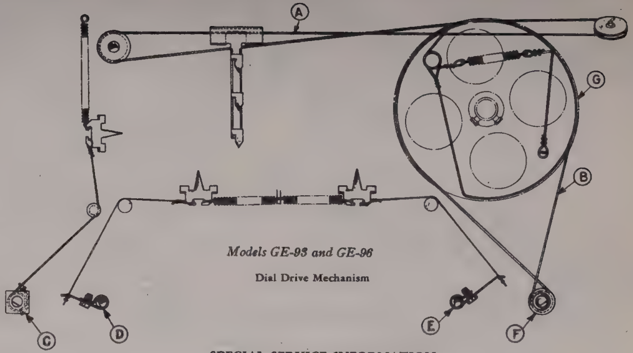
ALIGNMENT PROCEDURE

I.F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Frequency	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 mfd. or larger	2nd I.F. pri. and sec.	Gang condenser plates closed—manual key depressed—connect output meter across voice coil—keep signal low and volume control on as far as possible. Adjust all iron-core inductors for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 mfd. or larger	1st I.F. pri. and sec.	
3. Band "B"	455 K.C. with Modulation	Antenna Post	I.R.E.	C-12	Align wave trap for minimum output.

R. F. ALIGNMENT

1. Band "B"					Close gang condenser plates. Adjust pointer to first line at left end of tuning scale. Depress manual key.
2. Band "D"	21 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-8) R.F. (C-5) Ant. (C-2)	Connect output meter across voice coil—peak trimmers for maximum output. The image of any "D" band signal should be heard 910 K.C. below the input signal. EXAMPLE—21 M.C. image is at 20:09 M.C. Peak (C-5) while rocking the gang condenser.
3. Band "C"	6 M.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-9) R.F. (C-6) Ant. (C-3)	Peak trimmers for maximum output using a low input signal. Image—910 K.C. below signal.
4. Band "B"	1500 K.C. with Modulation	Antenna Post	I.R.E.	Osc. (C-10) R.F. (C-7) Ant. (C-4)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-11)	Adjust padder for maximum output in the vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"		Repeat Operation 4			



Models GE-93 and GE-96

Dial Drive Mechanism

SPECIAL SERVICE INFORMATION

MODELS JE-101, JE-107

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R.F. Amplifier Grid at

1000 KC	5.0
4000 KC	3.7
18,000 KC	2.6

(b) R.F. Amplifier Grid to Converter Grid at

1000 KC	14.0
4000 KC	10.0
18,000 KC	10.0**

(c) R.F. on Converter Grid to IF. on 1st I.F. Grid at

1000 KC ("B" Manual)	16.0
4000 KC	30.0
18,000 KC	34.0

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at
455 KC ("B" Manual—Gang Closed) 24.0

(e) I.F. Amplifier Grid to Detector Grid at
455 KC 112.0

(2) Voltage Across Volume Control to Give ½-watt Speaker Output at
400 Cycles 0.05*

(3) D.C. voltage developed across oscillator grid resistor (R-2) with the gang closed.

"B" Band	6.2*
"C" Band	7.8*
"D" Band	4.8*

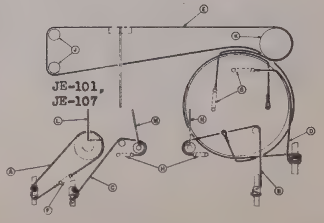
* Variations of +10%, −20% are permissible.
** On "D" band, stray oscillator voltage may upset reading.

MODELS JE-101, JE-107

VOLTAGE CHART*

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
6SK7 (R.F.)	235	95	4.7	6.3
6K8	Con.—235 Osc.—105	95	4.7	6.3
6SK7 (I.F.)	235	95	3	6.3
6J5G (Det.)	0		0	6.3
6SF5	120		1	6.3
6J5G (Inverter)	90		4	6.3
6V6G	290	230	12.5	6.3
5U4G	277a.c.		300	5.1
6U5	170			6.3

* Voltages measured at rated tap voltage (110 volts on 110 tap, etc.). Receiver tuned to low end of "B" band.



Cord Stringing Diagram

MODEL J-105
(Golden Tone)

GENERAL ELECTRIC CO.

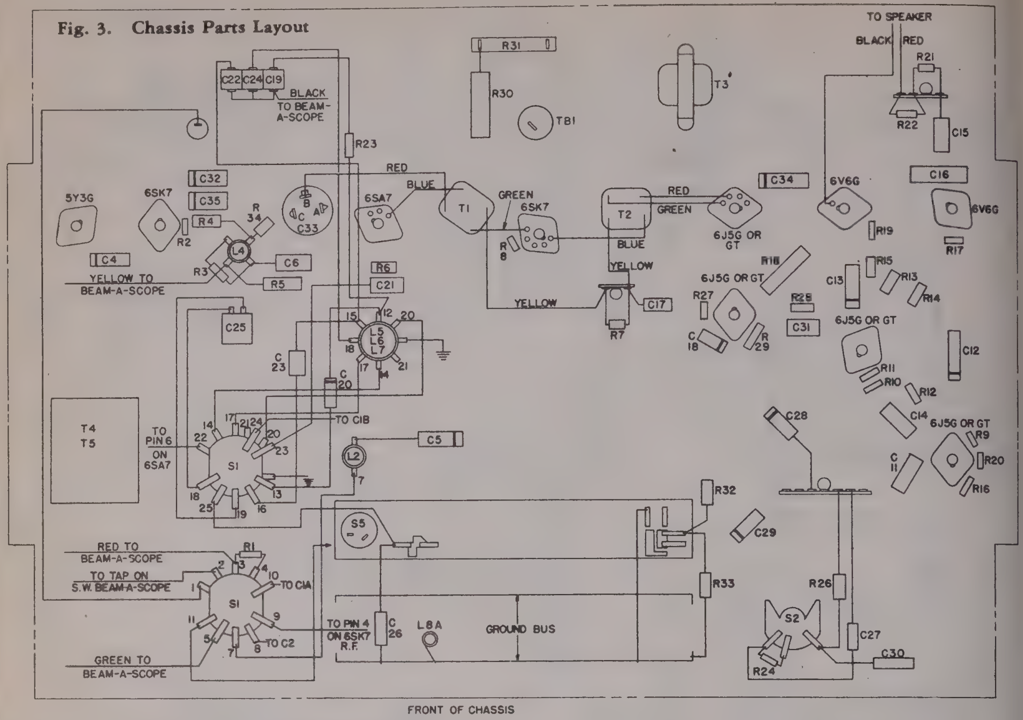


Fig. 3. Chassis Parts Layout

Note: The oscillator coil and band-switch terminals are numbered in the Chassis Parts Layout, Fig. 3, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 2. This numbering will also assist in rewiring if the coil or switch is replaced. I.F. transformer connections are shown as an aid in replacement.

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
A	110–125	50–60	115
C	110–125	25–60	120

Tubes

R.F. AMPLIFIER	GE-6SK7
CONVERTER AND OSCILLATOR	GE-6SA7
I.F. AMPLIFIER	GE-6SK7
DET., AVC	GE-6J5GT
1st AUDIO DRIVER	GE-6J5GT
2nd AUDIO DRIVER	GE-6J5GT
PHASE INVERTER	GE-6J5GT
POWER OUTPUT	(2) GE-6V6G
RECTIFIER	GE-5Y3G
DIAL LAMP	(2) Mazda No. 44

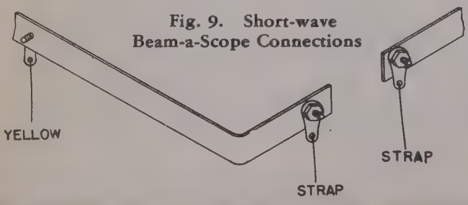


Fig. 9. Short-wave Beam-a-Scope Connections

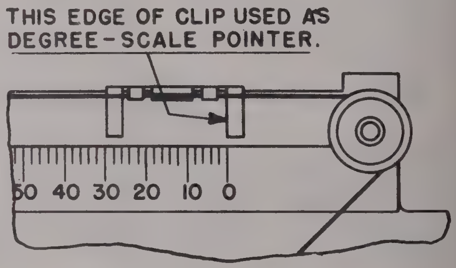


Fig. 6. Pointer-Guide Clip Setting with Gang Condenser Closed (See "R.F. Alignment with Chassis Outside of Cabinet")

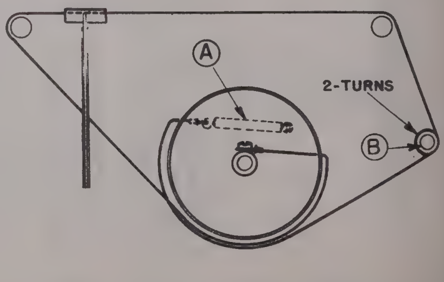
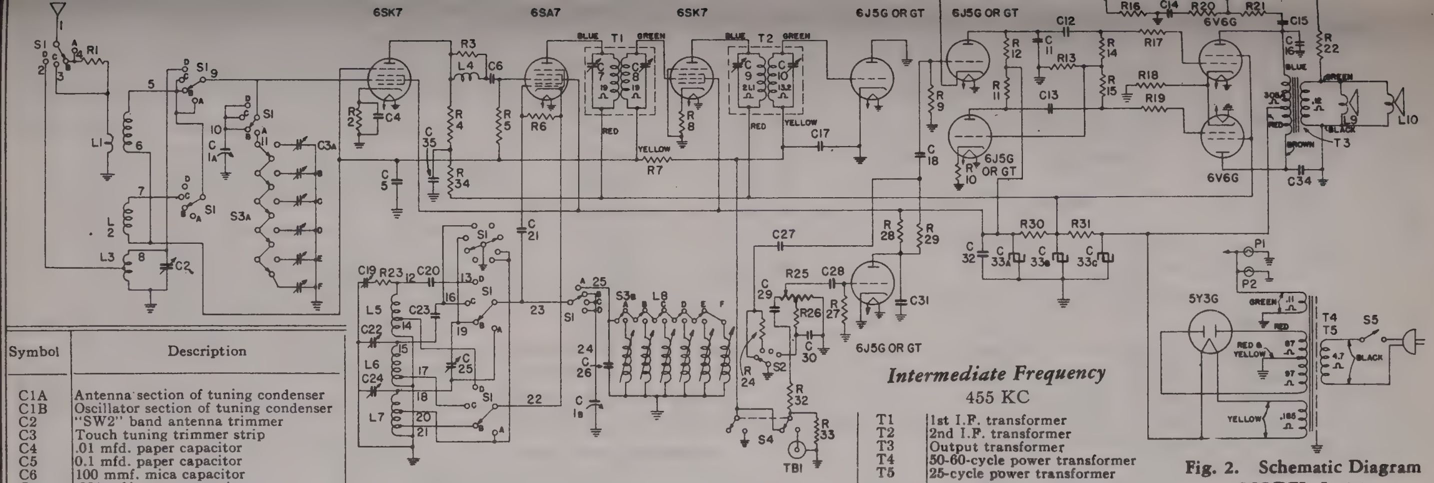


Fig. 7. Dial Cord Stringing Diagram

GENERAL ELECTRIC CO.

MODEL J-105 (Golden Tone)



Intermediate Frequency

455 KC

T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	50-60-cycle power transformer
T5	25-cycle power transformer

Fig. 2. Schematic Diagram MODEL J-105

Symbol	Description
C1A	Antenna section of tuning condenser
C1B	Oscillator section of tuning condenser
C2	"SW2" band antenna trimmer
C3	Touch tuning trimmer strip
C4	.01 mfd. paper capacitor
C5	0.1 mfd. paper capacitor
C6	100 mmf. mica capacitor
C11	.001 mfd. paper capacitor
C12	.03 mfd. paper capacitor
C13	.03 mfd. paper capacitor
C14	.02 mfd. paper capacitor
C15	100 mmf. 1000 V. mica capacitor
C16	.002 mfd. 1000 V. paper capacitor
C17	220 mmf. mica capacitor
C18	.01 mfd. paper capacitor
C19	"SW2" band oscillator trimmer
C20	.008 mfd. paper capacitor
C21	47 mmf. mica capacitor
C22	"SW1" band oscillator trimmer
C23	2400 mmf. ±5% mica capacitor
C24	"BC" band oscillator trimmer
C25	"BC" band oscillator padder
C26	750 mmf. silvered mica capacitor
C27	.005 mfd. paper capacitor
C28	.05 mfd. paper capacitor
C29	.005 mfd. paper capacitor
C30	.004 mfd. paper capacitor
C31	150 mmf. mica capacitor
C32	.01 mfd. paper capacitor
C33A	10 mfd. 350 V. dry electrolytic
C33B	15 mfd. 400 V. dry electrolytic
C33C	30 mfd. 400 V. dry electrolytic
C34	.002 mfd. 1000 V. paper capacitor
C35	.01 mfd. paper capacitor
L1	"BC" and "SW1" band Beam-a-Scope
L2	"SW1" band antenna coil
L3	"SW2" band Beam-a-Scope
L4	R.F. interstage coil
L5	"SW2" band oscillator coil
L6	"SW1" band oscillator coil
L7	"BC" band oscillator coil
L8	Touch tuning coil strip
P1	Dial lamp, Mazda No. 44
P2	Dial lamp; Mazda No. 44
R1	1000 ohms carbon resistor
R2	47 ohms carbon resistor
R3	10,000 ohms carbon resistor
R4	3300 ohms 1 W. carbon resistor
R5	47,000 ohms carbon resistor
R6	22,000 ohms carbon resistor

R7	2.2 megohms carbon resistor
R8	150 ohms carbon resistor
R9	470,000 ohms carbon resistor
R10	3300 ohms carbon resistor
R11	100,000 ohms carbon resistor
R12	220,000 ohms carbon resistor
R13	220,000 ohms carbon resistor
R14	150,000 ohms carbon resistor
R15	270,000 ohms carbon resistor
R16	4700 ohms carbon resistor
S1	Band switch
S2	Tone control switch
S3	Touch tuning switch
S4	Phono key
S5	Power key

R17	1000 ohms carbon resistor
R18	180 ohms 2 W. carbon resistor
R19	1000 ohms carbon resistor
R20	1800 ohms carbon resistor
R21	47,000 ohms carbon resistor
R22	6800 ohms carbon resistor
R23	27 ohms carbon resistor
R24	47,000 ohms carbon resistor
R25	2 megohms volume control (½ megohm tap)

R26	56,000 ohms carbon resistor
R27	5.6 megohms carbon resistor
R28	220,000 ohms carbon resistor
R29	33,000 ohms carbon resistor
R30	10,000 ohms 3 W. carbon resistor
R31	1600 ohms 4 W. candohm resistor
R32	47,000 ohms carbon resistor
R33	470,000 ohms carbon resistor
R34	1000 ohms carbon resistor

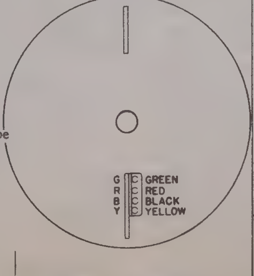


Fig. 8. Cylindrical Beam-a-Scope Connections

FRONT OF CHASSIS

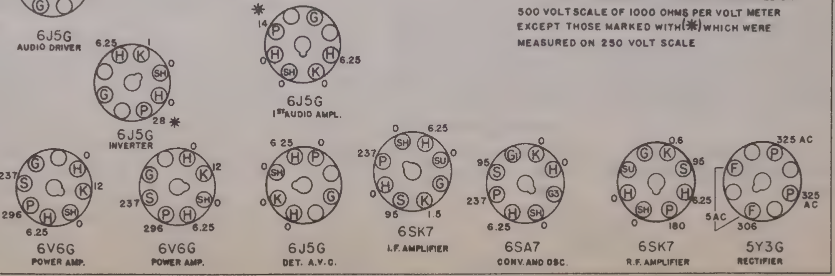
Fig. 4. Socket Voltages

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINAL AND CHASSIS

117 VOLTS LINE

NO SIGNAL INPUT "BC" BAND

ALL PLATE AND SCREEN VOLTAGES MEASURED ON 500 VOLT SCALE OF 1000 OHMS PER VOLT METER EXCEPT THOSE MARKED WITH (✱) WHICH WERE MEASURED ON 250 VOLT SCALE



BOTTOM VIEW OF CHASSIS

Tuning Frequency Range

Broadcast Band	540–1700 KC
Short-wave Band No. 1	2400–7000 KC
Short-wave Band No. 2	7000–22,000 KC

Electrical Power Output

Undistorted	10 Watts
Maximum	12 Watts

Tone Control...4 positions

Loud-speakers—"Alnico" Magnet Dynamic

Speaker Diameters	14 inches and 6½ inches	
Voice Coil Impedances	3.5 ohms	3.5 ohms

GENERAL INFORMATION

Model J-105 is a ten tube superheterodyne receiver designed to operate from an alternating current power supply. The receiver incorporates the latest developments in radio among which are the General Electric Dual Beam-a-Scopes. Broadcast and short-wave No. 1 signals are selected by the cylindrical Beam-a-Scope. Short-wave No. 2 signals are selected by the Beam-a-Scope which is mounted on the cabinet above the chassis. Additional features include single-ended tubes, iron-core oscillator station selector coils, six Feathertouch Tuning station keys, one Phono-Frequency Modulation-Television key, an "Off" key, a "Manual" key, Dual Dynapower speakers, tone monitor circuit and automatic volume control.

Phono-FM-Tel

This receiver is equipped with a pin jack on the rear apron of the chassis and a Phono–FM–Tel key for adapting it to use with record players, frequency modulation converters and television picture receivers with sound converters. General Electric plug, Stock No. RP-145, fits the pin jack.

SETTING UP THE RECEIVER

The following remarks will assist the serviceman in correctly setting up this receiver for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.

(2) After releasing the shipping screws the position of the chassis should be checked to insure accurate tuning. Close the gang condenser plates and push the chassis one way or the other until the pointer lines up with the first markings on the left side of the dial.

(3) The black speaker leads should be connected to the speaker terminals which are grounded to the speaker frame.

(4) A method of setting up station keys which will assure driftproof adjustments is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

CHASSIS OR BEAM-A-SCOPE REMOVAL

Before either the chassis or Beam-a-Scope can be removed the leads between them must be disconnected. The cylindrical Beam-a-Scope leads are disconnected by pulling the pin plugs out of the Beam-a-Scope terminals. The short-wave Beam-a-Scope leads are disconnected by unscrewing the nuts which clamp the terminals on the two phosphor-bronze straps and the screw which clamps the terminal of the yellow

Figs. 8 and 9 show the correct location of the Beam-a-Scope leads when reconnecting. The cylindrical Beam-a-Scope leads must be threaded down through the slot in the cabinet shelf which is immediately below the antenna-ground terminal board. The leads can then be brought out to the position of the cutout in the back of the cabinet shelf where they can be inserted in the Beam-a-Scope terminals.

To remove the cylindrical Beam-a-Scope the following procedure is recommended: Disconnect the four Beam-a-Scope leads. Unscrew the long self-tapping screw which prevents the Beam-a-Scope from rotating continuously in one direction. This screw is located in the cabinet shelf. Pry loose the cardboard strap which is stapled to the bottom of the cabinet and which holds the bottom of the Beam-a-Scope in place. The Beam-a-Scope can now be rotated from right to left until it comes loose. Note: The upper pivot bolt by which the Beam-a-Scope is supported should never be loosened or removed.

When replacing the cylindrical Beam-a-Scope it should be screwed on approximately five turns from the position where the bolt first takes hold. The self-tapping screw in the cabinet shelf should then be screwed down until it acts as a stop for the projection next to the terminals. The screw should not be run down so far that it contacts the projection on the opposite side from the terminals as this will limit rotation to only 180 degrees. The cardboard strap should be placed over the bottom Beam-a-Scope pivot and stapled to the cabinet in such a position that the Beam-a-Scope hangs vertically and is free to turn without rubbing on the strap.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

Note—In no case should the magnet be removed from the assembled position.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R.F. Grid at

1000 KC	6.5
4000 KC	3.0
18,000 KC	2.0

(b) R.F. Grid to Converter Grid at

1000 KC	5.0
4000 KC	3.0
18,000 KC	2.0

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at

1000 KC	50
4000 KC	50
18,000 KC	40

(d) Converter Grid to 1st I.F. Grid at

455 KC	55

(e) I.F. Amplifier Grid to Detector Grid at

455 KC	75

(2) Voltage across Volume Control to Give ½-watt Speaker Output at

400 cycles	94 volts

(3) DC Voltage Developed Across Oscillator Grid Resistor (R-6) at

1000 KC	8.5
4000 KC	8.5
18,000 KC	7.5

---

* Variations of ±20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

Alignment Procedure

The alignment procedure is given in table form. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are accessible through holes in the back apron of the chassis or from the top of the chassis (refer to the Trimmer Location diagram, Fig. 1). Metal objects such as meters, tools, etc. should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

R.F. ALIGNMENT
WITH CHASSIS OUTSIDE OF CABINET

R.F. alignment can be performed only on the "BC" and "SW-1" bands with the chassis outside the cabinet. Any alignment attempted on "SW-2" band will not be satisfactory. The same relative position between the chassis and cylindrical Beam-a-Scope should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of a 0–180° calibrated scale which is cemented to the back of the dial reflector plate. From the reference chart the degree readings for corresponding frequency settings may be ob-

(CONTINUED)

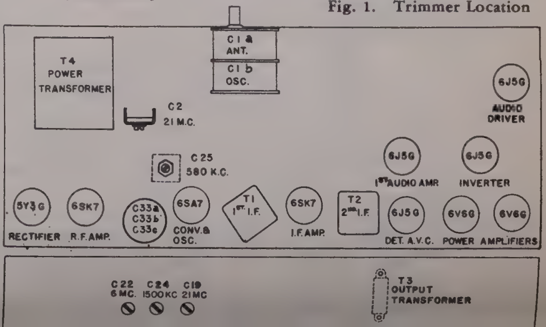


Fig. 1. Trimmer Location

(CONTINUED)

tained by laying a straight edge across the chart perpendicular to the line of figures and sliding the straight edge along to the various frequency settings desired. The degree readings will be found on either of the degree scales above or below the dial scale. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the inside edge of the right-hand pointer-guide clip is in line with the 0° mark. (See Fig. 6.) By using this edge of the clip as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until this edge of the clip is in line with 154°, the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW-1" band alignment procedure is the same as outlined in steps 2 to 5 inclusive of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed on the "BC" and "SW-1" bands the chassis should be mounted in the cabinet and "SW-2" band alignment checked as described in steps 6 to 8 of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

Note: After moving the pointer along the cord to use one of the guide clips as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

ALIGNMENT CHART

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. trimmers, C-9, C-10	Gang condenser plates closed. Depress any station key other than Phono–FM–Tel key. Connect audio input of oscilloscope to chassis ground and junction of R-32 and R-33. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Converter Grid	.05 mfd. or larger	1st I.F. trimmers, C-7, C-8	

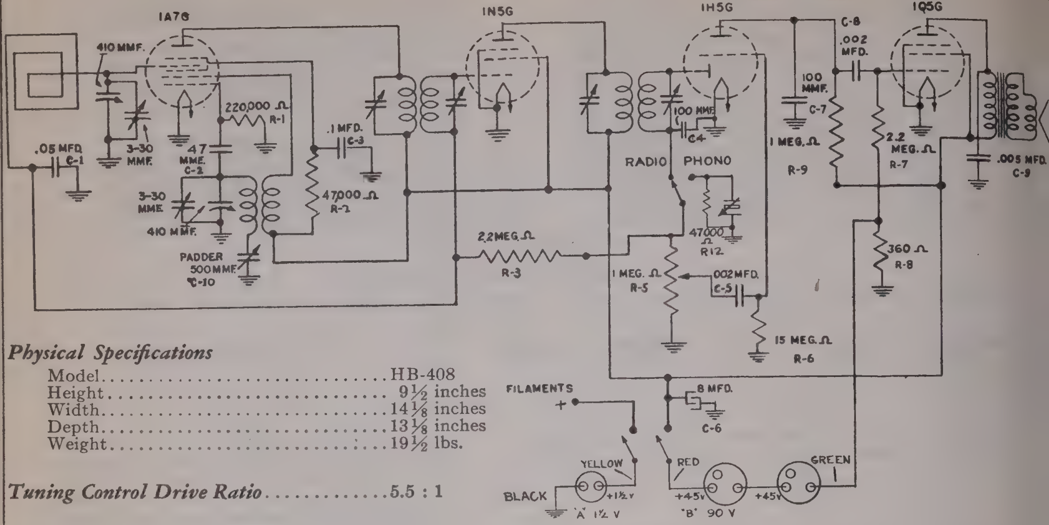
I.F. Alignment with Output Meter

1. "BC" Band	455 KC with Modulation	Converter Grid	.05 mfd. or larger	2nd I.F. trimmers, C-9, C-10	Gang condenser plates closed. Depress any key other than Phono–FM–Tel key. Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
				1st I.F. trimmers, C-7, C-8	

R.F. Alignment With Chassis Mounted in Cabinet

1. "BC" Band					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal."
2. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-25)	Set dial pointer to 580 KC and tune in signal with (C-25) while rocking gang condenser.
3. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-24)	Set dial pointer to 1500 KC and peak trimmer for maximum output while rocking the gang condenser.
4. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-25)	Realign for maximum output with a low input signal rocking the gang condenser.
5. "SW-1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-22)	Set pointer to 6 MC and peak signal while rocking gang condenser.
6. "SW-2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-19) Ant. (C-2)	Set pointer to 21 MC and tune in signal with (C-19). Peak output with (C-2) while rocking gang condenser. When (C-19) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
7. "SW-2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions. Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope strap leads closer or farther apart. The moving should be done with an insulated rod or stick.

8. Repeat Operation 6 if the short-wave Beam-a-Scope leads are moved appreciably in Operation 7.



Physical Specifications

Model	HB-408
Height	9½ inches
Width	14⅛ inches
Depth	13⅛ inches
Weight	19½ lbs.

Tuning Control Drive Ratio............5.5 : 1

Battery Specifications

"A" BATTERY
1—General 8-F-1 or 1—Eveready No. 741
"B" BATTERY
2—General V-30-B or 2—Eveready No. 762

Battery Life

Using the above recommended batteries a battery life from 200 to 250 hours can be expected providing the daily operation does not exceed four hours. If the daily operation exceeds four hours the battery life will be reduced due to the fact that the batteries do not have sufficient time to revitalize themselves.

Tuning Frequency Range...............550–1600 K.C.

Intermediate Frequency................455 K.C.

Loud-speaker—Permanent Magnet

Outside Cone Diameter	4 inches
Voice Coil Impedance (400 cycles)	3.5 ohms

Tubes

Converter and Oscillator	1A7G
I.F. Amplifier	1N5G
Detector-Amplifier	1H5G
Output	1Q5G

SERVICE INFORMATION

On later production models the 360-ohm output biasing resistor (R-8) was changed to 430 ohms. This change reduced battery drain while not appreciably affecting power output.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500 K.C. and 580 K.C The location of all trimmers is shown in Fig. 1.

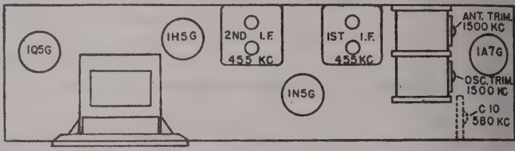


Fig. 1. Trimmer Location

I.F. Alignment

In order to align this receiver for I.F. the four wood screws holding the motorboard to the cabinet will have to be removed. Raise the front edge of the motorboard being careful not to let the cabinet cover swing back and place a strain o the hinges. The phono-switch cable will limit the amoun which the front edge of the motorboard can be opened. Pro the motorboard in the opened position and proceed with I.F alignment. (NOTE—Do not let the phono-switch cable com near the 1N5G grid leads. Standard dressing is to force th cable down in the space between the 1H5G tube and the 2n I.F. transformer.)

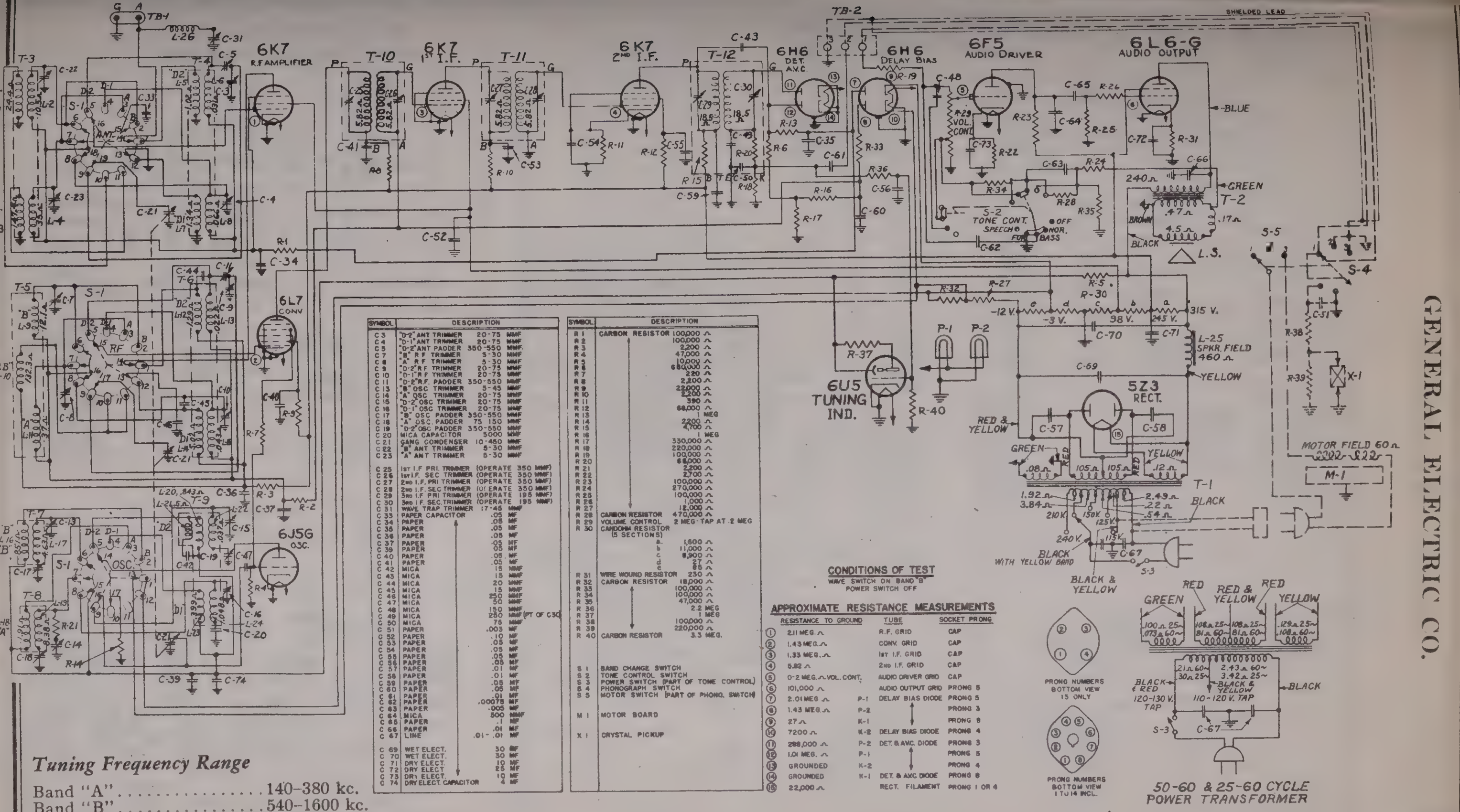
Connect an output meter across the voice coil. Set th volume control for maximum. With the test oscillator set t 455 K.C. apply signal to the control grid of the 1A7G converter tube through a .05-mfd. capacitor. Do not remove th grid leads from the tubes. Keep the test oscillator output a low as possible to give a readable output. Adjust all four I.F trimmers for maximum output.

R.F. Alignment

Return the motorboard to its normal cabinet position (NOTE—Before R.F. alignment be sure that all parts are i their normal positions in the cabinet.) It is not necessary t screw the motorboard to the cabinet as it may be convenient to raise the motorboard slightly from time to time t locate the heads of the trimmer screws. It must be remembere however, that R.F. trimmer adjustments should only be mad when the motorboard is down in position.

Access to the R.F. trimmers is made possible by removin the three snap fasteners on the right side of the cabinet. Th upper left-hand trimmer is the 1500-K.C. oscillator trimme The upper right-hand trimmer is the 1500-K.C. antenna trimmer. The lower trimmer is the 580-K.C. padder.

The test signal may be applied by connecting across the tes oscillator terminals a loop of ten turns of wire approximately one foot in diameter. Place the loop parallel to th plane of the back panel of the cabinet and not closer tha one foot. With 1500 K.C. input adjust the oscillator an antenna trimmers for maximum output. Change input signa to 580 K.C. and peak the 580-K.C. (C-10) padder by rockin the gang condenser.



SYMBOL	DESCRIPTION
C 3	"D-2" ANT TRIMMER 20-75 MMF
C 4	"D-1" ANT TRIMMER 20-75 MMF
C 5	"D-2" ANT PADDER 350-550 MMF.
C 7	"B" R F TRIMMER 5-30 MMF
C 8	"A" R F TRIMMER 5-30 MMF
C 9	"D-2" R F TRIMMER 20-75 MMF
C 10	"D-1" R F TRIMMER 20-75 MMF
C 11	"D-2" R.F. PADDER 350-550 MMF
C 13	"B" OSC TRIMMER 5-45 MMF
C 14	"A" OSC TRIMMER 20-75 MMF
C 15	"D-2" OSC TRIMMER 20-75 MMF
C 16	"D-1" OSC TRIMMER 20-75 MMF
C 17	"B" OSC PADDER 350-550 MMF
C 18	"A" OSC. PADDER 75 150 MMF
C 19	"D-2" OSC PADDER 350-550 MMF
C 20	MICA CAPACITOR 5000 MMF
C 21	GANG CONDENSER 10-450 MMF
C 22	"B" ANT TRIMMER 5-30 MMF
C 23	"A" ANT TRIMMER 5-30 MMF
C 25	1ST I.F PRI. TRIMMER (OPERATE 350 MMF)
C 26	1ST I.F. SEC TRIMMER (OPERATE 350 MMF)
C 27	2ND I.F. PRI TRIMMER (OPERATE 350 MMF)
C 28	2ND I.F. SEC TRIMMER (OPERATE 350 MMF)
C 29	3RD I.F PRI TRIMMER (OPERATE 195 MMF)
C 30	3RD I F. SEC. TRIMMER (OPERATE 195 MMF)
C 31	WAVE TRAP TRIMMER 17-45 MMF
C 33	PAPER CAPACITOR .05 MF
C 34	PAPER .05 MF
C 35	PAPER .05 MF
C 36	PAPER .05 MF
C 37	PAPER .05 MF
C 39	PAPER .05 MF
C 40	PAPER .05 MF
C 41	PAPER .05 MF
C 42	MICA 15 MMF
C 43	MICA 15 MMF
C 44	MICA 20 MMF
C 45	MICA 15 MMF
C 46	MICA 250 MMF
C 47	MICA 50 MMF
C 48	MICA 150 MMF
C 49	MICA 250 MMF (PT OF C30)
C 50	MICA 75 MMF
C 51	PAPER .003 MF
C 52	PAPER .10 MF
C 53	PAPER .05 MF
C 54	PAPER .05 MF
C 55	PAPER .05 MF
C 56	PAPER .05 MF
C 57	PAPER .01 MF
C 58	PAPER .01 MF
C 59	PAPER .05 MF
C 60	PAPER .05 MF
C 61	PAPER .01 MF
C 62	PAPER .00075 MF
C 63	PAPER .005 MF
C 64	MICA 500 MMF
C 65	PAPER .1 MF
C 66	PAPER .01 MF
C 67	LINE .01 - .01 MF
C 69	WET ELECT. 30 MF
C 70	WET ELECT. 30 MF
C 71	DRY ELECT. 10 MF
C 72	DRY ELECT 25 MF
C 73	DRY ELECT. 10 MF
C 74	DRY ELECT. CAPACITOR 4 MF

SYMBOL	DESCRIPTION
R 1	CARBON RESISTOR 100,000 Ω
R 2	100,000 Ω
R 3	2,200 Ω
R 4	47,000 Ω
R 5	10,000 Ω
R 6	680,000 Ω
R 7	220 Ω
R 8	2,200 Ω
R 9	22,000 Ω
R 10	2,200 Ω
R 11	390 Ω
R 12	68,000 Ω
R 13	1 MEG
R 14	2200 Ω
R 15	4,700 Ω
R 16	1 MEG
R 17	330,000 Ω
R 18	220,000 Ω
R 19	100,000 Ω
R 20	68,000 Ω
R 21	2,200 Ω
R 22	2,700 Ω
R 23	100,000 Ω
R 24	270,000 Ω
R 25	100,000 Ω
R 26	1,000 Ω
R 27	12,000 Ω
R 28	CARBON RESISTOR 470,000 Ω
R 29	VOLUME CONTROL 2 MEG - TAP AT .2 MEG
R 30	CANDOHM RESISTOR (5 SECTIONS) a. 1,600 Ω b 11,000 Ω c 8,900 Ω d 27 Ω e 85 Ω
R 31	WIRE WOUND RESISTOR 230 Ω
R 32	CARBON RESISTOR 18,000 Ω
R 33	100,000 Ω
R 34	100,000 Ω
R 35	47,000 Ω
R 36	2.2 MEG
R 37	1 MEG
R 38	100,000 Ω
R 39	220,000 Ω
R 40	CARBON RESISTOR 3.3 MEG.
S 1	BAND CHANGE SWITCH
S 2	TONE CONTROL SWITCH
S 3	POWER SWITCH (PART OF TONE CONTROL)
S 4	PHONOGRAPH SWITCH
S 5	MOTOR SWITCH (PART OF PHONO. SWITCH)
M 1	MOTOR BOARD
X 1	CRYSTAL PICKUP

CONDITIONS OF TEST

WAVE SWITCH ON BAND "B"
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND		TUBE	SOCKET PRONG
①	2.11 MEG. Ω		R.F. GRID	CAP
②	1.43 MEG. Ω		CONV. GRID	CAP
③	1.33 MEG. Ω		1ST I.F. GRID	CAP
④	5.82 Ω		2ND I.F. GRID	CAP
⑤	0-2 MEG. Ω VOL. CONT.		AUDIO DRIVER GRID	CAP
⑥	101,000 Ω		AUDIO OUTPUT GRID	PRONG 5
⑦	2.01 MEG Ω	P-1	DELAY BIAS DIODE	PRONG 5
⑧	1.43 MEG. Ω	P-2		PRONG 3
⑨	27 Ω	K-1		PRONG 8
⑩	7200 Ω	K-2	DELAY BIAS DIODE	PRONG 4
⑪	288,000 Ω	P-2	DET. & A.V.C. DIODE	PRONG 3
⑫	1.01 MEG. Ω	P-1		PRONG 5
⑬	GROUNDED	K-2		PRONG 4
⑭	GROUNDED	K-1	DET. & A.V.C. DIODE	PRONG 8
⑮	22,000 Ω		RECT. FILAMENT	PRONG 1 OR 4

Tuning Frequency Range

Band "A"	140-380 kc.
Band "B"	540-1600 kc.
Band "D-1"	5500-14,000 kc.
Band "D-2"	13,000-23,000 kc.

Intermediate Frequency . . 455 kc.

Electrical Output

Undistorted	6 watts
Maximum	10 watts

MOTOR AND PICKUP CONNECTIONS SHOWN IN DOTTED LINES APPLY TO MODEL FE-119 ONLY.

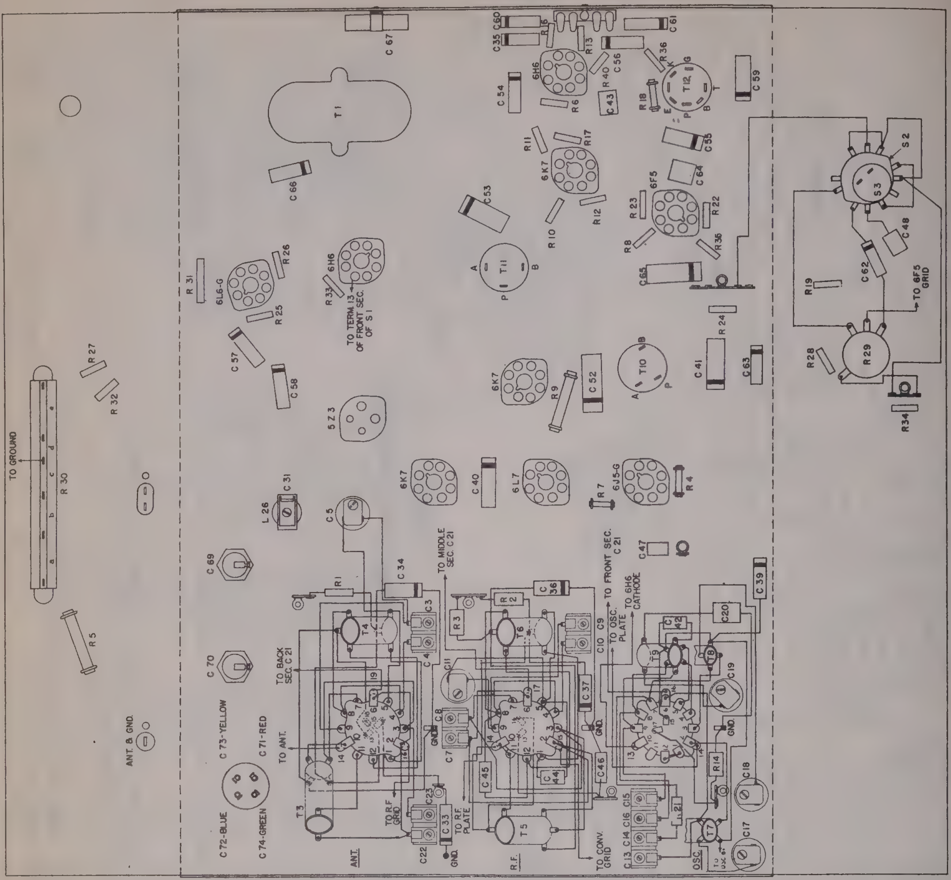
TERMINALS 1 AND 2 ON TB-2 JOINED IN MODELS FE-112 AND FE-116.

-1940-

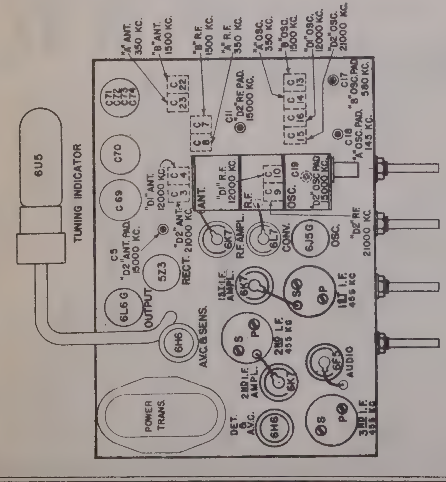
FOR OTHER DATA SEE INDEX

MODELS FE-62, FE-67, FE-68
MODELS FE-112, FE-116, FE-119

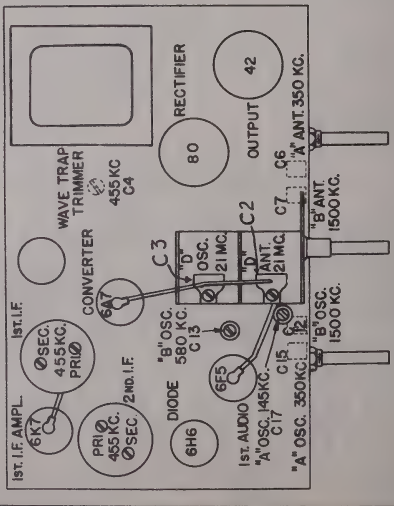
GENERAL ELECTRIC CO.



CHASSIS PARTS LAYOUT
MODELS FE-112,FE-116,FE-119



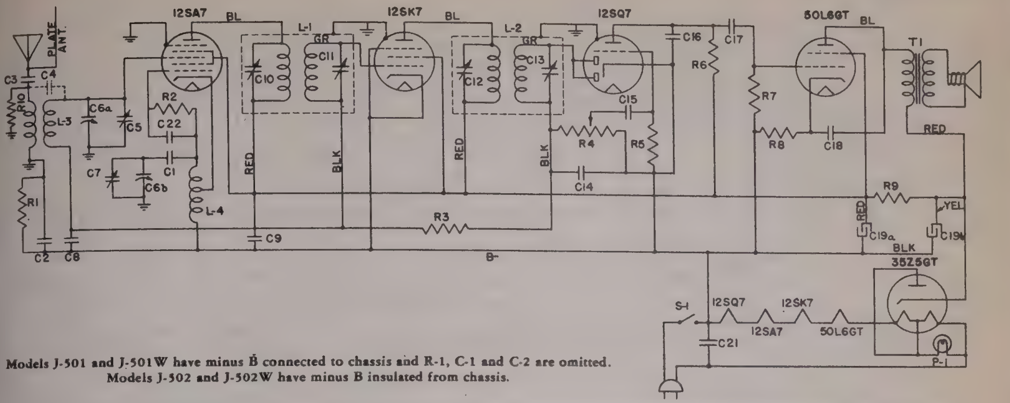
Chassis Layout and Trimmer Location
MODELS FE-112,FE-116,FE-119



Chassis Layout and Trimmer Location
MODELS FE-62,FE-67,FE-68

GENERAL ELECTRIC CO.

MODELS J-501, J-501W, J-502, J-502W



Models J-501 and J-501W have minus B connected to chassis and R-1, C-1 and C-2 are omitted. Models J-502 and J-502W have minus B insulated from chassis.

Symbol	Description	Symbol	Description	Symbol	Description
C-1	.02 mfd. paper (Used only in J-502, 502W)	C-16	100 mmf. mica	R-2	20,000 ohms carbon
C-2	.2 mfd. paper (Used only in J-502, 502W)	C-17	.01 mfd. paper	R-3	2.2 megohms carbon
C-3	.01 mfd. paper	C-18	.02 mfd. paper	R-4	0.5 megohm volume control
C-5	Antenna trimmer	C-19A	16 mfd. dry electrolytic	R-5	5.1 megohms carbon
C-6A	Antenna section of tuning condenser	C-19B	24 mfd. dry electrolytic	R-6	250,000 ohms carbon
C-6B	Oscillator section of tuning condenser	C-21	.05 mfd. paper	R-7	750,000 ohms carbon
C-7	Oscillator trimmer	C-22	100 mmf. mica	R-8	150 ohms carbon
C-8	.05 mfd. paper	L-3	Antenna coil	R-9	2800 ohms 1 W. carbon
C-9	.05 mfd. paper	L-4	Oscillator coil	R-10	10,000 ohms carbon
C-14	250 mmf. mica	P-1	Dial lamp, Mazda No. 47	S-1	Power switch
C-15	.01 mfd. paper	R-1	250,000 ohms carbon (Used only in J-502, 502W)		

GENERAL INFORMATION

Models J-501, J-501W, J-502 and J-502W are five-tube, AC-DC superheterodyne receivers. Models J-502 and J-502W are Underwriters' approved versions of the Models J-501 and J-501W. The Models J-501 and J-502 use rich brown plastic cabinets. Models J-501W and J-502W are identical to Models J-501 and J-502, respectively, except for white plastic cabinet.

These receivers incorporate the following features: Single-ended tubes, automatic volume control, plate antenna, dynapower speaker, beam power output and a dial lamp.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F. .... 455 KC
R.F. .... 1750 and 1500 KC

The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C-7) to 1750 KC. Change the generator signal to 1500 KC, tune the receiver to the signal and peak antenna trimmer (C-5) for maximum output.

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

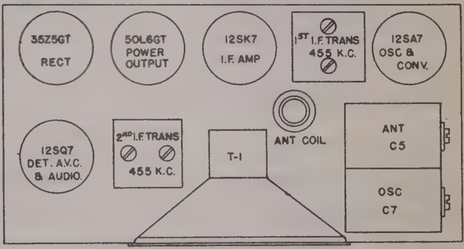


Fig. 1. Trimmer Location

Over-all Dimensions

Height .... 6 inches
Width .... 9¼ inches
Depth .... 5½ inches

Tuning Control Drive Ratio 6:1

Electrical Specifications

Models	VOLTAGE RATING (AC or DC)	FREQUENCY (Cycles per Second)	POWER CONSUMPTION (Watts)
J-501, 501W	105–125	40–60	30
J-502, 502W	105–117	40–60	30

Tuning Frequency Range .... 550–1750 KC

Intermediate Frequency .... 455 KC

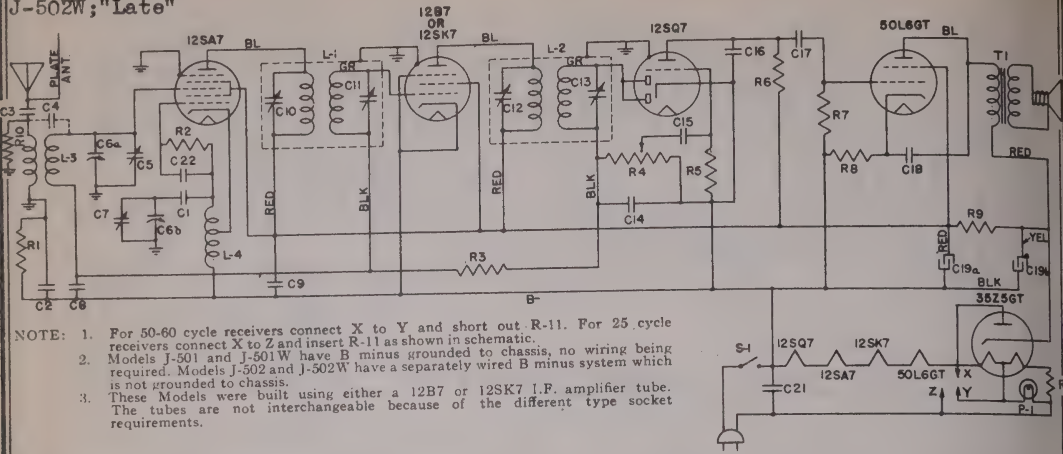
Maximum Power Output .... 1.5 Watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside cone diameter .... 4 inches
Voice coil impedance (400 cycles) .... 3.1 ohms

MODELS J-501,
J-501W, J-502,
J-502W;"Late"

GENERAL ELECTRIC CO.



NOTE: 1. For 50-60 cycle receivers connect X to Y and short out R-11. For 25 cycle receivers connect X to Z and insert R-11 as shown in schematic.
2. Models J-501 and J-501W have B minus grounded to chassis, no wiring being required. Models J-502 and J-502W have a separately wired B minus system which is not grounded to chassis.
3. These Models were built using either a 12B7 or 12SK7 I.F. amplifier tube. The tubes are not interchangeable because of the different type socket requirements.

Symbol	Description	Symbol	Description	Symbol	Description
C-1	.05 mfd. paper capacitor (Used only in J-502 and J-502W)	C-16	330 mmf. mica capacitor	R-2	22,000 ohms carbon resistor
C-2	0.2 mfd. paper capacitor (Used only in J-502 and J-502W)	C-17	.01 mfd. paper capacitor	R-3	2.2 megohms carbon resistor
C-3	.01 mfd. paper capacitor	C-18	.02 mfd. paper capacitor	R-4	0.5 megohm volume control
C-4	5 to 7 mmf. (part of L-3)	C-19a	20 mfd. 150 V. dry electrolytic	R-5	4.7 megohms carbon resistor
C-5	Antenna trimmer on gang	C-19b	30 mfd. 150 V. dry electrolytic	R-6	270,000 ohms carbon resistor
C-6a	Antenna section of tuning condenser	C-21	.05 mfd. paper capacitor	R-7	470,000 ohms carbon resistor
C-6b	Oscillator section of tuning condenser	C-22	100 mmf. mica capacitor	R-8	150 ohms carbon resistor
C-7	Oscillator trimmer on gang	L-1	1st I.F. transformer	R-9	2700 ohms 1 W. carbon resistor
C-8	.05 mfd. paper capacitor	L-2	2nd I.F. transformer	R-10	10,000 ohms carbon resistor
C-9	.05 mfd. paper capacitor	L-3	Antenna coil	R-11	13 ohms carbon resistor (Used on 25 cycle sets only)
C-14	330 mmf. mica capacitor	L-4	Oscillator coil	T-1	Output transformer
C-15	.005 mfd. paper capacitor	P-1	Dial lamp, Mazda No. 47		
		R-1	330,000 ohms carbon resistor (Used only in J-502 and J-502W)		

-1940-

POWER CONSUMPTION-30 WATTS

Tuning Frequency Range..............550–1720 KC

Intermediate Frequency....................455 KC

Maximum Power Output..................1.5 Watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside cone diameter....................4 inches
Voice coil impedance (400 cycles).........3.1 ohms

Tubes

Converter and Oscillator.......GE-12SA7
I.F. Amplifier................GE-12SK7 or 12B7
Det., Aud., AVC..............GE-12SQ7
Power Output.................GE-50L6GT
Rectifier....................GE-35Z5GT
Dial Lamp....................Mazda No. 47

VOLTAGE CHART

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
12SA7	73	73	0	12
12SK7	73	73	0	12
12SQ7	40		0	12
50L6GT	120	73	12	50
35Z5GT	112 AC		122	31

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII

Alignment Frequencies

I.F...455 KC
R.F..1500 KC

The location of all trimmers is shown in Fig. 1.

R.F. Alignment

Close the gang condenser by rotating the tuning control. Slide the pointer along the cord until it lines up with the first dial marking on the left. Now rotate the tuning control until the pointer is over the 1500 KC dial mark. Apply a 1500 KC signal to the receiver antenna post through a standard I.R.E. dummy antenna. Align the oscillaton trimmer (C-7) to bring in the signal and peak the signal by adjusting the antenna trimmer (C-5). (See Fig. 1 for trimmer locations.)

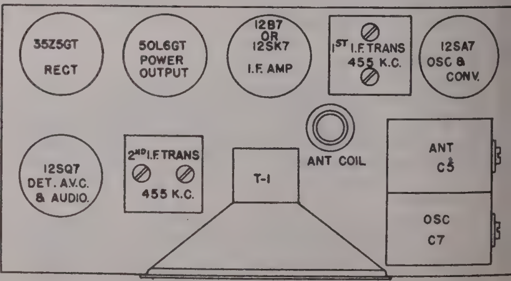
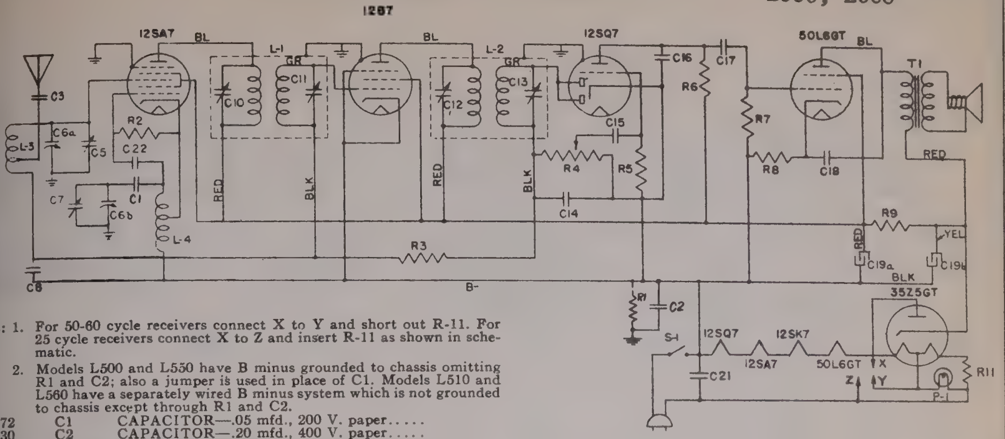


Fig. 1. Trimmer Location

GENERAL ELECTRIC CO.

MODELS L500, L510, L550, L560



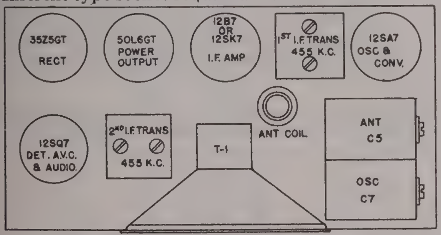
NOTE: 1. For 50-60 cycle receivers connect X to Y and short out R-11. For 25 cycle receivers connect X to Z and insert R-11 as shown in schematic.

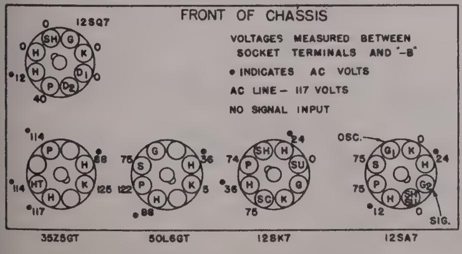
2. Models L500 and L550 have B minus grounded to chassis omitting R1 and C2; also a jumper is used in place of C1. Models L510 and L560 have a separately wired B minus system which is not grounded to chassis except through R1 and C2.

*RC-072	C1	CAPACITOR—.05 mfd., 200 V. paper.....
*RC-130	C2	CAPACITOR—.20 mfd., 400 V. paper.....
*RC-293	C3	CAPACITOR—470 mmf., mica...........
*RC-7039	C6a, 6b	CONDENSER—Tuning condenser........
*RC-072	C8	CAPACITOR—.05 mfd., 200 V. paper.....
*RC-274	C14	CAPACITOR—330 mmf., mica...........
*RC-023	C15	CAPACITOR—.005 mfd., 600 V. paper....
*RC-274	C16	CAPACITOR—330 mmf., mica...........
*RC-039	C17	CAPACITOR—.01 mfd., 600 V. paper.....
*RC-048	C18	CAPACITOR—.02 mfd., 600 V. paper.....
*RC-5174	C19a	CAPACITOR—20 mfd., 150 V. electrolytic
*RC-5174	C19b	CAPACITOR—30 mfd., 150 V. electrolytic
*RC-092	C21	CAPACITOR—.05 mfd., 600 V. paper.....
*RC-235	C22	CAPACITOR—100 mmf., mica...........
*RQ-1319	R1	RESISTOR—330,000 ohms, ½ W. carbon..
*RQ-1291	R2	RESISTOR—22,000 ohms, ½W. carbon...
*RQ-1339	R3	RESISTOR—2.2 megohms, ½W. carbon...
*RV-108	R4	VOL. CONTROL—0.5 megohm control.....
*RQ-1347	R5	RESISTOR—4.7 megohms, ½W. carbon....
*RQ-1317	R6	RESISTOR—270,000 ohms, ½W. carbon...
*RQ-1323	R7	RESISTOR—470,000 ohms, ½W. carbon...
*RQ-1239	R8	RESISTOR—150 ohms, ½W. carbon......
*RQ-1469	R9	RESISTOR—2,700 ohms, 1W. carbon.....
*RQ-1214	R11	RESISTOR—13 ohms, ½W. carbon.......
*RT-375	L1	TRANSFORMER—1st I.F. transformer...
*RT-376	L2	TRANSFORMER—2nd I.F. transformer...
RL-1011	L3	COIL—antenna coil....................
RL-2047	L4	COIL—oscillator coil..................
RT-4004	T1	TRANSFORMER—output transformer....

Models L500, L510, L550 and L560 are five tube AC-DC superheterodyne receivers. Models L510 and L560 are Underwriters' approved versions of the Models L500 and L550. The models L500 and L510 use rich mahogany plastic cabinets. Models L550 and L560 are identical to Models L500 and L510, respectively, except for ivory plastic cabinets.

These models are built using either a 12B7 or 12SK7 I.F. amplifier tube. The tubes are not interchangeable because of the different type socket requirements.





BOTTOM VIEW OF CHASSIS

Intermediate Frequency..................455 KC

Maximum Power Output..................1.5 watts

Loud-speaker—PM Dynamic

Outside Cone Diameter....................4 inches

Voice Coil Impedance (400 Cycles).........3.5 ohms

I.F Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

Close the gang condenser by rotating the tuning control. Slide the pointer along the cord until it lines up with the first dial marking on the left. Now rotate the tuning control until the pointer is over the 1500 KC dial mark. Apply a 1500 KC signal to the receiver antenna post through a standard I.R.E. dummy antenna. Align the oscillator trimmer (C-7) to bring in the signal and peak the signal by adjusting the antenna trimmer (C-5). (See Fig. 1 for trimmer locations.)

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

Special Service Information

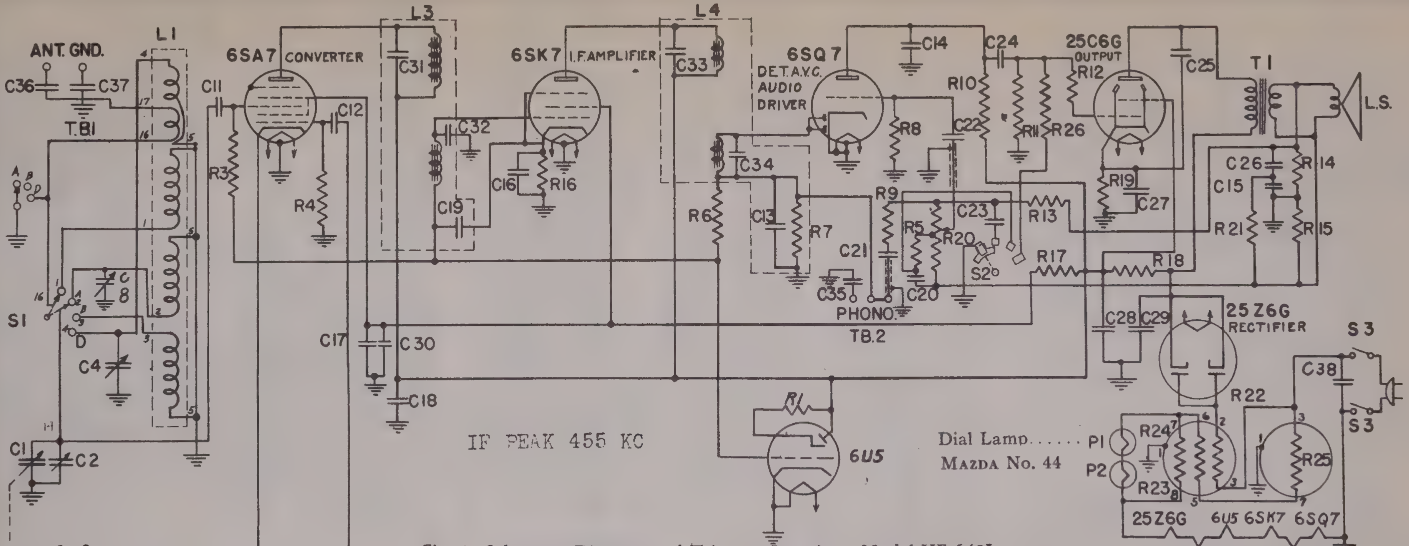
The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*
   Antenna Post to Converter Grid.....4.0 at 1000 KC
   I.F. on Converter Grid to I.F. on I.F. Amplifier Grid..................50 at 455 KC
   I.F. Amplifier Grid to Diode Plate...45 at 455 KC

(2) 0.20-volt, 400-cycle signal across the volume control will give ½-watt speaker output.* (Volume control turned to maximum.)

(3) Average DC voltage developed across oscillator grid leak..................6 volts

* Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.



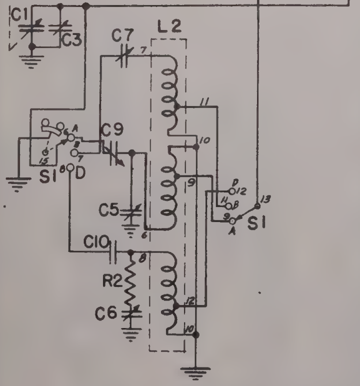
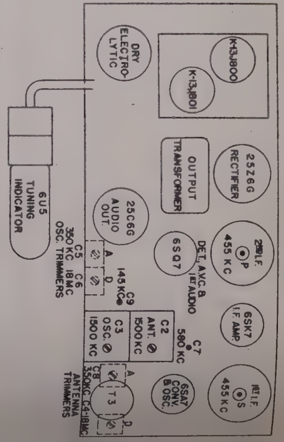


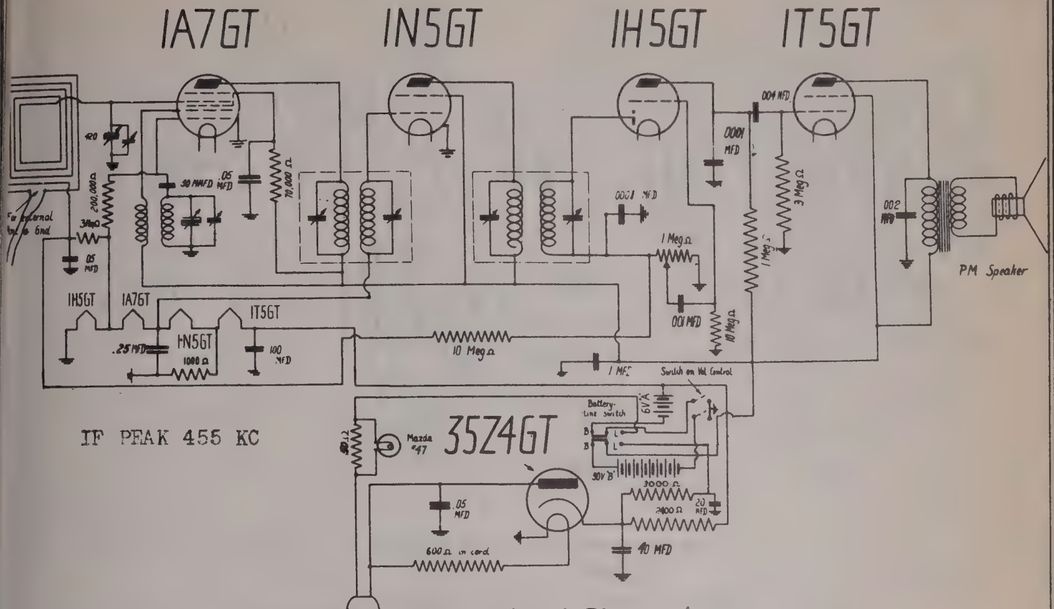
Fig. 9. Schematic Diagram and Trimmer Location—Model HE-640L



Symbol	Description	Symbol	Description
C-1	Tuning Condenser	C-38	.05 Mfd. 600 V. Paper Capacitor
C-2	2–18 Mmf. "B" Ant. Trimmer	L-1	Antenna Transformer
C-3	2–18 Mmf. "B" Osc. Trimmer	L-2	Oscillator Transformer
C-4	2–20 Mmf. "D" Ant. Trimmer	L-3	1st I.F. Transformer
C-5	3–30 Mmf. "A" Osc. Trimmer	L-4	2nd I.F. Transformer
C-6	3–30 Mmf. "D" Osc. Trimmer	P-1	Pilot Light Mazda No. 44
C-7	300–675 Mmf. "B" Osc. Padder	P-2	Pilot Light Mazda No. 44
C-8	2–20 Mmf. "A" Ant. Trimmer	R-1	1.0 Meg., ½-W. Carbon Resistor
C-9	75–150 Mmf. "A" Osc. Padder	R-2	39 Ohms, ½-W. Carbon Resistor
C-10	4300 Mmf. Mica ±5%	R-3	680,000 Ohms, ½-W. Carbon Resistor
C-11	470 Mmf. Mica Capacitor	R-4	22,000 Ohms, ½-W. Carbon Resistor
C-12	50 Mmf. Mica Capacitor	R-5	180,000 Ohms, ½-W. Carbon Resistor
C-13	100 Mmf. Mica Capacitor	R-6	2.2 Meg., ½-W. Carbon Resistor
C-14	220 Mmf. Mica Capacitor	R-7	330,000 Ohms, ½-W. Carbon Resistor
C-15	.03 Mfd. 600 V. Paper Capacitor	R-8	4.7 Meg., ½-W. Carbon Resistor
C-16	.05 Mfd. 200 V. Paper Capacitor	R-9	47,000 Ohms, ½-W. Carbon Resistor
C-17	.05 Mfd. 600 V. Paper Capacitor	R-10	330,000 Ohms, ½-W. Carbon Resistor
C-18	.05 Mfd. 600 V. Paper Capacitor	R-11	470,000 Ohms, ½-W. Carbon Resistor
C-19	.05 Mfd. 200 V. Paper Capacitor	R-12	1000 Ohms, ½-W. Carbon Resistor
C-20	.002 Mfd. 600 V. Paper Capacitor	R-13	5.6 Meg., ½-W. Carbon Resistor
C-21	.005 Mfd. 600 V. Paper Capacitor	R-14	1500 Ohms, ½-W. Carbon Resistor
C-22	.005 Mfd. 600 V. Paper Capacitor	R-15	270 Ohms, ½-W. Carbon Resistor
C-23	.0015 Mfd. 600 V. Paper Capacitor	R-16	330 Ohms, ½-W. Carbon Resistor
C-24	.05 Mfd. 600 V. Paper Capacitor	R-17	3900 Ohms, 1-W. Carbon Resistor
C-25	.008 Mfd. 1000 V. Paper Capacitor	R-18	3300 Ohms, 2-W. Carbon Resistor
C-26	0.1 Mfd. 200 V. Paper Capacitor	R-19	270 Ohms, 1-W. Carbon Resistor
C-27	20 Mfd. 25 V. Dry Electrolytic	R-20	2.0 Meg. Vol. Control, 1 Megohm Tap
C-28	50 Mfd. 250 V. Dry Electrolytic	R-21	220 Ohms, ½-W. Carbon Resistor
C-29	40 Mfd. 300 V. Dry Electrolytic	R-22	240 Ohms, 10-W. Ballast (K13J801)
C-30	20 Mfd. 250 V. Dry Electrolytic	R-23	110 Ohms, 20-W. Ballast (K13J801)
C-35	.25 Mfd. 400 V. Paper Capacitor	R-24	160 Ohms, 20-W. Ballast (K13J801)
C-36	.01 Mfd. 600 V. Paper Capacitor	R-25	370 Ohms, 50-W. Ballast (K13J800)
C-37	.01 Mfd. 600 V. Paper Capacitor	R-26	680,000 Ohms, ½-W. Carbon Resistor

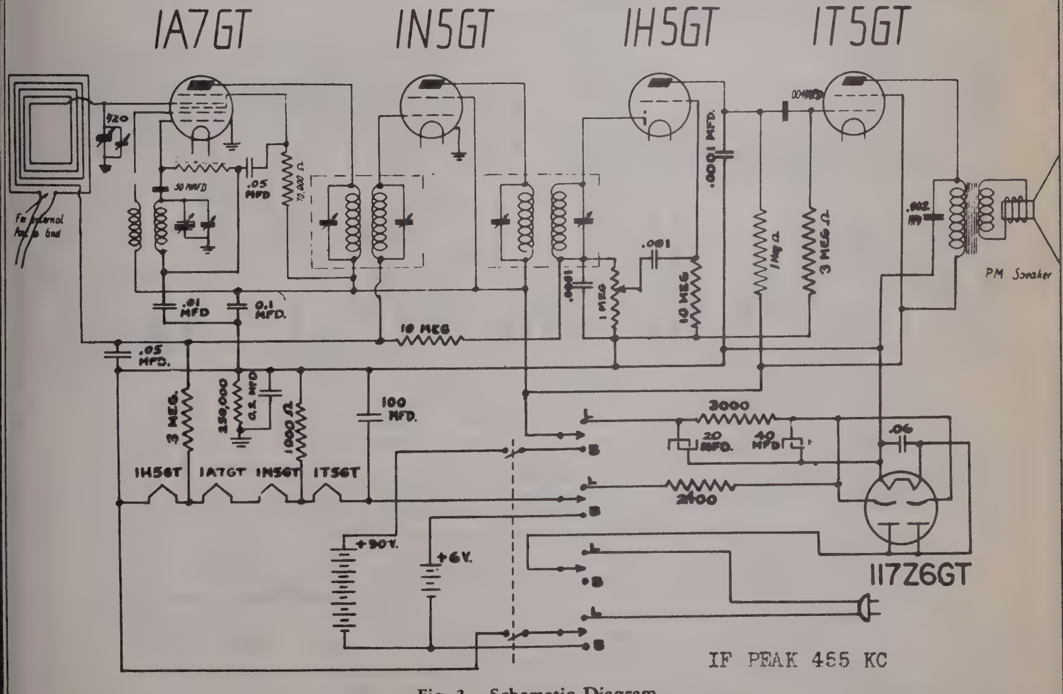
GENERAL ELECTRIC CO.

MODEL JB-513
MODEL JB-514



IF PEAK 455 KC

Fig. 2. Schematic Diagram
Model JB-513



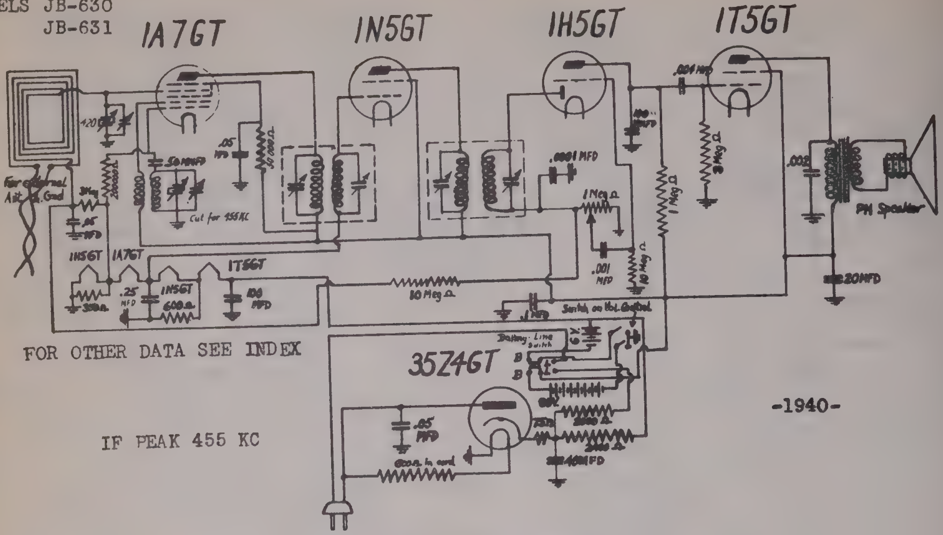
IF PEAK 455 KC

Fig. 3. Schematic Diagram
Model JB-514

MODEL JB-523
MODEL JB-524

GENERAL ELECTRIC CO.

MODELS JB-630
JB-631



FOR OTHER DATA SEE INDEX

IF PEAK 455 KC

-1940-

Fig. 1. Schematic Diagram—Model JB-523

ALIGNMENT AND VOLTAGES

MODELS JB-523,JB-524,JB-630,JB-631

VOLTAGE CHART
(117 line volts)

Tubes	Plate to Gnd. Volts	Screen to Gnd. Volts	Cathode to Gnd. Volts	Filament Volts
1A7GT	90 (conv.) 90 (osc.)	60 *		1.2 to 1.5
1N5GT	90	90		1.2 to 1.5
1H5GT	54 *			1.2 to 1.5
1T5GT	85	90		1.2 to 1.5
3Q5GT	85	90		2.5 to 3.3
35Z4GT	117 AC		122	35
117Z6GT	117 AC		122	117

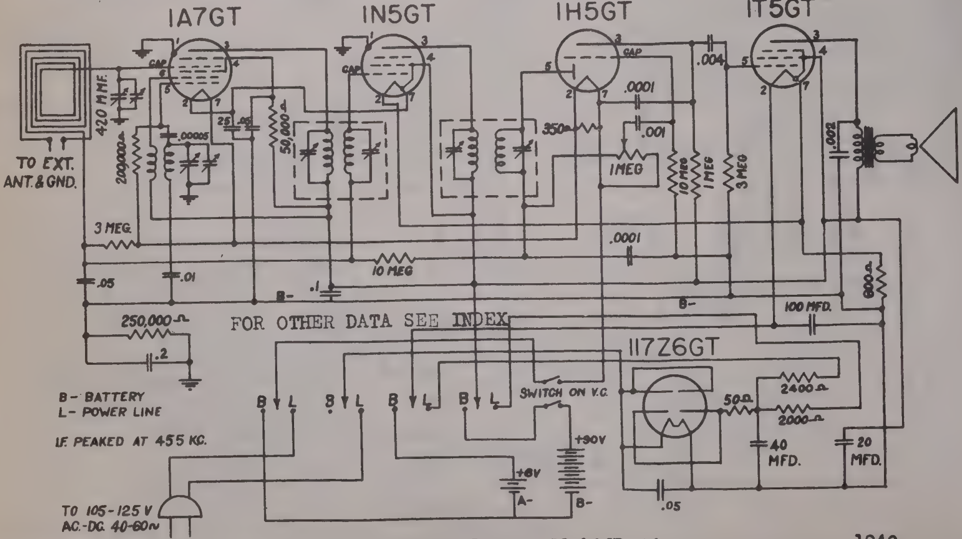
* Voltages are operating voltages in circuits with high series resistance. The actual voltages will be lower depending on the voltmeter loading. Above voltages should be held within ±20% with 117 volts AC line.

I.F ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII

R.F. Alignment

Connect high side of signal generator to one of Beam-a-Scope primary leads and ground side to other primary lead.

Turn tuning condenser completely out of mesh (open). Set generator to 1700 KC. Adjust oscillator trimmer (cut section of tuning condenser) until generator signal is heard through speaker. Then reset generator to 1500 KC and tune receiver to signal. Peak antenna trimmer on tuning condenser for maximum output.



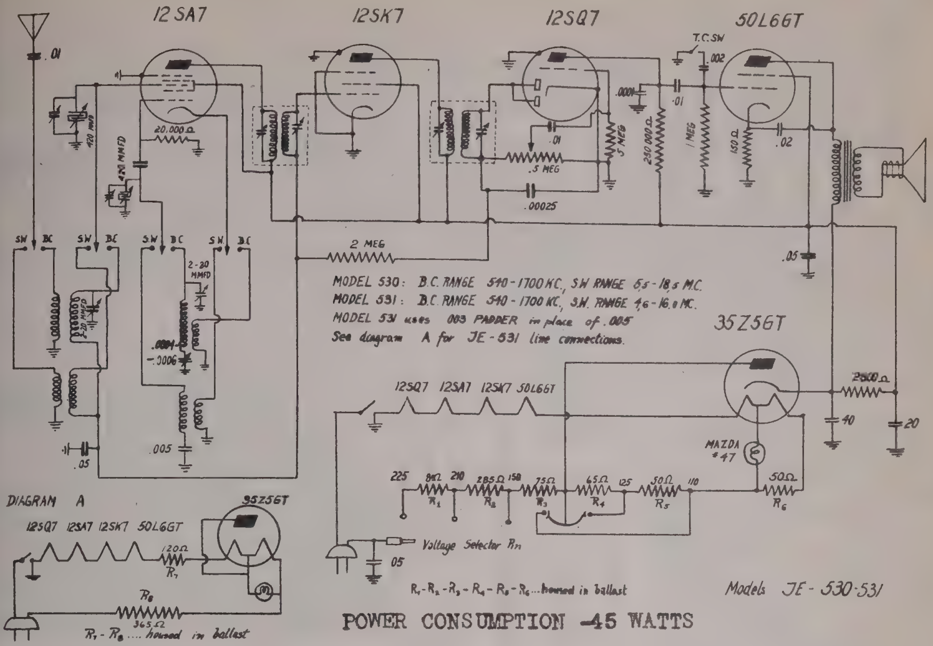
FOR OTHER DATA SEE INDEX

Fig. 2. Schematic Diagram—Model JB-524

-1940-

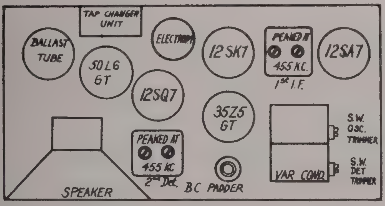
GENERAL ELECTRIC CO.

MODELS JE-530,
JE-531, JE-531X



POWER CONSUMPTION -45 WATTS

-1940-

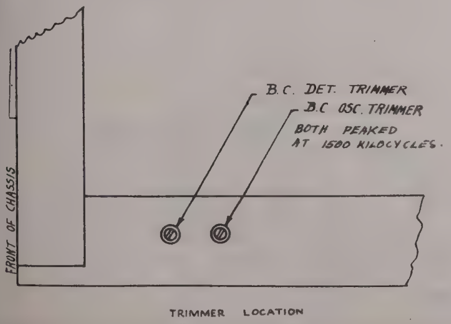


Electrical Power Output

Undistorted	1.2 watts
Maximum	2 watts

Loud-speaker—Permanent Magnet

Outside Cone Diameter	5 inches
Voice Coil Impedance (400 cycles)	3.5 ohms



TRIMMER LOCATION

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	455 Kc.
Broadcast R.F.	1500 and 600 Kc.
Short Wave	
JE530	17,000 Kc.
JE531X	15,000 Kc.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 Kc. and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 12SK7 through a .05 mfd. capacitor and align the 2nd I.F. transformer. Repeat the procedure applying the 455 Kc. signal to the control grid of the 12SA7 and aligning the 1st I.F. transformer. Do not remove the grid leads from the tubes. Finish alignment by over-all adjustments.

R.F. Alignment

Refer Sketch **"Trimmer Location."** Apply R.F. signals through a standard IRE dummy to the antenna terminal.

"C" Band (Model JE530—5500–18,500 Kc.)

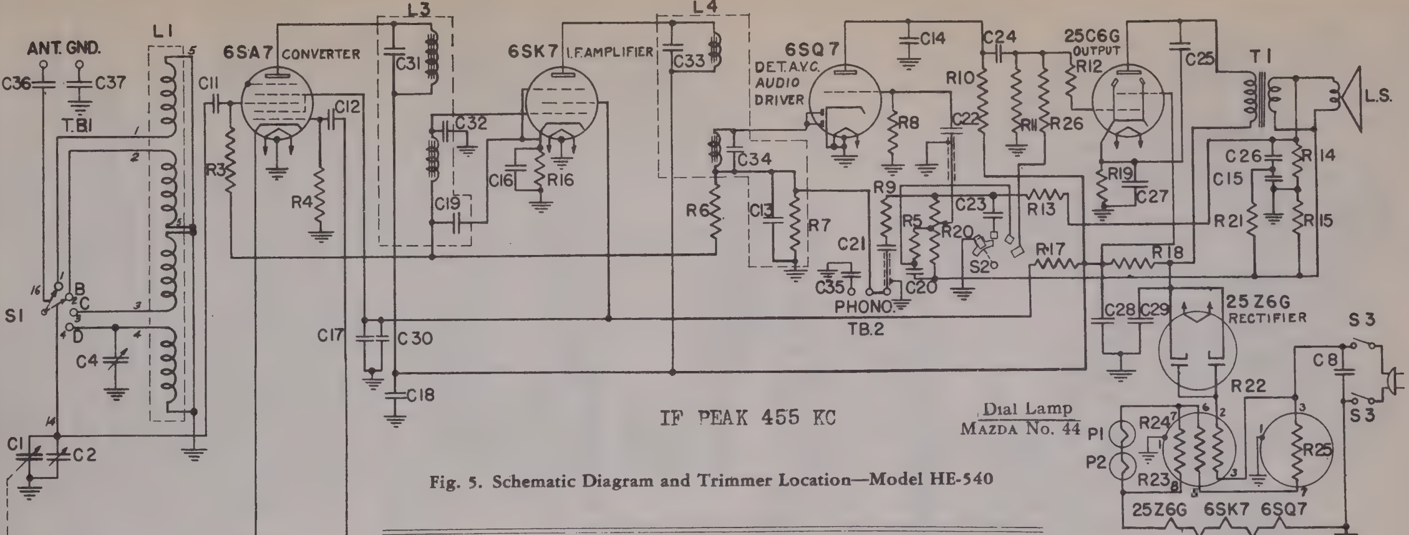
Rotate band switch to clockwise position and set dial pointer and signal generator to 17 megacycles. Align by rotating S.W. osc. trimmer located on rear section of variable condenser. Peak the S.W. detector trimmer located on front section of variable condenser for maximum signal while rocking the gang condenser. The image of 17 Mc. should be heard at 16.09 Mc.

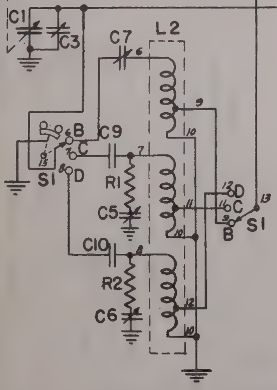
"C" Band (Models JE531, JE531X—4600–16,000 Kc.)

Same procedure as above, but align osc. trimmer at 15 megacycles. Image will be heard at 14.09 Mc.

"B" Band (All models—540–1700 Kc.)

Rotate band switch to counterclockwise position and set dial pointer and signal generator to 1500 Kc. Align by turning the broadcast oscillator trimmer screw. Peak broadcast detector screw for maximum signal. Set screw for maximum signal. Set receiver dial and signal generator to 600 Kc. and adjust the broadcast padder for maximum signal while rocking the gang condenser. Retrim at 1500 Kc.





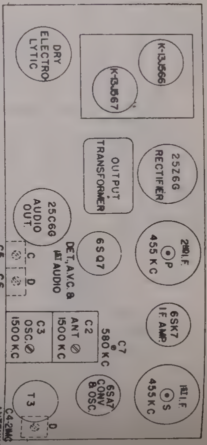


Fig. 5. Schematic Diagram and Trimmer Location—Model HE-540

Symbol	Description	Symbol	Description
C-1	Tuning Condenser	L-1	Antenna Transformer
C-2	2–18 Mmf. "B" Ant. Trimmer	L-2	Oscillator Transformer
C-3	2–18 Mmf. "B" Osc. Trimmer	L-3	1st I.F. Transformer
C-4	3–30 Mmf. "D" Ant. Trimmer	L-4	2nd I.F. Transformer
C-5	3–30 Mmf. "C" Osc. Trimmer	P-1	Pilot Light Mazda No. 44
C-6	3–30 Mmf. "D" Osc. Trimmer	P-2	Pilot Light Mazda No. 44
C-7	300–650 Mmf. "B" Osc. Padder	R-1	330 Ohms, ½-W. Carbon Resistor
C-8	.05 Mfd. 600 V. Paper	R-2	39 Ohms, ½-W. Carbon Resistor
C-9	1800 Mmf. Mica ±5%	R-3	680,000 Ohms, ½-W. Carbon Resistor
C-10	5600 Mmf. Mica ±5%	R-4	22,000 Ohms, ½-W. Carbon Resistor
C-11	470 Mmf. Mica Capacitor	R-5	180,000 Ohms, ½-W. Carbon Resistor
C-12	50 Mmf. Mica Capacitor	R-6	2.2 Meg., ½-W. Carbon Resistor
C-13	100 Mmf. Mica Capacitor	R-7	330,000 Ohms, ½-W. Carbon Resistor
C-14	220 Mmf. Mica Capacitor	R-8	4.7 Meg., ½-W. Carbon Resistor
C-15	.03 Mfd. 600 V. Paper Capacitor	R-9	47,000 Ohms, ½-W. Carbon Resistor
C-16	.05 Mfd. 200 V. Paper Capacitor	R-10	330,000 Ohms, ½-W. Carbon Resistor
C-17	.05 Mfd. 600 V. Paper Capacitor	R-11	470,000 Ohms, ½-W. Carbon Resistor
C-18	.05 Mfd. 600 V. Paper Capacitor	R-12	1000 Ohms, ½-W. Carbon Resistor
C-19	.05 Mfd. 200 V. Paper Capacitor	R-13	5.6 Meg., ½-W. Carbon Resistor
C-20	.002 Mfd. 600 V. Paper Capacitor	R-14	1500 Ohms, ½-W. Carbon Resistor
C-21	.005 Mfd. 600 V. Paper Capacitor	R-15	270 Ohms, ½-W. Carbon Resistor
C-22	.005 Mfd. 600 V. Paper Capacitor	R-16	330 Ohms, ½-W. Carbon Resistor
C-23	.0015 Mfd. 600 V. Paper Capacitor	R-17	3900 Ohms, 1-W. Carbon Resistor
C-24	.05 Mfd. 600 V. Paper Capacitor	R-18	3300 Ohms, 2-W. Carbon Resistor
C-25	.008 Mfd. 1000 V. Paper Capacitor	R-19	270 Ohms, 1-W. Carbon Resistor
C-26	0.1 Mfd. 200 V. Paper Capacitor	R-20	2 Meg. Volume Control, 1 Meg. Tap
C-27	20 Mfd. 25 V. Dry Electrolytic	R-21	220 Ohms, ½-W. Carbon Resistor
C-28	50 Mfd. 250 V. Dry Electrolytic	R-22	240 Ohms, 10-W. Ballast (K13J567)
C-29	40 Mfd. 300 V. Dry Electrolytic	R-23	110 Ohms, 20-W. Ballast (K13J567)
C-30	20 Mfd. 250 V. Dry Electrolytic	R-24	160 Ohms, 20-W. Ballast (K13J567)
C-35	.25 Mfd. 400 V. Paper Capacitor	R-25	390 Ohms, 50-W. Ballast (K13J566)
C-36	.01 Mfd. 600 V. Paper Capacitor	R-26	680,000 Ohms, ½-W. Carbon Resistor
C-37	.01 Mfd. 600 V. Paper Capacitor		

GENERAL ELECTRIC CO.

MODELS HP-558, HP-559, HP-560, HP-561

One side of the power line is connected directly to the chassis, therefore, caution should be exercised when servicing.

Power Supply (Volts)	Frequency (Cycles on A-C)	Power Consumption (Watts)
105-125 AC 105-125 DC	50-60	30

Electrical Power Output

Undistorted. . . . . .1.0 watt
Maximum. . . . . .1.7 watts

Loud-speaker—Permanent Magnet Type

Outside Cone Diameter. . . . . .5 inches
Voice Coil Impedance (400 cycles). . .3.8 ohms
D.C. Coil Resistance. . . . . .3.4 ohms

ALIGNMENT PROCEDURE

The location of alignment trimmers is shown in Figs. 1 and 2.

*I.F. Alignment**

Connect an output meter across the voice coil. Turn the volume control to maximum. Set signal generator to 455 K.C. and keep the generator output as low as a readable meter reading will permit.

Apply signal to the grid of the 12SA7GT through a .05 capacitor. Align all I.F. trimmers (C-14, 15 and 16) for a maximum meter reading.

*R.F. Alignment**

Set the signal generator to 1730 K.C. and connect the output to the blue antenna lead through a 100 mmf. mica capacitor. Rotate the gang condenser to wide open and align the oscillator trimmer. Readjust signal generator output to 1400 K.C. and after tuning in signal by rotating the gang condenser, peak the antenna trimmer. The alignment is now complete unless the gang condenser plates have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 K.C. and bend the plates into position of maximum output.

*Precaution—If signal generator is A-C operated use an isolating transformer between the power supply and the radio receiver power output. The use of an isolating capacitor is not recommended as A-C current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

SERVICE INFORMATION

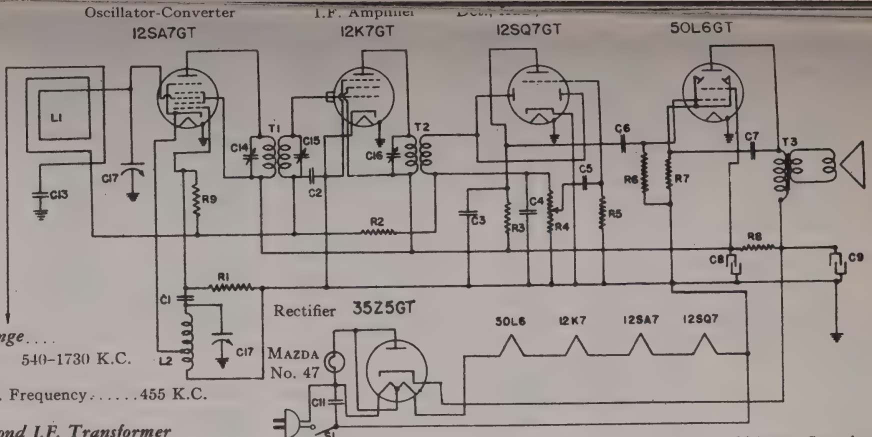
Oscillator Coil

Looking at connection end in clockwise direction starting at chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 1 to No. 2. . . . . .4.8 ohms
No. 1 to No. 3. . . . . .4.2 ohms

First I.F. Transformer

Primary—Blue, plate; red, B+. . . . . .32.1 ohms
Secondary—White, grid; black, AVC. . . . .33.2 ohms



Range. . . .
540-1730 K.C.

I.F. Frequency. . . . . .455 K.C.

Second I.F. Transformer

Primary—Blue, plate; red, B+. . . . . .24.2 ohms
Secondary—White, grid; black, AVC. . . . .24.1 ohms

Electrolytic Condenser

Red, 30 mfd., 150 volts; green, 20 mfd., 150 volts; black, common terminal.

SOCKET VOLTAGES

Tube	Plate To Gnd (Volts)	Screen To Gnd (Volts)	Cathode To Gnd (Volts)	Filament Voltage
12SA7GT	80	82		11
12K7GT	80	82	0	11
12SQGT	40*		0	11
50L6GT	97	82	5.5	48
35Z5GT	115 AC		102	34

Line—115 Volts AC, Volume Control Maximum.
Antenna shorted to ground.
*Measured on 250 volt scale of 1000 ohms per volt voltmeter.

Symbol	Description	Symbol	Description
C-1	100 mmf. mica capacitor	C-13	.001 mfd. paper capacitor
C-2	.02 mfd. paper capacitor	R-1	20,000 ohms carbon resistor
C-3	500 mmf. mica capacitor	R-2	2.2 megohms carbon resistor
C-4	250 mmf. mica capacitor	R-3	250,000 ohms carbon resistor
C-5	.01 mfd. paper capacitor	R-4	500,000 ohms volume control
C-6	.002 mfd. paper capacitor	R-5	5.6 megohms carbon resistor
C-7	.01 mfd. paper capacitor	R-6	510,000 ohms carbon resistor
C-8	20 mfd. 150 V. dry electrolytic	R-7	150 ohms carbon resistor
C-9	30 mfd. 150 V. dry electrolytic	R-8	1000 ohms 1 W. carbon resistor
C-11	.05 mfd. paper capacitor	R-9	15 megohms carbon resistor

Fig. 1. Trimmer Location
Models HP-558 and HP-561

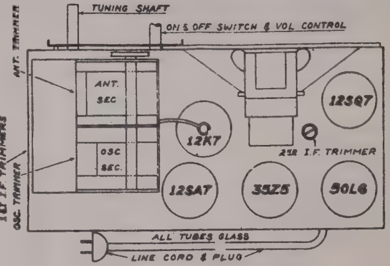
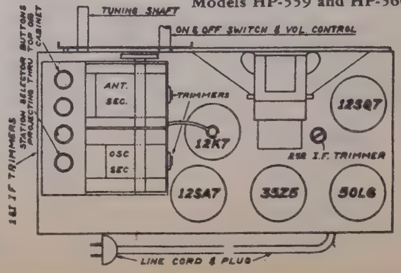
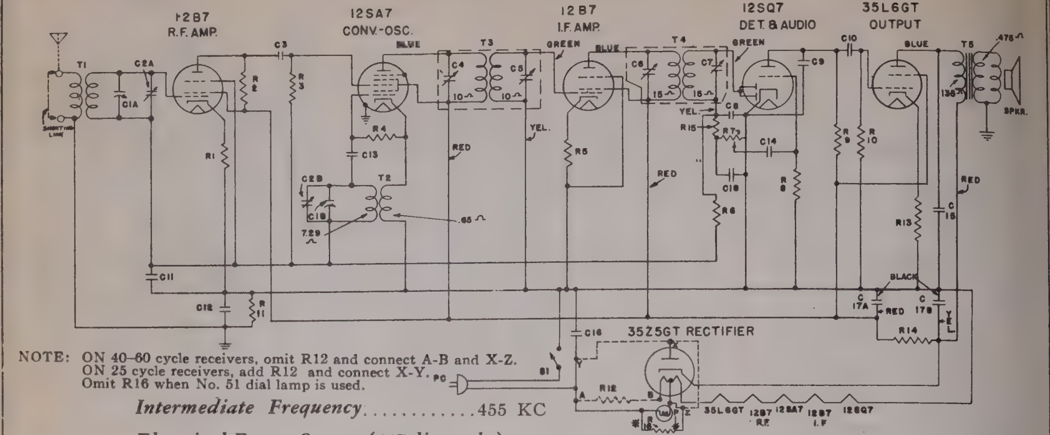


Fig. 2. Trimmer Location
Models HP-559 and HP-560



MODELS J-602
J-603

GENERAL ELECTRIC CO.



NOTE: ON 40–60 cycle receivers, omit R12 and connect A-B and X-Z.
ON 25 cycle receivers, add R12 and connect X-Y.
Omit R16 when No. 51 dial lamp is used.

Intermediate Frequency............455 KC

Electrical Power Output (117 line volts)
Undistorted......................1.0 watts
Maximum........................1.5 watts

Loudspeaker—PM Dynamic
Outside Cone Diameter...........5 inches
Voice Coil Impedance (400 cycles).3.5 ohms

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the screw and spacer mounting. The RF signal should be capacity coupled to the receiver loop by placing a two-foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed in close proximity to the loop when making this alignment.

With the gang condenser plates completely closed, the pointer should line up with the first mark on the left of the scale. Set the signal generator to 1500 KC. Align (C-1b) to the signal while the pointer is on the 1500 KC mark. Peak (C-1a) for maximum output.

Special Service Information

The following information will be very useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments.

(1) Stage Gains
Antenna post to RF grid—3.8 at 1000 KC
RF grid to converter grid—6.0 at 1000 KC
Converter grid to IF grid—46 at 455 KC
IF grid to 12SQ7 diode plate—75 at 455 KC

(2) Audio Gain
.14 volts, 400 cycles signal across volume control with control set at maximum, will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 10.0 volts at 1000 KC.

Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

Stock No.	Symbol	Description
RC-7049	C-1a, 1b, 2a, 2b	CONDENSER—Tuning condenser..........
*RC-235	C-3	CAPACITOR—100 Mmf., mica............
*RC-242	C-8	CAPACITOR—150 Mmf., mica............
*RC-274	C-9	CAPACITOR—330 Mmf., mica............
*RC-039	C-10	CAPACITOR—.01 Mfd., 600 V. paper.....
*RC-072	C-11	CAPACITOR—.05 Mfd., 200 V. paper.....
*RC-104	C-12	CAPACITOR—0.1 Mfd., 600 V. paper.....
*RC-216	C-13	CAPACITOR—47 Mmf., mica............
*RC-023	C-14	CAPACITOR—.005 Mfd., 600 V. paper....
*RC-039	C-15	CAPACITOR—.01 Mfd., 600 V. paper.....
*RC-092	C-16	CAPACITOR—.05 Mfd., 600 V. paper.....
RC-5183	C-17a, 17b	CAPACITOR—50 Mfd., 60 Mfd., electrolytic
*RC-235	C-18	CAPACITOR—100 Mmf., mica............
*RQ-1227	R-1	RESISTOR—47 ohm, ½ W. carbon........
*RQ-1275	R-2	RESISTOR—4700 ohm, ½ W. carbon......
*RQ-1299	R-3	RESISTOR—47,000 ohm, ½ W. carbon....
*RQ-1295	R-4	RESISTOR—33,000 ohm, ½ W. carbon....
*RQ-1235	R-5	RESISTOR—100 ohm, ½ W. carbon.......
*RQ-1339	R-6	RESISTOR—2.2 megohm, ½ W. carbon....
RV-120	R-7, S-1	VOLUME CONTROL—0.5 megohm, combined with power switch...............
*RQ-1349	R-8	RESISTOR—5.6 megohm, ½ W. carbon....
*RQ-1323	R-9, 10, 11	RESISTOR—470,000 ohm, ½ W. carbon....
*RQ-1213	R-12	RESISTOR—12 ohm, ½ W. carbon.........
*RQ-1239	R-13	RESISTOR—150 ohm, ½ W. carbon........
RQ-651	R-14	RESISTOR—1000 ohm, 2 W. carbon.......
*RQ-1299	R-15	RESISTOR—47,000 ohm, ½ W. carbon....
*RQ-1255	R-16	RESISTOR—680 ohm, ½ W. carbon.......

*Used in previous receivers.

Models J602 and J603 are six-tube AC-DC superheterodyne receivers with Underwriters' Approval listing. The Model J602 is housed in a mahogany plastic cabinet, while the Model J603 has an ivory plastic cabinet.

Both the MAZDA No. 47 and No. 51 dial lamps were used during production. When lamp No. 51 is used, the resistor R16 should be omitted.

Either the metal or glass type 12B7 tube may be used in the RF or IF stage. However when the glass tube is used in the IF stage, a tube shield must be used to prevent oscillation at the low frequency end of the broadcast band.

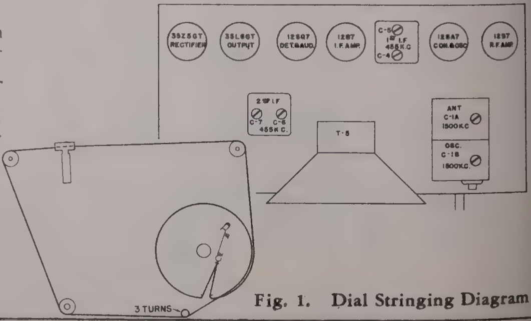
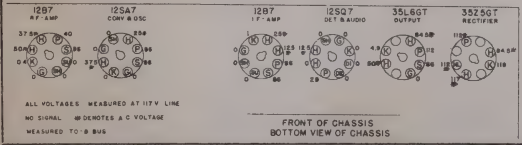
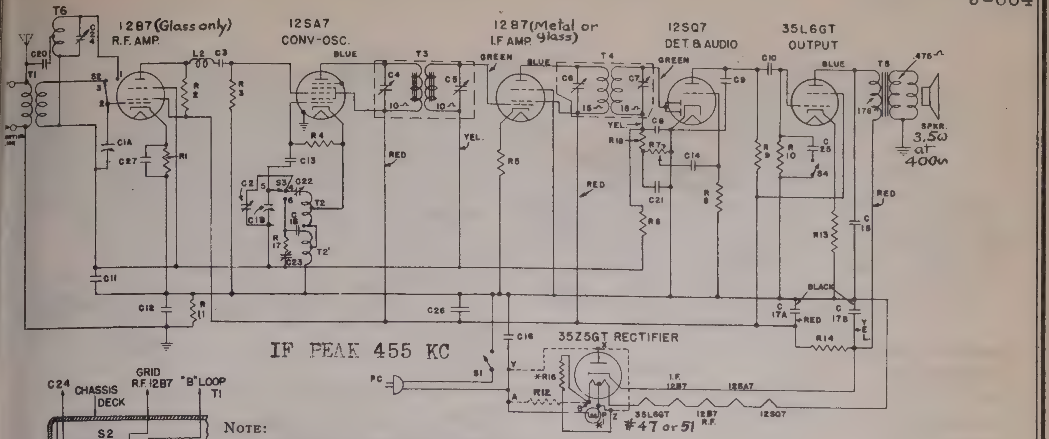


Fig. 1. Dial Stringing Diagram



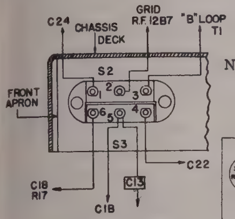
GENERAL ELECTRIC CO.

MODELS J-614 J-664

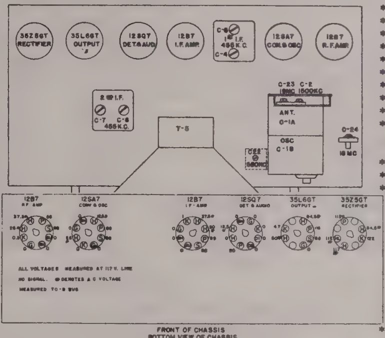


Note:

On 40-60 cycle receivers, omit R12 and connect A-B & X-Z.
On 25 cycle receivers, add R12 and connect X-Y.
* Omit R16 when No. 51 Mazda dial lamp is used



Band Switch Wiring



FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS

RC-7050	C-1a, 1b	CONDENSER—Tuning condenser
RC-6547	C-2, 23	CAPACITOR—"BC" and "SW" osc. trimmer assembly
*RC-235	C-3	CAPACITOR—100 Mmf., mica
*RC-274	C-8	CAPACITOR—330 Mmf., mica
*RC-242	C-9	CAPACITOR—150 Mmf., mica
*RC-039	C-10	CAPACITOR—.01 Mfd., 600 V. paper
*RC-072	C-11	CAPACITOR—.05 Mfd., 200 V. paper
*RC-104	C-12	CAPACITOR—0.1 Mfd., 600 V. paper
*RC-216	C-13	CAPACITOR—47 Mmf., mica
*RC-023	C-14	CAPACITOR—.005 Mfd,. 600 V. paper
*RC-039	C-15	CAPACITOR—.01 Mfd., 600 V. paper
*RC-092	C-16	CAPACITOR—.05 Mfd., 600 V. paper
RC-5183	C-17a, 17b	CAPACITOR—50 Mfd., 60 Mfd., 150 V. electrolytic
*RC-391	C-18	CAPACITOR—4300 Mmf., mica
*RC-209	C-20	CAPACITOR—39 Mmf., mica
*RC-235	C-21	CAPACITOR—100 Mmf., mica
RC-6548	C-22	CAPACITOR—"B" padder
RC-6547	C-23, 2	CAPACITOR—"SW" and "BC" osc. trimmer assembly
RC-6546	C-24	CAPACITOR—"SW" band antenna trimmer
RC-053	C-25	CAPACITOR—.0032 Mfd., 600 V. paper
RC-039	C-26, 27	CAPACITOR—.01 Mfd., 600 V. paper
RQ-1227	R-1	RESISTOR—47 ohm, ½ W. carbon
RQ-1275	R-2	RESISTOR—4700 ohm, ½ W. carbon
RQ-1299	R-3	RESISTOR—47,000 ohm, ½ W. carbon
*RQ-1295	R-4	RESISTOR—33,000 ohm, ½ W. carbon
*RQ-1235	R-5	RESISTOR—100 ohm, ½ W. carbon
*RQ-1339	R-6	RESISTOR—2.2 megohm, ½ W. carbon
RV-120	R-7, S-1	VOLUME CONTROL — 0.5 megohm with power switch
*RQ-1349	R-8	RESISTOR—5.6 megohm, ½ W. carbon
*RQ-1315	R-9	RESISTOR—220,000 ohm, ½ W. carbon
RQ-1323	R10, 11	RESISTOR—470,000 ohm, ½ W. carbon
*RQ-1213	R-12	RESISTOR—12 ohm, ½ W. carbon
*RQ-1239	R-13	RESISTOR—150 ohm, ½ W. carbon
RQ-651	R-14	RESISTOR—1000 ohm, 2 W. carbon
*RQ-1255	R-16	RESISTOR—680 ohm, ½ W. carbon
*RQ-1231	R-17	RESISTOR—68 ohm, ½ W. carbon
*RQ-1299	R-18	RESISTOR—47,000 ohm, ½ W. carbon
RL-1012	L-2	COIL—R.F. choke coil

* Used in previous receivers.

he alignment procedure is gi n in table form. All IF al nments may be made with th chassis removed from the ca inet. However the RF al nments are made with the ch ssis and loop antennas se-cu ely bolted in the cabinet, as he relative position of the o antenna with respect to h chassis materially affects t The RF signal should be ca acity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	12B7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C22**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2 (Osc.)
5	REPEAT STEP 3			
6	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.)
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.)

* Use minimum capacity peak.
** Rock gang condenser when making alignment.

"A" rating—115 Volts AC or DC, 40-60 cycles, 35 watts
"C" rating—115 Volts AC or DC, 25 cycles, 35 watts

Tuning Frequency Range

Broadcast Band	540-1720 kilocycles
Short-wave Band	5600-18,300 kilocycles

Special Service Information

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

(1) Stage gains
Antenna post to RF grid—3.0 at 1000 KC
RF grid to converter grid—6.0 at 1000 KC
Converter grid to IF grid—50 at 455 KC
IF grid to 12SQ7 diode plate—75 at 455 KC

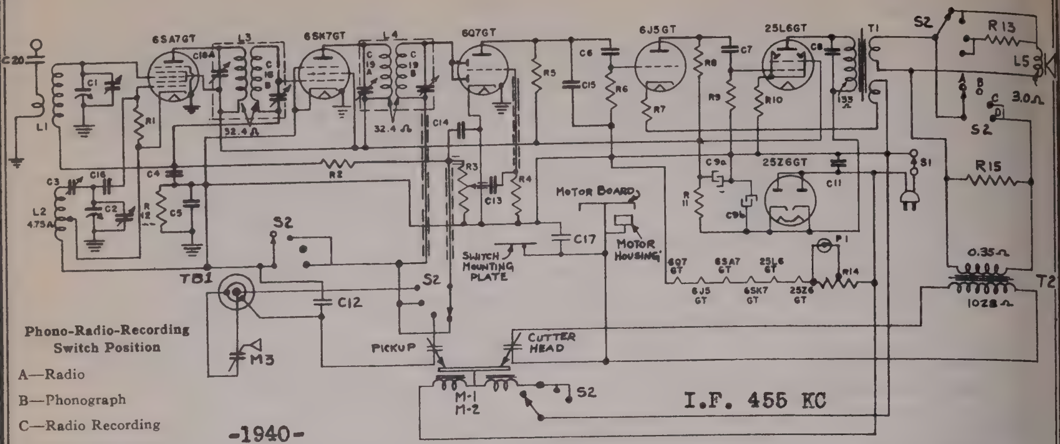
(2) Audio gains
.14 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 9.0 volts at 1000 KC or 8.0 volts at 10,000 KC.

* Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

MODEL J-629

GENERAL ELECTRIC CO.



Phono-Radio-Recording Switch Position

A—Radio

B—Phonograph

C—Radio Recording

D—Microphone Recording

	Description	Symbol	Description	Symbol	Description
	RADIO CHASSIS	C-14	470 mmf. mica capacitor	R-6	1.0 megohm carbon resistor
C-1	Antenna section of tuning condenser	C-15	220 mmf. mica capacitor	R-7	3300 ohms carbon resistor
C-2	Oscillator section of tuning condenser	C-16	47 mmf. mica capacitor	R-8	39,000 ohms carbon resistor
C-3	"B" band padder	C-17	.01 mfd. paper capacitor	R-9	470,000 ohms carbon resistor
C-4	.05 mfd. paper capacitor	C-20	.002 mfd. paper capacitor	R-10	150 ohms carbon resistor
C-5	.20 mfd. paper capacitor	L-1	Beam-a-Scope	R-11	1000 ohms 1 W. carbon resistor
C-6	.005 mfd. paper capacitor	L-2	Oscillator coil	R-12	470,000 ohms carbon resistor
C-7	.005 mfd. paper capacitor	L-3	1st I.F. transformer	R-13	3.9 ohm W. W. resistor
C-8	.01 mfd. paper capacitor	L-4	2nd I.F. transformer	R-14	BL-42-B ballast resistor
C-9a	30 mfd. 150 V. dry electrolytic	P-1	Pilot lamp MAZDA No. 44	R-15	7.0 ohm W. W. resistor
C-9b	50 mfd. 150 V. dry electrolytic	R-1	33,000 ohms carbon resistor	S-1	Power switch (comb. with R-3)
C-11	.05 mfd. paper capacitor	R-2	2.2 megohms carbon resistor	S-2	Radio-phono-record switch
C-12	.08 mfd. paper capacitor	R-3	0.5 megohm volume control	T-1	Output transformer
C-13	.03 mfd. paper capacitor	R-4	15 megohms carbon resistor	T-2	Cutter transformer
		R-5	470,000 ohms carbon resistor	TB-1	Microphone jack

Outside Cone Diameter	6.5 inches
Voice Coil Impedance (400 cycles)	3.5 ohms

ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
TRIM ANT, OSC, 1500 KC; PAD 580 KC
POWER CONSUMPTION-75 WATTS

Special Service Information

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

(1) Stage Gains
Antenna Post to Converter Grid—6 at 1000 KC‡
Converter Grid to 6SK7GT Grid—30 at 455 KC‡
6SK7GT Grid to 6Q7GT Det. Plate—100 at 455 KC‡

(2) Audio Gains
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R-1) averages 12 volts.

‡ Variations of +10, −20% permissible.

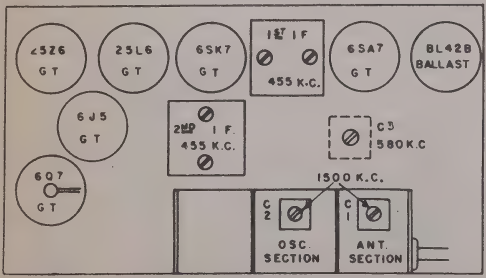


Fig. 1. Trimmer Location

RECORDING ADJUSTMENTS

Cutting Head Pressure

The pressure is controlled by means of the adjustment screw located midway back on top of the recording arm.

The pressure should be adjusted so that by inspection with a magnifying glass, the uncut portion of the record between the grooves is the same width as the groove. At no time should pressure be great enough to cut through the acetate surface enough to show the metal base of the record.

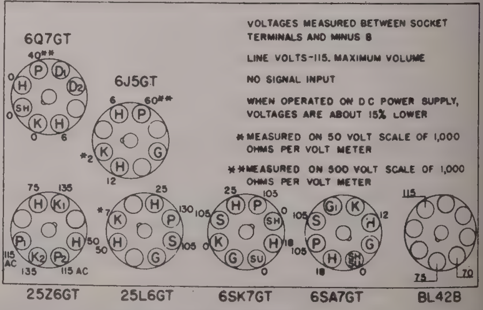
A clockwise rotation of the setscrew increases pressure.

Cutting Arm Adjustment

The adjustment at the rear and underneath the cutting arm, controls the height above the record blank at which the cutting arm rides. This should be adjusted so that when resting in the recording position, the setscrew of the cutting head rides halfway down in the needle screw gap.

Lead Screw Follower Arm Pressure Adjustment

The pressure is varied by the phosphor bronze spring adjustment underneath the phono assembly on the follower arm. The pressure should be great enough so that when the recording head is in the recording position, this phosphor bronze spring should rest at the bottom of the lead screw groove. Too great pressure will cause binding, while too little pressure is liable to cause overlapping of the grooves.



VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND MINUS B

LINE VOLTS-115. MAXIMUM VOLUME

NO SIGNAL INPUT

WHEN OPERATED ON DC POWER SUPPLY, VOLTAGES ARE ABOUT 15% LOWER

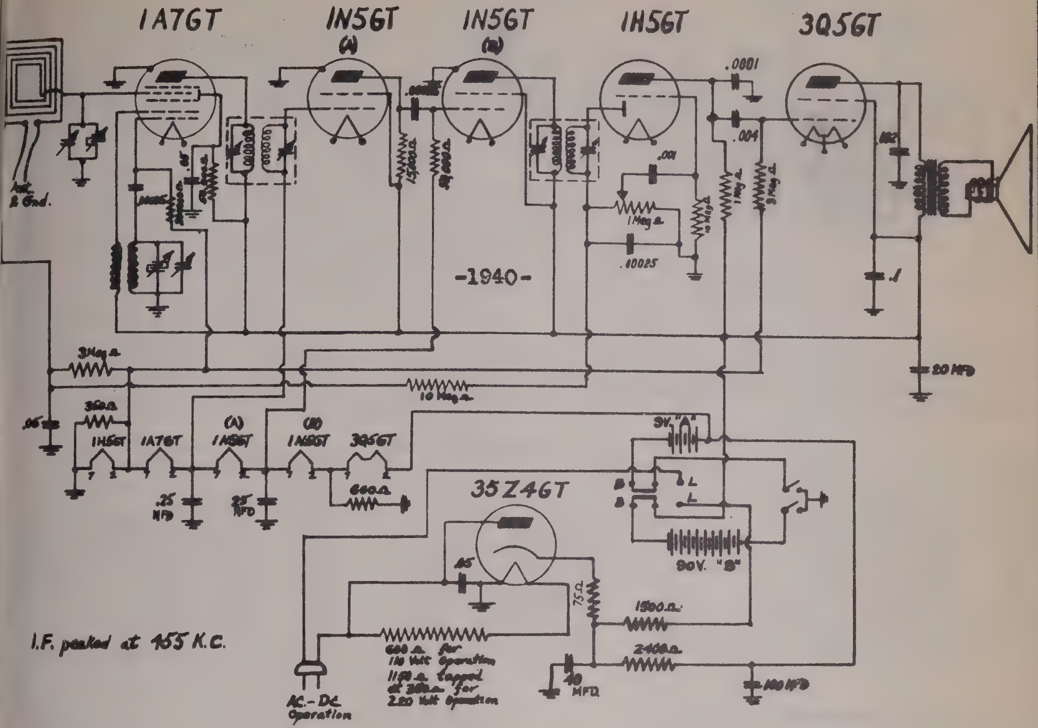
*MEASURED ON 50 VOLT SCALE OF 1,000 OHMS PER VOLT METER

**MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLT METER

BOTTOM VIEW OF CHASSIS

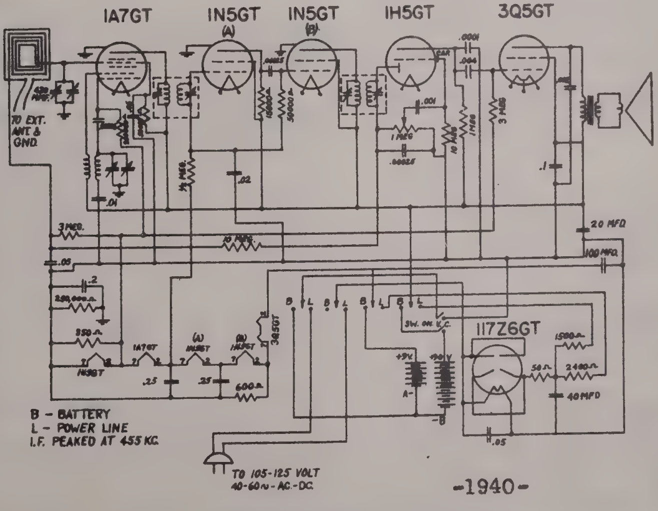
GENERAL ELECTRIC CO.

MODEL JB-630
MODEL JB-631



Schematic Diagram—Model JB-630

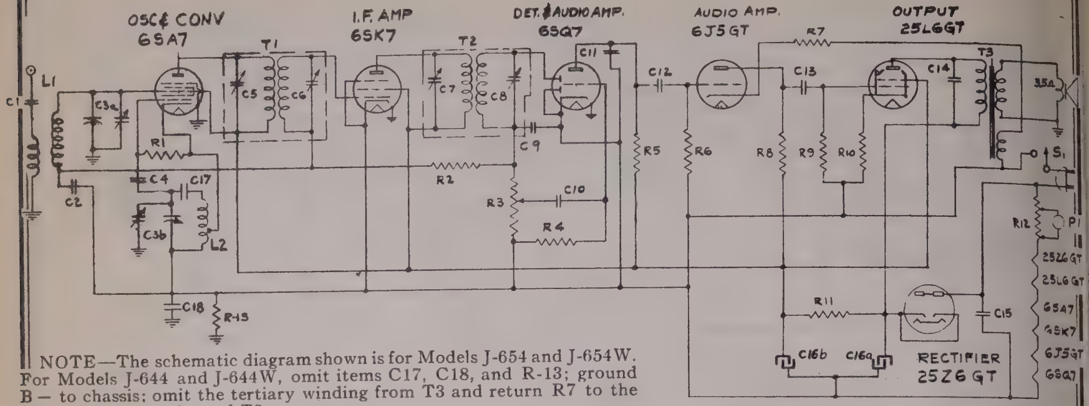
FOR ALIGNMENT, VOLTAGES, PARTS, SEE INDEX



Schematic Diagram—Model JB-631

MODELS J-644, J-644W, J-654, J-654W

GENERAL ELECTRIC CO.



NOTE—The schematic diagram shown is for Models J-654 and J-654W. For Models J-644 and J-644W, omit items C17, C18, and R-13; ground B — to chassis; omit the tertiary winding from T3 and return R7 to the ungrounded secondary of T3.

PARTS DESCRIPTION LIST I.F. 455 KC

Symbol	Description	Symbol	Description	Symbol	Description
C1	.01 mfd. paper capacitor	C16a, 16b	50 mfd., 30 mfd. electrolytic	R9	470,000 ohm carbon resistor
C2	.05 mfd. paper capacitor	C17	.05 mfd. paper capacitor	R10	150 ohm carbon resistor
C3a, 3b	Tuning condenser	C18	.20 mfd. paper capacitor	R11	1000 ohm carbon resistor
C4	47 mmf. mica capacitor	R1	33,000 ohm carbon resistor	R12	Ballast resistor tube
C5–C8	I.F. trimmers	R2	2.2 megohm carbon resistor	R13	470,000 ohm carbon resistor
C9	470 mmf. mica capacitor	R3	0.5 megohm volume control	L1	Beam-a-Scope
C10	.02 mfd. paper capacitor	R4	4.7 megohm carbon resistor	L2	Oscillator coil
C11	470 mmf. mica capacitor	R5	470,000 ohm carbon resistor	T1	1st I.F. transformer
C12, C13	.005 mfd. paper capacitor	R6	1.0 megohm carbon resistor	T2	2nd I.F. transformer
C14	.01 mfd. paper capacitor	R7	3300 ohm carbon resistor	T3	Output transformer
C15	.05 mfd. paper capacitor	R8	39,000 ohm carbon resistor		

-1940-

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains — Gain*
Antenna Post to Converter Grid.....4.0 at 1000 KC
I.F. on Converter Grid to I.F. on I.F. Amplifier Grid...................35 at 455 KC
I.F. Amplifier Grid to Diode Plate...60 at 455 KC

(2) 0.05-volt, 400-cycle signal across the volume control will give ½-watt speaker output.* (Volume control turned to maximum.)

(3) Average RF voltage developed from oscillator cathode to B —..............................1.5 volts

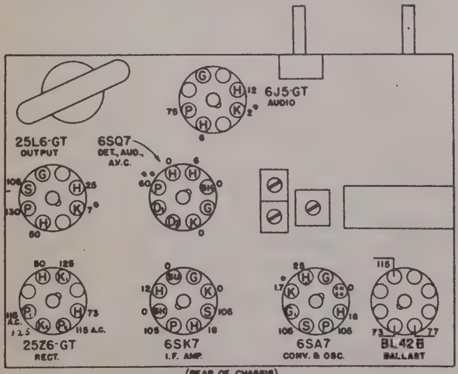
* Variations of ± 20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
TRIM OSC 1650 KC; ANT 1500 KC

Intermediate Frequency..................455 KC

Electrical Power Output (117 line volts)
Undistorted..........................1.5 watts
Maximum.............................2.5 watts

Loud-speaker—Alnico Magnet Dynamic
Outside Cone Diameter..................5 inches
Voice Coil Impedance (400 cycles)........3.5 ohms



Socket Voltages

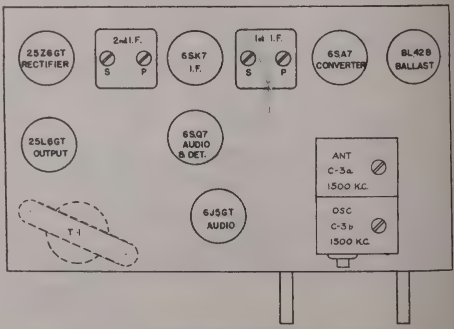
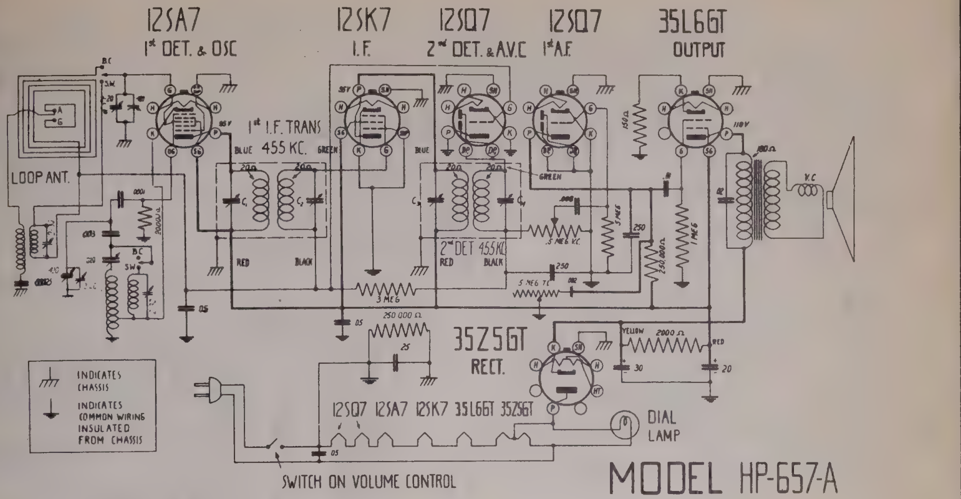


Fig. 1. Tube and Trimmer Location

GENERAL ELECTRIC CO.



Model HP-657-A

SERVICE DATA

Over-all Dimensions

Height	8 inches
Width	12⅞ inches
Depth	7¼ inches

Tuning Control Drive Ratio

Tuning Control Drive Ratio	5:1

Electrical Specifications

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
105–125 AC or DC	40–60	30

Tuning Frequency Range

Broadcast Band	540–1650 KC
Police Band	2600–7500 KC

Electrical Power Output

Undistorted	0.8 watts
Maximum	1.6 watts

Loud-speaker—Permanent Magnet

Outside Cone Diameter	5 inches
Voice Coil Impedance (400 cycles)	3 ohms

Tubes

Converter-Oscillator	GE-12SA7
I.F. Amplifier	GE-12SK7
Detector—AVC	GE-12SQ7
1st Audio Amplifier	GE-12SQ7
Audio Output	GE-35L6GT
Rectifier	GE-35Z5GT
Dial Lamp	MAZDA No. 47

GENERAL INFORMATION

Model HP-657-A is a compact, six-tube, AC-DC, superheterodyne radio designed to receive programs on the broadcast and police-amateur-aircraft bands of frequency. Antenna and ground connections are not necessary as the built-in "Beam-a-Scope" provides adequate pick-up; however, terminals are provided on the cabinet back for connecting antenna and ground leads when signal strengths are low. The receiver is equipped with five mechanical "Feathertouch Tuning" keys adjustable by removing the keys and loosening the binding screws with a screwdriver. Additional design features include Underwriters' approval, full automatic volume control, continuously variable tone control, and single-ended tubes.

When operating from a DC source of power it is necessary to insert the power plug with the proper polarity. If the receiver fails to function with the power plug inserted one way, reverse the plug. If any hum is noticed when the receiver is used on AC, reverse the power plug as above.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	455 KC
Broadcast R.F.	1650, 1500 and 600 KC
Police R.F.	7000 KC

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 12SK7 through a .05 mfd. capacitor and align the 2nd I.F. transformer. Repeat the procedure applying the 455 KC signal to the control grid of the 12SA7 and aligning the 1st I.F. transformer. Do not remove the grid leads from the tubes. Finish alignment by over-all adjustments.

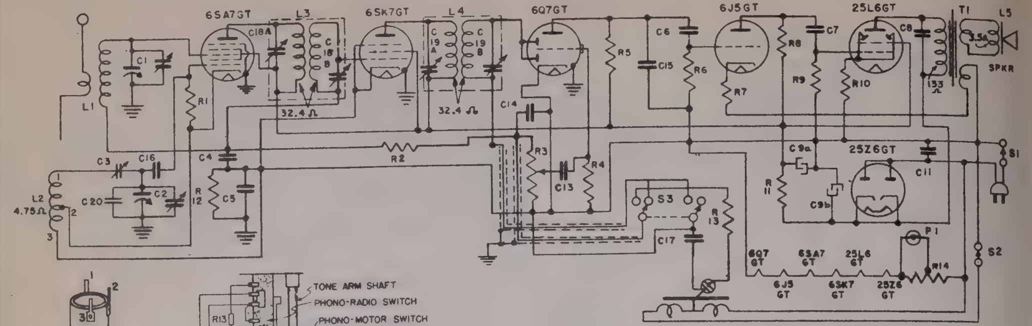
R.F. Alignment

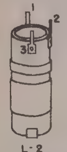
Apply R.F. signals either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the signal generator output which can be magnetically coupled to the receiver Beam-a-Scope.

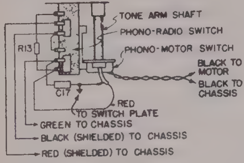
1. Rotate the gang condenser to maximum open and apply 1650 KC signal to Beam-a-Scope. Peak oscillator trimmer on right-hand section of gang condenser (as viewed from front) for maximum output.
2. Change generator signal to 1500 KC and set dial pointer to 1500 KC mark. Peak antenna trimmer on left-hand section of gang condenser.
3. Set pointer and generator signal to 600 KC. Peak broadcast padder while rocking the gang condenser. Broadcast padder is first from front on right side of chassis.
4. Rotate band switch to clockwise position and set dial pointer to the 7.0 MC mark. With 7.0 MC input signal align rear trimmer on right side of chassis and peak trimmer located on small antenna coil on top of chassis.

MODEL J-678

GENERAL ELECTRIC CO.







Alignment Frequencies

I.F. . . . . .455 KC R.F. . . . . .1500 and 580 KC

The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 6SK7GT through a .05-mfd. capacitor and align the 2nd IF transformer. Repeat the procedure, applying the 455-Kc signal to the control grid of the 6SA7GT and aligning the 1st I.F. transformer. Finish by over-all adjustments.

R.F. Alignment

With gang condenser plates completely closed, set dial pointer to the first mark at the left end of the scale. Apply a 1500-Kc signal either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the generator output which can be magnetically coupled to the receiver Beam-a-Scope. Align (C-2) at 1500 KC and peak (C-1) for maximum output. Peak (C-3) on 580 KC while rocking the gang condenser. Retrim at 1500 KC.

Precaution

If the signal generator is AC operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned out signal generator attenuator.

Special Service Information

The following data will be very useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments.

(1) Stage Gains*

Antenna post to 6SA7GT grid	4 at 1000 KC
6SA7GT grid to 6SK7GT grid	30 at 455 KC
6SK7GT grid to 6Q7GT det. plate	100 at 455 KC

(2) Audio Gains
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½ watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R-1) averages 12 volts.

* Variations of +10%, −20% permissible.

Electrical Rating

A-6 Rating	115 volts, 60 cycles AC, 75 watts
A-5 Rating	115 volts, 50 cycles AC, 75 watts

Tuning Frequency Range . . . . .550–1600 KC.

Intermediate Frequency . . . . .455 KC.

Electrical Power Output

Undistorted	2.0 watts
Maximum	2.5 watts

Loud-speaker—PM Dynamic

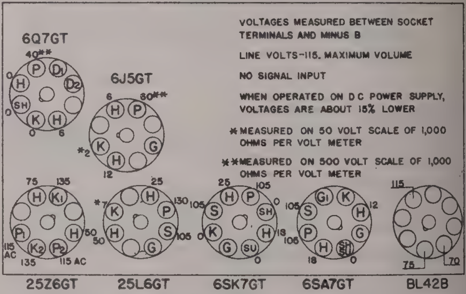
Outside cone diameter	6.5 inches
Voice coil impedance (400 cycles)	3.5 ohms

Phonograph Mechanism

Type mechanism	Manual
Type pick-up	Crystal
Turntable speed	78 R.P.M.

RC-7017	C-1, -2	CONDENSER—Tuning Condenser
RC-6515	C-3	CAPACITOR—Oscillator padder
RC-072	C-4	CAPACITOR—.05 Mfd., 200 V. paper
RC-130	C-5	CAPACITOR—0.2 Mfd., 400 V. paper
RC-023	C-6, 7	CAPACITOR—.005 Mfd., 600 V. paper
RC-039	C-8	CAPACITOR—.01 Mfd., 600 V. paper
RC-5145	C-9a	CAPACITOR—30 Mfd., 150 V.
RC-5145	C-9b	CAPACITOR—50 Mfd., 150 V.
RC-092	C-11	CAPACITOR—.05 Mfd., 600 V. paper
RC-060	C-13	CAPACITOR—.03 Mfd., 600 V. paper
RC-293	C-14	CAPACITOR—470 Mmf., mica
RC-250	C-15	CAPACITOR—220 Mmf., mica
RC-216	C-16	CAPACITOR—47 Mmf., mica
RC-104	C-17	CAPACITOR—0.1 Mfd., 400 V. paper
RC-226	C-20	CAPACITOR—10 Mmf., mica
RQ-1295	R-1	CAPACITOR—33,000 ohms, ½ W. carbon
RQ-1339	R-2	RESISTOR—2.2 megohm, ½ W. carbon
RV-119	R-3, S-1	VOLUME CONTROL—0.5 megohm potentiometer
RQ-1365	R-4	RESISTOR—15 megohm, ½ W. carbon
RQ-1323	R-5	RESISTOR—470,000 ohms, ½ W. carbon
RQ-1331	R-6	RESISTOR—1.0 megohm, ½ W. carbon
RQ-1271	R-7	RESISTOR—3,300 ohms, ½ W. carbon
RQ-1297	R-8	RESISTOR—39,000 ohms, ½ W. carbon
RQ-1323	R-9	RESISTOR—470,000 ohms, ½ W. carbon
RQ-1239	R-10	RESISTOR—150 ohms, ½ W. carbon
RQ-1459	R-11	RESISTOR—1,000 ohms, 1 W. carbon
RQ-1323	R-12	RESISTOR—470,000 ohms, ½ W. carbon
RQ-1307	R-13	RESISTOR—100,000 ohms, ½ W. carbon
RR-773	R-14	RESISTOR—BL42B Ballast resistor
RL-528	L-1	LOOP—Built-in antenna and back cover assembly
RL-2016	L-2	COIL—Oscillator coil
RT-341	L-3	TRANSFORMER—1st I.F. transformer
RT-342	L-4	TRANSFORMER—2nd I.F. transformer
RT-475	T-1	TRANSFORMER—Output transformer

FRONT OF CHASSIS



VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND MINUS B

LINE VOLTS-115. MAXIMUM VOLUME

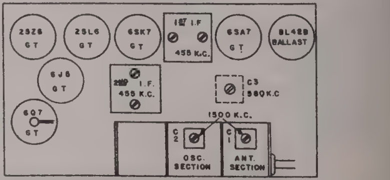
NO SIGNAL INPUT

WHEN OPERATED ON DC POWER SUPPLY, VOLTAGES ARE ABOUT 15% LOWER

*MEASURED ON 50 VOLT SCALE OF 1,000 OHMS PER VOLT METER

**MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLT METER

BOTTOM VIEW OF CHASSIS



TO SET-UP PUSH BUTTONS

1. Make a list of stations desired on push buttons and arrange in order, from low to highest frequency; insert tabs of the call letters of the stations in the keys in the order listed.
2. Allow the receiver to run five minutes before making the following adjustments. Manually tune in first station, lift key upward and loosen adjusting bolt. Hold the tuning control to the exact tune position and with a screwdriver push in the adjusting bolt as far as it will go, then tighten the adjusting bolt.
3. Adjust for each of the five remaining stations in a similar manner.

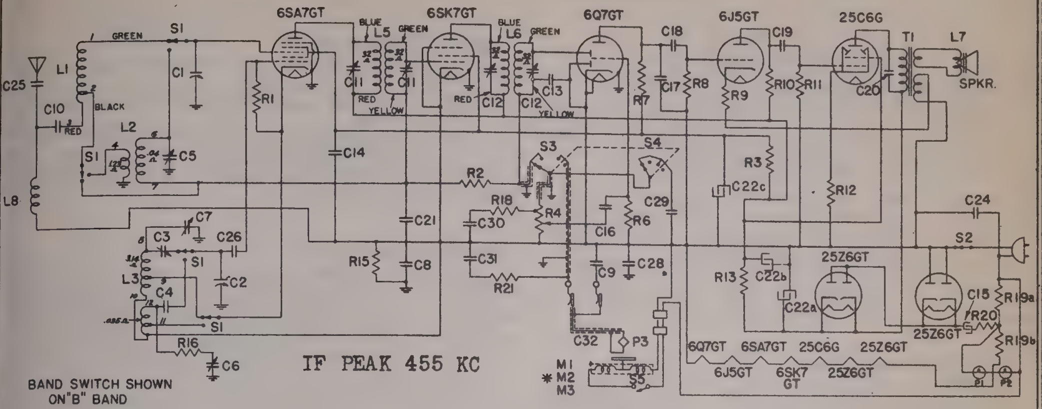


Fig. 3. Schematic Diagram

Symbol	Description
C-1	Antenna section tuning condenser
C-2	Oscillator section tuning condenser
C-3	"B" band padding capacitor
C-4	3900 mmf. mica condenser ±5%
C-5	3–30 mmf. "D" antenna trimmer
C-6	3–20 mmf. "D" oscillator trimmer
C-7	3–20 mmf. "B" oscillator trimmer
C-8	0.1 mfd. paper capacitor
C-9	0.1 mfd. paper capacitor
C-10	.01 mfd. paper capacitor
C-13	220 mmf. mica capacitor
C-14	.05 mfd. paper capacitor
C-15	30 mfd. 250 V. dry electrolytic
C-16	.02 mfd. paper capacitor
C-17	220 mmf. mica capacitor
C-18	.005 mfd. paper capacitor
C-19	.03 mfd. paper capacitor
C-20	.01 mfd. paper capacitor
C-21	0.1 mfd. paper capacitor
C-22a	40 mfd. 250 V. electrolytic
C-22b	20 mfd. 250 V. electrolytic
C-22c	20 mfd. 250 V. electrolytic
C-24	.05 mfd. paper capacitor
C-25	.01 mfd. paper capacitor
C-26	47 mmf. mica capacitor
C-28	0.1 mfd. paper capacitor
C-29	.002 mfd. paper capacitor
C-30	.01 mfd. paper capacitor
C-31	.0072 mfd. paper capacitor
L-1	Beam-a-Scope
L-2	"D" antenna coil
L-3	"B-D" oscillator coil
L-5	1st I.F. transformer
L-6	2nd I.F. transformer
L-8	1½ mh. antenna choke
M-1	60-cycle phono motor
M-2	50-cycle phono motor
M-3	25-cycle phono motor
P-1, -2	Dial lamps, Mazda No. 44
P-3	Crystal pick-up
R-1	33,000 ohms carbon resistor
R-2	2.2 megohms carbon resistor
R-3	3900 ohms carbon resistor
R-4	0.5 megohm volume control
R-6	15 megohms carbon resistor
R-7	470,000 ohms carbon resistor
R-8	1.0 megohm carbon resistor
R-9	3300 ohms carbon resistor
R-10	39,000 ohms carbon resistor
R-11	470,000 ohms carbon resistor
R-12	220 ohms 1 W. carbon resistor
R-13	3300 ohms 2 W. carbon resistor
R-15	470,000 ohms carbon resistor
R-16	27 ohms carbon resistor
R-18	33,000 ohms carbon resistor
R-19a	33 ohms 3.5 W. wire wound
R-19b	20 ohms 2.5 W. wire wound
R-20	22 ohms 2 W. carbon resistor
R-21	100,000 ohms carbon resistor
S-1	Band switch
S-2	Power switch on volume control
S-3	Radio-phono switch
S-4	Tone control
S-5	Motor power switch
T-1	Output transformer

MODEL J-709

TECHNICAL AND SERVICE INFORMATION

Model J-709 combination uses the same chassis and record-changer mechanism as the Model H-708, data for which will be found in Vol. XI. The schematic Fig. 3 above and parts view of the automatic changer, Fig. 5 below, are corrected to care for the Model J-709.

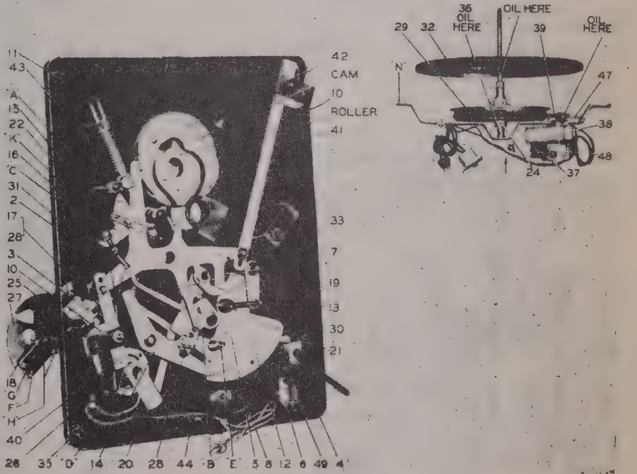


Fig. 5. Parts View of Automatic Record Changer

MODELS J-718 AND J-728

SPECIFICATIONS

Over-all Dimensions

Height	35⅛ inches
Width	35⅛ inches
Depth	16 inches

Electrical Rating

Rating	Power Supply (volts)	Frequency (cycles on AC)	Power Consumption (watts)
A6	110–125	60	95
A5	110–125	50	95
C2	110–125	25	105

Tuning Frequency Range

Broadcast Band	540–1600 KC
Short-wave Band No. 1	2300–6900 KC
Short-wave Band No. 2	6900–22,000 KC

Intermediate Frequency........455 KC

Electrical Power Output

Undistorted	4 Watts
Maximum	5.5 Watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside Speaker Diameter	14 inches
Voice Coil Impedance	3.5 ohms

Tubes

R.F. Amplifier	GE-6SK7
Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud., AVC	GE-6SQ7
Audio Driver	GE-6J5G or GT
Audio Output	GE-6Y6G
Rectifier	GE-5Y3G
Dial and Pilot Lamps	(4) MAZDA No. 44

Phonograph Mechanism

Type	Automatic Record Changer
Record Capacity	
10-inch records	8
12-inch records	7
Type Pick-up	Crystal
Turntable speed	78 Rpm

GENERAL INFORMATION

Models J-718 and J-728 are radio-automatic phonograph combinations each incorporating a seven-tube, three-band, A-C radio receiver. The only difference between these two models is in the cabinet.

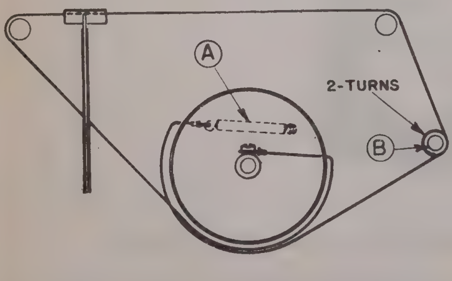


Fig. 4. Dial Cord Stringing Diagram

Setting Up the Receiver

The following remarks will assist the serviceman in correctly setting up these receivers for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.

(2) The black speaker lead should be connected to the speaker terminal which is grounded to the speaker frame.

(3) A method of setting up station keys which will assure driftproof adjustments is to turn each iron core screw adjustment to its extreme counterclockwise position, and then turn slowly in a clockwise direction until the desired station is tuned in.

Beam-a-Scope Removal

Before either the chassis or Beam-a-Scopes can be removed the leads between them must be disconnected. The cylindrical Beam-a-Scope leads are disconnected by pulling the pin-plug connections out of the Beam-a-Scope terminals. The short-wave Beam-a-Scope leads are disconnected by unscrewing the nuts which clamp the terminals on the phosphor-bronze strap and green leads, and the screw which clamps the terminal of the yellow lead.

Fig. 2 shows the location of the Beam-a-Scope leads when connected.

To remove the cylindrical Beam-a-Scope, the following procedure is recommended: Disconnect the four Beam-a-Scope leads. Pry loose the cardboard strap which is stapled to the bottom of the cabinet and which holds the bottom end of the Beam-a-Scope in place. The cylindrical Beam-a-Scope can now be tilted enough out of vertical to allow continuous rotation of it. Rotate the Beam-a-Scope from right to left until it comes loose. NOTE: The upper pivot bolt by which the Beam-a-Scope is supported should never be loosened or removed.

When replacing the cylindrical Beam-a-Scope it should be screwed up on the bolt approximately five turns or until the blocking bolt prevents more than 180° rotation when the Beam-a-Scope hangs vertically. The cardboard strap which holds the bottom pivot of the Beam-a-Scope in place should be restapled in such a position that the Beam-a-Scope hangs vertically and is free to turn without rubbing on the strap.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

NOTE: In no case should the magnet be removed from the assembled position.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available:

(1) STAGE GAINS*

(a) Antenna Post to R.F. Grid at	
1,000 KC	5.5
4,000 KC	2.5
18,000 KC	2.5
(b) R.F. Grid to Converter Grid at	
1,000 KC	5.5
4,000 KC	3.0
18,000 KC	2.0
(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at	
1,000 KC	50
4,000 KC	50
18,000 KC	45
(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at 455 KC	75
(e) I.F. Amplifier Grid to Detector Plate at 455 KC	70

(2) Voltage across volume control to give ½-watt speaker output at 400 cycles........03 volts

(3) DC voltage developed across oscillator grid resistor (R-7) at

1,000 KC	8.3
4,000 KC	7.8
18,000 KC	4.6

* Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

Frequency-degree Reference Chart

"BC" Band

1600 KC	168°	1200 KC	129°	700 KC	60°
1500 KC	158°	1000 KC	106°	600 KC	32°
1400 KC	148°	800 KC	80°	580 KC	24°
				540 KC	0°

"SW1" Band

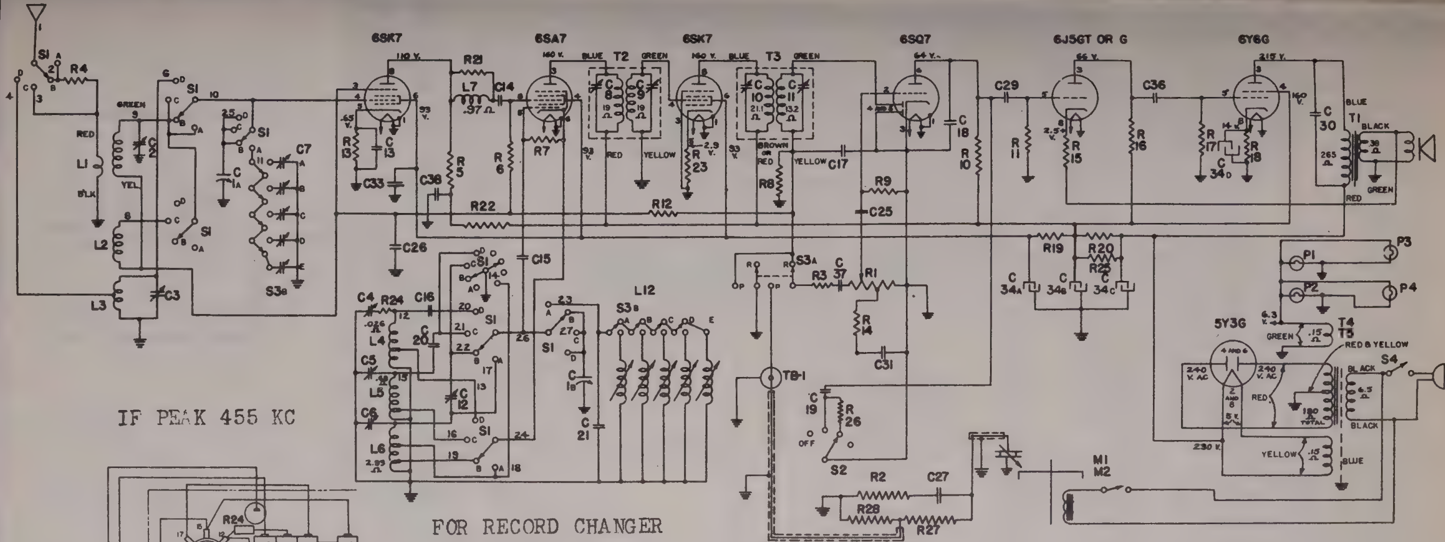
6.9 MC	173°	4.0 MC	98°
6.0 MC	150°	3.0 MC	59°
5.0 MC	126°	2.5 MC	24°

"SW2" Band

22 MC	172°	16 MC	134°	8 MC	46°
21 MC	164°	12 MC	101°	7 MC	20°
18 MC	146°	10 MC	79°		

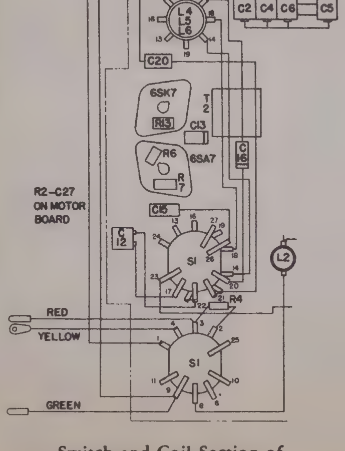
GENERAL ELECTRIC CO.

MODELS J-718
J-728



IF PEAK 455 KC

FOR RECORD CHANGER DATA, SEE INDEX



Switch and Coil Section of Chassis Underview

Symbol	Description
C1A	Antenna Section of Tuning Condenser
C1B	Oscillator Section of Tuning Condenser
C2	"BC" Band Antenna Trimmer
C3	"SW2" Band Antenna Trimmer
C4	"SW2" Band Oscillator Trimmer
C5	"SW1" Band Oscillator Trimmer
C6	"BC" Band Oscillator Trimmer
C7	Station Selector Antenna Trimmers
C12	"BC" Band Padder
C13	.01 mfd. paper
C14	100 mmf. mica
C15	47 mmf. mica
C16	.008 mfd. polystyrene
C17	220 mmf. mica
C18	150 mmf. mica
C19	.005 mfd. paper
C20	2400 mmf. mica ±5%
C21	750 mmf. silvered mica ±5%
C25	.02 mfd. paper
C26	0.1 mfd. paper
C27	.01 mfd. paper
C29	.005 mfd. paper
C30	.01 mfd. paper
C31	.005 mfd. paper
C33	.01 mfd. paper
C34A	20 mfd. dry electrolytic
C34B	50 mfd. dry electrolytic
C34C.	40 mfd. dry electrolytic
C34D	20 mfd. dry electrolytic
C36	.05 mfd. paper
C37	.005 mfd. paper
C38	.01 mfd. paper
L1	"BC" band Beam-a-Scope
L2	"SW1" band Antenna Coil
L3	"SW2" band Beam-a-Scope
L4	"SW2" band oscillator coil
L5	"SW1" band oscillator coil
L6	"BC" band oscillator coil
L7	R.F. interstage coil
L12	Station selector oscillator coils
M1, 2	Automatic record changer
P1 to 4	Pilot lamp, Mazda No. 44
R1	2 megohm volume control
R2	100,000 ohms carbon
R3	47,000 ohms carbon
R4	1000 ohms carbon
R5	3300 ohms carbon
R6	47,000 ohms carbon
R7	22,000 ohms carbon
R8	470,000 ohms carbon
R9	4.7 megohms carbon
R10	330,000 ohms carbon
R11	470,000 ohms carbon
R12	2.2 megohms carbon
R13	47 ohms carbon
R14	150,000 ohms carbon
R15	3300 ohms carbon
R16	100,000 ohms carbon
R17	330,000 ohms carbon
R18	270 ohms 2 W. carbon
R19	3900 ohms 1 W. carbon
R20	3900 ohms 2 W. carbon
R21	10,000 ohms carbon
R22	1000 ohms carbon
R23	150 ohms carbon
R24	27 ohms carbon
R25	3900 ohms 2 W. carbon
R26	47,000 ohms carbon
R27	680,000 ohms carbon
R28	270,000 ohms carbon
S1	Band switch
S2	Tone control switch
S3A	Phono switch
S3B	Feathertouch tuning switch
S4	Power switch
T1	Output transformer
T2	1st I.F. transformer
T3	2nd I.F. transformer
T4, 5	Power transformer

MODELS J-718
J-728

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form below. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop-coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are available either through holes in the back apron of the chassis or from the top of the chassis deck. See Fig. 1 for trimmer location. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

ALIGNMENT CHART

Band Switch Setting	Input Frequency	Point of Input	Dummy Antenna	Trimmer	Comments
I.F. Alignment with Oscilloscope					
1. "BC" Band	455 KC Sweep	I.F. Grid and Chassis Ground	.05 Mfd. or larger	2nd I.F. Trimmers C-10, 11	Gang condenser plates open. Depress any station key other than Phono key. Connect audio input of oscilloscope to chassis ground and top of volume control. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Green lead on "BC" Beam-a-Scope terminal board and chassis ground	.05 Mfd. or larger	1st I.F. Trimmers C-8, 9	
I.F. Alignment with Output Meter					
1. "BC" Band	455 KC with Modulation	Green lead on "BC" Beam-a-Scope terminal board and chassis ground	.05 Mfd. or larger	2nd I.F. Trimmers C-10, 11. 1st I.F. trimmers C-8, 9	Gang condenser plates open. Depress any key other than Phono key. Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
R.F. Alignment with Chassis Mounted in Cabinet					
1. "BC" Band					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal" position.
2. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Set pointer to 1500 KC and tune in signal with (C-6). Peak output with (C-2).
3. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-12)	Set Pointer to 580 KC and peak signal while rocking gang condenser
4. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-2)	Retrim for maximum output.
5. Repeat operation 3 if "BC" band trimmers are badly out of alignment.					
6. "SW1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-5)	Set pointer to 6 MC and peak signal while rocking gang condenser.
7. "SW2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-4) Ant. (C-3)	Set pointer to 21 MC and tune in signal with (C-4). Peak output with (C-3) while rocking gang condenser. When (C-4) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
8. "SW2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions. Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope phosphor-bronze lead closer or farther away from the green lead. The moving should be done with an insulated rod or stick.
9. Repeat operation 7 if the Beam-a-Scope leads are moved in operation 8.					

R.F. ALIGNMENT
With Chassis Outside of Cabinet

R.F. alignment can be performed only on the "BC" and "SW1" bands with the chassis outside of the cabinet. Any alignment attempted on "SW2" band will not be satisfactory. The same relative position between the chassis and broadcast loop should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of 0–180° calibrated scale which is cemented to the back of the dial-reflector plate. From the "frequency-degree reference chart" the degree readings for corresponding frequency settings may be obtained. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the left-hand edge of the pointer-guide slide lines up with the 0° mark. By using this left-hand edge (as viewed from the rear) of the slide as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until the left-hand edge of the slide is in line with 158°, the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW1" band alignment procedure is the same as outlined in steps 2 to 6 inclusive of the chart—"R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed on the "BC" and "SW1" bands, the chassis should be mounted in the cabinet and "SW2" band alignment checked as described in steps 7 to 9 of the chart—"R.F. Alignment with Chassis Mounted in Cabinet."

NOTE: After moving the pointer along the cord to use the left-hand edge as a reference pointer for the degree scale, it will be necsessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

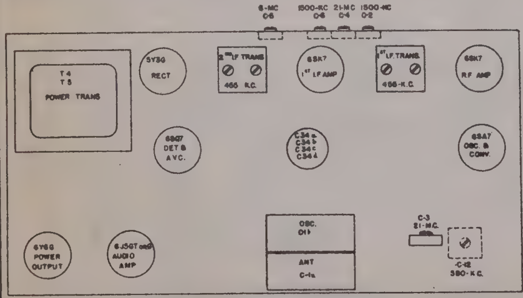


Fig. 1. Trimmer Location

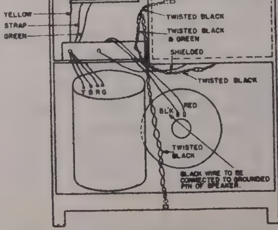


Fig. 2. Interconnection Diagram

GENERAL ELECTRIC CO.

MODEL J-805
(GOLDEN TONE)

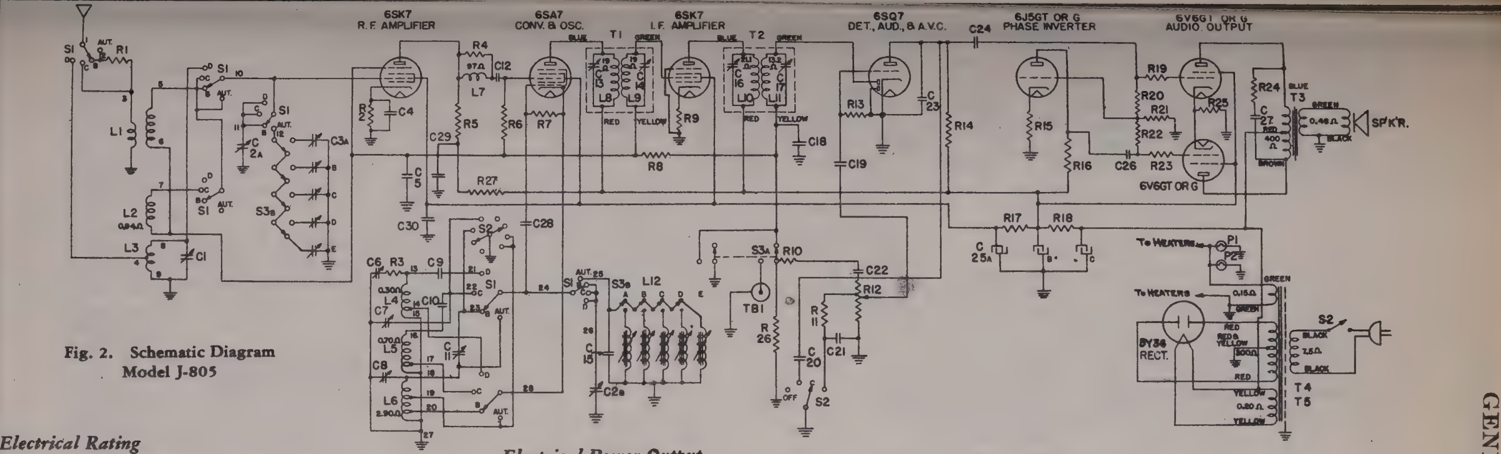


Fig. 2. Schematic Diagram
Model J-805

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
A	110–125	50–60	85
C	110–125	25–60	85

Electrical Power Output

Undistorted........................6.0 watts
Maximum............................9.0 watts

Tone Control........................3-position

Loud-speaker—"Alnico" Magnet Dynamic

Outside Cone Diameter..............12 inches
Voice Coil Impedance...............3.5 ohms

Tuning Frequency Range

Broadcast Band....................540–1700 KC
Short-wave Band No. 1.............2400–7000 KC
Short-wave Band No. 2.............7000–22000 KC

Intermediate Frequency.........................455 KC

PARTS DESCRIPTION LIST

Symbol	Description	Symbol	Description	Symbol	Description
C1	"D" band antenna trimmer	C28	47 mmf. mica capacitor	R13	4.7 megohms carbon resistor
C2A	Antenna section of tuning condenser	C29	.01 mfd. paper capacitor	R14	470,000 ohms carbon resistor
C2B	Oscillator section of tuning condenser	C30	.01 mfd. paper capacitor	R15	3300 ohms carbon resistor
C3	Antenna station selector trimmer strip	L1	"B" and "C" band Beam-a-Scope	R16	68,000 ohms carbon resistor
C4	.01 mfd. paper capacitor	L2	"C" band antenna coil	R17	8200 ohms 2 W. carbon resistor
C5	0.1 mfd. paper capacitor	L3	"D" band Beam-a-Scope	R18	1800 ohms 3 W. carbon resistor
C6	"D" band oscillator trimmer	L4	"D" band oscillator coil	R19	1000 ohms carbon resistor
C7	"C" band oscillator trimmer	L5	"C" band oscillator coil	R20	150,000 ohms carbon resistor
C8	"B" band oscillator trimmer	L6	"B" band oscillator coil	R21	56,000 ohms carbon resistor
C9	.008 mfd. paper capacitor	L7	R.F. interstage coil	R22	270,000 ohms carbon resistor
C10	2400 mmf. ±5% mica capacitor	L12	Oscillator station selector coil strip	R23	1000 ohms carbon resistor
C11	"B" band padding trimmer	P1	Dial lamp, MAZDA No. 44	R24	5600 ohms carbon resistor
C12	100 mmf. mica capacitor	P2	Dial lamp, MAZDA No. 44	R25	180 ohms 1 W. carbon resistor
C15	750 mmf. ±5% silvered mica	R1	1000 ohms carbon resistor	R26	470,000 ohms carbon resistor
C18	220 mmf. mica capacitor	R2	47 ohms carbon resistor	R27	1000 ohms carbon resistor
C19	.02 mfd. paper capacitor	R3	27 ohms carbon resistor	S1	Band switch
C20	.003 mfd. paper capacitor	R4	10,000 ohms carbon resistor	S2	Tone control switch
C21	.005 mfd. paper capacitor	R5	3300 ohms carbon resistor	S3A	Phono-FM-Tel switch
C22	.005 mfd. paper capacitor	R6	47,000 ohms carbon resistor	S3B	Station selector switch
C23	220 mmf. mica capacitor	R7	22,000 ohms carbon resistor	T1	1st I.F. transformer
C24	.03 mfd. paper capacitor	R8	2.2 megohms carbon resistor	T2	2nd I.F. transformer
C25A	10 mfd. 300 V. dry electrolytic	R9	150 ohms carbon resistor	T3	Output transformer
C25B	15 mfd. 300 V. dry electrolytic	R10	47,000 ohms carbon resistor	T4	50–60 cycle-power transformer
C25C	30 mfd. 350 V. dry electrolytic	R11	82,000 ohms carbon resistor	T5	25 cycle power transformer
C26	.03 mfd. paper capacitor	R12	2 megohms volume control (0.5-meg-ohm tap)		
C27	.002 mfd. paper capacitor				

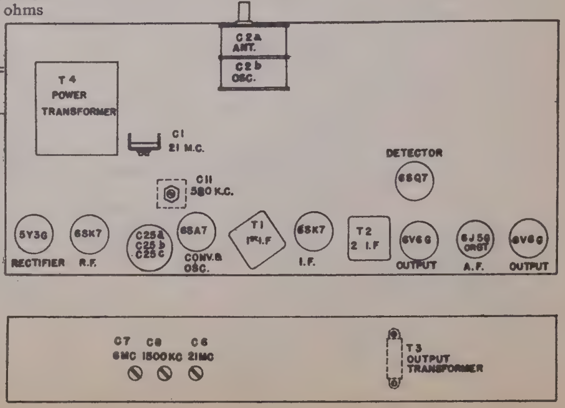


Fig. 1. Trimmer Location

MODEL 805
(GOLDEN TONE)

GENERAL ELECTRIC CO.

NOTE: The oscillator coil and band switch terminals are numbered in the Chassis Parts Layout, Fig. 3, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 2. This numbering will also assist in rewiring if the coil or switch are replaced. I.F. transformer connections are shown as an aid in replacement.

Tubes

R. F. Amplifier	GE-6SK7
Converter and Oscillator	GE-6SA7
I. F. Amplifier	GE-6SK7
Det., Aud., AVC	GE-6SQ7
Phase Inverter	GE-6J5G or GT
Audio Output	(2) GE-6V6G or GT
Rectifier	GE-5Y3G
Dial Lamp	(2) MAZDA No. 44

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R. F. Grid at

1000 KC	6.5
4000 KC	3.0
18000 KC	2.3

(b) R.F. Grid to Converter Grid at

1000 KC	5.0
4000 KC	3.0
18000 KC	2.0

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at

1000 KC	47
4000 KC	47
18000 KC	39

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at

455 KC	55

(e) I.F. Amplifier Grid to Detector Plate at

455 KC	77

(2) Voltage across Volume Control to Give ½-watt Speaker Output at

400 cycles	.05 volts

(3) DC Voltage Developed Across Oscillator Grid Resistor (R-7) at

1000 KC	6.0
4000 KC	5.5
18000 KC	3.9

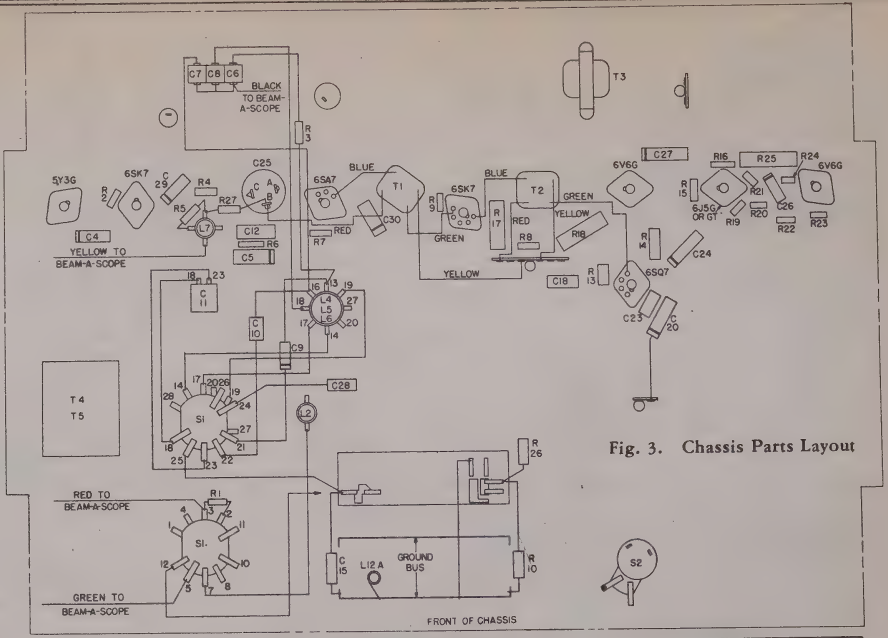
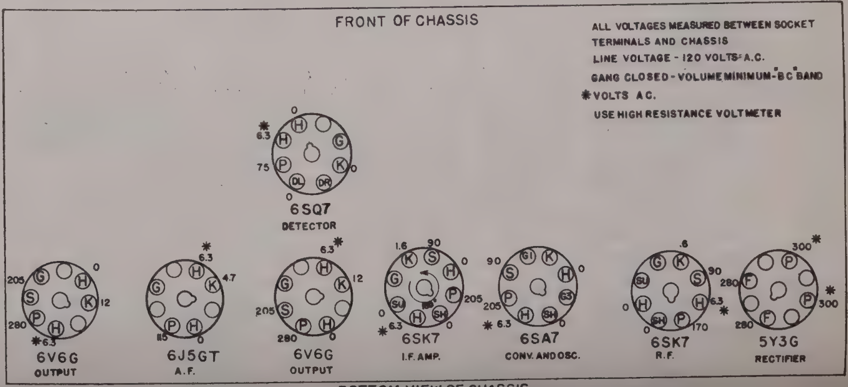


Fig. 3. Chassis Parts Layout



FRONT OF CHASSIS
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
LINE VOLTAGE - 120 VOLTS A.C.
GANG CLOSED - VOLUME MINIMUM - BC BAND
* VOLTS A.C.
USE HIGH RESISTANCE VOLTMETER
6SQ7
DETECTOR
6V6G
OUTPUT
6J5GT
A.F.
6V6G
OUTPUT
6SK7
I.F. AMP.
6SA7
CONV. AND OSC.
6SK7
R.F.
5Y3G
RECTIFIER

BOTTOM VIEW OF CHASSIS
Fig. 4. Socket Voltages

*Variations of ± 20% are permissible. All readings obtained with enough input signal to give ½-watt speaker output.

GENERAL INFORMATION

Model J-805 is an eight-tube superheterodyne receiver designed to operate on an alternating-current power supply. The receiver incorporates the latest developments in radio of which the General Electric Dual Beam-a-Scopes are notable. Broadcast and short-wave No. 1 signals are selected by the cylindrical Beam-a-Scope which is in the speaker compartment. Short-wave No. 2 signals are selected by the Beam-a-Scope which is mounted on the cabinet above the chassis. Additional features include single-ended tubes, iron-core oscillator station selector coils, five feather-touch tuning station keys, one Phono-Frequency Modulation-Television key, tone monitor circuit, automatic volume control and push-pull power output.

Phono-FM-Tel

This receiver is equipped with a pin jack on the rear apron of the chassis and a Phono-FM-Tel key for adapting it to use with record players, frequency modulation converters and television picture receiver and sound converters. General Electric plug, Stock No. RP-145, fits the pin jack.

Setting Up the Receiver

The following remarks will assist the serviceman in correctly setting up this receiver for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.

(2) After releasing the shipping screws the position of the chassis should be checked to insure accurate tuning. Close the gang condenser plates and push the chassis one way or the other until the pointer lines up with the first markings on the left side of the dial.

(3) The black speaker lead should be connected to the speaker terminal which is grounded to the speaker frame.

(4) A method of setting up station keys which will assure driftproof adjustments is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

Chassis or Beam-a-Scope Removal

Before either the chassis or Beam-a-Scope can be removed the leads between them must be disconnected. The cylindrical Beam-a-Scope leads are disconnected by pulling the pin plugs out of the Beam-a-Scope terminals. The short-wave Beam-a-Scope leads are disconnected by unscrewing the nuts which clamp the terminals on the two phosphor-bronze straps and the screw which clamps the terminal of the yellow lead

Figs. 8 and 9 show the correct location of the Beam-a-Scope leads when reconnecting. The cylindrical Beam-a-Scope leads must be threaded down through the slot in the cabinet shelf which is immediately below the antenna-ground terminal board. The leads can then be brought out to the position of the cutout in the back of the cabinet shelf where they can be inserted in the Beam-a-Scope terminals.

To remove the cylindrical Beam-a-Scope the following procedure is recommended· Disconnect the four Beam-a Scope leads. Unscrew the long self-tapping screw which prevents the Beam-a-Scope from rotating continuously in one direction This screw is located in the cabinet shelf. Pry loose the cardboard strap which is stapled to the bottom of the cabinet and which holds the bottom of the Beam-a-Scope in place. The Beam-a-Scope can now be rotated from right to left until it comes loose. Note: The upper pivot bolt by which the Beam-a-Scope is supported should never be loosened or removed.

When replacing the cylindrical Beam-a-Scope it should be screwed up on the bolt approximately five turns from the position where the bolt first takes hold. The self-tapping screw in the cabinet shelf should then be screwed down until it acts as a stop for the projection next to the terminals. The screw should not be run down so far that it contacts the projection on the opposite side from the terminals as this will limit rotation to only 180 degrees. The cardboard strap should be placed over the bottom Beam-a-Scope pivot and stapled to the cabinet in such a position that the Beam-a Scope hangs vertically and is free to turn without rubbing on the strap.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

Note—In *no* case should the magnet be removed from the assembled position.

GOLDEN TONE

MODEL J-805

Alignment Procedure

The alignment procedure is given in table form below. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F alignment can be performed by loop-coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to over-couple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are accessible through holes in the back apron of the chassis or from the top of the chassis (refer to the Trimmer Location diagram, Fig. 1). Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

R.F. Alignment
With Chassis Outside of Cabinet

R.F. alignment can be performed only on the "BC" and "SW-1" bands with the chassis outside the cabinet. Any alignment attempted on "SW-2" band will not be satisfactory. The same relative position between the chassis and cylindrical Beam-a-Scope should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of a 0-180 deg calibrated scale which is cemented to the back of the dial reflector plate. To use these readings, first completely close the gang condenser plates and then slide the pointer along the cord until the inside edge of the right-hand pointer-guide clip is in line with the 0 deg mark. (See Fig. 6.) By using this edge of the clip as the degree-scale pointer the receiver may be tuned to any frequency.

Example: By setting the edge of the clip to 154 deg the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW-1" band alignment procedure is the same as outlined in steps 2 to 5 inclusive of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed on the "BC" and "SW-1" bands the chassis should be mounted in the cabinet and "SW-2" band alignment checked as described in steps 6 to 8 of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

Note: After moving the pointer along the cord to use one of the guide clips as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

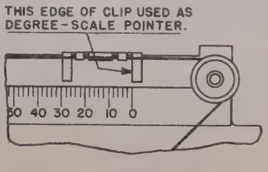


Fig. 6. Pointer-guide Clip Setting with Gang Condenser Closed

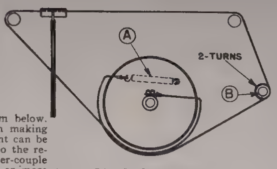


Fig. 7. Dial Cord Stringing Diagram

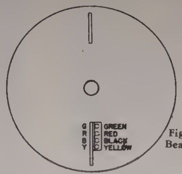


Fig. 8. Cylindrical Beam-a-Scope Connections

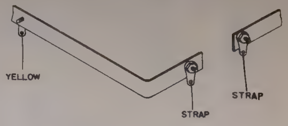


Fig. 9. Short-wave Beam-a-Scope Connections

ALIGNMENT CHART

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. Trimmers, C-16, 17	Gang condenser plates open. Depress any station key other than Phono-FM-Tel key. Connect audio input of oscilloscope to chassis ground and junction of R-10 and R-26. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Converter Grid	.05 mfd. or larger	1st I.F. Trimmers, C-13, 14	

I.F. Alignment with Output Meter

1. "BC" Band	455 KC with Modulation	Converter Grid	.05 mfd. or larger	2nd I.F. Trimmers C-16, 17	Gang condenser plates open. Depress any key other than Phono-FM-Tel key. Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
				1st I.F. Trimmers, C-13, 14	

R.F. Alignment
With Chassis Mounted in Cabinet

1. "BC"					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal" position.
2. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-11)	Set dial pointer to 580 KC and tune in signal with (C-11) while rocking gang condenser.
3. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-8)	Set dial pointer to 1500 KC. Peak trimmer for maximum output while rocking the gang condenser.
4. "BC" Band	580 KC. with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-11)	Realign for maximum output with a low input signal, rocking the gang condenser.
5. "SW-1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-7)	Set pointer to 6 MC and peak signal while rocking gang condenser.
6. "SW-2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-1)	Set pointer to 21 MC and tune in signal with (C-6). Peak output with (C-1) while rocking gang condenser. When (C-6) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
7. "SW-2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope phosphor-bronze strap leads closer or farther away from one another. The moving should be done with an insulated rod or stick

8. Repeat Operation 6 if the short-wave Beam-a-Scope leads are moved appreciably in Operation 7.

MODELS J-808,
J-818, J-828,
J-809

GENERAL ELECTRIC CO.

SPECIFICATIONS

Over-all Dimensions

Model	J-808, -818, -828	J-809
Height	35 inches	37⅛ inches
Width	36½ inches	38¼ inches
Depth	17½ inches	17¼ inches

Tuning Control Drive Ratio............25:1

Electrical Rating (All Models)

Rating	Power Supply (Volts)	Frequency (Cycles per Second)	Power Consumption (Watts)
A6	110–125	60	100
A5	110–125	50	100
C2	110–125	25	100

Tuning Frequency Range

Broadcast Band	540–1600 KC
Short-wave Band No. 1	2300–7000 KC
Short-wave Band No. 2	7000–22,000 KC

Intermediate Frequency............455 KC

Electrical Power Output

Undistorted	10 watts
Maximum	12 watts

Tone Control

Models—J-808, -818, -828 (Individual Phonograph and Radio Controls)—3 positions each.
J-809 (Phonograph and Radio Controls Combined)—3 positions.

Loud-speakers—"Alnico" Magnet Dynamic

Outside Cone Diameters	6½ and 14 inches
Voice Coil Impedances	3.5 ohms each

Phonograph Mechanism

Type	Automatic Record Changer
Record Capacity	
10-inch	8
12-inch	7
Type Pickup	Crystal
Turntable Speed	78 Rpm

Tubes

R.F. Amplifier	GE-6SK7
Converter and Oscillator	GE-6SA7
I.F. Amplifier	GE-6SK7
Det., Aud., AVC	GE-6SQ7
Phase Inverter	GE-6J5G or GT
Audio Output	(2) GE-6V6G or GT
Rectifier	GE-5Y3G
Dial Lamps	(3) MAZDA No. 44

GENERAL INFORMATION

These models each contain an eight tube, superheterodyne receiver which is designed to operate from an alternating current power supply. Dual Beam-a-Scopes insure satisfactory performance at all frequencies within the tuning ranges of the receiver. Broadcast and short-wave No. 1 signals are selected by the cylindrical Beam-a-Scope. Short-wave No. 2 signals are selected by the Beam-a-Scope which is mounted on the cabinet. Additional features include single-ended tubes, iron core oscillator station selector coils, five feathertouch tuning station keys, and automatic volume control.

Models J-808, J-818 and J-828 are provided with dual controls for volume and tone. One set of volume and tone controls permit adjustment of the radio output only while the remaining set of controls permit adjustment of the phonograph output. The phonograph volume and tone controls are mounted on a plate separate from the chassis. Fig. 2 shows the interconnections between chassis and phonograph controls, chassis and phono motor, chassis and speakers, and chassis and Beam-a-Scopes.

Phono-FM-Tel

All models are designed to allow the ready connection of separate record players, frequency modulation converters, and television picture receivers with sound converters. Models J-808, J-818 and J-828 are equipped with a pin jack immediately in back of the plug connection on the bottom apron of the chassis. Model J-809 is equipped with a pin jack on the back apron of the chassis into which a plug connection is made from the tone arm of the automatic record changer. If a separate record player, frequency modulation converter, or television picture receiver with sound converter is to be used with the Model J-809, the record changer plug connection can be removed and the auxiliary plug connection made. General Electric plug, Stock No. RP-145, fits the pin jack. The left-hand feathertouch tuning key, marked "Tel-FM" on Models J-808, J-818 and J-828, and "Phono" on Model J-809, when depressed switches the receiver from radio to operation with the auxiliary equipment.

Setting Up the Receiver

The following remarks will assist the serviceman in correctly setting up this receiver for use:

(1) In order to press the volume or tuning knobs all the way on their respective shafts, the dial reflector plate should be held in place by pressure from the rear.

(2) The black speaker lead should be connected to the 14-inch speaker terminal which is grounded to the speaker frame and to the 6½ inch speaker terminal which is not grounded. This will assure proper phasing of the speakers.

(3) A method of setting up station keys which will assure drift-proof adjustments is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

Chassis or Beam-a-Scope Removal

MODELS J-808, 818 AND J-828

The chassis in anchored to the chassis board which in turn is held in place by three woodscrews located along the bottom edge. Removal of these three woodscrews will allow the chassis to be dropped down and taken out. Three felt pads are stapled to the upper edge of the chassis board to firmly cushion the board in the cabinet slot.

To remove the cylindrical Beam-a-Scope proceed as follows: Disconnect the four Beam-a-Scope leads and the Beam-a-Scope drive cord. Remove the two woodscrews in the bracket which holds the Beam-a-Scope drive shaft in place. This will allow the shaft to be swung clear of the wooden stopping block on the cylindrical Beam-a-Scope. Tilt or raise the cabinet off the floor enough to get a screwdriver under the bottom Beam-a-Scope support. Remove the two woodscrews which hold the support in place. The Beam-a-Scope can now be rotated from right to left until it is free.

MODEL J-809

The chassis is held in place on the cabinet shelf by four mounting bolts accessible from the under side. Removal of these bolts will free the chassis from the shelf.

To remove the cylindrical Beam-a-Scope proceed as follows: Disconnect the four Beam-a-Scope leads. Remove the Beam-a-Scope drive cord. With a screwdriver remove the two woodscrews which hold the bottom Beam-a-Scope support to the cabinet. These screws are accessible from the top side of the support next to the lower rear cross-member of the cabinet. The Beam-a-Scope can now be rotated from right to left until it comes loose from the upper pivot.

The Beam-a-Scope drive mechanism is held in place by two bolt-and-nut anchorages. The nuts are accessible from the bottom side of the plate. If in attempting to remove these nuts, the bolt is found to turn then it will be necessary to remove the chassis to get at the bolt heads. This mechanism will have to be removed to replace either the control drum or the drive cord. When replacing the drive cord, it will be best to take out the Beam-a-Scope and drive unit as one assembly allowing the cord to be completely restrung before remounting the assembly.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly.

NOTE.—In no case should the magnet be removed from the assembled position.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*

(a) Antenna Post to R.F. Grid at

1000 KC	5.5
4000 KC	2.5
18000 KC	2.5

(b) R.F. Grid to Converter Grid at

1000 KC	5.5
4000 KC	3.0
18000 KC	2.0

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at

1000 KC	50
4000 KC	50
18000 KC	45

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at

455 KC	60

(e) I.F. Amplifier Grid to Detector Plate at

455 KC	55

(2) Voltage across volume control to give ½-watt speaker output at

400 cycles	.068 volts

(3) DC voltage developed across oscillator grid resistor (R-7) at

1000 KC	8.3
4000 KC	7.8
18000 KC	4.6

* Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

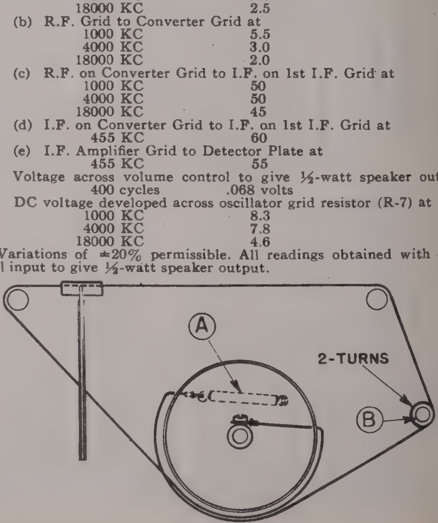


Fig. 8. Dial Cord Stringing Diagram

GENERAL ELECTRIC CO.

MODELS J-808,
J-818, J-828

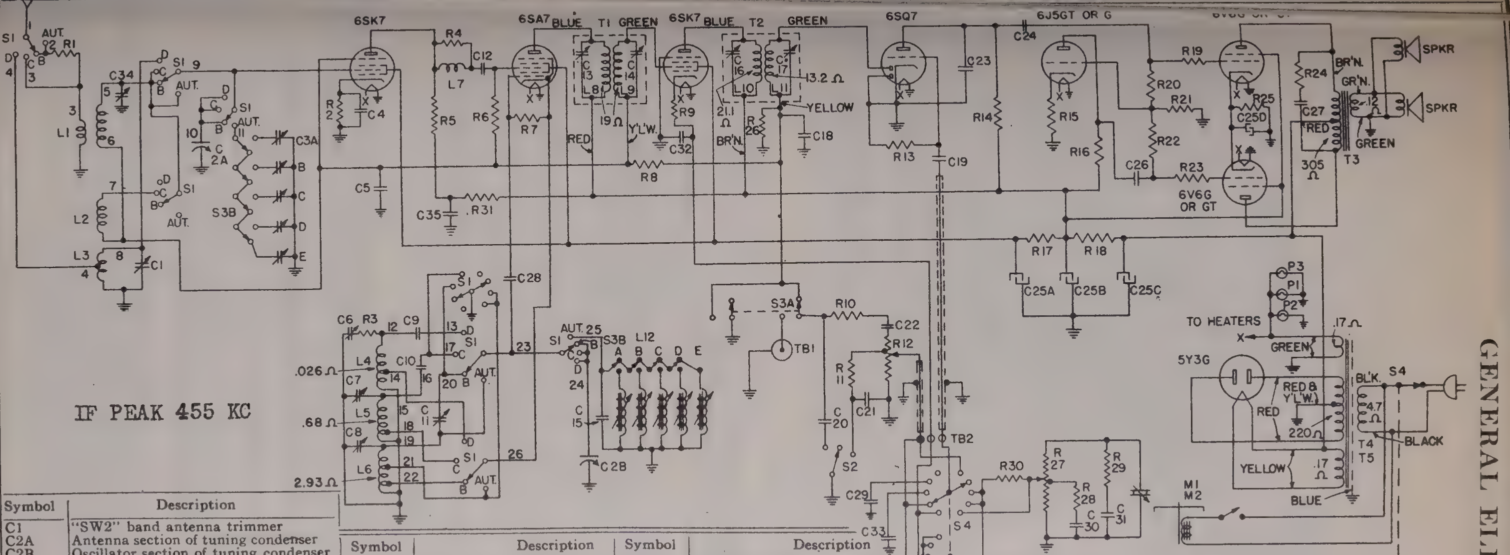


Fig. 3. Schematic Diagram—Models J-808, J-818, and J-828

Symbol	Description
C1	"SW2" band antenna trimmer
C2A	Antenna section of tuning condenser
C2B	Oscillator section of tuning condenser
C3	Touch tuning trimmer strip
C4	.01 mfd. paper capacitor
C5	.05 mfd. paper capacitor
C6	"SW2" band oscillator trimmer
C7	"SW1" band oscillator trimmer
C8	"BC" band oscillator trimmer
C9	.008 mfd. polystyrene capacitor
C10	2400 mmf. ±5% mica capacitor
C11	"BC" band padder
C12	100 mmf. mica capacitor
C15	750 mmf. silvered mica capacitor
C18	330 mmf. mica capacitor
C19	.02 mfd. paper capacitor
C20	.003 mfd. paper capacitor
C21	.003 mfd. paper capacitor
C22	.005 mfd. paper capacitor
C23	220 mmf. mica capacitor
C24	.03 mfd. paper capacitor
C25A	10 mfd. 350 V. dry electrolytic
C25B	20 mfd. 400 V. dry electrolytic
C25C	30 mfd. 400 V. dry electrolytic
C25D	20 mfd. 25 V. dry electrolytic
C26	.03 mfd. paper capacitor
C27	.002 mfd. paper capacitor
C28	47 mmf. mica capacitor
C29	.004 mfd. paper capacitor
C30	.003 mfd. paper capacitor
C31	.008 mfd. paper capacitor
C32	.05 mfd. paper capacitor
C33	220 mmf. mica capacitor
C34	"BC" band antenna trimmer
C35	.01 mfd. paper capacitor
L1	"BC" band Beam-a-Scope
L2	"SW1" band antenna coil
L3	"SW2" band Beam-a-Scope
L4	"SW2" band oscillator coil
L5	"SW1" band oscillator coil
L6	"BC" band oscillator coil
L7	R.F. interstage coil
L12	Touch tuning coils
P1	Dial Lamp, MAZDA No. 44
P2	Dial lamp, MAZDA No. 44
P3	Dial lamp, MAZDA No. 44
R1	1000 ohms carbon resistor
R2	47 ohms carbon resistor
R3	27 ohms carbon resistor
R4	10,000 ohms carbon resistor
R5	3300 ohms carbon resistor
R6	47,000 ohms carbon resistor
R7	22,000 ohms carbon resistor
R8	2.2 megohms carbon resistor
R9	150 ohms carbon resistor
R10	47,000 ohms carbon resistor
R11	82,000 ohms carbon resistor
R12	2 megohms volume control (.5 megohm tap)
R13	4.7 megohms carbon resistor
R14	470,000 ohms carbon resistor
R15	2200 ohms carbon resistor
R16	68,000 ohms carbon resistor
R17	11,200 ohms wire wound resistor
R18	1940 ohms wire wound resistor
R19	1000 ohms carbon resistor
R20	150,000 ohms carbon resistor
R21	56,000 ohms carbon resistor
R22	330,000 ohms carbon resistor
R23	1000 ohms carbon resistor
R24	5600 ohms carbon resistor
R25	180 ohms 1 W. carbon resistor
R26	470,000 ohms carbon resistor
R27	2 megohm volume control (.5 megohm tap)
R28	82,000 ohms carbon resistor
R29	100,000 ohms carbon resistor
R30	220,000 ohms carbon resistor
R31	1000 ohms carbon resistor
S1	Band switch
S2	Tone control switch
S3	Touch tuning switch
S4	Phono-Radio switch
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	60-cycle power transformer
T5	25/50-cycle power transformer

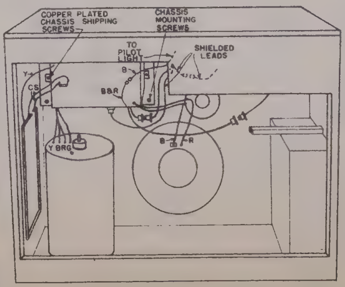


Fig. 2. Interconnection Diagram (Models J-808, J-818, J-828)

*NOTE:
GREEN LEAD TO CYLINDRICAL BEAM-A-SCOPE SHOULD BE KEPT SEPARATE FROM OTHER LEADS AND THREADED THRU HOLE IN CROSS MEMBER ADJACENT TO BEAM-A-SCOPE TOP BEARING.

COLOR CODE:
Y— —YELLOW
B— —BLACK
R— —RED
G— —GREEN
B&R— —BLACK & RED
CS— —COPPER STRIP

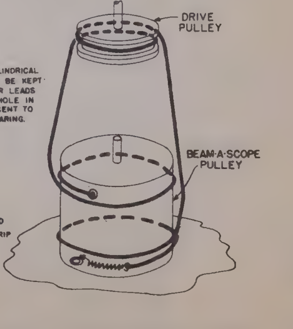


Fig. 10. Beam-a-Scope Drive Cord Stringing Diagram (Models J-808, J-818, J-828)

MODELS J-808,
J-809, J-818,
J-828

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form below. The use of a standard I.R.E. dummy antenna in making all R.F. alignments is recommended. R.F. alignment can be performed by loop coupling the generator signal to the receiver Beam-a-Scopes if care is exercised not to overcouple the two circuits. Keeping a distance of two feet or more between the generator loop and the receiver Beam-a-Scope will generally insure freedom from overcoupling. The relative position of the Beam-a-Scopes with respect to the chassis materially affects R.F. alignment; therefore, all R.F. alignments should be made with the chassis and Beam-a-Scopes mounted in the cabinet. In keeping with this recommendation all R.F. alignment trimmers are available either on top of the chassis or through holes in the back apron as shown in Fig. 1. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet. Also the receiver should be kept away from large metal objects such as radiators, metal-top tables, etc.

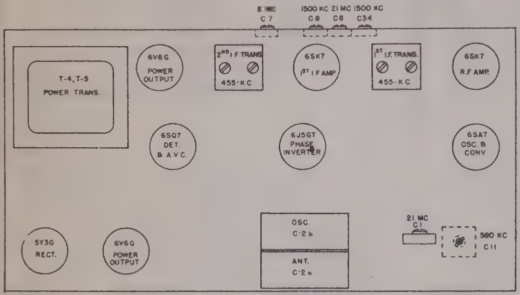


Fig. 1. Trimmer Location
(All Models)

R.F. ALIGNMENT
WITH CHASSIS OUTSIDE OF CABINET

R.F. alignment can be performed only on the "BC" and "SW1" bands with the chassis outside of the cabinet. Any alignment attempted on "SW2" band will not be satisfactory. The same relative position between the chassis and broadcast loops should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of a 0–180° calibrated scale which is cemented to the back of the dial reflector plate. From the reference chart Fig. 7 the degree readings for corresponding frequency settings may be obtained by laying a straight edge across the chart perpendicular to the line of figures and sliding the straight edge along to the various frequency settings desired. The degree readings will be found on either of the degree scales. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the left-hand edge of the pointer-guide slide lines up with the 0° mark. By using the left-hand edge (as viewed from the rear) of the slide as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until the left-hand edge of the slide is in line with 158°, the receiver will be tuned to 1500 KC on the "BC" band.

The "BC" and "SW1" band alignment procedure is the same as outlined in steps 2 to 6 inclusive of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

After the alignment has been performed on the "BC" and "SW1" bands the chassis should be mounted in the cabinet and "SW2" band alignment checked as described in steps 7 to 9 of the chart "R.F. Alignment with Chassis Mounted in Cabinet."

NOTE: After moving the pointer along the cord to use the left-hand edge as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

ALIGNMENT CHART
I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. "BC" Band	455 KC Sweep	I.F. Grid	.05 mfd. or larger	2nd I.F. Trimmers C-16, 17	Gang condenser plates open. Depress any station key other than Phono-FM-Tel key. ("Radio On" position in Models J-808, 818, 828.) Connect audio input of oscilloscope to chassis ground and top of volume control, R12. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. Finish by retrimming 2nd I.F. trimmers.
2. "BC" Band	455 KC Sweep	Green lead on cylindrical Beam-a-Scope	.05 mfd. or larger	1st I.F. Trimmers C-13, 14	

I.F. ALIGNMENT WITH OUTPUT METER

1. "BC" Band	455 KC with Modulation	Green lead on cylindrical Beam-a-Scope	.05 mfd. or larger	2nd I.F. Trimmers C-16, 17. 1st I.F. Trimmers C-13, 14	Gang condenser plates open. Depress any key other than Phono-FM-Tel key. ("Radio On" position in Models J-808, 818, 828.) Connect output meter across voice coil. Keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.

R.F. ALIGNMENT
WITH CHASSIS MOUNTED IN CABINET

1. "BC" Band					Close gang plates, adjust pointer to first line at left end of tuning scale. Connect output meter across voice coil. Tone control set to "Normal" position.
2. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-8) Ant. (C-34)	Set pointer to 1500 KC and tune in signal with (C-8). Peak output with (C-34).
3. "BC" Band	580 KC with Modulation	Antenna Post	I.R.E.	Osc. Padder (C-11)	Set pointer to 580 KC and peak signal while rocking gang condenser.
4. "BC" Band	1500 KC with Modulation	Antenna Post	I.R.E.	Osc. (C-8) Ant. (C-34)	Retrim for maximum output.
5. Repeat operation 3 if "BC" band trimmers are badly out of alignment.					
6. "SW 1" Band	6 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-7)	Set pointer to 6 MC and peak signal while rocking gang condenser.
7. "SW 2" Band	21 MC with Modulation	Antenna Post	I.R.E.	Osc. (C-6) Ant. (C-1)	Set pointer to 21 MC and tune in signal with (C-6). Peak output with (C-1) while rocking gang condenser. When (C-6) is on proper peak, image of 21 MC signal should be heard 910 KC below or on 20.09 MC.
8. "SW 2" Band	8 MC with Modulation	Antenna Post	I.R.E.		This operation may or may not be necessary depending on how much the short-wave Beam-a-Scope leads have been moved from their correctly dressed positions. Repositioning will be indicated if an increased output meter reading can be obtained by moving the short-wave Beam-a-Scope strap leads closer or farther away from one another. The moving should be done with an insulated rod or stick.
9. Repeat operation 7 if the Beam-a-Scope leads are moved in operation 8.					

GENERAL ELECTRIC CO.

MODELS J-808,
J-809, J-818,
J-828

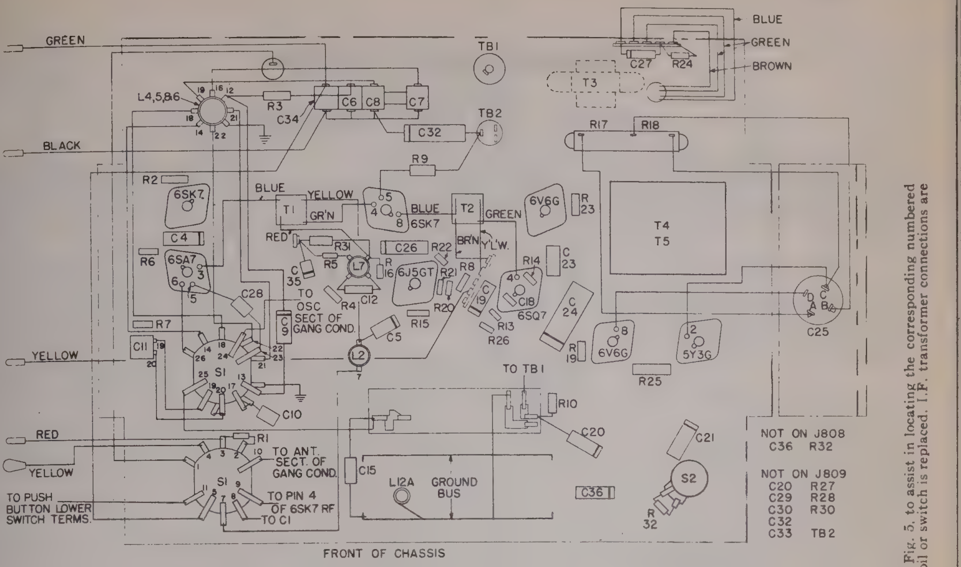


Fig. 5. Chassis Parts Layout (All Models)

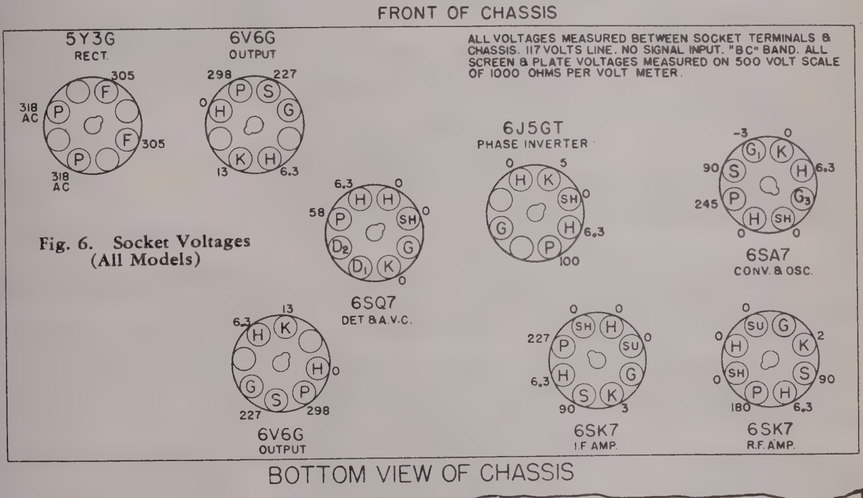

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS. 117 VOLTS LINE. NO SIGNAL INPUT. "BC" BAND. ALL SCREEN & PLATE VOLTAGES MEASURED ON 500 VOLT SCALE OF 1000 OHMS PER VOLT METER.

Fig. 6. Socket Voltages (All Models)

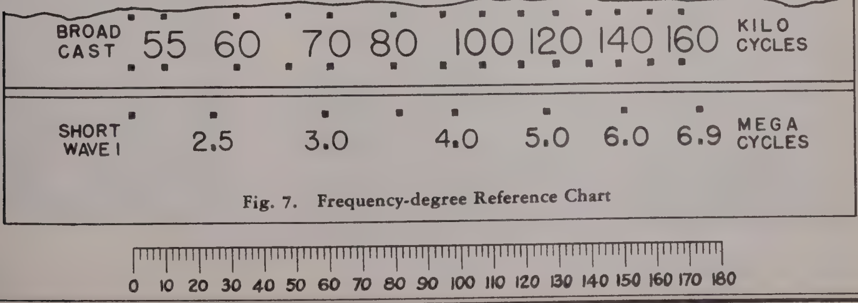


Fig. 7. Frequency-degree Reference Chart

NOTE: The oscillator coil and band-switch terminals are numbered in the Chassis Parts Layout, Fig. 5, to assist in locating the corresponding numbered points on the Schematic Diagrams, Figs. 3 and 4. This numbering will also assist in rewiring if the coil or switch is replaced. I.F. transformer connections are shown as an aid in replacement.

AUTOMATIC RECORD CHANGER

USED IN MODELS

J-718, J-728, J-808, J-809, J-818 AND J-828

This automatic Record Changer is a standard assembly in all of the above models. It is designed for operation on 110 volts, 60 cycles only and will automatically play a series of eight 10-inch or seven 12-inch records of the 78 revolutions per minute type. Manual operation is also provided. Records of the last few years with the standard eccentric or spiral stopping groove will operate the automatic mechanism and change your records.

OPERATING INSTRUCTIONS

Before operating the phonograph, either automatically or manually, be sure the pick-up is down and can be moved by hand; if not, a "cycle" must be completed to bring it down. To do this, throw the turntable switch to "ON." The turntable will start to revolve and the cycle of motion on the pick-up arm will be resumed. When the pick-up arm comes down, turn the turntable switch off.

CONTROLS AND MOVING MECHANISM

Index and Record-reject Lever

This lever is located near the right-front corner of the motorboard with its index plate marked for four positions—"Manual," "12," "10," and "Reject." When you desire to change record selections manually, this lever should be set in the "Manual" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play a series of 10-inch records, the lever should be set at the "10" position.

To reject a record being played or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "Reject" position and let go. The pick-up will raise up and swing outward and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "Manual" position when not actually playing records automatically.

Turntable Switch

The toggle switch located just in front of the Index and Record-reject Lever controls the current to the turntable motor. To start the turntable throw the switch to the "On" position. To stop the turntable throw the switch to the "Off" position. This switch will not operate unless receiver power is turned on.

Pick-up and Top-loading Needle Socket

The pick-up is the new crystal type, with a hole in the top for insertion of needles. When not playing records or changing needles the pick-up arm should be moved out to the right beyond the turntable and placed at rest on the support with the left edge of the pick-up arm in the left-edge recess of the support as shown in Fig. 2a.

When changing needles rest the pick-up arm in the right recess of the support as shown in Fig. 2b. To insert a needle initially, loosen the needle screw on the front of the pick-up, place the needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw. As soon as the needle has been changed raise the pick-up arm and return to the position of rest as described in the preceding paragraph.

Needle Ejector

The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pick-up arm in needle-changing rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pick-up as described above.

Record-holder Shelves

To place a record on the turntable or to remove records, raise the record-holder shelves, by grasping the knob posts with the fingers, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record-holder post. You now have clear access to the turntable. Before loading the magazine for automatic operation swing the record-holder shelves back into position.

AUTOMATIC OPERATION

1. See that pick-up arm is in rest position (Fig. 2a) with needle properly in place. If mechanism will not allow pick-up arm to come to the rest position, complete a "cycle" as explained in the first paragraph under "Operation."
2. Place the series of records (up to eight 10-inch or seven 12-inch records) on the record-holder posts (as shown in Fig. 1). The records should be arranged in the desired order with the desired selection face up and the last selection on top.
3. Throw turntable switch to "On."

(Note—The radio power should be turned on or phonograph will not operate.)

4. To start the automatic cycle, simply push the lever to the "Reject" position and then return it immediately to the numbered position corresponding to the size of records to be played. The pick-up will raise up and swing outward and the first record will drop down and the pick-up will come to rest on it.

The whole series of records will play without further attention, and the last record will repeat until the Turntable Switch is turned off. If the record-changing mechanism is in a change cycle wait until it is completed before stopping the turntable. Then lift the pick-up, swing the arm to the right beyond the edge of the record and lower it onto the pick-up rest (Fig. 2a). The record player is then ready for reloading, or for manual operation.

MANUAL OPERATION

To play records manually:

1. Proceed as in Step 1, under "Automatic Operation."
2. Swing record-holder shelves clear of turntable. Place record on turntable with desired selection upwards.
3. Set Index and Record-reject Lever to "Manual" position.
4. Proceed as in Step 3 under "Automatic Operation" and when turntable has attained speed, lift pick-up and lower gently onto the record so that the needle point enters the outside groove. When you have finished playing, be sure that the turntable has stopped and the pick-up is in the rest position over needle gauge plate. Never leave pick-up with needle resting on a record or on the turntable.

SERVICE DATA

General Information

The turntable is driven through a friction drive wheel mounted on the turntable spindle. It is important that the drive motor spindle and rubber tires on the main driving wheel and idler pulley be kept clean and free from oil, grease, dirt or any foreign matter. Any quick-drying naphtha is satisfactory for cleaning these parts. The drive motor bearing is lubricated from an oil well filled and sealed at the factory. It should not require lubrication in the field. The turntable is not removable from the spindle without removing the tapered pin "24" which fastens the rubber-tired driving wheel to the spindle. Once the pin is removed, the driving wheel can be slipped off the spindle and the turntable and spindle assembly lifted upward from the motor board. Caution should be exercised not to bend the spindle. The spindle bearing should be oiled and the cup and ball thrust bearing oiled and checked for proper position.

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10- and 12-inch records must be absolutely flat for smooth operation.

Adjustments

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pick-up is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pick-up Lift Cable Screw.—During the record-change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pick-up lift cable. To adjust pick-up for proper elevation, stop the changer "in-cycle" at the point where pick-up is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1-inch spacing between needle point and turntable top surface.

D. and E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10-inch record. Position of eccentric stud "E" governs the landing of the needle on a 12-inch record; this, however, is dependent on the proper 10-inch adjustment.

To adjust for needle landing, place 10-inch record on turntable; push index lever to reject position and return to the 10-inch position; see that pick-up locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4⅝ inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32-inch end play between hub of lever "20" and pick-up base bearing, and tighten the blunt-nose screw "D"; run mechanism through several cycles as a check, then tighten cone-pointed screw "D."

After adjusting for needle landing on a 10-inch record, place 12-inch record on turntable; push index lever to reject and return to 12-inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5⅝ inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board; otherwise incorrect landing may occur with 10-inch records.

F. and G. Record Separating Knife.—The upper plate (knife) "25" on each of the record post serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10-inch record is nominally .055 inch, and for the 12-inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052–.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072–.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12-inch record on the turntable, rotate mechanism into cycle to the point where both separating knives have turned clockwise as far as the mechanism will turn them; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Some backlash will be present in the rotation of these shelves. They should be adjusted so that backlash permits them to move away from record but not closer than the 1/16 inch specified above. Tighten the blunt-nose screw "H," run mechanism through cycle several times to check action, then tighten cone-pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pick-up head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication. Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record-post bearings, and all other bearings of various levers on under side of motor board.

The turntable bearing must be lubricated from the top of the motor board. Using an oil can with a long spout, reach in between the turntable and motor board and apply oil directly to the spindle.

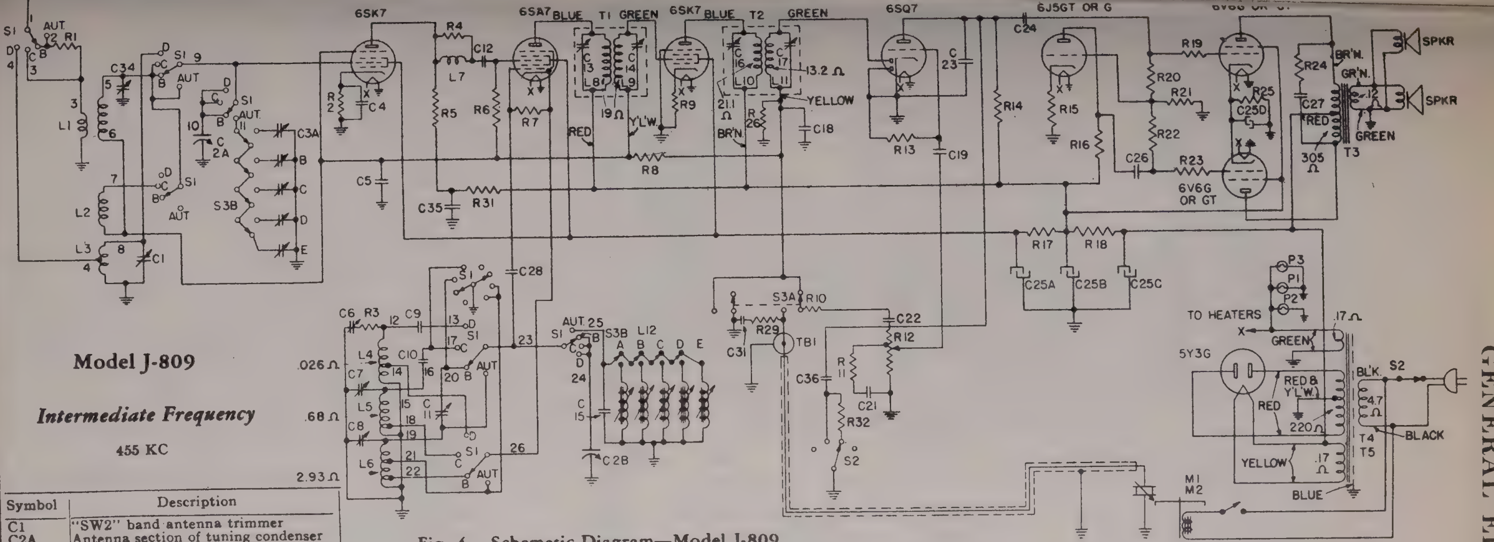
Do not allow oil or grease to come in contact with rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10- and 12-inch record—Make complete adjustments "D" and "E."
3. Needle does not land properly on 12-inch record but correctly on 10-inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pick-up strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pick-up output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. "Wow" in record reproduction—Record is defective; instrument is not being operated at normal room temperature (65° F); oil, grease or dirt on driving wheel or idler pulley rubber tire. The motor support bracket "N" should be moved in its mounting holes until motor spindle is parallel to the turntable spindle and exactly at right angles to the main driving wheel "29." The bracket mounting nuts should then be securely tightened.
9. Record knives strike edge of records—Record warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. When playing both types of records mixed and needle either lands in 10-inch position on 12-inch record or misses record entirely—Increase tension of mixed record discriminating lever spring "M."

GENERAL ELECTRIC CO.



Model J-809

Intermediate Frequency

455 KC

Fig. 4. Schematic Diagram—Model J-809

Symbol	Description
C1	"SW2" band antenna trimmer
C2A	Antenna section of tuning condenser
C2B	Oscillator section of tuning condenser
C3	Touch tuning trimmer strip
C4	.01 mfd. paper capacitor
C5	.05 mfd. paper capacitor
C6	"SW2" band oscillator trimmer
C7	"SW1" band oscillator trimmer
C8	"BC" band oscillator trimmer
C9	.008 mfd. polystyrene capacitor
C10	2400 mmf. ±5% mica capacitor
C11	"BC" band padder
C12	100 mmf. mica capacitor
C15	750 mmf. silvered mica capacitor
C18	330 mmf. mica capacitor
C19	.02 mfd. paper capacitor
C21	.003 mfd. paper capacitor
C22	.005 mfd. paper capacitor
C23	390 mmf. mica capacitor
C24	.03 mfd. paper capacitor
C25A	10 mfd. 350 V. dry electrolytic
C25B	20 mfd. 400 V. dry electrolytic
C25C	30 mfd. 400 V. dry electrolytic
C25D	20 mfd. 25 V. dry electrolytic
C26	.03 mfd. paper capacitor
C27	.002 mfd. paper capacitor
C28	47 mmf. mica capacitor
C31	.008 mfd. paper capacitor
C34	"BC" band antenna trimmer
C35	.01 mfd. paper capacitor
C36	.01 mfd. paper capacitor
L1	"BC" band Beam-a-Scope
L2	"SW1" band antenna coil
L3	"SW2" band Beam-a-Scope
L4	"SW2" band oscillator coil
L5	"SW1" band oscillator coil
L6	"BC" band oscillator coil
L7	R.F. interstage coil
L12	Touch tuning coils
P1	Dial lamp, Mazda No. 44
P2	Dial lamp, Mazda No. 44
P3	Dial lamp, Mazda No. 44
R1	1000 ohms carbon resistor
R2	47 ohms carbon resistor
R3	27 ohms carbon resistor
R4	10,000 ohms carbon resistor
R5	3300 ohms carbon resistor
R6	47,000 ohms carbon resistor
R7	22,000 ohms carbon resistor
R8	2.2 megohms carbon resistor
R9	150 ohms carbon resistor
R10	47,000 ohms carbon resistor
R11	82,000 ohms carbon resistor
R12	2 megohms volume control (.5 megohms tap)
R13	4.7 megohms carbon resistor
R14	470,000 ohms carbon resistor
R15	2200 ohms carbon resistor
R16	68,000 ohms carbon resistor
R17	11,200 ohms wire wound resistor
R18	1940 ohms wire wound resistor
R19	1000 ohms carbon resistor
R20	150,000 ohms carbon resistor
R21	56,000 ohms carbon resistor
R22	330,000 ohms carbon resistor
R23	1000 ohms carbon resistor
R24	5600 ohms carbon resistor
R25	180 ohms 1 W. carbon resistor
R26	470,000 ohms carbon resistor
R29	100,000 ohms carbon resistor
R31	1000 ohms carbon resistor
R32	39,000 ohms carbon resistor
S1	Band switch
S2	Tone control switch
S3	Touch tuning switch
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	60-cycle power transformer
T5	25/50-cycle power transformer

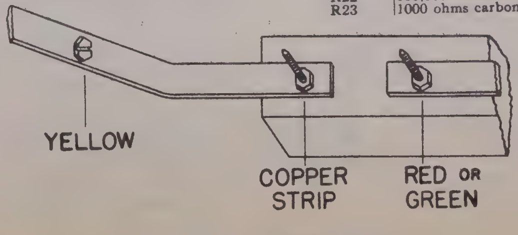


Fig. 9. Shortwave Beam-a-Scope Connections (Model J-809)

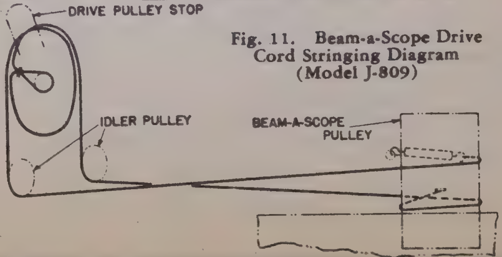
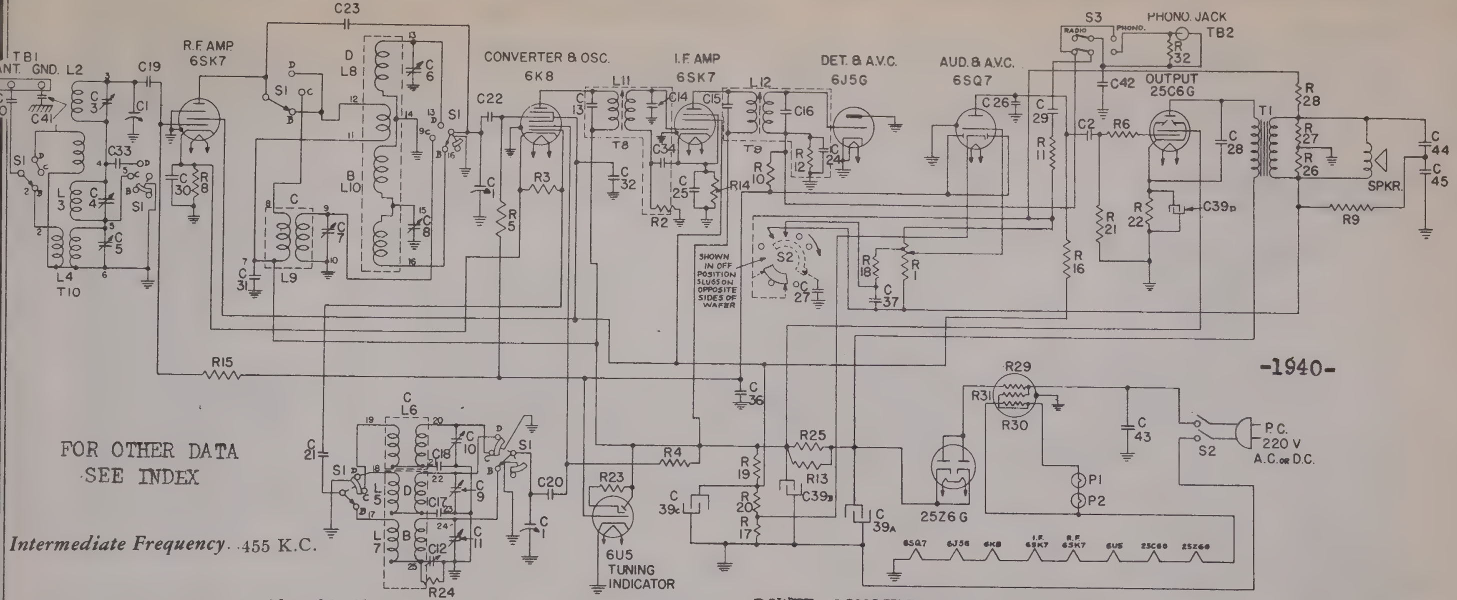


Fig. 11. Beam-a-Scope Drive Cord Stringing Diagram (Model J-809)

©John F. Rider, Publisher

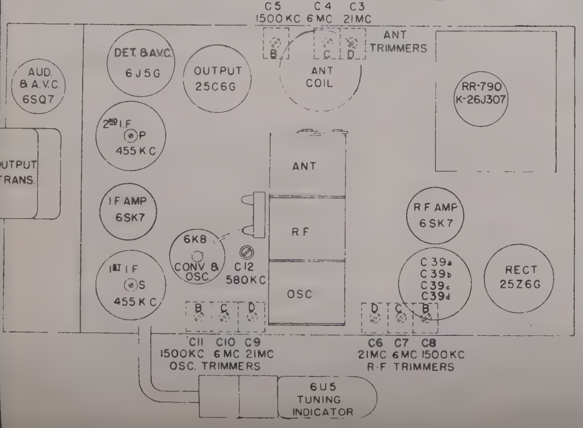
GENERAL ELECTRIC CO.

-1940-



FOR OTHER DATA SEE INDEX

Intermediate Frequency. 455 K.C.



POWER CONSUMPTION 105 WATTS

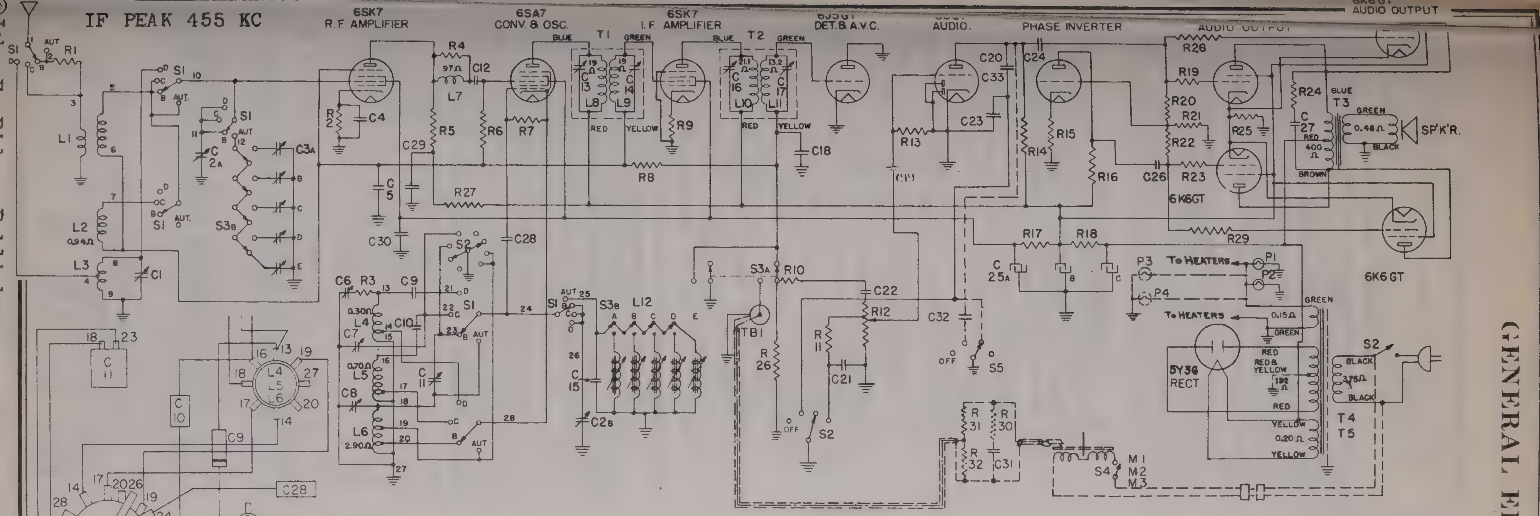
Symbol	Description	Symbol	Description	Symbol	Description
C1	Tuning Condenser	C33	.006 Mfd. 600 V. Paper	R4	22,000 Ohms Carbon
C2	.05 Mfd. 600 V. Paper	C34	.05 Mfd. 200 V. Paper	R5	560,000 Ohms Carbon
C3	5-40 Mmf. "D" Ant. Trimmer	C36	.05 Mfd. 200 V. Paper	R6	1000 Ohms Carbon
C4	3-30 Mmf. "C" Ant. Trimmer	C37	.002 Mfd. 600 V. Paper	R8	120 Ohms Carbon
C5	2-20 Mmf. "B" Ant. Trimmer	C39a	40 Mfd. 300 V. Dry Electrolytic	R9	220 Ohms Carbon
C6	3-30 Mmf. "D" R.F. Trimmer	C39b	50 Mfd. 250 V. Dry Electrolytic	R10	2.2 Megohms Carbon
C7	3-30 Mmf. "C" R.F. Trimmer	C39c	20 Mfd. 250 V. Dry Electrolytic	R11	47,000 Ohms Carbon
C8	3-30 Mmf. "B" R.F. Trimmer	C39d	20 Mfd. 25 V. Dry Electrolytic	R12	330,000 Ohms Carbon
C9	3-30 Mmf. "D" Osc. Trimmer	C40	.01 Mfd. 600 V. Paper	R13	3900 Ohms 2 W. Carbon
C10	3-30 Mmf. "C" Osc. Trimmer	C41	.01 Mfd. 600 V. Paper	R14	330 Ohms Carbon
C11	5-45 Mmf. "B" Osc. Trimmer	C42	.25 Mfd. 400 V. Paper	R15	560,000 Ohms Carbon
C12	300-650 Mmf. "B" Osc. Padder	C43	.02 Mfd. Metal Cased	R16	330,000 Ohms Carbon
C17	2800 Mmf. ±5% Mica	C44	0.1 Mfd. 200 V. Paper	R17	150 Ohms Carbon
C18	1600 Mmf. ±5% Mica	C45	.05 Mfd. 200 V. Paper	R18	120,000 Ohms Carbon
C19	470 Mmf. Mica	L2	"D" Antenna Coil	R19	2700 Ohms 2 W. Carbon
C20	470 Mmf. Mica	L3	"C" Antenna Coil	R20	15,000 Ohms 1 W. Carbon
C21	47 Mmf. Mica	L4	"B" Antenna Coil	R21	470,000 Ohms Carbon
C22	470 Mmf. Mica	L5	"D" Oscillator Coil	R22	270 Ohms 2 W. Carbon
C23	10 Mmf. L.P.F. Mica	L6	"C" Oscillator Coil	R23	1.0 Megohm Carbon
C24	100 Mmf. Mica	L7	"B" Osciliator Coil	R24	5600 Ohms Carbon
C25	.05 Mfd. 200 V. Paper	L8	"D" R.F. Coil	R25	3900 Ohms 2 W. Carbon
C26	220 Mmf. Mica	L9	"C" R.F. Coil	R26	270 Ohms Carbon
C27	.002 Mfd. 600 V. Paper	L10	"B" R.F. Coil	R27	1500 Ohms Carbon
C28	.008 Mfd. 1000 V. Paper	P1	Dial Lamp, Mazda No. 44	R28	6.8 Megohms Carbon
C29	.002 Mfd. 600 V. Paper	P2	Dial Lamp, Mazda No. 44	R29	200 Ohms 10 W. Ballast
C30	.05 Mfd. 200 V. Paper	R1	2.0 Megohms Volume Control	R30	200 Ohms 15 W. Ballast
C31	.05 Mfd. 600 V. Paper	R2	330,000 Ohms Carbon	R31	434 Ohms 45 W. Ballast
C32	.05 Mfd. 600 V. Paper	R3	33,000 Ohms Carbon	R32	220,000 Ohms Carbon

©John F. Rider, Publisher

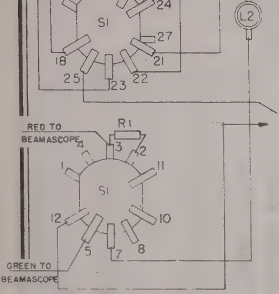
GENERAL ELECTRIC CO.

MODELS J1106
J1108

IF PEAK 455 KC



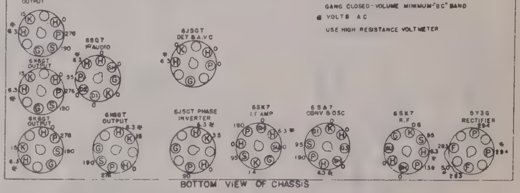
Switch and Coil Section of Chassis Underview



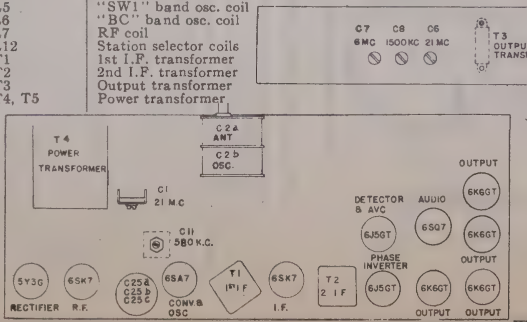
NOTE—Parts and lines shown dotted are to be added in circuit for J-1108 receiver only.

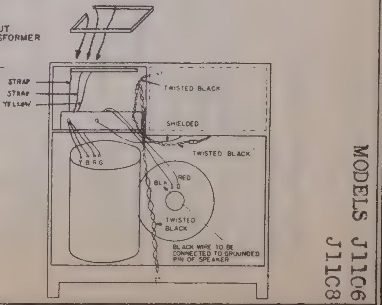
Symbol	Description
C1	2–20 mmf. trimmer
C2a, 2b	Tuning condenser
C3a, b, c, d, e	Touch tuning trimmer strip
C4	.01 mfd. paper capacitor
C5	.10 mfd. paper capacitor
C6, 7, 8	Osc. trimmer strip
C9	.008 mfd. paper capacitor
C10	2400 mmf. mica capacitor
C11	"BC" band padder
C12	100 mmf. mica capacitor
C15	750 mmf. silvered mica
C18	220 mmf. mica capacitor
C19	.02 mfd. paper capacitor
C20	.003 mfd. paper capacitor
C21,22	.005 mfd. paper capacitor
C23	220 mmf. mica capacitor
C24	.03 mfd. paper capacitor
C25a	10 mfd. dry electrolytic
C25b	15 mfd. dry electrolytic
C25c	30 mfd. dry electrolytic
C26	.03 mfd. paper capacitor
C27	.002 mfd. paper capacitor
C28	47 mmf. mica capacitor
C29, 30	.01 mfd. paper capacitor
C31	.008 mfd. paper capacitor
C32	.005 mfd. paper capacitor
C33	.002 mfd. paper capacitor
R1	1000 ohm carbon resistor
R2	47 ohm carbon resistor
R3	27 ohm carbon resistor
R4	10,000 ohm carbon resistor
R5	3300 ohm carbon resistor
R6	47,000 ohm carbon resistor
R7	22,000 ohm carbon resistor
R8	2.2 megohm Carbon resistor
R9	150 ohm carbon resistor
R10	47,000 ohm carbon resistor
R11	82,000 ohm carbon resistor
R12	2.0 megohm volume control
R13	4.7 megohm carbon resistor
R14	470,000 ohm carbon resistor
R15	3300 ohm carbon resistor
R16	68,000 ohm carbon resistor
R17	6800 ohm carbon resistor
R18	1900 ohm carbon resistor
R19	1000 ohm carbon resistor
R20	150,000 ohm carbon resistor
R21	120,000 ohm carbon resistor
R22	270,000 ohm carbon resistor
R23	1000 ohm carbon resistor
R24	5600 ohm carbon resistor
R25	220 ohm, carbon resistor
R26	470,000 ohm carbon resistor
R27, 28, 29	1000 ohm carbon resistor
R30	100,000 ohm carbon resistor
R31, 32	220,000 ohm carbon resistor
S1	Band change switch
S2	Tone control switch
S3	Station selector switch
L1	"BC" band Beam-a-Scope
L2	"SW1" ant. coil
L3	"SW2" band Beam-a-Scope
L4	"SW2" band osc. coil
L5	"SW1" band osc. coil
L6	"BC" band osc. coil
L7	RF coil
L12	Station selector coils
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4, T5	Power transformer

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE STATED
LINE VOLTAGE - 120 VOLTS A C
GANG CLOSED - VOLUME MINIMUM - "BC" BAND
● VOLTS A C
USE HIGH RESISTANCE VOLTMETER



BOTTOM VIEW OF CHASSIS





Tuning Frequency Range

Broadcast Band	540–1700 KC
Short-wave Band No. 1	2400–7000 KC
Short-wave Band No. 2	7000–22,000 KC
Intermediate Frequency	455 KC

Electrical Power Output

Undistorted	6 watts
Maximum	9.5 watts

Loud-speaker "Alnico" Magnet Dynamic

Outside Diameter	14 inches
Voice Coil Impedance (400 cycles)	3.5 ohms

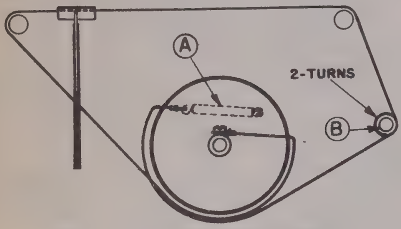


Fig. 5. Dial Cord Stringing Diagram

BEAM-A-SCOPE REMOVAL

Before either the chassis or Beam-a-Scope can be removed, the leads between them must be disconnected. Fig. 1 shows the location of the Beam-a-Scope leads when connected.

Model J-1106—To remove Beam-a-Scope, disconnect the leads, unscrew the long self-tapping screw from cabinet shelf, then pry loose the cardboard strap which is stapled to the bottom of the cabinet and holds the Beam-a-Scope in place. Now rotate the Beam-a-Scope from right to left until it comes loose. Note: The upper pivot bolt support should never be loosened.

To replace the Beam-a-Scope the reverse procedure is followed and the strap should be restapled to the cabinet.

Model J-1108—To remove the Beam-a-Scope from this model, use the same procedure as above with the exception of the bottom support removal. This receiver uses a wooden support held in place by two wood screws which are accessible from underneath the cabinet base. When the screws are removed the wood support can be removed allowing the Beam-a-Scope to be rotated from right to left until it is free.

Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains*
- (a) Antenna Post to R. F. Grid at
  - 1000 KC....6.5
  - 4000 KC....3.0
  - 18000 KC....2.3
- (b) R.F. Grid to Converter Grid at
  - 1000 KC....5.0
  - 4000 KC....3.0
  - 18000 KC....2.0
- (c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at
  - 1000 KC....47
  - 4000 KC....47
  - 18000 KC....39
- (d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at 455 KC....55
- (e) I.F. Amplifier Grid to Detector Plate at 455 KC....77

(2) Voltage across Volume Control to Give ½-watt** Speaker Output at 400 cycles....0.05 volts

(3) DC Voltage Developed across Oscillator Grid Resistor (R-7) at
- 1000 KC....6.0
- 4000 KC....5.5
- 18000 KC....3.9

* Variations of ±20 per cent. are permissible. All readings obtained with enough input signal to give ½-watt speaker output.

** ½-watt speaker output at 400 cycles is equivalent to a reading of 1.32 volts as measured by a high resistance A-C voltmeter across the voice coil of the receiver speaker.

Phonograph Mechanism (Model J-1108)

Type	Automatic Record Changer
Record Capacity	Twelve 10-inch or ten 12-inch records
Type Pickup	Crystal
Turntable Speed	78 Rpm

ALIGNMENT PROCEDURE

The alignment procedure, performed with the chassis in the cabinet, is given in table form below. All R.F. alignment is performed by capacity coupling the test oscillator to the receiver input. This is accomplished by using a three-foot piece of wire as an antenna connected to the high side of the test oscillator output and brought to within three feet of the Beam-a-Scope input when making the alignment. Metal objects such as tools, meters, etc. should not be placed on top of the cabinet.

Before making the R.F. alignment make sure the pointer is set to the line at the left-hand edge of the dial scale when the gang condenser plates are closed. Output meter alignment is preferable and the meter may be connected across the voice coil; then turn volume control to maximum. Keep the signal input as low as possible to avoid AVC action.

ALIGNMENT CHART

Step	Test-Osc. Connect to	Osc. Output Frequency	Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 I.F. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C16 &C17
2	6SA7 grid in series with .05 mfd	455 KC	"BC" Band 550 KC	C13 & C14
3	Use Capacity Coupling 580 KC		"BC" Band 580 KC	C11**
4	Use Capacity Coupling 1500 KC		"BC" Band 1500 KC	C8
5	Repeat step 3			
6	Use Capacity Coupling 6.0 MC		"SW1" Band 6 MC	C7
7	Use Capacity Coupling 21.0 MC		"SW2" Band 21 MC	C6*
8	Use Capacity Coupling 21.0 MC		"SW2" Band 21 MC	C1**

* Use minimum capacity peak.

** Rock gang condenser for optimum peak.

R.F. Alignment with Chassis Outside of Cabinet

R.F. alignment can be performed only on the "BC" and "SW1" bands with the chassis outside of the cabinet. Any alignment attempted on "SW2" band will not be satisfactory. The same relative position between the chassis and broadcast loop should be maintained when aligning outside the cabinet as these components occupy in the cabinet. Since the glass dial scale is fastened to the cabinet it cannot be used for reference during alignment of the chassis outside of the cabinet. Use must be made, therefore, of 0–180° calibrated scale which is cemented to the back of the dial-reflector plate. From the "frequency-degree reference chart" the degree readings for corresponding frequency settings may be obtained. To use these degree readings, first completely close the gang condenser plates and then slide the pointer along the cord until the left-hand edge of the pointer-guide slide lines up with the 0° mark. By using this left-hand edge (as viewed from the rear) of the slide as the degree-scale pointer the receiver may be tuned to any frequency. Example: By rotating the tuning control until the left-hand edge of the slide is in line with 154°, the receiver will be tuned to 1500 KC on the "BC" band.

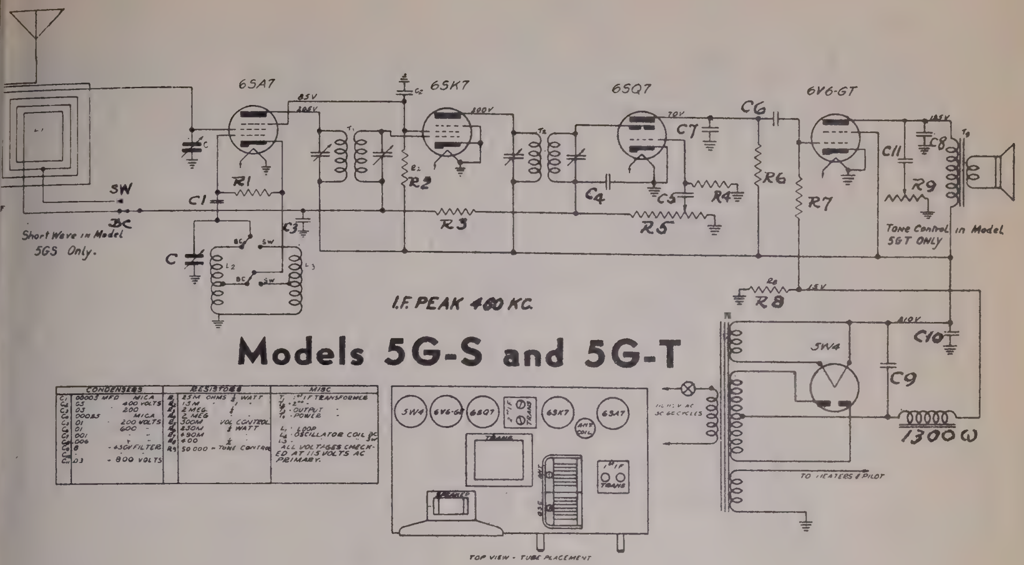
The "BC" and "SW1" band alignment procedure is the same as outlined in steps 3 to 6 inclusive of the chart—"R.F. Alignment with Chassis Mounted in Cabinet."

The chassis should be mounted in the cabinet and "SW2" band alignment checked as described in steps 7 and 8 of the chart.

Note: After moving the pointer along the cord to use the left-hand edge as a reference pointer for the degree scale, it will be necessary after reassembly in the cabinet for the gang condenser plates to be closed and the pointer to be moved back along the cord so that it lines up with the first dial markings on the left.

FREQUENCY-DEGREE REFERENCE CHART

"BC" Band	"SW1" Band	"SW2" Band
1500 KC. . 154°	6.0 MC. . 143°	21 MC. . 162°
1000 KC. . 104°	4.0 MC. . 96°	12 MC. . 101°
580 KC. . 20°	2.5 MC. . 20°	7 MC. . 28°



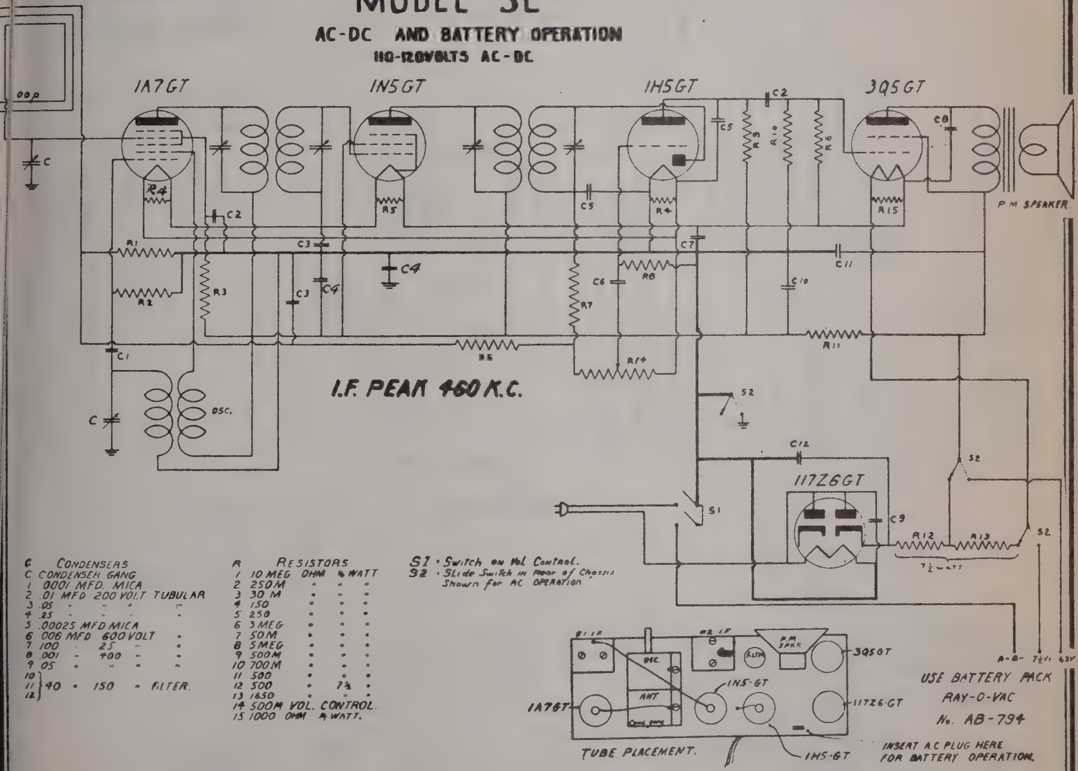
Models 5G-S and 5G-T

CONDENSERS			RESISTORS		MISC
C1	.00005 MFD MICA	R1	25M OHMS ½ WATT	T1	1st IF TRANSFORMER
C2	.05 400 VOLTS	R2	13M " "	T2	2nd "
C3	.05 " 200	R3	2 MEG ½	T3	OUTPUT "
C4	.00025 MICA	R4	2 MEG " "	T4	POWER "
C5	.01 " 200 VOLTS	R5	300M VOL CONTROL		
C6	.01 600 "	R6	250M ½ WATT	L1	LOOP
C7	.001 " "	R7	490M " "	L2	OSCILLATOR COIL BC
C8	.006 " "	R8	400 ½ "	L3	" " SW
C9	8 - 450V FILTER	R9	50 000 - TONE CONTROL		ALL VOLTAGES CHECKED AT 115 VOLTS AC PRIMARY.
C10	" " "				
C11	.03 - 800 VOLTS				

MODEL 5L

AC-DC AND BATTERY OPERATION

110-120 VOLTS AC-DC



C	CONDENSERS
C	CONDENSER GANG
1	.0001 MFD. MICA
2	.01 MFD 200 VOLT TUBULAR
3	.05 " " " "
4	.25 " " " "
5	.00025 MFD MICA
6	.006 MFD 600 VOLT "
7	100 " 25 " "
8	.001 " 400 " "
9	.05 " " " "
10 11 12	40 " 150 " FILTER.

R	RESISTORS
1	10 MEG OHM ½ WATT
2	250M " " "
3	30 M " " "
4	150 " " "
5	250 " " "
6	3 MEG " " "
7	50M " " "
8	5 MEG " " "
9	500M " " "
10	700M " " "
11	500 " " "
12	500 " 7½ "
13	1650 " " "
14	500M VOL. CONTROL.
15	1000 OHM ½ WATT.

S1 - Switch on Vol Control.
S2 - Slide Switch in Rear of Chassis Shown for AC OPERATION

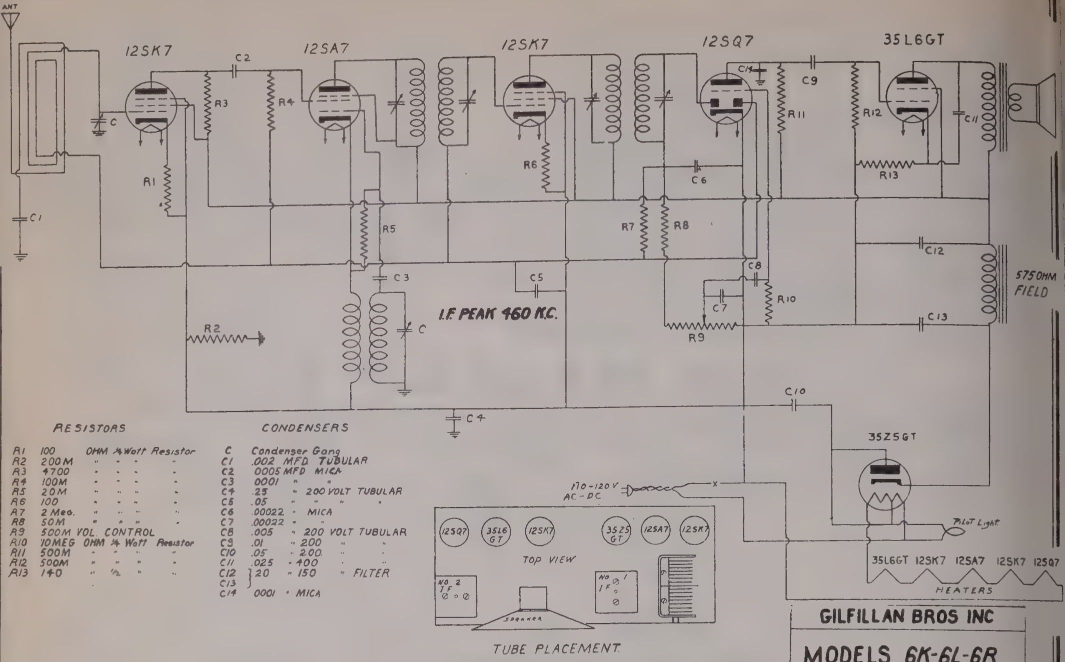
USE BATTERY PACK
RAY-O-VAC
No. AB-794

INSERT A.C PLUG HERE
FOR BATTERY OPERATION.

MFG. by.
Gilfillan Bros Inc. 9/21/40

MODELS 6K, 6L, 6R
MODEL 6U

GILFILLAN BROS. INC.



TUBE PLACEMENT

RESISTORS

R1	100	OHM	¼ Watt	Resistor	
R2	200M	"	"	"	"
R3	4700	"	"	"	"
R4	100M	"	"	"	"
R5	20M	"	"	"	"
R6	100	"	"	"	"
R7	2 Meg.	"	"	"	"
R8	50M	"	"	"	"
R9	500M	VOL. CONTROL			
R10	10MEG	OHM	¼ Watt	Resistor	
R11	500M	"	"	"	"
R12	500M	"	"	"	"
R13	140	"	½	"	"

CONDENSERS

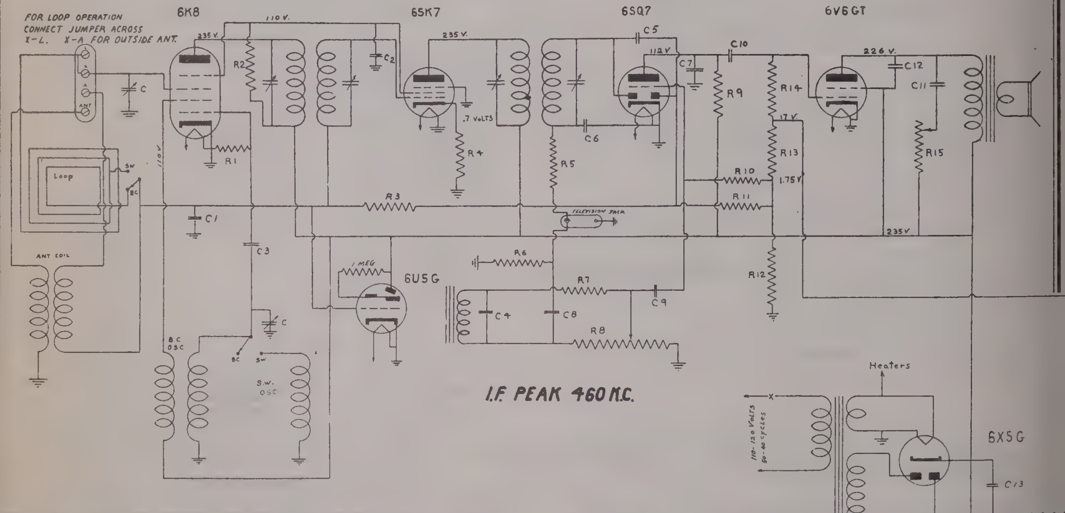
C	Condenser Gang				
C1	.002	MFD	TUBULAR		
C2	.0005	MFD	MICA		
C3	.0001	"	"		
C4	.25	"	200 VOLT	TUBULAR	
C5	.05	"	"	"	"
C6	.00022	"	MICA		
C7	.00022	"	"		
C8	.005	"	200 VOLT	TUBULAR	
C9	.01	"	200	"	"
C10	.05	"	200	"	"
C11	.025	"	400	"	"
C12 C13	20	"	150	"	FILTER
C14	.0001	"	MICA		

GILFILLAN BROS INC

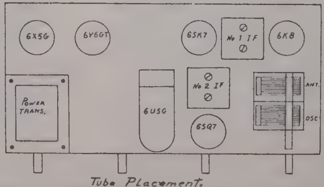
MODELS 6K-6L-6R

FEB-20-40

FOR LOOP OPERATION
CONNECT JUMPER ACROSS
X-L. X-A FOR OUTSIDE ANT.



CONDENSERS					RESISTORS					
C	CONDENSER GANG				R1	100M	OHM	¼	WATT	RESISTOR
C1	.05 MFD	200 VOLT	TUBULAR		R2	10M	"	2	"	"
C2	.05 "	400	"	"	R3	1 MEG	"	¼	"	"
C3	70 MMFD	MICA	CONDENSER		R4	100	"	"	"	"
C4	70 "	"	"		R5	25M	"	"	"	"
C5	70 "	"	"		R6	100M	"	"	"	"
C6	.00025 MFD	"	"		R7	"	"	"	"	"
C7	.0005 "	"	"		R8	500M	"	VOLUME CONTROL		
C8	.01 MFD	400 VOLT	"		R9	250M	"	¼	WATT	RESISTOR
C9	.01 MFD	400	"	"	R10	10MEG	"	"	"	"
C10	.01 MFD	600	"	"	R11	3 "	"	"	"	"
C11	.05 "	800	"	"	R12	40	"	"	"	"
C12	.006 "	600	"	"	R13	400	"	1	"	"
C13	16MFD.	450	"	FILTER	R14	1 MEG	"	¼	"	"
C14	4MFD.	"	"	"	R15	250M	"	TONE CONTROL		

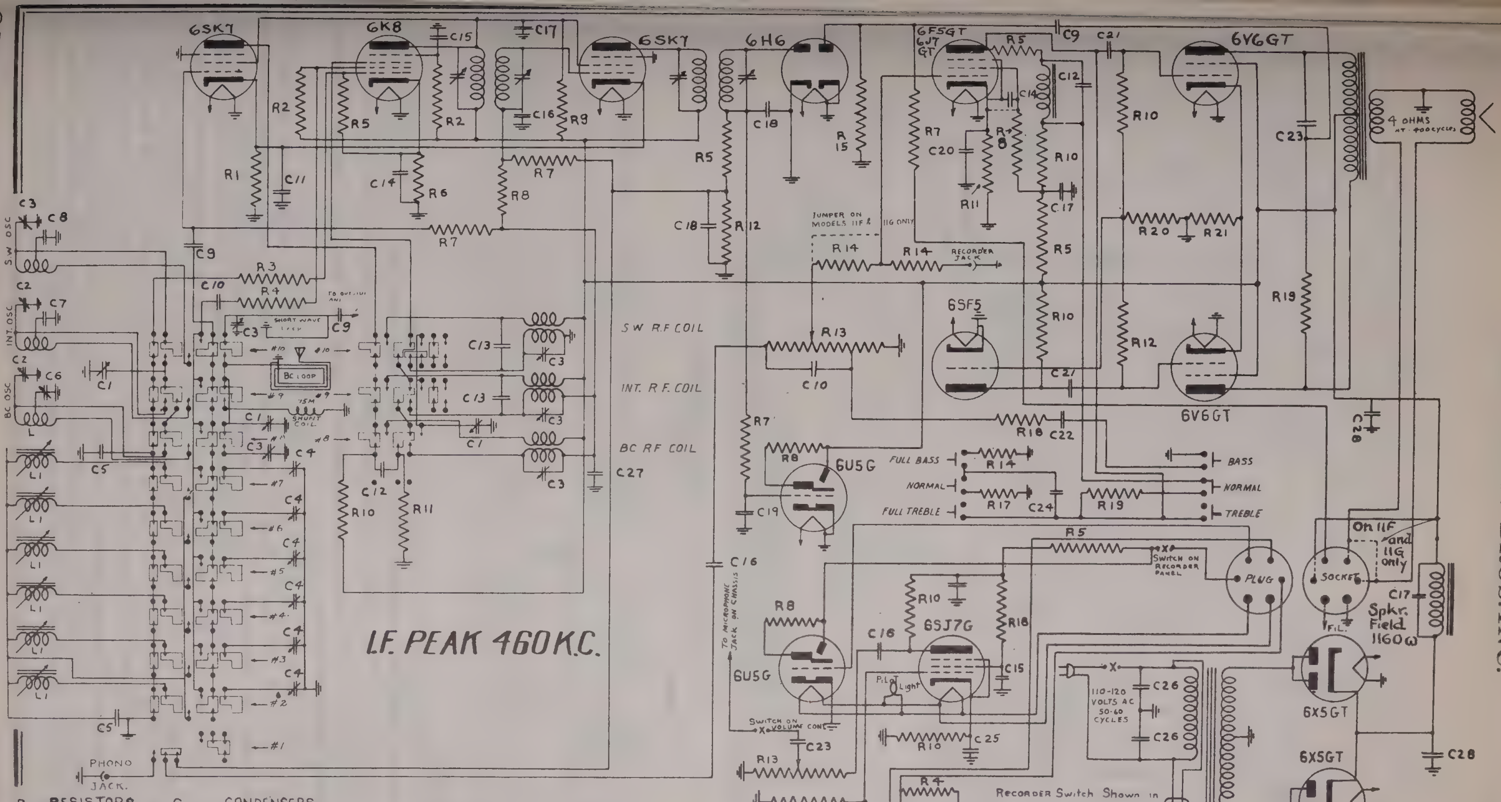


Tube Placement.

GILFILLAN BROS INC.
ENGINEERING DEPT
MODEL 6U
L.Z.
2-10-40

GILFILLAN BROS. INC.

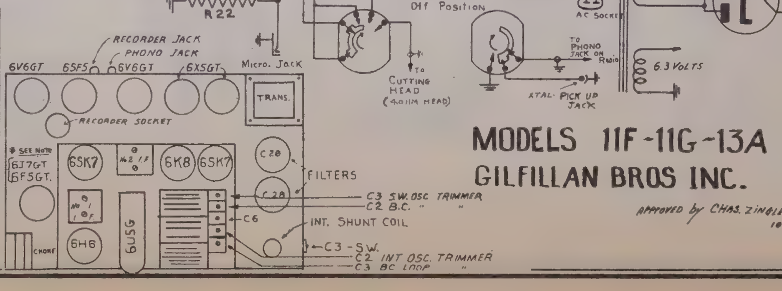
MODELS 11F, 11G, 13A



R	RESISTORS
1	250 OHM 1/4 WATT
2	25M " "
3	25 " "
4	100 " "
5	50M " "
6	300 " "
7	2 MEG " "
8	1 " " "
9	40M " "
10	100M " "
11	4M " "
12	200M " "
13	500M " VOL. CONT.
14	10M " 1/4 WATT
15	500M " "
16	20M " "
17	30M " "
18	500M " "
19	8500 " "
20	180M " "
21	180 " 2 "
22	5 MEG " 1/4 "

C	CONDENSERS
1	CONDENSER GANG
2	3-30 MMFD TRIMMERS
3	15-20 "
4	AUTOMATIC TUNING "
5	370 MMFD SILVER CONDENSERS.
6	800 " PADDER
7	0014 " "
8	.0057 " "
9	.0005 MFD. MICA
10	.00005 " "
11	.25 MFD. 200 VOLT TUBULAR
12	.00025 MFD. MICA
13	.00001 " "
14	.1 MFD. 200 VOLT TUBULAR
15	.1 " 400 " "
16	.05 " " " "
17	.25 " 600 " "
18	.0001 MFD. MICA
19	.02 " 200 VOLT
20	50 " 50 "
21	.05 " 600 "
22	.02 " " "
23	.005 " 800 "
24	.01 " 600 "
25	10 MFD. 25 VOLT
26	.006 MFD. 600 VOLT TUBULAR
27	.05 " 200 " "
28	40 " 450 " FILTER
L1	IRON CORE OSC.
#1	PHONO PUSH BUTTON
#2	AUTOMATIC TUNING
#3	" "
#4	" "
#5	" "
#6	" "
#7	" "
#8	B.C. TUNING BUTTON
#9	INT. " "
#10	S.W. " "

NOTE: MODELS WITH SERIAL Nos. 30590 TO 30689 USE 6J7GT ALL OTHERS USING 6F5GT HAVE JUMPER AS SHOWN WITH DOTTED LINE. C14 IS LEFT OFF



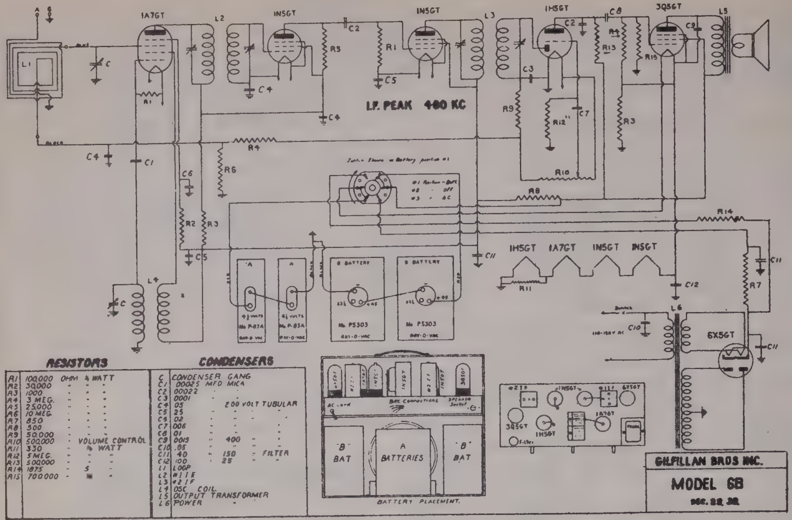
MODELS 11F-11G-13A
GILFILLAN BROS INC.

APPROVED by CHAS. ZINGLE. 10-2-40

©John F. Rider, Publisher

MODEL 6B
MODELS 11F, 11G, 13A

GILFILLAN BROS.INC.



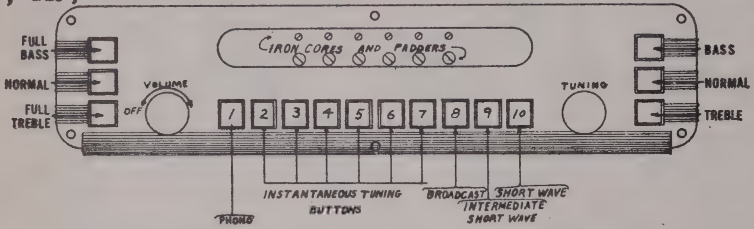
RESISTORS

R1	100,000	OHM ¼ WATT
R2	30,000	" " "
R3	1000	" " "
R4	3 MEG.	" " "
R5	25,000	" " "
R6	10 MEG.	" " "
R7	850	" " "
R8	500	" " "
R9	50,000	" " "
R10	500,000	" VOLUME CONTROL
R11	330	" ¼ WATT
R12	5 MEG.	" " "
R13	500,000	" " "
R14	1875	" 5 "
R15	700,000	" " "

CONDENSERS

C	CONDENSER GANG	
C1	.00025	MFD MICA
C2	.00022	" "
C3	.0001	" "
C4	.05	" 200 VOLT TUBULAR
C5	.25	" " " "
C6	.02	" " " "
C7	.006	" " " "
C8	.01	" " " "
C9	.0015	" 400 " "
C10	.05	" " " "
C11	40	" 150 " FILTER
C12	100	" 25 " "
L1	LOOP	
L2	#1 I F	
L3	#2 I F	
L4	OSC COIL	
L5	OUTPUT TRANSFORMER	
L6	POWER "	

MODELS 11F, 11G, 13A



Plug in AC cord, turn "Off Volume" knob on, push in "Broadcast" button, and select stations as desired by using tuning knob.

Use same procedure, though push in "Intermediate Short Wave" or "Short Wave" buttons for tuning these bands.

To set broadcast band stations to buttons for instantaneous tuning:

Remove decorated cover above long row of knobs (with fingernail or screw driver). This will expose six pairs of screws. These are the iron-core tuners and padders. From left to right these iron cores tune stations for buttons number two to seven, inclusive. Select the six stations desired, remove the call letters from the station tab sheet, insert the tabs in the buttons, assigning the station with the lowest KC frequency to button No. 2 and, in order, to the station with the highest KC frequency to button No. 7.

To actually set stations to the buttons:

By means of manual tuning, play the station to be set; then push the button at which the station is to be set; then with a screwdriver turn iron-core (long screw) till station is located. Adjust station to loudest volume, using padder screw (short screw); then readjust long screw till station is set to a point where the tuning eye is at its most closed position. The station is then "set" to the button.

This procedure must be repeated for each station to be set to each button, and it is suggested that, after the stations are all once set to their buttons, they be rechecked before replacing the cover.

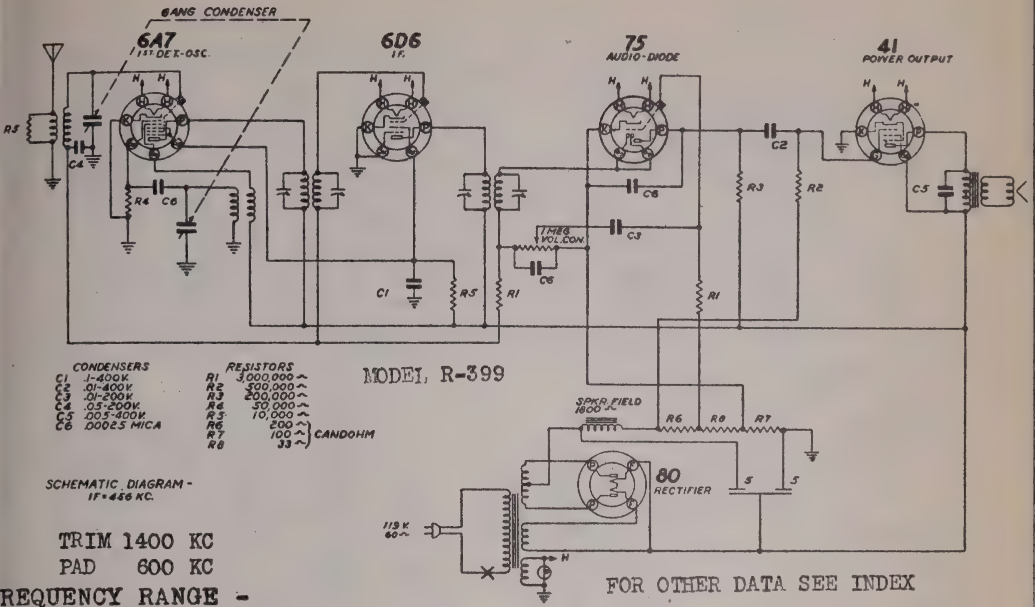
Standard broadcast antenna is mounted on a swivel in rear of cabinet. For tuning some more distant stations, it may be desirable to rotate antenna to position of loudest volume or, if necessary, an outside antenna may be connected to a green wire lead coming from this broadcast loop. For short wave tuning, some locations will require an outside antenna. This outside antenna should be connected to the green wire coming from the short wave loop, which is located directly above the chassis. If extra antenna is desired for both short wave and standard broadcast performance, both green antenna leads can be joined together satisfactorily to one outside antenna.

If a phonograph or microphone is to be used, they should be plugged into the rear of the chassis in place provided and so marked. To use as a phonograph or with microphone, push in "Phono" button. In the rear of the chassis is provided a 110 volt plug. This is for your convenience for using this radio with a phonograph attachment or with a lamp.

A six-prong outlet is provided in the chassis pan. This outlet is wired into the circuit and can be used only in conjunction with a special microphone pre-amplifier and control that has been designed especially for recording purposes. The consumer owning this receiver may purchase a portable recorder and, by connecting it to our microphone pre-amplifier, it is possible to make recordings of the highest quality.

B. F. GOODRICH

MODELS R-399,R-405



MODEL R-399

CONDENSERS	
C1	.1-400V.
C2	.01-400V.
C3	.01-200V.
C4	.05-200V.
C5	.005-400V.
C6	.00025 MICA

RESISTORS		
R1	3,000,000 ~	
R2	500,000 ~	
R3	200,000 ~	
R4	50,000 ~	
R5	10,000 ~	
R6	200 ~	CANDOHM
R7	100 ~	
R8	33 ~	

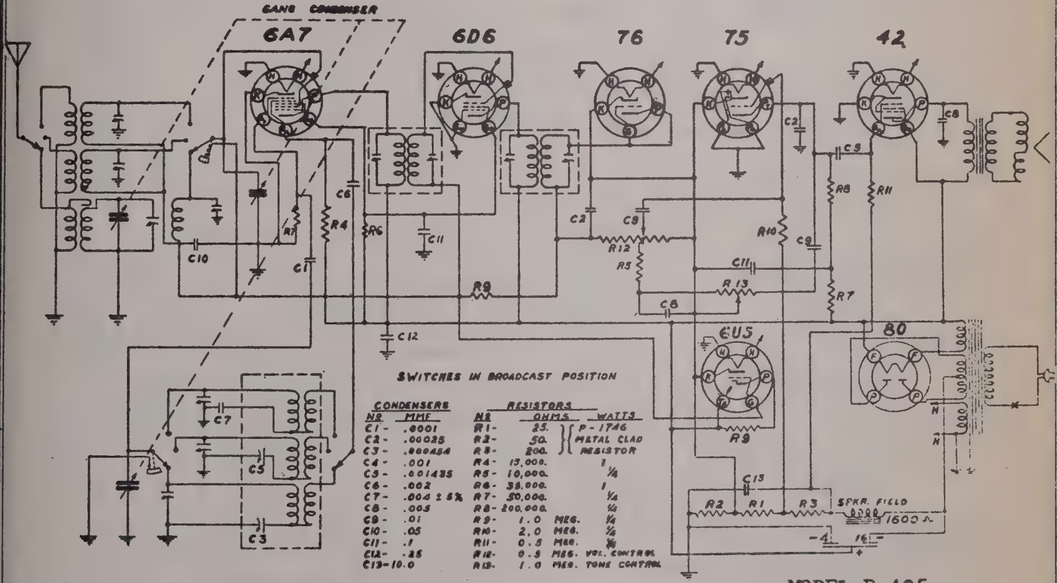
SCHEMATIC DIAGRAM -
IF=456 KC.

TRIM 1400 KC
PAD 600 KC

FREQUENCY RANGE -
535 to 1720 KC

FOR OTHER DATA SEE INDEX

CONVENTIONAL ALIGNMENT SEE SPECIAL SECT.
VOL. VIII



SWITCHES IN BROADCAST POSITION

CONDENSERS	
NO	MMF
C1-	.0001
C2-	.00025
C3-	.000454
C4-	.001
C5-	.001435
C6-	.002
C7-	.004 ± 5%
C8-	.005
C9-	.01
C10-	.05
C11-	.1
C12-	.25
C13-	10.0

RESISTORS		
NO	OHMS	WATTS
R1-	25.	P-1746 METAL CLAD RESISTOR
R2-	50.	
R3-	200.	
R4-	15,000.	1
R5-	10,000.	¼
R6-	35,000.	1
R7-	50,000.	¼
R8-	200,000.	¼
R9-	1.0 MEG.	¼
R10-	2.0 MEG.	¼
R11-	0.5 MEG.	¼
R12-	0.5 MEG. VOL. CONTROL	
R13-	1.0 MEG. TONE CONTROL	

MODEL R-405

FREQUENCY RANGE -
550 to 1700 KC
1700 to 5400 KC
5600 to 18100 KC

IF PEAKED
AT 456 KC

FOR OTHER DATA SEE INDEX

MODELS R-399,R-400,R-404,
R-405,R-419,R-421

B. F. GOODRICH

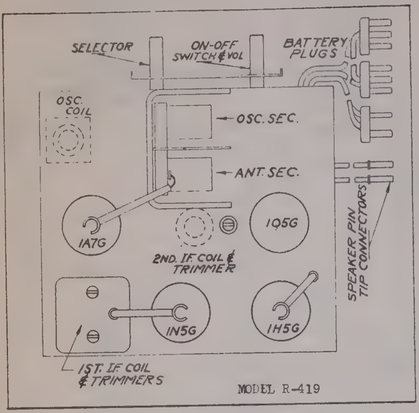
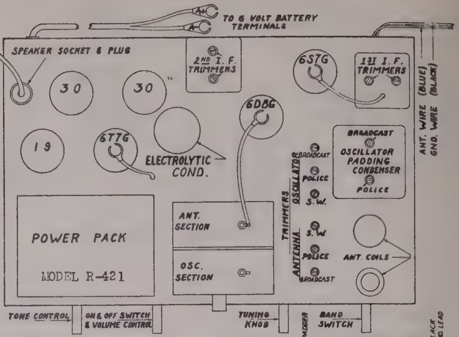
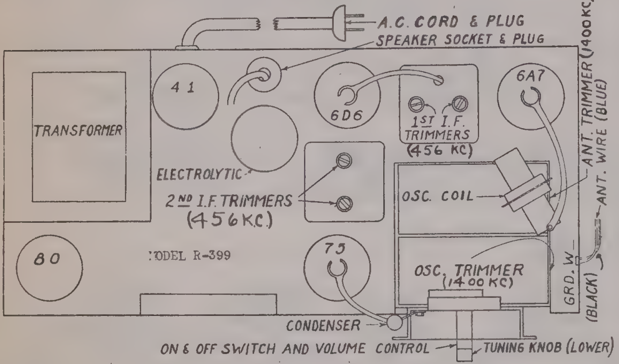
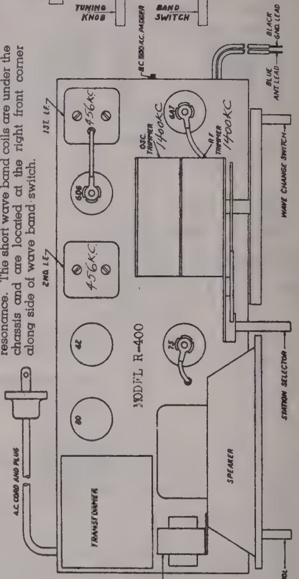


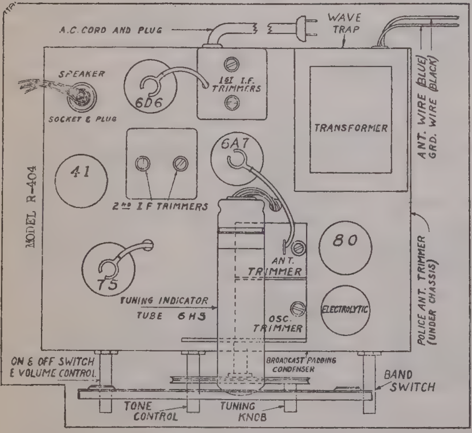
Fig. 1 -- Top View



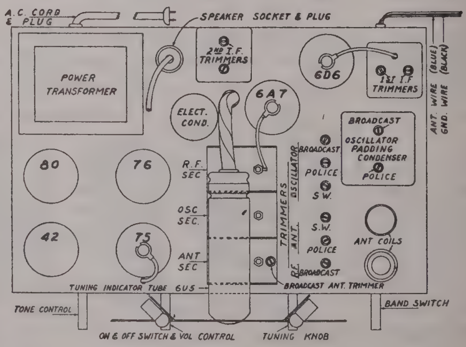


S.W. ALIGNMENT. Set the dial pointer to 6000KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.



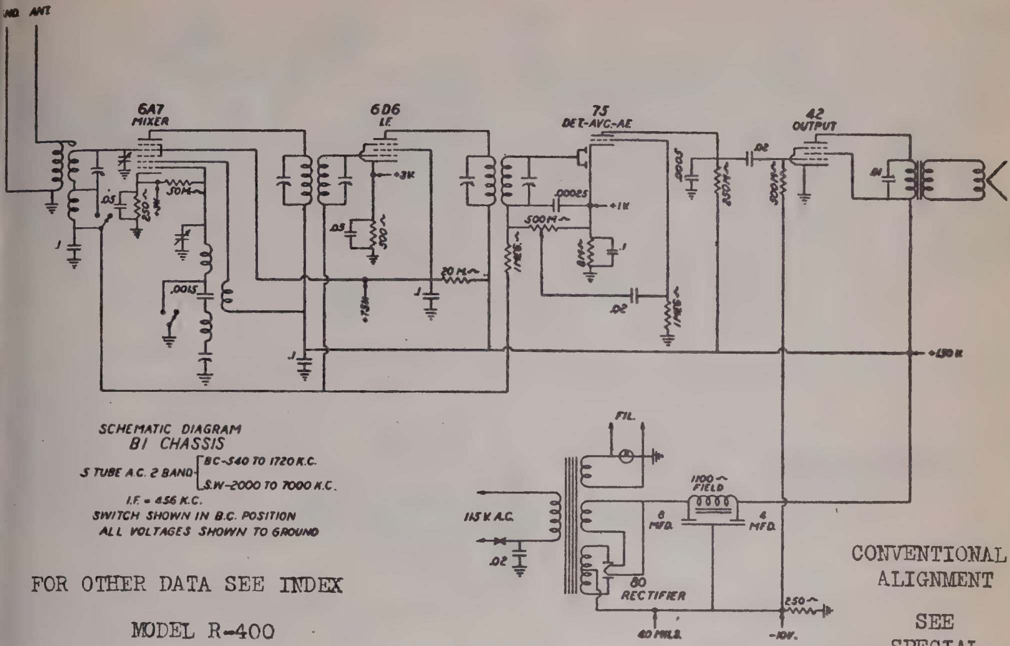


MODEL R-405



B. F. GOODRICH

MODELS R-400,R-424



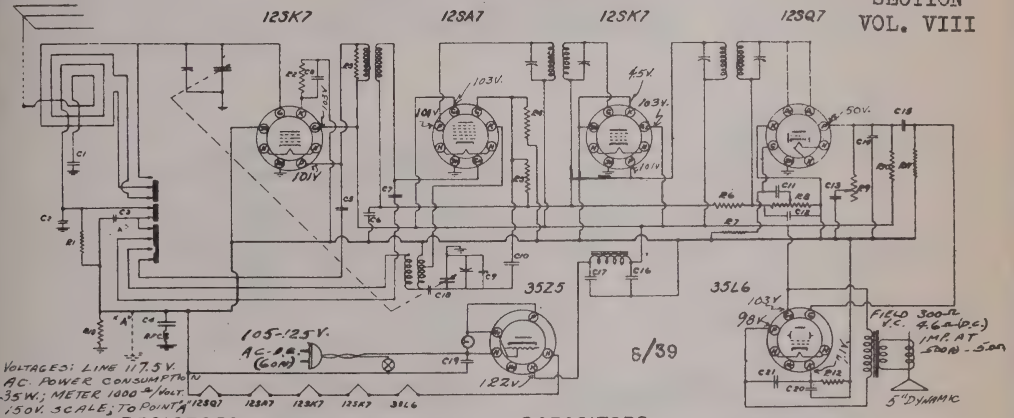
SCHEMATIC DIAGRAM
81 CHASSIS
5 TUBE A.C. 2 BAND – BC-540 TO 1720 K.C.; S.W.-2000 TO 7000 K.C.
I.F. = 456 K.C.
SWITCH SHOWN IN B.C. POSITION
ALL VOLTAGES SHOWN TO GROUND

FOR OTHER DATA SEE INDEX

MODEL R-400

CONVENTIONAL
ALIGNMENT

SEE
SPECIAL
SECTION
VOL. VIII



VOLTAGES: LINE 117.5 V.
AC. POWER CONSUMPTION 35W.; METER 1000 Ω/VOLT.
150V. SCALE; TO POINT "A"

8/39

RESISTORS.

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	150K±10%	½	R8	500K-V.C.	½
R2	600±10%	½	R9	500K-T.C.-	½
R3	5K±10%	½	R10	150K.	½
R4	15 MEG.	½	R11	250K	½
R5	25K	½	R12	200±10%	½
R6	2 MEG	½	R13	150K	½
R7	5 MEG	½			

CAPACITORS.

Nº	MFD.	VOLTS	Nº	MFD.	VOLTS.	Nº	MFD.	VOLTS
C1	.001	600	C8	.05	200	C15	.01	400
C2	.00127±5%	Mica	C9	.000010	Mica.	C16	20.	150
C3	.05	400	C10	.00005	Mica.	C17	20.	150
C4	.25	200	C11	.01	400	C18	.02	400
C5	.00006±5%	Mica.	C12	.00025	Mica	C19	.05	400
C6	.05	200	C13	.005	600	C20	20.	25
C7	.00006±5%	Mica	C14	.0005	Mica.	C21	.02	400

I.F. 455 K.C.

In some sets C3, C4, C18, R13 and the R.F. choke (RFC) are not used and points "A" are connected to chassis.

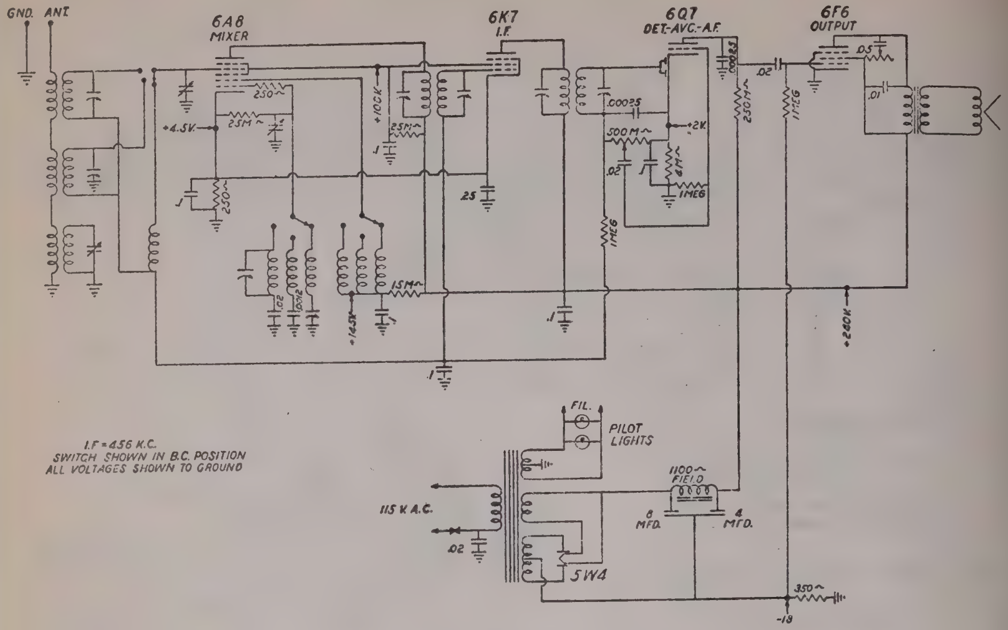
I.F. ALIGNMENT CONVENTIONAL (SEE VOL.VIII).
BROADCAST BAND
TRIM OSC 1630 KC
TRIM ANT 1400 KC

FOR OTHER DATA SEE INDEX

MODEL R-424

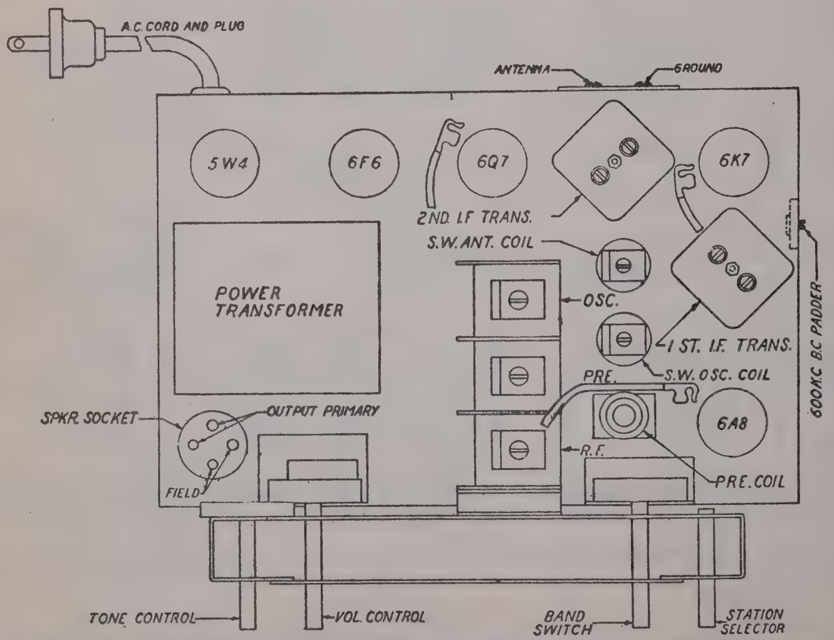
MODEL R-401

B. F. GOODRICH



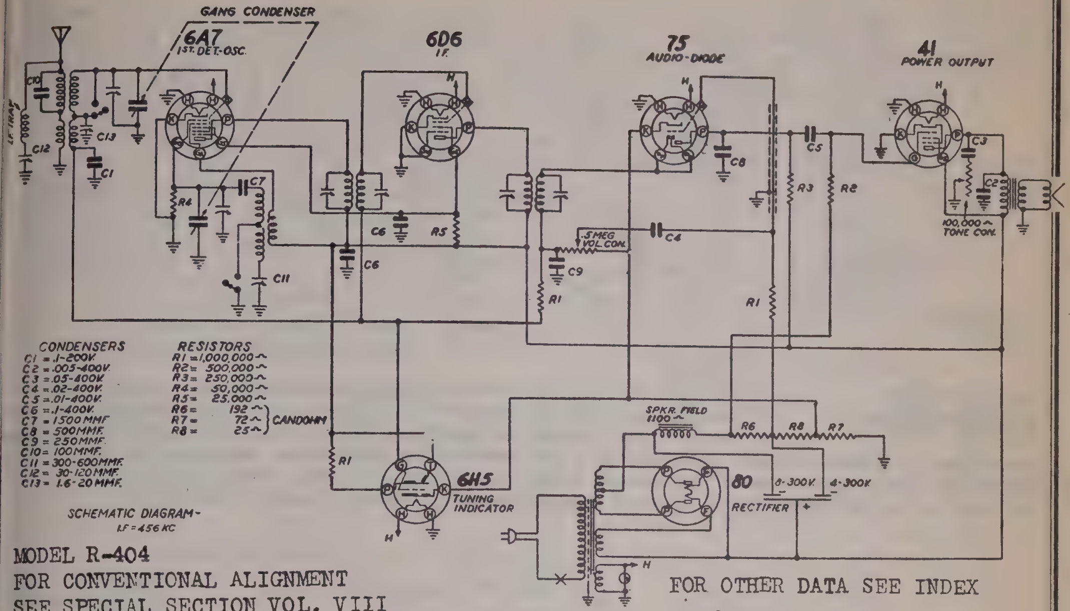
I.F = 456 K.C.
SWITCH SHOWN IN B.C. POSITION
ALL VOLTAGES SHOWN TO GROUND

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII



B. F. GOODRICH

MODELS R-404,R-415A



CONDENSERS
C1 = .1-200V.
C2 = .005-400V.
C3 = .05-400V.
C4 = .02-400V.
C5 = .01-400V.
C6 = .1-400V.
C7 = 1500 MMF
C8 = 500 MMF.
C9 = 250 MMF.
C10 = 100 MMF.
C11 = 300-600 MMF.
C12 = 30-120 MMF.
C13 = 1.6-20 MMF.

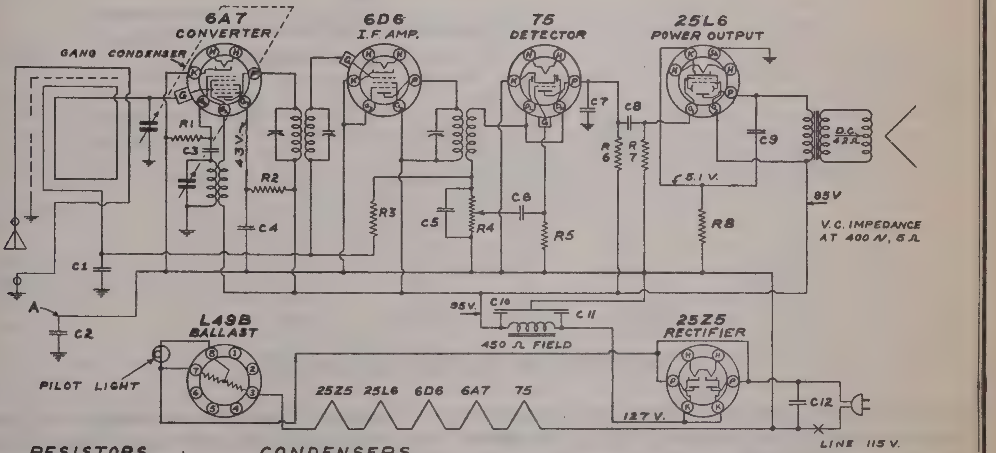
RESISTORS
R1 = 1,000,000 ~
R2 = 500,000 ~
R3 = 250,000 ~
R4 = 50,000 ~
R5 = 25,000 ~
R6 = 192 ~ } CANDOHM
R7 = 72 ~ } CANDOHM
R8 = 25 ~ } CANDOHM

SCHEMATIC DIAGRAM-
I.F = 456 KC

MODEL R-404
FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII
TRIM 1400 KC (BB)
PAD 600 KC (BB)
TRIM 6000 KC (SW)

FOR OTHER DATA SEE INDEX

FREQUENCY RANGE
535 to 1750 KC
2200 to 6500 KC



RESISTORS

Nº	OHMS	WATTS
R1	50,000	½
R2	30,000	½
R3	2,000,000	½
R4	500,000	VOL. CONT.
R5	5,000,000	½
R6	250,000	½
R7	500,000	½
R8	150 ± 10%	½

CONDENSERS

Nº	MFDS.	VOLTS
C1	.02	200
C2	.25	200
C3	.00005	MICA
C4	.05	400
C5	.00025	MICA
C6	.01	400
C7	.00025	MICA
C8	.01	400
C9	.005	600
C10	20.	150
C11	20.	150
C12	0.05	400

C2 is used in some models
In others point A connects to chassis

I.F. 456 K.C.
⏚ INDICATES CHASSIS GROUND

MODEL R-415A

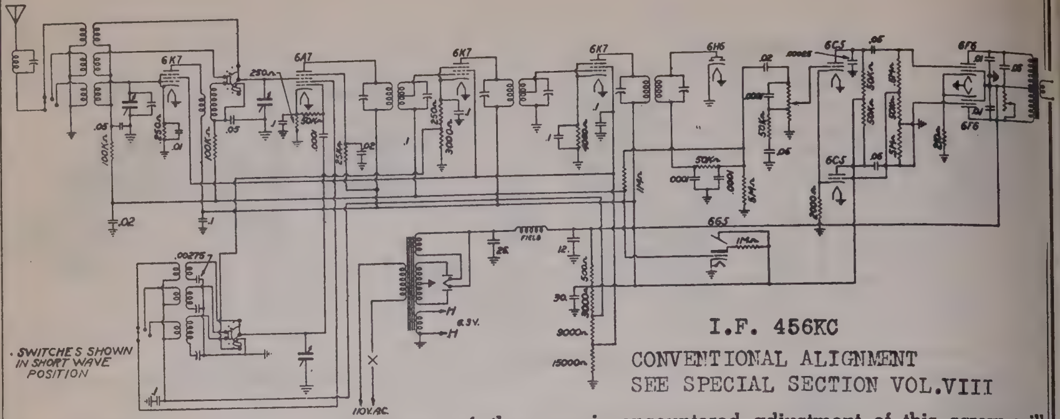
TRIM OSC 1630 KC
TRIM ANT 1400 KC

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

FOR OTHER DATA SEE INDEX

MODEL R-410

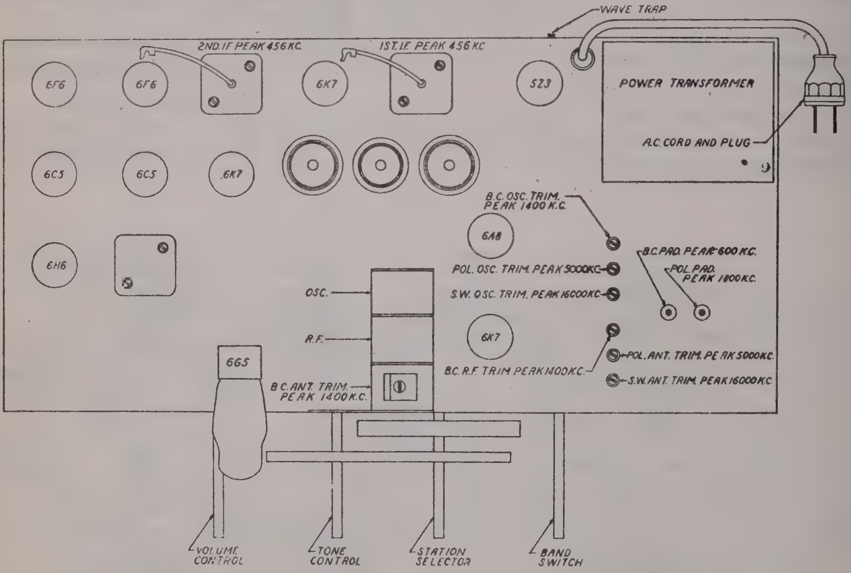
B. F. GOODRICH



I.F. 456KC
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

WAVE TRAP ADJUSTMENT

At the rear of the chassis near the Antenna and Ground posts is an adjustment screw connected to a trap circuit for elimination of code interference when operating on the broadcast band. If code interference is encountered adjustment of this screw will filter it out. It is to be used only if such interference is experienced in broadcast reception. It's use prevents code transmitters operating on a frequency around 456 K. C. from being received by the I. F. amplifier which is tuned to 456 K. C.

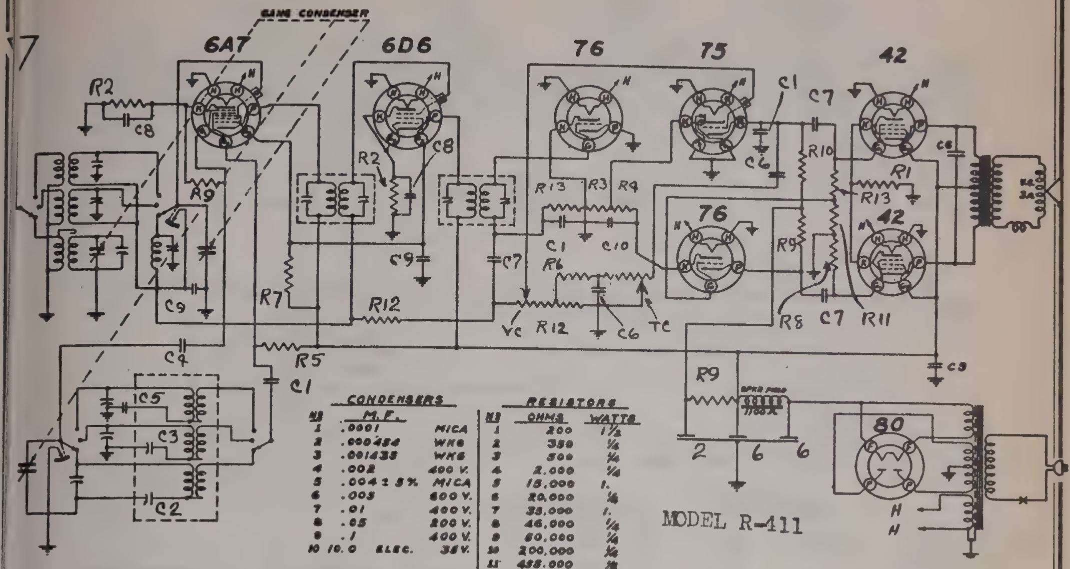


SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage. Grounding or shorting the stator and grid components should be accomplished by grounding the stator mounting nut to the frame of the condenser with a screw-driver or any metallic conductor.

Do not wedge a screw-driver between the plates for this is liable to permanently warp the plates and thus prevent the oscillator section of the gang condenser from tracking

B. F. GOODRICH MODELS R-405,R-411,R-421,
R-436,R-454



Nº	CONDENSERS M.F.	
1	.0001	MICA
2	.000454	WKG
3	.001435	WKG
4	.002	400 V.
5	.004 ± 5%	MICA
6	.005	600 V.
7	.01	400 V.
8	.05	200 V.
9	.1	400 V.
10	10.0 ELEC.	35 V.

Nº	RESISTORS OHMS	WATTS
1	200	1½
2	350	¼
3	500	¼
4	2.000	¼
5	15,000	1.
6	20,000	¼
7	35,000	1.
8	46,000	¼
9	60,000	¼
10	200,000	¼
11	455.000	¼
12	1 MEG.	¼
13	5 MEG.	¼

V.C. - VOLUME CONTROL.
T.C. - TONE CONTROL.
SWITCHES IN BROADCAST POSITION.

IF PEAKED
AT 456 KC

FREQUENCY RANGE
535 to 1730- KC
1.7 to 5.6 - MC
5.6 to 18.1- MC

Eight Tube AC Superheterodyne

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

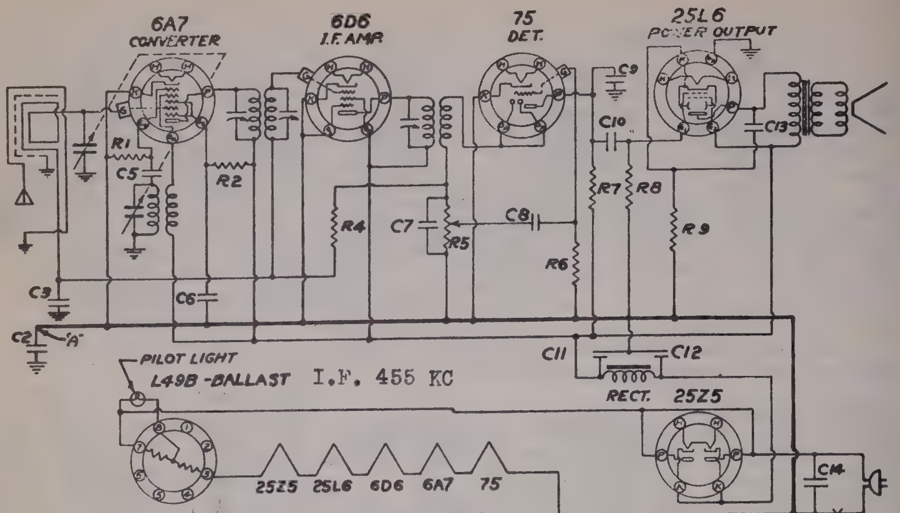
BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

MODELS R-412, R-412A

B. F. GOODRICH



FOR OTHER DATA SEE INDEX

CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII

CONDENSERS

Nº	MFD.	VOLTS
C2	.25	200
C3	.02	400
C5	.00005	MICA
C6	.05	400
C7	.00025	MICA
C8	.01	400
C9	.00025	MICA
C10	.01	400
C11	20. }	150
C12	20. }	
C13	.005	600
C14	.05	400

RESISTORS

Nº	OHMS	WATTS
R1	50,000	½
R2	30,000	½
R4	2,000,000	½
R5	500,000	VOL CONT
R6	5,000,000	½
R7	250,000	½
R8	500,000	½
R9	150	½ ±10%

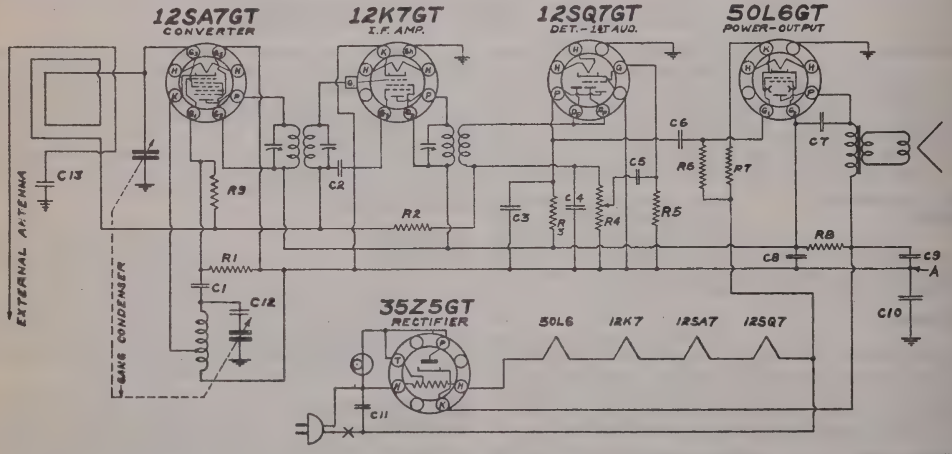
⏚ IND. CHASSIS GND.

SCHEMATIC DIAGRAM

MODEL R-412

NOTE: C2 USED on some models.
On others POINT "A" IS CONNECTED TO CHASSIS

ALIGNMENT MODELS R-412 and R-412A---Trim Osc 1730 KC, Ant 1400 KC Pad 600 KC



RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	20,000	½	R6	500,000	½
R2	2 MEG.	½	R7	150± 10%	½
R3	250,000	½	R8	1,000	1
R4	500,000	V.C	R9	15 MEG.	½
R5	5 MEG.	½			

CAPACITORS

Nº	MFD.	VOLTS	Nº	MFD.	VOLTS
C1	.0001	MICA	C7	.01	400
C2	.02	400	C8	20.0	150
C3	.0005	MICA	C9	30.0	150
C4	.00025	MICA	C10	.25	200
C5	.01	400	C11	.05	400
C6	.002	600	C12	.02	400
			C13	.001	600

FOR OTHER DATA SEE INDEX

I.F. 455 KC

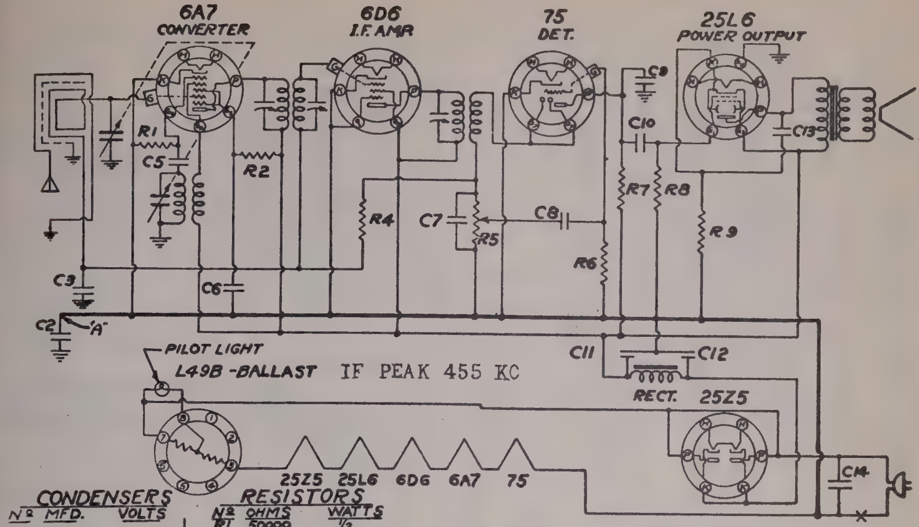
TUBES SHOW BOTTOM VIEW

MODEL R-412A

C10 and C12 used in some models. In others point "A" is connected to chassis.

B. F. GOODRICH

MODELS R-413,R-413A



IF PEAK 455 KC

CONDENSERS

Nº	MFD.	VOLTS
C2	.25	200
C3	.02	400
C5	.00005	MICA
C6	05	400
C7	.00025	MICA
C8	.01	400
C9	.00025	MICA
C10	.01	400
C11	20.	150
C12	20.	
C13	.005	600
C14	.05	400

RESISTORS

Nº	OHMS	WATTS
R1	50,000	½
R2	30,000	½
R4	2,000,000	½
R5	500,000	VOL CONT
R6	5,000,000	½
R7	250,000	½
R8	500,000	½
R9	150	½ ±10%

⏚ IND. CHASSIS GND.

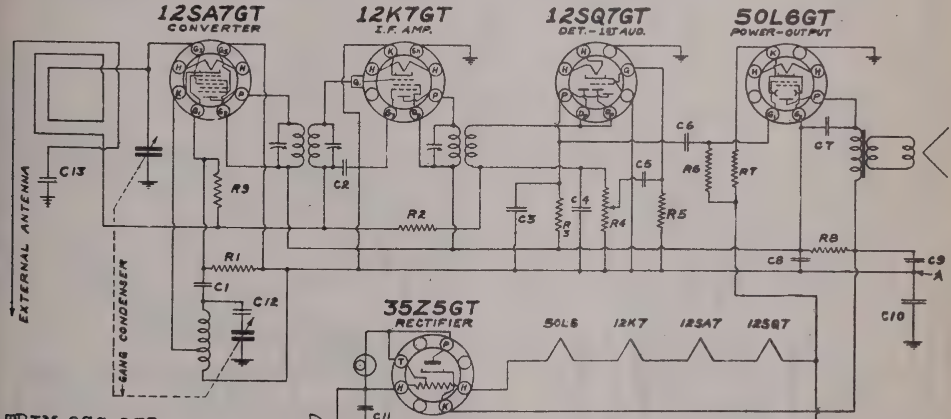
NOTE: C2 USED on some models;
On others POINT "A" IS CONNECTED TO CHASSIS

TRIM OSC 1730 KC
TRIM ANT 1400 KC

MODEL R-413

FOR OTHER DATA SEE INDEX

CONVENTIONAL ALIGNMENT PROCEDURE FOR BOTH THESE MODELS
FOR FULL DETAILS SEE SPECIAL SECTION VOL. VIII.



TRIM OSC 1730 KC
TRIM ANT 1400 KC

FOR OTHER DATA SEE INDEX

RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	20,000	½	R6	500,000	½
R2	2 MEG.	½	R7	150± 10%	½
R3	250,000	½	R8	1,000	1
R4	500,000	V.C	R9	15 MEG.	½
R5	5 MEG.	½			

CAPACITORS

Nº	MFD.	VOLTS	Nº	MFD.	VOLTS
C1	0001	MICA	C7	.01	400
C2	.02	400	C8	20.0	150
C3	.0005	MICA	C9	30.0	150
C4	.00025	MICA	C10	.25	200
C5	.01	400	C11	.05	400
C6	.002	600	C12	.02	400
			C13	.001	600

I.F. 455 K.C

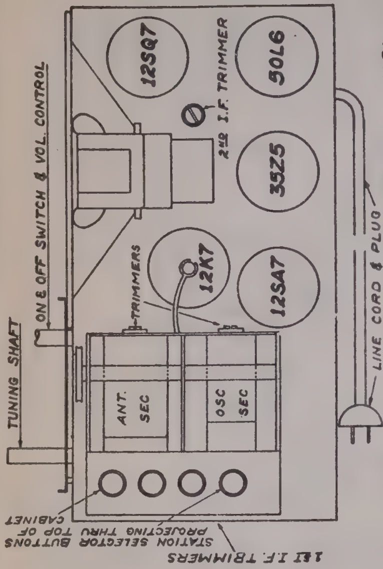
TUBES SHOW BOTTOM VIEW

MODEL R-413A

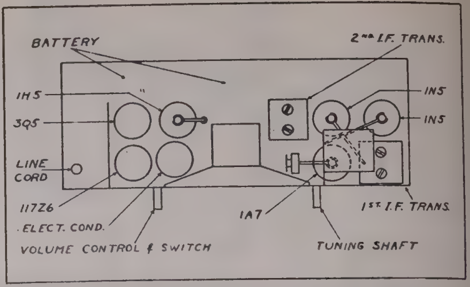
C10 and C12 used in some models. In others point "A" is connected to chassis.

MODELS R-412A,R-413,R-413A,
R-415A,R-460,R-471,R-478

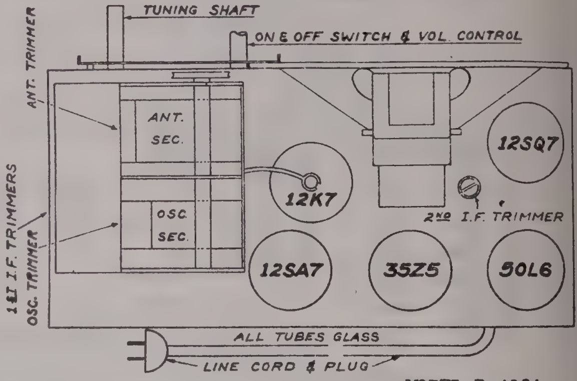
B. F. GOODRICH



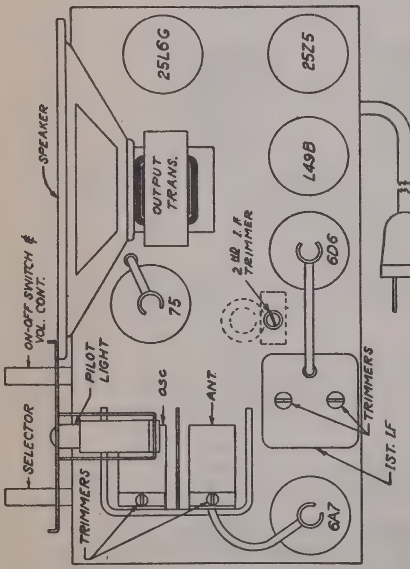
MODEL R-413A



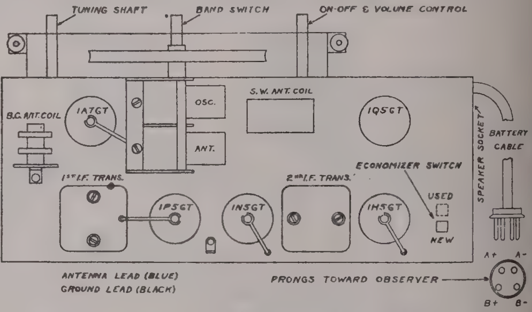
MODEL R-460



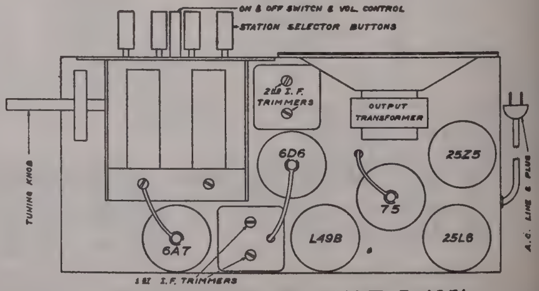
MODEL R-412A



MODEL R-413

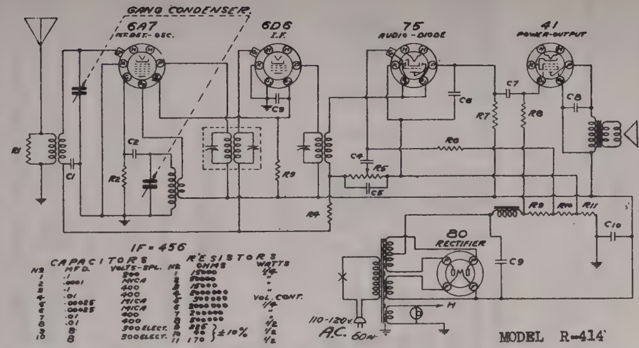


MODEL R-471,R-478



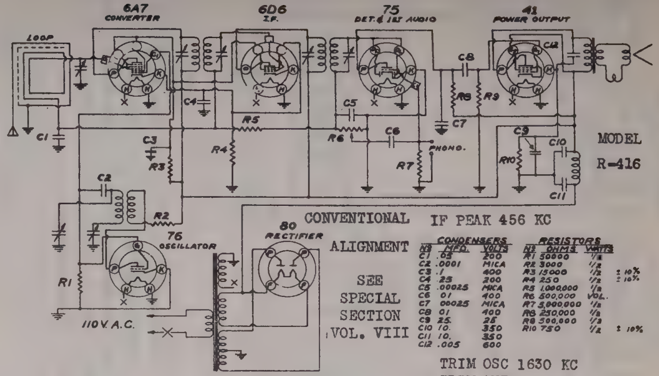
MODEL R-415A

MODELS R-414,R-416



IF = 456

CAPACITORS Nº	MFD.	VOLTS-SPL.	RESISTORS Nº	OHMS	WATTS
1	.1	200	1	15000	1/4
2	.0001	MICA	2	50000	"
3	.1	400	3	15000	"
4	.01	400	4	2000000	"
5	.00025	MICA	5	500000	VOL. CONT.
6	.00025	MICA	6	2000000	1/4
7	.01	400	7	200000	"
8	.01	400	8	500000	"
9	8	300 ELECT.	9	225 } ±10%	1/2
10	8	300 ELECT.	10	50 } ±10%	1/2
			11	170 } ±10%	1/2



CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII

IF PEAK 456 KC

CONDENSERS Nº	MFD.	VOLTS	RESISTORS Nº	OHMS	WATTS	
C1	.05	200	R1	50000	1/2	
C2	.0001	MICA	R2	3000	1/2	
C3	.1	400	R3	15000	1/2	± 10%
C4	.25	200	R4	250	1/2	± 10%
C5	.00025	MICA	R5	1,000,000	1/2	
C6	01	400	R6	500,000	VOL.	
C7	00025	MICA	R7	5,000,000	1/2	
C8	01	400	R8	250,000	1/2	
C9	25.	25	R9	500,000	1/2	
C10	10.	350	R10	750	1/2	± 10%
C11	10.	350				
C12	.005	600				

TRIM OSC 1630 KC
TRIM ANT 1400 KC

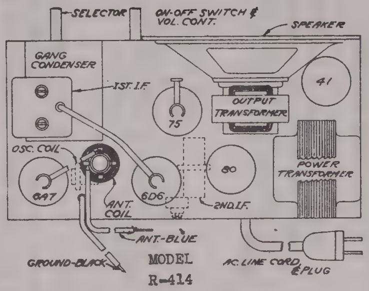
BROADCAST BAND A.C. SUPERHETERODYNE

RANGE 535 - 1730 KILOCYCLES

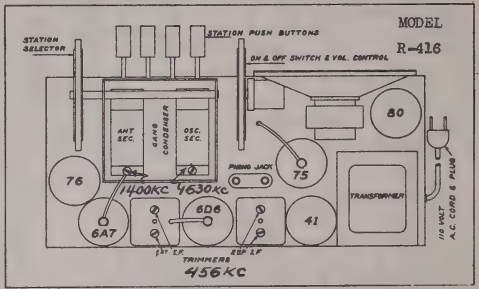
CORRECT ALIGNMENT PROCEDURE MODEL R-414 The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band alignment should be the next procedure.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1730 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the test oscillator and the receiver to 600 KC and bend the plates into the position for maximum output.



MODEL R-414



MODEL R-416

Voltages—Line 115 Volts AC. MODEL R-416
Volume control minimum. Antenna shorted to ground. Meter 1,000 ohms per volt.

Filament of 80 tube to ground	250	volts
Screen of 41 tube to ground	187	volts
Screens of 6A7 and 6D6 tubes to ground	84	volts
Cathode of 41 tube to ground	13.2	volts
Cathode of 6A7 tube to ground	3.1	volts

Speaker (Part No. P3087)

Field resistance	1,500	ohms
DC voice coil resistance	4.6	ohms
Voice coil impedance at 400 cycles	5	ohms

PROCEDURE FOR SETTING UP PUSH BUTTONS

MODEL R-416

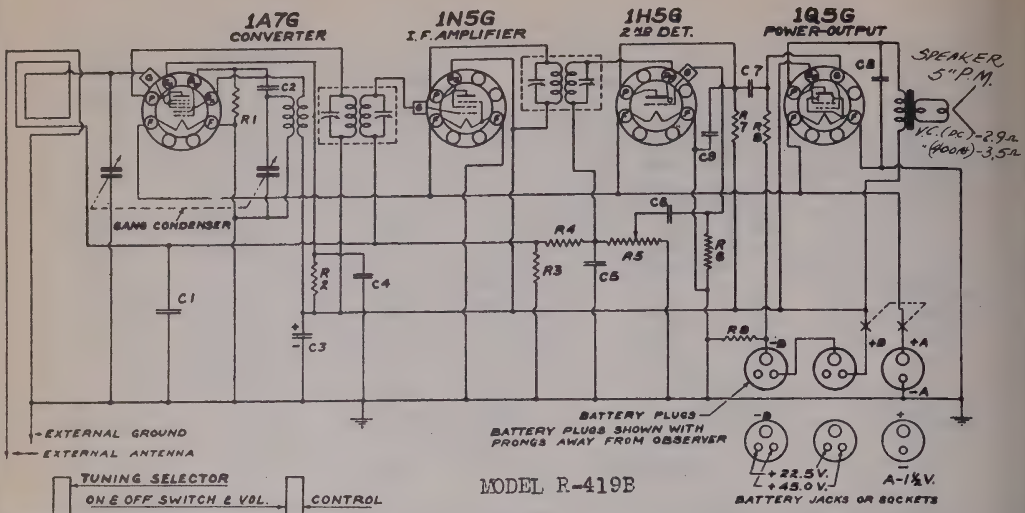
There are four push buttons by means of which four stations may be selected (See Fig. 1). Make a list of four stations tuned in regularly. Loosen any of the push buttons by turning the push button proper, counter clockwise a few turns. Holding it in, tune in any one of your favorite stations by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now tighten the push button knob by turning clockwise.

Release the push button and loosen another push button. Holding it in, tune in another favorite station using the station selector. Turn the selector wheel very slowly back and forth until the signal is clearest. Now tighten the push button by turning it clockwise.

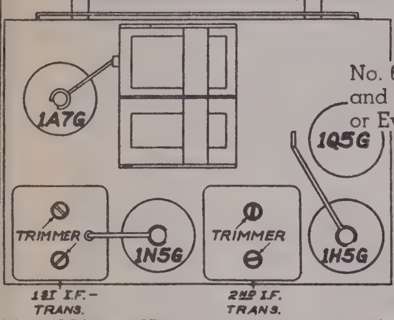
Repeat this operation for the remaining two buttons, tightening each button securely as it is set.

MODEL R-419B

B. F. GOODRICH



MODEL R-419B



POWER SUPPLY The power supply of this portable radio uses one Ray-O-Vac No. P96A, General No. 6-F-1, Burgess No. 6FP1 or Eveready No. 743. Portable "A" battery and two Ray-O-Vac No. 5303, General No. V-30-B, Burgess No. B30P1 or Eveready No. 762 Portable "B" batteries.

AT LEFT

TOP VIEW OF CHASSIS

ALIGNMENT
BROADCAST BAND

Trim Ant.- 1400 kc
" Osc.- 1610 kc

I.F.- 455 kc

I.F. ALIGNMENT Remove the chassis from the cabinet and connect one end of a 100,000 ohm resistor to the grid of the 1A7 tube and the other end to the A.V.C. fahnestock clip (See "antenna and ground" for location of this clip). Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) thru a .05 or .1 mfd. condenser. The ground of the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

CAPACITORS

Nº	MFDS.	VOLTS	Nº	MFDS	VOLTS
C1	05	200	C6	.01	400
C2	.00005	MICA	C7	.01	400
C3	.0(ELECT)	150	C8	.002	400
C4	.05	200	C9	.00025	MICA
C5	.00025	MICA			

RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	200,000	½	R6	2,000,000	½
R2	70,000	½	R7	500,000	½
R3	2,000,000	½	R8	1,000,000	½
R4	2,000,000	½	R9	440	½
R5	500,000	V.C			

SERVICE INFORMATION

Speaker (Part No. P3465) 5" PM Type

D.C. voice coil resistance......................2.9 ohms

Voice coil impedance at 400 cycles.3.5 ohms

Oscillator Coil (Part No. P3318) (Brown Dot)

Primary—No. 2 and No. 3—1.7 ohms.

Secondary—No. 4 and No. 1— 4.9 ohms.

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+– 12.1 ohms.

Secondary—White, grid; black white, AVC– 24.9 ohms.

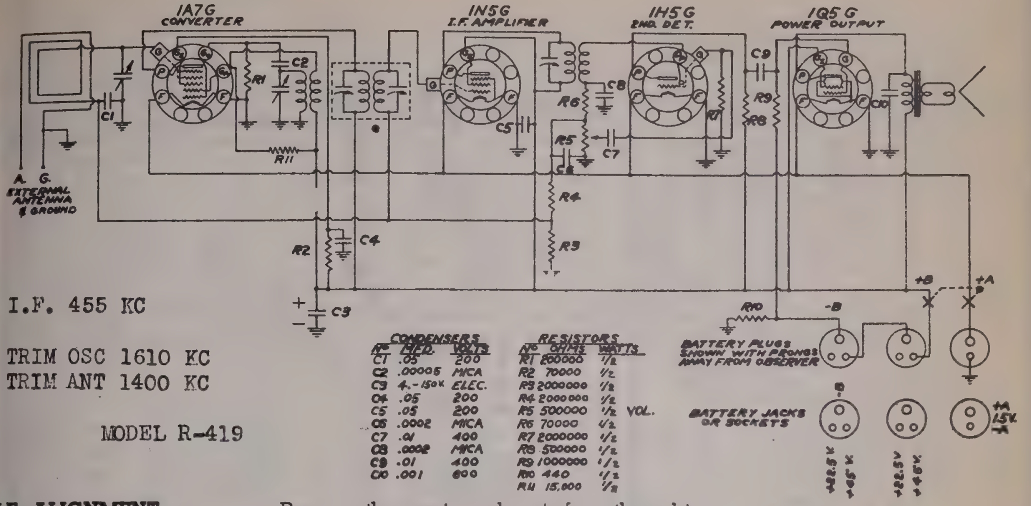
Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate; red white B+—15.1 ohms.

Secondary—White, grid; black white, AVC—11.8 ohms.

B. F. GOODRICH

MODELS R-419, R-420



I.F. 455 KC

TRIM OSC 1610 KC
TRIM ANT 1400 KC

MODEL R-419

CONDENSERS

NO.	MFD.	VOLTS
C1	.05	200
C2	.00005	MICA
C3	4.-150V	ELEC.
C4	.05	200
C5	.05	200
C6	.0002	MICA
C7	.01	400
C8	.0002	MICA
C9	.01	400
C10	.001	600

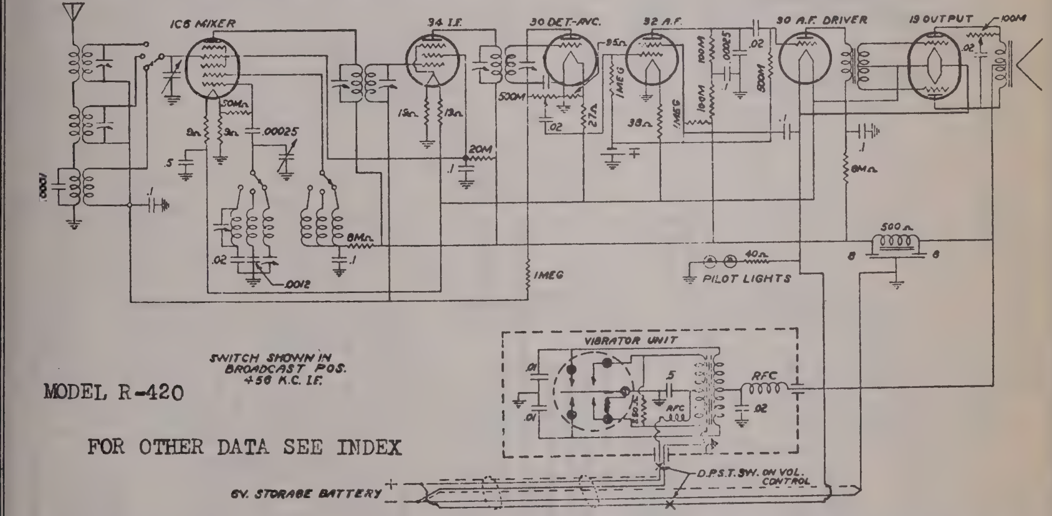
RESISTORS

NO.	OHMS	WATTS	
R1	200000	1/2	
R2	70000	1/2	
R3	2000000	1/2	
R4	2000000	1/2	
R5	500000	1/2	VOL.
R6	70000	1/2	
R7	2000000	1/2	
R8	500000	1/2	
R9	1000000	1/2	
R10	440	1/2	
R11	15,000	1/2	

I.F. ALIGNMENT Remove the receiver chassis from the cabinet and connect a 100,000 ohm resistor to the green and yellow leads in place of the loop antenna to which they were originally connected. Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) through a .05 or .1 mfd. condenser. The ground on the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

FOR OTHER DATA, SEE INDEX

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL. VIII



MODEL R-420

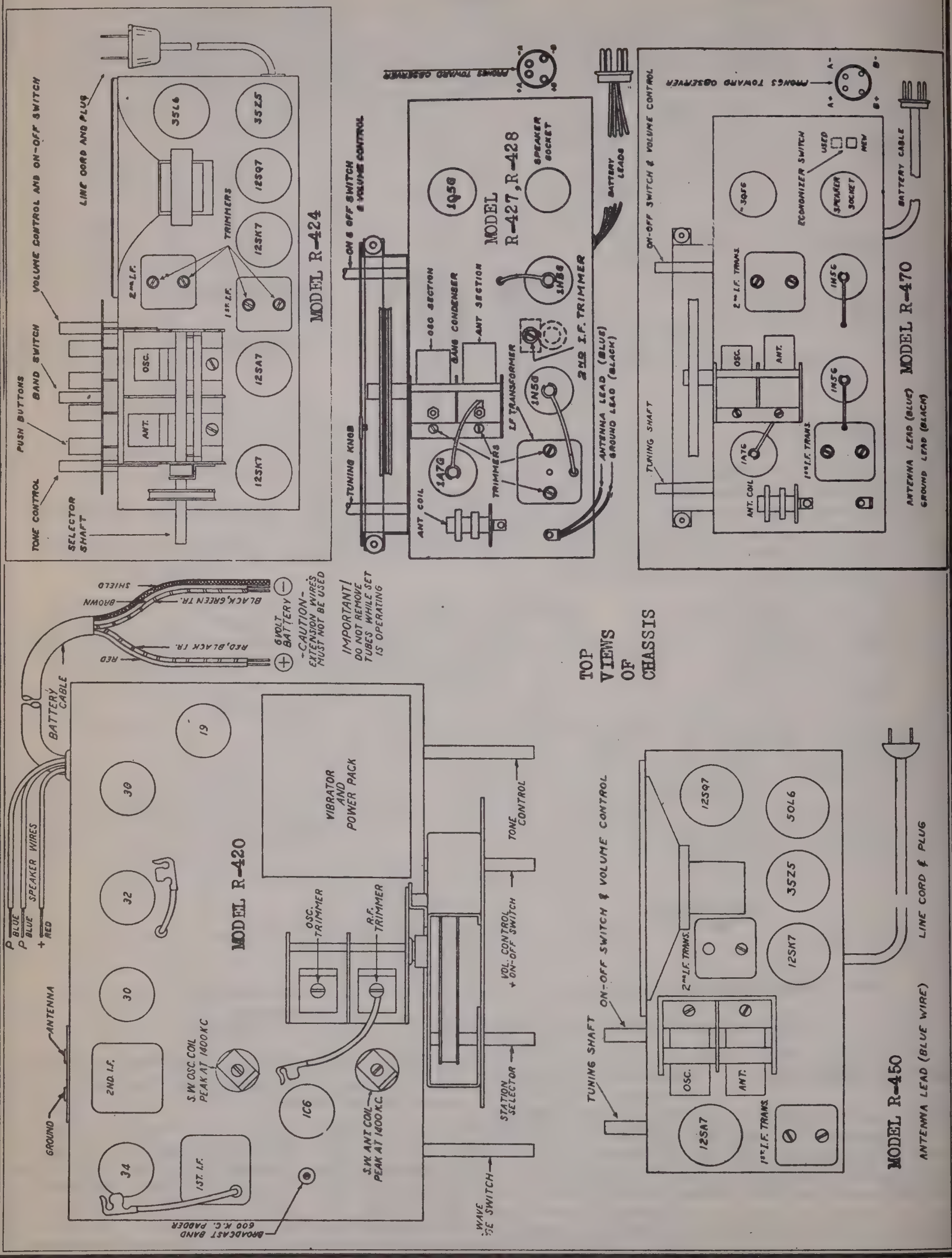
FOR OTHER DATA SEE INDEX

BATTERY SELECTION This receiver is designed to operate entirely from a 6 volt storage battery. It requires no other batteries. It will operate from any storage battery having a capacity ranging from 90 to 175 ampere hours. It is suggested, for the sake of greatest economy, that the largest possible capacity battery be used. The following is a schedule giving the number of hours of service on a single charge from batteries of standard capacities. A fully charged battery will provide satisfactory power for the periods specified before requiring additional charge.

90 Ampere Hour Capacity provides	60 hours use.
100 Ampere Hour Capacity provides	66 hours use.
110 Ampere Hour Capacity provides	73 hours use.
120 Ampere Hour Capacity provides	80 hours use.
150 Ampere Hour Capacity provides	100 hours use.
170 Ampere Hour Capacity provides	113 hours use.

MODELS R-420, R-424, R-427,
R-428, R-450, R-470

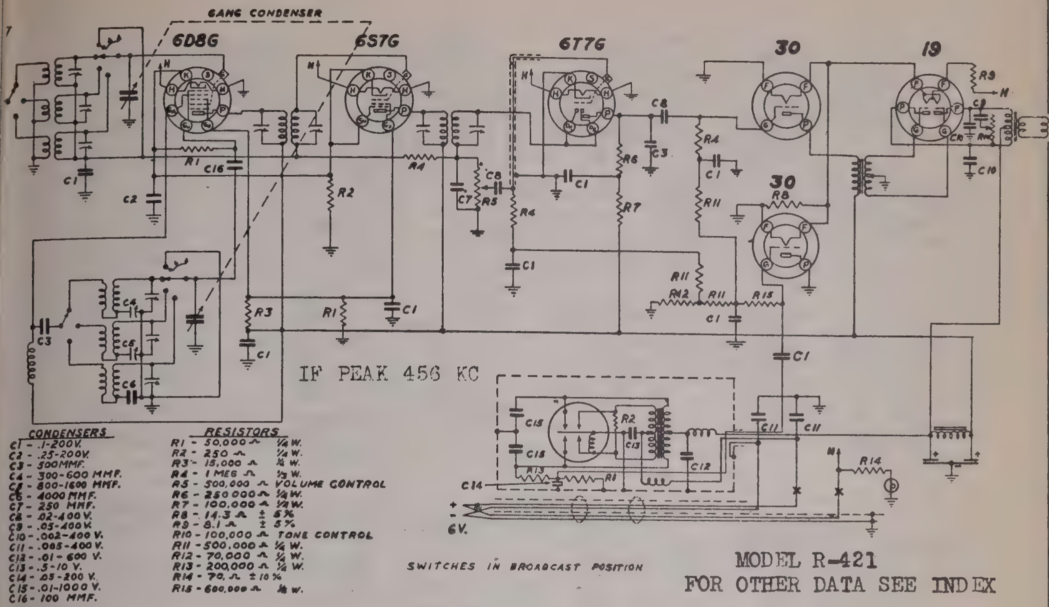
B. F. GOODRICH



TOP VIEWS OF CHASSIS

B. F. GOODRICH

MODELS R-421,R-460



IF PEAK 456 KC

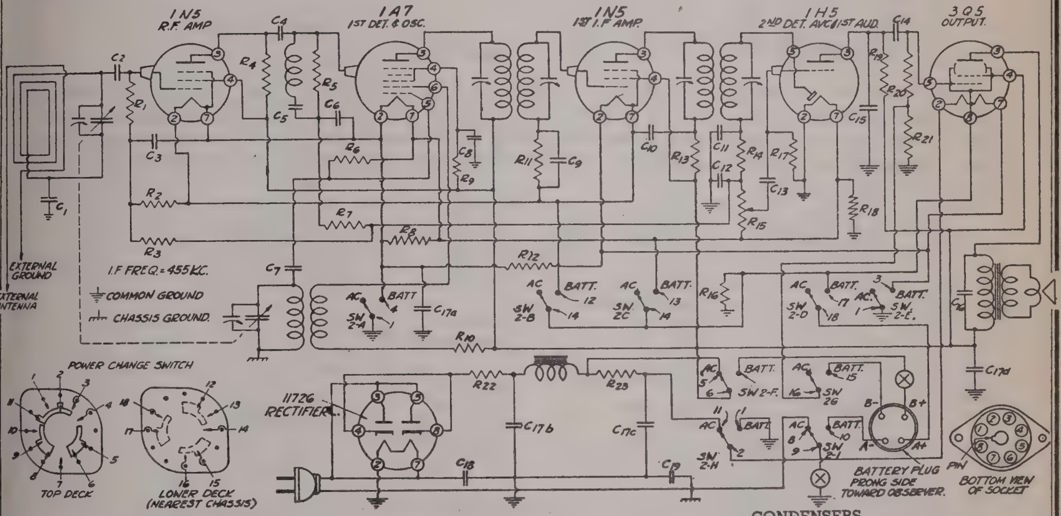
CONDENSERS

C1 - .1-200V.
C2 - .25-200V.
C3 - 500MMF.
C4 - 300-600 MMF.
C5 - 800-1600 MMF.
C6 - 4000 MMF.
C7 - 250 MMF.
C8 - .02-400V.
C9 - .05-400V.
C10 - .002-400 V.
C11 - .005-400 V.
C12 - .01 - 600 V.
C13 - .5 - 10 V.
C14 - .05 - 200 V.
C15 - .01-1000 V.
C16 - 100 MMF.

RESISTORS

R1 - 50,000 Ω ¼ W.
R2 - 250 Ω ¼ W.
R3 - 15,000 Ω ½ W.
R4 - 1 MEG Ω ⅓ W.
R5 - 500,000 Ω VOLUME CONTROL
R6 - 250 000 Ω ¼ W.
R7 - 100,000 Ω ¼ W.
R8 - 14.3 Ω ± 5%
R9 - 8.1 Ω ± 5%
R10 - 100,000 Ω TONE CONTROL
R11 - 500,000 Ω ¼ W.
R12 - 70,000 Ω ¼ W.
R13 - 200,000 Ω ¼ W.
R14 - 70. Ω ± 10%
R15 - 600,000 Ω ¼ W.

MODEL R-421
FOR OTHER DATA SEE INDEX



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	1,000,000	½	R13	5,000	½
R2	5,000,000	½	R14	70,000	½
R3	5,000,000	½	R15	1,000,000	V.C.
R4	10,000	½	R16	1,500	½
R5	250,000	½	R17	5,000,000	½
R6	200,000	½	R18	150	½
R7	1,000,000	½	R19	1,000,000	½
R8	300	½	R20	1,000,000	½
R9	30,000	½	R21	400—10%	½
R10	500	½	R22	30	½
R11	15,000,000	½	R23	1,950	5
R12	700	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.1	200	C12	.00005	Mica
C2	.00025	Mica	C13	.01	400
C3	.01	200	C14	.01	400
C4	.00005	Mica	C15	.00025	Mica
C5	.00006	Mica	C16	.002	400
C6	.01	200	C17a	40.	25
C7	.00005	Mica	C17b	30.	150
C8	.01	400	C17c	40.	25
C9	.01	200	C17d	30.	150
C10	.05	200	C18	.05	400
C11	.00005	Mica	C19	.25	200

In Model G6 switch points 15, 16, 17 and 18 are not used. Power change switch 2A thru 2I and the pictorial view shown in the "AC-DC" position.

In late models C1 is not used and C11 and R14 are inside 2nd I.F. can.

MODEL R-460

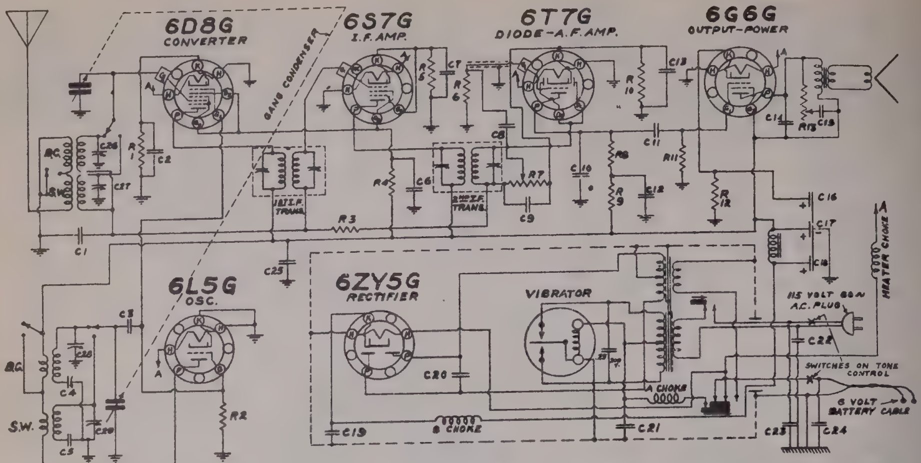
TRIM OSC 1550 KC, ANT 1400 KC, PAD 600 KC

FOR OTHER DATA SEE INDEX

©John F. Rider, Publisher

MODEL R-422

B. F. GOODRICH



NO	CAPACITY	TYPE	NO	CAPACITY	TYPE
1	.05 Mfd.	200 V.	13	.5 Mfd.	200 V.
2	.05 Mfd.	200 V.	14	.005 "	600 V.
3	100 $\mu\mu$f.	MICA	15	.05 "	400 V.
4	300-600 $\mu\mu$f	"	16	5. "	25 V.
5	4000 $\mu\mu$f	M. ± 5%	17	8. "	200 V.
6	.1 Mfd	200 V.	18	8. "	200 V.
7	.05 "	200 V.	19	.01 "	600 V.
8	.01 "	400 V.	20	.015 "	1000 V. OIL TYPE
9	250 $\mu\mu$f.	MICA	21	.5 "	10 V.
10	250 "	"	22	.05 "	400 V.
11	.01 Mfd.	400 V.	23	.01 "	600 V.
12	.1 "	200 V.	24	.5 "	10 V.
			25	.1 "	200 V.

CONDENSERS

NO	OHMS	WATTS	SPL. TOL.
1	1500	1/4	± 10%
2	50,000	1/4	
3	1,000,000	1/4	
4	31,000	1/4	
5	1,000	1/4	± 10%
6	1,000,000	1/4	
7	500,000	1/4	(VOL. CONT)
8	500,000	1/4	
9	200,000	1/4	
10	10,000	1/4	± 10%
11	500,000	1/4	
12	450	1/4	± 10%
13	100,000	1/4	(TONE CONT.)

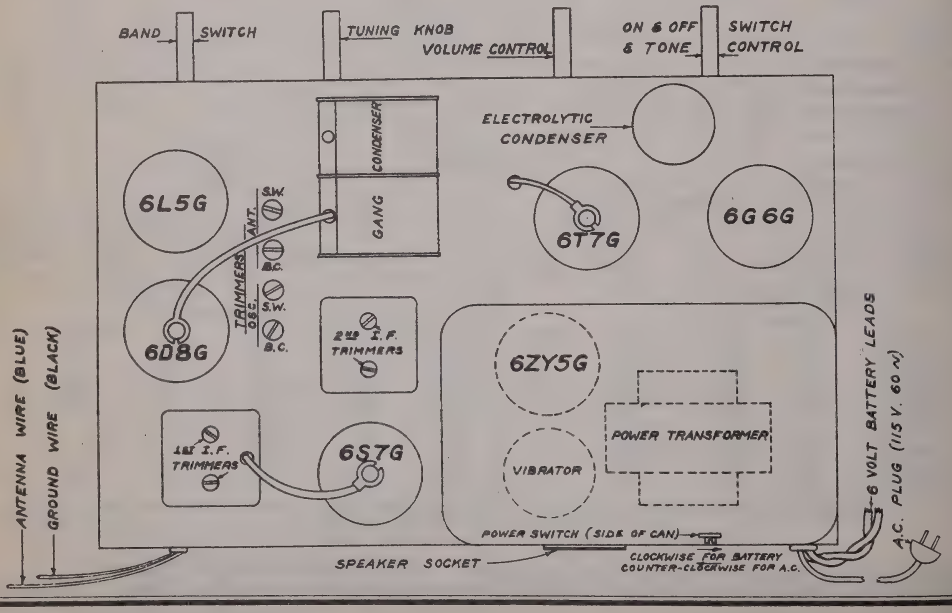
RESISTORS

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

BAND SWITCH IN BROADCAST POSITION.
POWER SWITCH IN BATTERY POSITION.
I.F. – 456 K.C.
C26 TO C29 – 2 TO 20 $\mu\mu$f. TRIMMERS

MODEL R-422

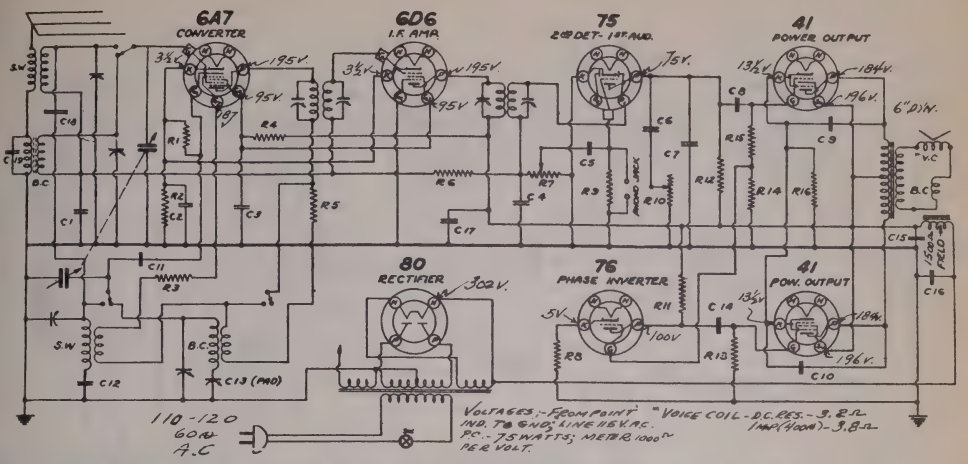
This receiver is designed to operate over two tuning ranges; the broadcast range which extends from 535 to 1730 Kilocycles (KC) (173.4 to 561 meters), and the International Short Wave Band which extends from 5650 to 18,100 Kilocycles (KC) (16.5 to 53 Meters). This latter range is the one which includes the internationally assigned bands—the 19, 25, 31, 39 and 49 meter bands.



©John F. Rider, Publisher

B. F. GOODRICH

MODELS R-423,R-436



VOLTAGES;- FROM POINT IND. TO GND; LINE 115V. A.C.
P.C.- 75 WATTS; METER 1000Ω PER VOLT.

"VOICE COIL - D.C. RES. - 3.2Ω
IMP.(400~) - 3.8Ω

CAPACITORS						RESISTORS					
No.	MFDS	VOLTS	No.	MFDS	VOLTS	No.	OHMS	WATTS	No.	OHMS	WATTS
C1	.06	200	C11	.0001	MICA	R1	60,000	½	R11	50,000	½
C2	.25	200	C12	.004±5%	MICA	R2	200	½	R12	250,000	½
C3	.06	400	C13	300-600 μμfd	PADDER	R3	250	½	R13	500,000	½
C4	.00025	MICA	C14	.01	400	R4	20,000	½	R14	100,000	½
C5	.01	400	C15	10.0	350	R5	1,000	½	R15	400,000	½
C6	.005	600	C16	10.0	350	R6	2 MEG	½	R16	300	½
C7	.00025	MICA	C17	.05	400	R7	500,000	VOL. CON.			
C8	.01	400	C18	GIMMICK		R8	3,000	½			
C9	.005	600	C19	.0001	MICA	R9	5 MEG	½			
C10	.006	600				R10	500,000	TONE CON.			

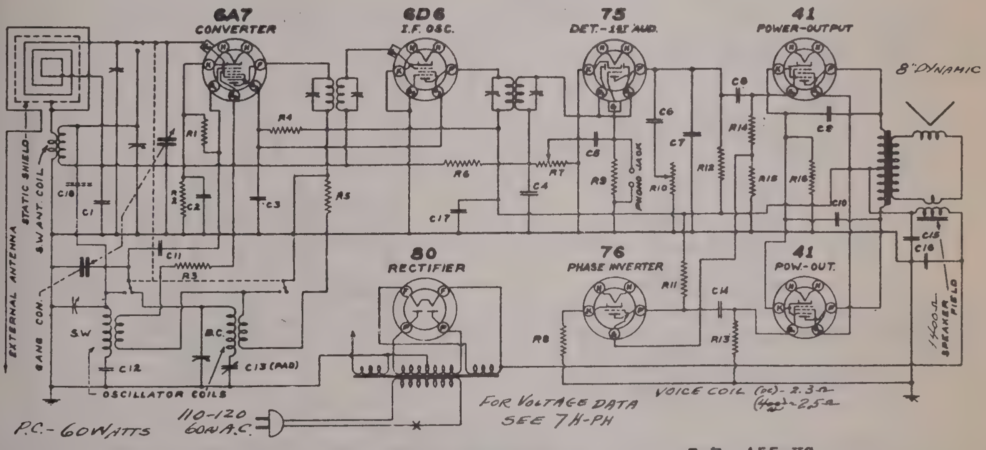
I.F. 455 KC

BAND SWITCHES SHOWN IN BROADCAST POSITION
BOTTOM VIEW OF TUBE SOCKETS SHOWN
GANG CONDENSER CAPACITY 443 μμfds.

TRIM OSC- 1730 KC (BB)
TRIM OSC- 18100 KC (SW)
PAD OSC- 600 KC (BB)
TRIM ANT- 1400 KC (BB)
TRIM ANT- 16000 (SW)

MODEL R_423

FOR
ALIGNMENT PROCEDURE
SEE MODEL R-411



P.C.- 60 WATTS

FOR VOLTAGE DATA SEE 7H-PH

VOICE COIL (DC) - 2.3Ω
(400~) - 2.5Ω

CAPACITORS						RESISTORS					
NO	MFDS	VOLTS	NO	MFDS.	VOLTS	NO	OHMS	WATTS	NO	OHMS	WATTS
C1	.05	200	C10	.006	600	R1	50,000	½	R10	500,000	TONE CON.
C2	.25	200	C11	.0001	MICA	R2	300	½	R11	50,000	½
C3	.05	400	C12	.004±5%	MICA	R3	250	½	R12	250,000	½
C4	.00025	MICA	C13	300-600 μμfds.		R4	20,000	½	R13	500,000	½
C5	.01	400	C14	.01	400	R5	1,000	½	R14	400,000	½
C6	.005	600	C15	10.0	350	R6	2 MEG.	½	R15	100,000	½
C7	.00025	MICA	C16	10.0	350	R7	500,000	VOL. CON.	R16	300	½
C8	.01	400	C17	.05	400	R8	3,000	½			
C9	.005	600	C18	GIMMICK		R9	5 MEG.	½			

I.F. 455 KC

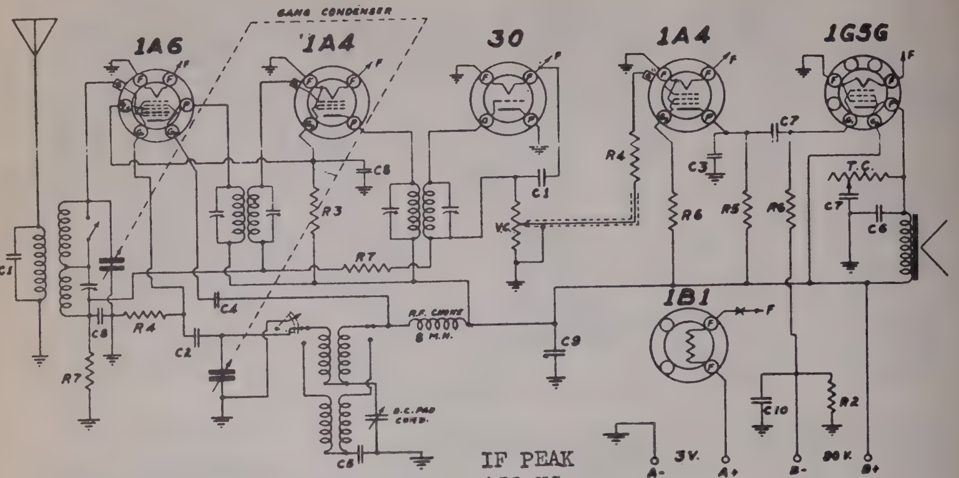
SWITCHES SHOWN IN BROADCAST POSITION
BOTTOM VIEW OF SOCKETS SHOWN.
GANG CONDENSER CAPACITY 443 μμfds.

MODEL R-436

TRIM OSC-1550 KC (BB)
OTHER ALIGNMENT DATA SAME AS MODEL R-411

MODEL R-425

B. F. GOODRICH



IF PEAK
456 KC

CONDENSERS

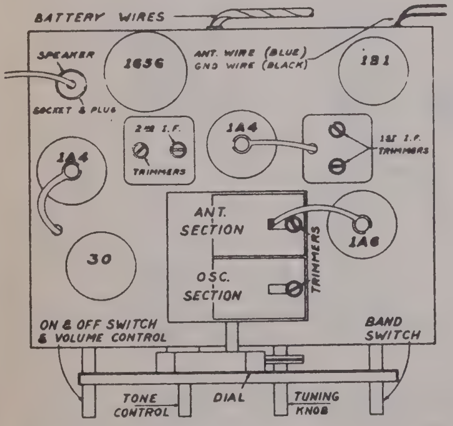
No.	MFD.	
1	.0001	MICA
2	.00025	"
3	.0005	"
4	.001	"
5	.0015	"
6	.002	200 VOLTS
7	.01	200 "
8	.05	200 "
9	.25	
10	10.0	ELECT. 25 V.

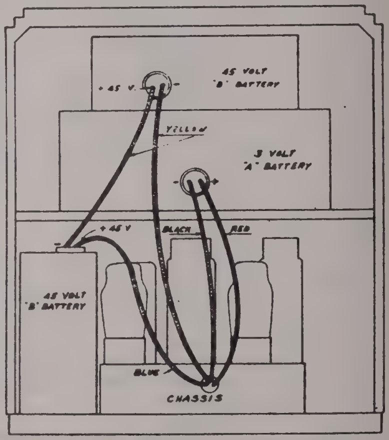
RESISTORS

No.	OHMS	WATTS
1	50.	1/4
2	535. ± 5%	1/2
3	10,000.	1/3
4	50,000.	1/4
5	200,000.	1/4
6	1. MEG.	1/4
7	2. MEG.	1/4

V.C. - VOLUME CONTROL - 1 MEGOHM.
T.C. - TONE CONTROL - 100,000 OHMS.
SWITCHES IN BROADCAST POSITION.

FREQUENCY RANGE -
535 to 1730 KC
2.2 to 6.5 MC





IF ALIGNMENT - Wave change Sw. in BC position. Gang condenser at minimum, generator at 456 KC, output to 1A6 CG thru .05 MFD condenser, Generator grounded to receiver, align four trimmers of IF transformers.

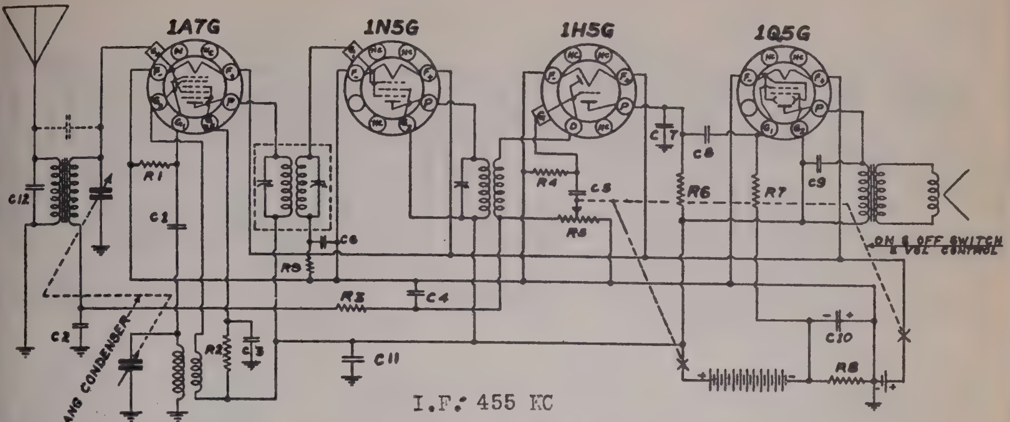
BROADCAST - Generator connected to antenna lead thru 200 MMFD condenser, and set at 1400 KC. Gang condenser at minimum. Trim oscillator then Antenna trimmers Pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - Generator at 6000 KC, start rotating gang condenser from HF end, when signal is heard, adjust antenna trimmer (SW) for maximum peak.

Repeat all adjustments for maximum performance.

B. F. GOODRICH

MODELS R-427, R-428, R-451



CAPACITORS

Nº	CAP.-MFDS.	TYPE	Nº	CAP.-MFDS	TYPE
C1	.00005	MICA	C7	.00025	MICA
C2	.05	200V.	C8	.01	400V.
C3	.1	200V.	C9	.005	400V.
C4	.00025	MICA	C10	20. (ELECT)	25V.
C5	.01	400V.	C11	.1	200V.
C6	.002	400V.	C12	.00008	MICA

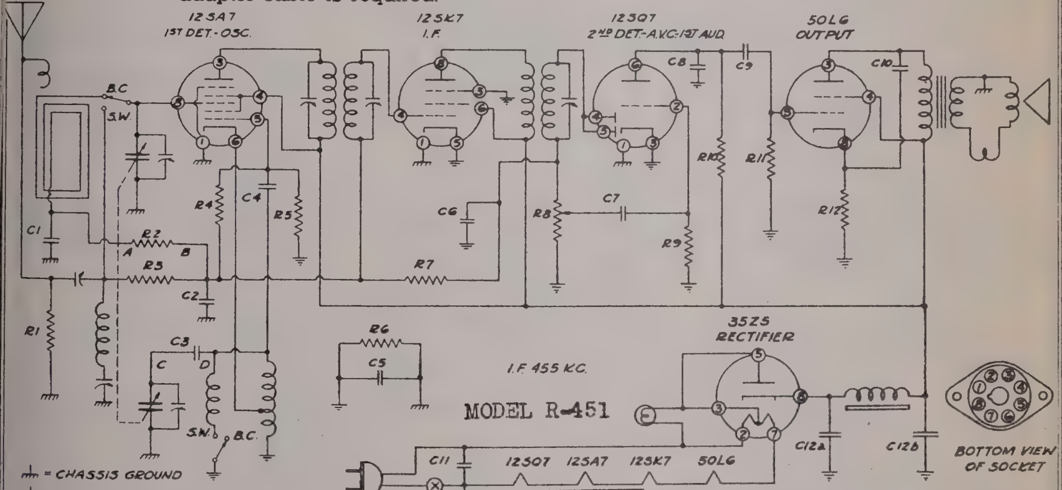
RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	200,000	¼	R6	250,000	¼
R2	70,000	¼	R7	500,000	¼
R3	1 MEG.	¼	R8	440	¼
R4	2 MEG.	¼	R9	2 MEG.	¼
R5	500,000	VOL. CONTROL			

MODELS R-427, R-428
CONVENTIONAL ALIGNMENT
FOR OTHER DATA SEE INDEX

POWER SUPPLY

This receiver is designed to operate on a single unit Ray-O-Vac No. AB-82, Burgess 17G-D60, Eveready 748 or General 60DL-11L Battery. No other batteries are required as this battery is a combination 90 volt "B" battery and a 1½ volt "A" battery. To use separate batteries a P2863 battery adapter cable is required.



MODEL R-451

ISSUE A
APRIL 1940

FOR OTHER DATA SEE INDEX

CONVENTIONAL ALIGNMENT

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	250,000	¼	R7	2,000,000	¼
R2	100,000	¼	R8	500,000	V.C.
R3	250,000	¼	R9	5,000,000	¼
R4	10,000,000	¼	R10	250,000	¼
R5	25,000	¼	R11	500,000	¼
R6	150,000	¼	R12	150—10%	¼

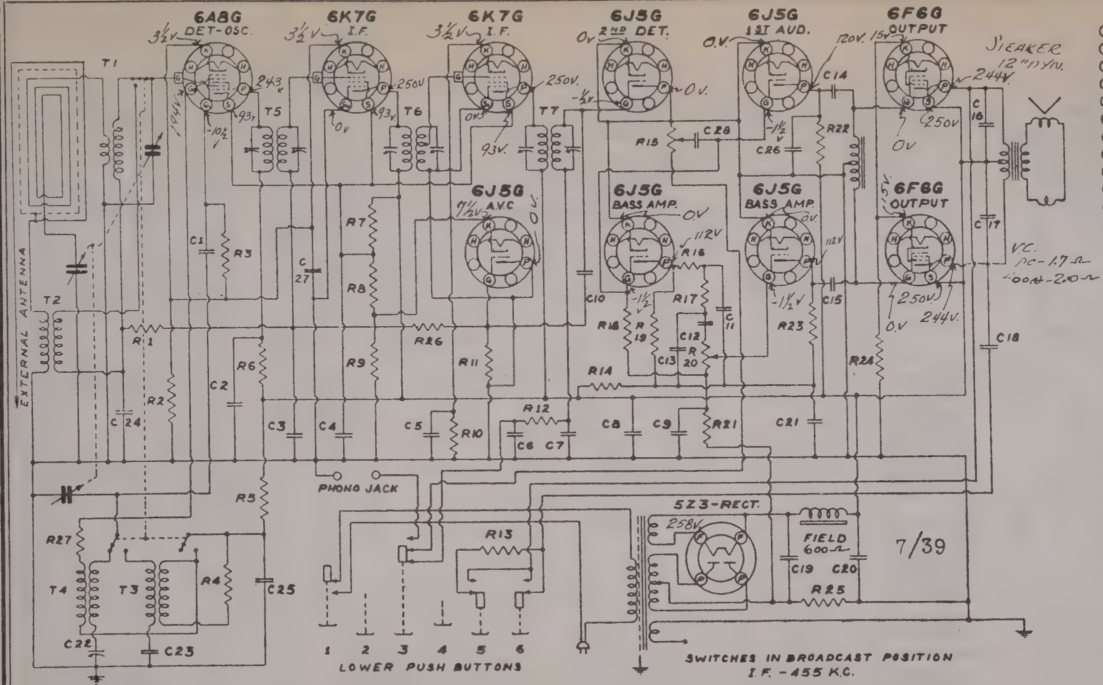
CONDENSERS

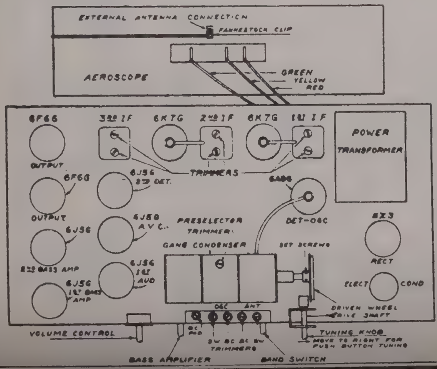
No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C8	.0005	Mica
C2	.05	200	C9	.01	400
C3	.02	200	C10	.02	400
C4	.0001	Mica	C11	.05	400
C5	.2	200	C12a	30. Elec.	150
C6	.00025	Mica	C12b	20. Elec.	150
C7	.005	400			

In some models all common grounds become chassis grounds, C1, C3, C5, R2, and R6 are omitted. Point "A" is connected to point "B" and point "C" to point "D."

MODEL R-437

B. F. GOODRICH





I.F. 455 KC

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION OF VOL.VIII

AT LEFT
TOP VIEW OF CHASSIS

VOLTAGES;- FROM POINT INDICATED TO GROUND. LINE 115 V.A.C. P.C.-125 W.

CONDENSERS

C 1–	.0001 mfd. mica
C 2–	.05 mfd. 400 volt tubular
C 3–	.05 mfd. 200 volt tubular
C 4–	.25 mfd. 200 volt tubular
C 5–	.05 mfd. 200 volt tubular
C 6–	.0001 mfd. mica
C 7–	.0001 mfd. mica
C 8–	.05 mfd. 400 volt tubular
C 9–	.25 mfd. 200 volt tubular
C10–	.00005 mfd. mica
C11–	.05 mfd. 400 volt tubular
C12–	.1 mfd. 400 volt tubular
C13–	.1 mfd. 400 volt tubular
C14–	.15 mfd. 400 volt tubular
C15–	.15 mfd. 400 volt tubular
C16–	.002 mfd. 600 volt tubular
C17–	.002 mfd. 600 volt tubular
C18–	.02 mfd. 400 volt tubular
C19–	25 mfd. 475 volt wet electrolytic
C20	20 mfd. 450 volt dry electrolytic
C21	15 mfd. 450 volt dry electrolytic
C22–	300—600 mmfd., B. C. pad
C23–	.004 mfd. mica, 5% S.W. pad
C24–	.05 mfd. 200 volt tubular
C25–	.05 mfd. 400 volt tubular
C26–	00025 mfd. mica
C27–	.25 mfd. 200 volt tubular
C28–	.01 mfd. 400 volt tubular

ALIGNMENT

BROADCAST BAND
Pad-600 kc
Trim osc-1550 kc
" ant-1400 kc

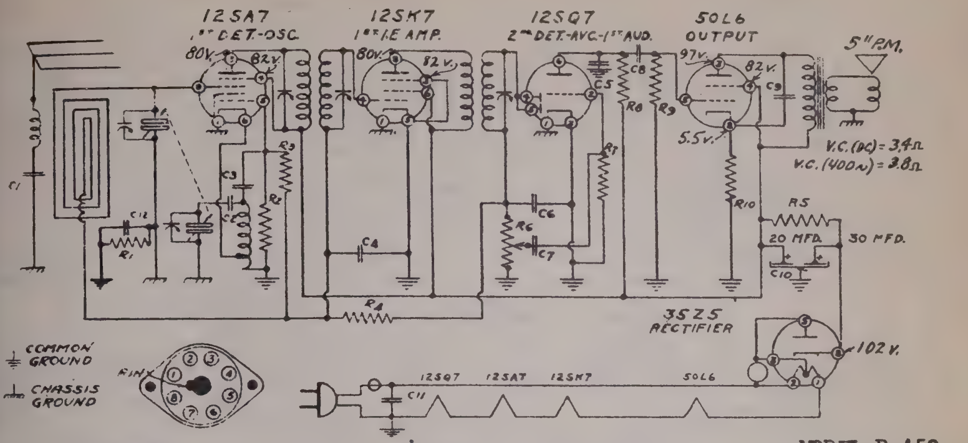
SHORTWAVE BAND
Trim osc- 18,100 kc
" ant- 16,000 kc

RESISTORS

R 1—	250,000 ohm ½ watt
R 2—	170 ohm 1/3 watt 10%
R 3—	50,000 ohm ½ watt
R 4—	1,000 ohm ½ watt
R 5—	10,000 ohm ½ watt
R 6—	3,000 ohm ½ watt
R 7—	20,000 ohm 2 watt
R 8—	30,000 ohm ½ watt
R 9—	3,000 ohm ½ watt
R10—	500 ohm ½ watt
R11—	1,000,000 ohm ½ watt
R12—	20,000 ohm ½ watt
R13—	10,000 ohm 1 watt
R14—	5,000 ohm ½ watt
R15—	500,000 ohm vol. control
R16—	10,000 ohm ½ watt
R17—	20,000 ohm ½ watt
R18—	1,000,000 ohm ½ watt
R19—	25,000 ohm ½ watt
R20—	500,000 ohm bass control
R21—	500,000 ohm ½ watt
R22—	30,000 ohm ½ watt
R23—	25 000 ohm ½ watt
R24—	220 ohm 2 watt 10%
R25—	30 ohm (wire wound) ½ watt
R26—	250,000 ohm ½ watt
R27—	150 ohm ½ watt

B. F. GOODRICH

MODELS R-450,R-470



MODEL R-450

ISSUE A
MARCH 1940

No.	Capacity	Volts
C1	.001	600
C2	.02	400
C3	.00005	Mica
C4	.05	200
C5	.0005	Mica
C6	.00025	Mica
C7	.01	400
C8	.002	600
C9	.01	400
C10	20.0 30.0	150 150
C11	.05	400
C12	.25	200

RESISTORS

No.	Ohms	
R1	150,000	½ Watt
R2	20,000	½ Watt
R3	15,000,000	½ Watt
R4	2,000,000	½ Watt
R5	1,000	1 Watt
R6	500,000	Vol. Cont.
R7	5,000,000	¼ Watt
R8	250,000	½ Watt
R9	500,000	½ Watt
R10	150	½ Watt 10%

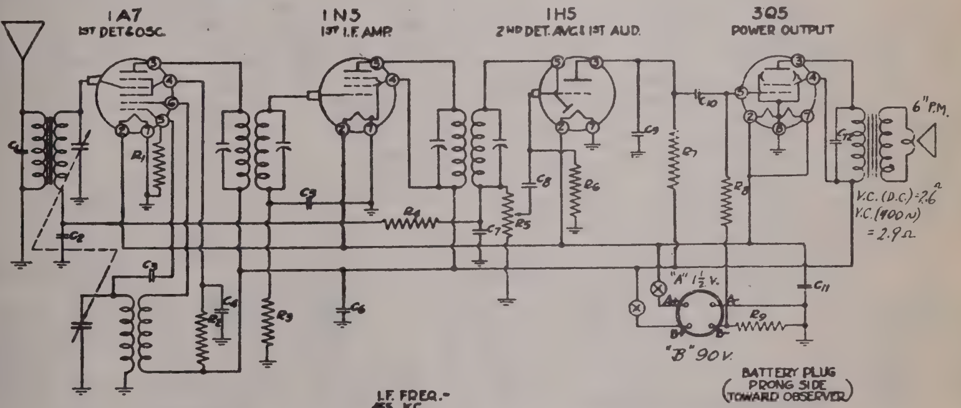
For SOCKET LAYOUT
See INDEX

C2,C12 and R1 are not used in some sets,all grounds connecting to chassis ground

I.F. PEAK - 455 KC
TRIM OSC. - 1730 KC
TRIM ANT. - 1400 KC

VOLTAGES: Line 115 v. AC. Power consumption, 30 watts. Volume control maximum. Meter 1000 ohms per volt. Read from point indicated to common ground.

CONVENTIONAL ALIGNMENT



I.F. FREQ.-
455 KC.

RESISTORS

No.	Ohms	Watts
R1	200,000	½
R2	30,000	½
R3	5 Meg.	¼
R4	1 Meg.	¼
R5	500,000	V.C.
R6	5 Meg.	¼
R7	" "	¼
R8		¼
R9	440 10%	¼

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.00005	Mica
C2	.05	200
C3	.00005	Mica
C4	.1	200
C5	.002	400
C6	.001	200
C7	.00025	Mica
C8	.01	400
C9	.00025	Mica
C10	.01	400
C11	20 (Elect.)	25
C12	.005	400

I.F. PEAK - 455 KC
TRIM OSC. - 1730 KC
TRIM ANT. - 1400 KC

ISSUE A
MARCH 1940

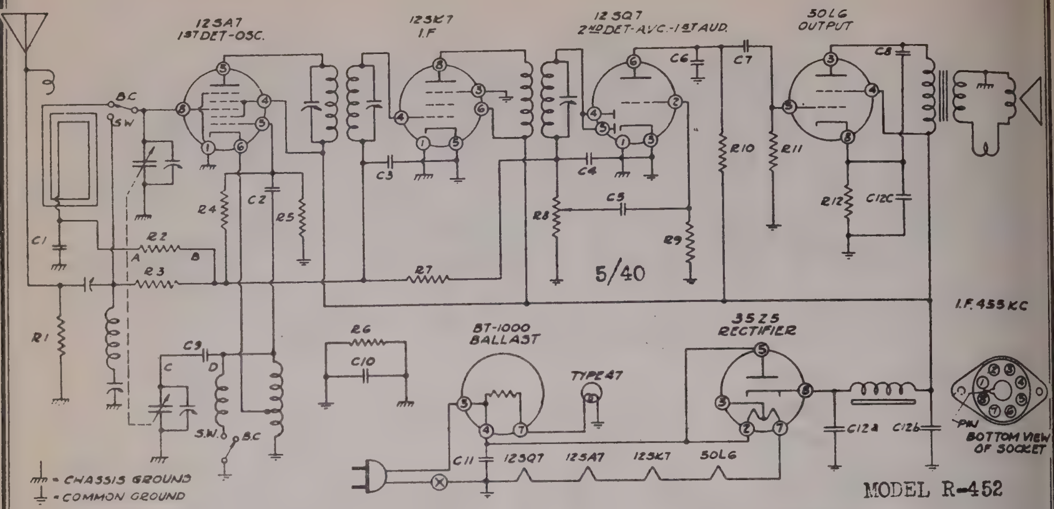
MODEL R-470

For SOCKET LAYOUT
See INDEX

©John F. Rider, Publisher

MODELS R-452, R-453

B. F. GOODRICH



MODEL R-452

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	250,000	¼	R7	2,000,000	¼
R2	100,000	¼	R8	500,000	V.C
R3	250,000	¼	R9	5,000,000	¼
R4	10,000,000	¼	R10	250,000	¼
R5	25,000	¼	R11	500,000	¼
R6	150,000	¼	R12	150—10%	¼

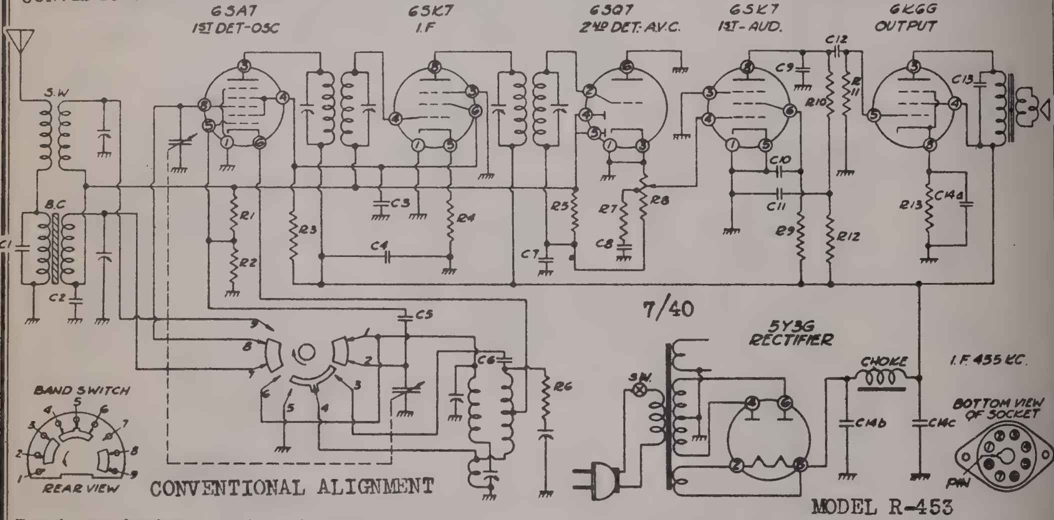
CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C8	.02	400
C2	.0001	Mica	C9	.02	200
C3	.05	200	C10	.2	200
C4	.00025	Mica	C11	.05	400
C5	.005	400	C12a	30.	150
C6	.0005	Mica	C12b	20.	150
C7	.01	400	C12c	20.	25

In model J6 all common grounds become chassis grounds, C1, C9, C10, R2 and R6 are omitted.
Point "A" is connected to point "B" and point "C" to point "D."

FOR OTHER DATA SEE INDEX

CONVENTIONAL ALIGNMENT



CONVENTIONAL ALIGNMENT

MODEL R-453

Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

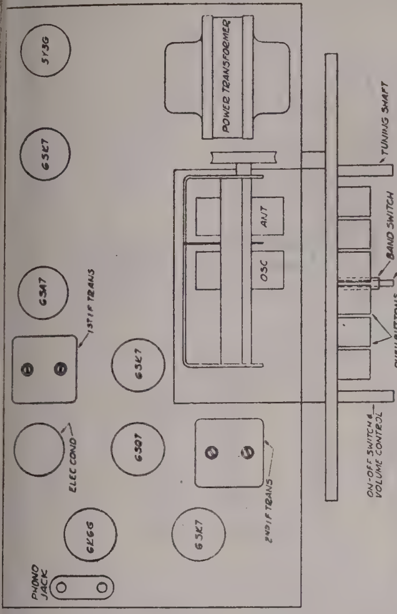
FOR OTHER DATA SEE INDEX

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	¼	R9	1,000,000	¼
R2	20,000	¼	R10	200,000	¼
R3	10,000	1	R11	500,000	¼
R4	100—10%	¼	R12	50,000	¼
R5	2,000,000	¼	R13	500—10%	½
R6	30	¼			
R7	8,000	¼			
R8	500,000	V.C.			

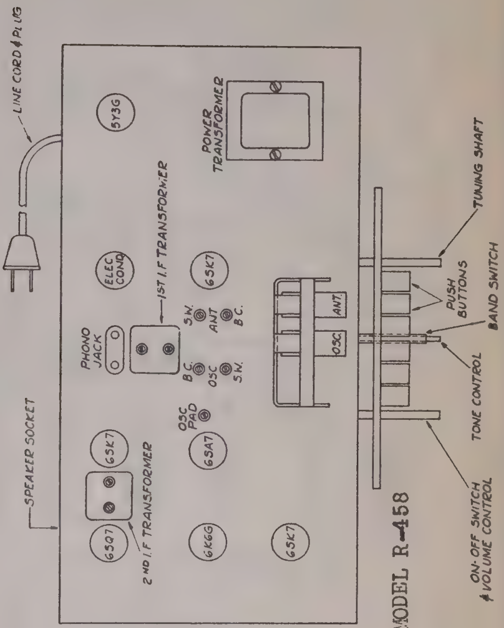
No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C9	.00025	Mica
C2	.05	200	C10	.05	200
C3	.05	400	C11	.1	200
C4	.05	400	C12	.01	400
C5	.00005	Mica	C13	.005	600
C6	.004 —5%	Mica	C14a	20.	25
C7	.00025	Mica	C14b	20.	350
C8	.05	200	C14c	20.	350

B. F. GOODRICH

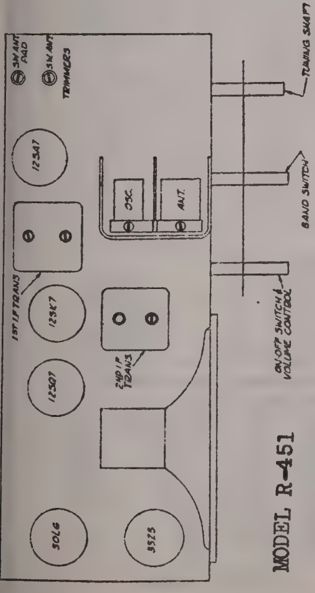
MODELS R-451, R-452,
R-453, R-454, R-458



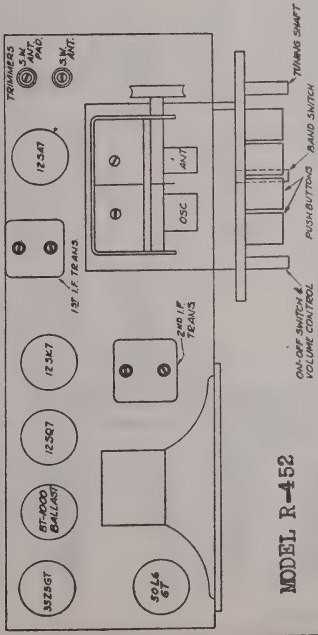
MODEL R-454



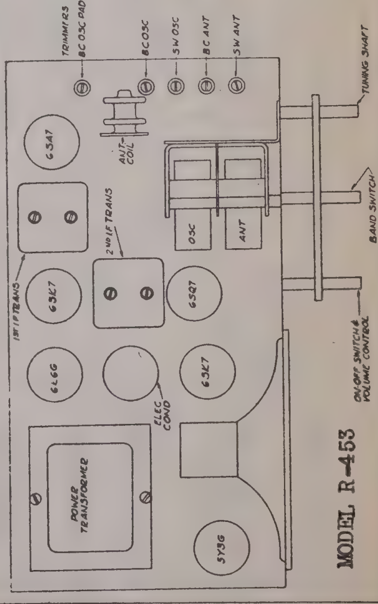
MODEL R-458



MODEL R-451



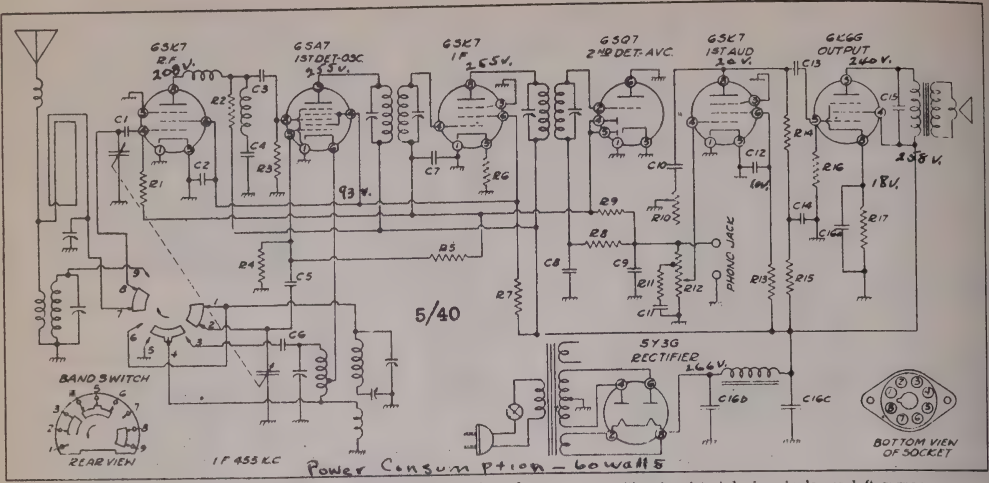
MODEL R-452



MODEL R-453

MODELS R-454,R-458

B. F. GOODRICH



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

RESISTORS

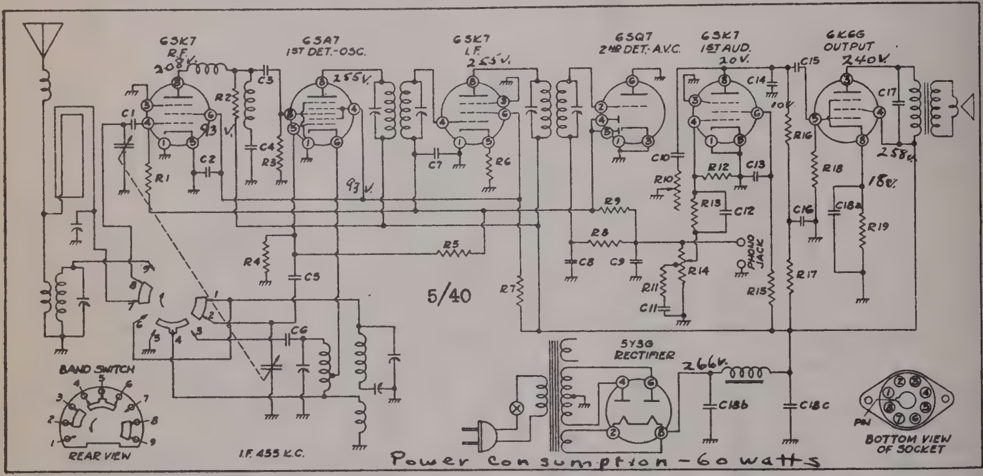
No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R10	500,000	T.C.
R2	4,000	½	R11	10,000	¼
R3	100,000	½	R12	500,000	V.C.
R4	25,000	½	R13	2,000,000	¼
R5	5,000,000	¼	R14	250,000	¼
R6	100	¼	R15	50,000	¼
R7	15,000	2	R16	500,000	¼
R8	50,000	¼	R17	600—10%	½
R9	1,000,000	¼			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C10	.002	600
C2	.05	400	C11	.05	200
C3	.0001	Mica	C12	.25	400
C4	.00006—5%	Mica	C13	.01	400
C5	.0001	Mica	C14	.25	400
C6	.003—5%	Mica	C15	.005	600
C7	.05	200	C16a	20.	25
C8	.0001	Mica	C16b	20.	350
C9	.00025	Mica	C16c	20.	350

FOR OTHER DATA SEE INDEX

MODEL R-454



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R11	15,000	¼
R2	2,500	½	R12	2,000,000	¼
R3	100,000	½	R13	2,000,000	¼
R4	25,000	½	R14	500,000	V.C.
R5	5,000,000	¼	R15	2,000,000	¼
R6	100	¼	R16	250,000	¼
R7	15,000	2	R17	50,000	¼
R8	50,000	¼	R18	500,000	¼
R9	1,000,000	¼	R19	600—10%	½
R10	500,000	T.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.05	200
C2	.05	400	C12	.05	200
C3	.0001	Mica	C13	.25	400
C4	.00006—5%	Mica	C14	.00025	Mica
C5	.0001	Mica	C15	.01	400
C6	.003 —5%	Mica	C16	.25	400
C7	.05	200	C17	.002	600
C8	.00005	Mica	C18a	20.	25
C9	.0001	Mica	C18b	30.	350
C10	.002	600	C18c	30.	350

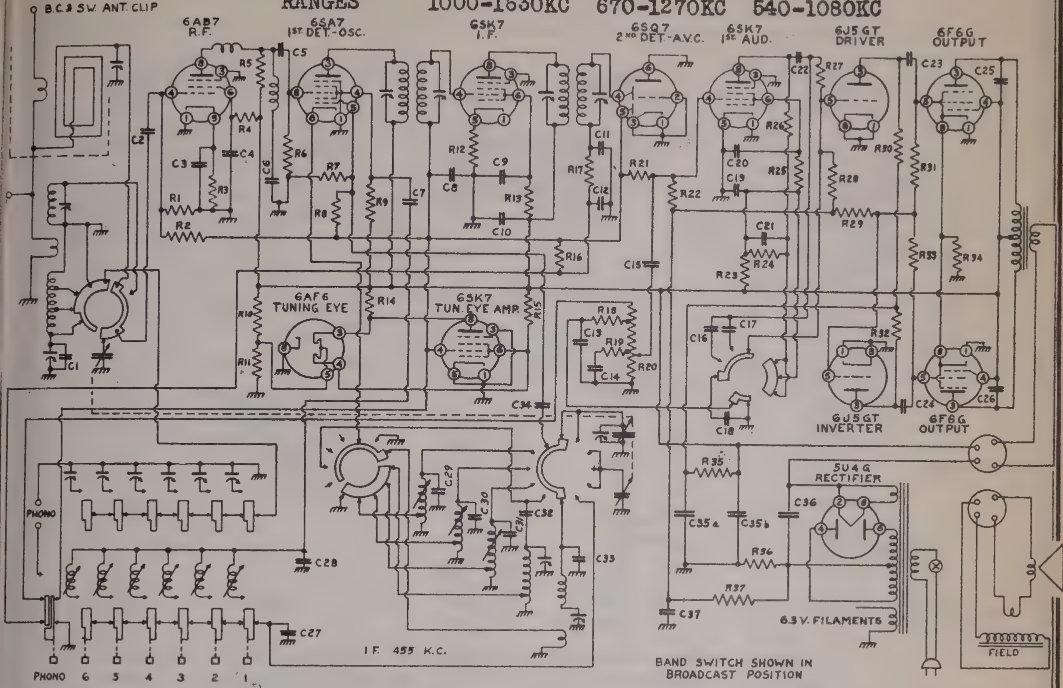
FOR OTHER DATA SEE INDEX

MODEL R-458

B. F. GOODRICH

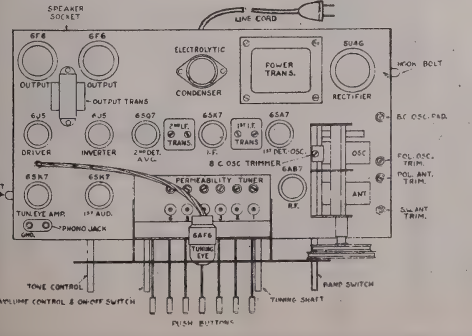
MODEL R-459

PUSH-BUTTON RANGES	#1,#2	#3,#4	#5,#6
	1000-1630KC	670-1270KC	540-1080KC

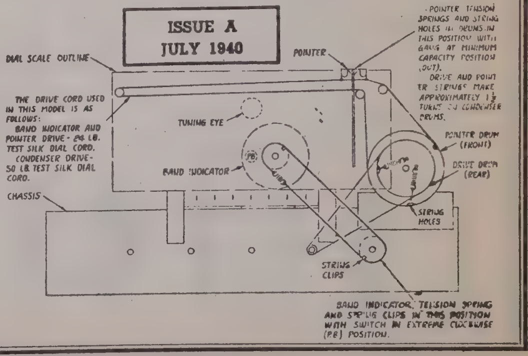


ALIGNMENT CONVENTIONAL-SEE SPECIAL SECTION VOL. VIII

R 1	1,000,000 ohm ½ watt	R20	500,000 ohm V.C.	C1	.00002	10% Mica	C20	.05	400 V.
R 2	2,000,000 ohm ½ watt	R21	1,000,000 ohm ½ watt	C2	.0001	Mica	C21	.05	400 V.
R 3	250 ohm ½ watt	R22	2,000,000 ohm ½ watt	C3	.05	200 V.	C22	.01	400 V.
R 4	50,000 ohm ½ watt	R23	50,000 ohm ½ watt	C4	.05	400 V.	C23	.02	400 V.
R 5	5,000 ohm ½ watt	R24	100,000 ohm ½ watt	C5	.0001	Mica	C24	.02	400 V.
R 6	100,000 ohm ½ watt	R25	500,000 ohm ½ watt	C6	.00006	5% Mica	C25	.005	600 V
R 7	25,000 ohm ½ watt	R26	15,000 ohm ½ watt	C7	.05	400 V.	C26	.005	600 V.
R 8	5,000,000 ohm ½ watt	R27	500,000 ohm ½ watt	C8	.05	200 V.	C27	.0005	2½% Mica
R 9	15,000 ohm 2 watt	R28	100,000 ohm ½ watt	C9	.05	400 V.	C28	.003	5% Mica
R10	25,000 ohm 1 watt	R29	250,000 ohm ½ watt	C10	.1	400 V.	C29	.0003	2½% Mica
R11	30,000 ohm ½ watt	R30	50,000 ohm ½ watt	C11	.0001	Mica	C30	.00025	2½% Mica
R12	100 ohm ½ watt	R31	250,000 ohm ½ watt	C12	.0001	Mica	C31	.0002	2½% Mica
R13	50,000 ohm ½ watt	R32	50,000 ohm ½ watt	C13	.02	200 V.	C32	.003	5% Mica
R14	200,000 ohm ½ watt	R33	300,000 ohm ½ watt	C14	.02	200 V.	C33	.00003	10% Mica
R15	200,000 ohm ½ watt	R34	220 ohm 1 watt	C15	.05	400 V.	C34	.0001	Mica
R16	1,000,000 ohm ½ watt	R35	20,000 ohm ½ watt	C16	.0001	Mica	C35a	16 Mfd.	450 V.
R17	50,000 ohm ½ watt	R36	25 ohm 1 watt	C17	.00025	Mica	C35b	20 Mfd.	450 V.
R18	30,000 ohm ½ watt		10%	C18	.001	600 V.	C36	25 Mfd.	450 V.
R19	30,000 ohm ½ watt	R37	250,000 ohm ½ watt	C19	.25	400 V.	C37	.25	200 V.



ISSUE A
JULY 1940



THE DRIVE CORD USED IN THIS MODEL IS AS FOLLOWS:
BAND INDICATOR AND POINTER DRIVE - 24 LB. TEST SILK DIAL CORD.
CONDENSER DRIVE - 50 LB TEST SILK DIAL CORD.

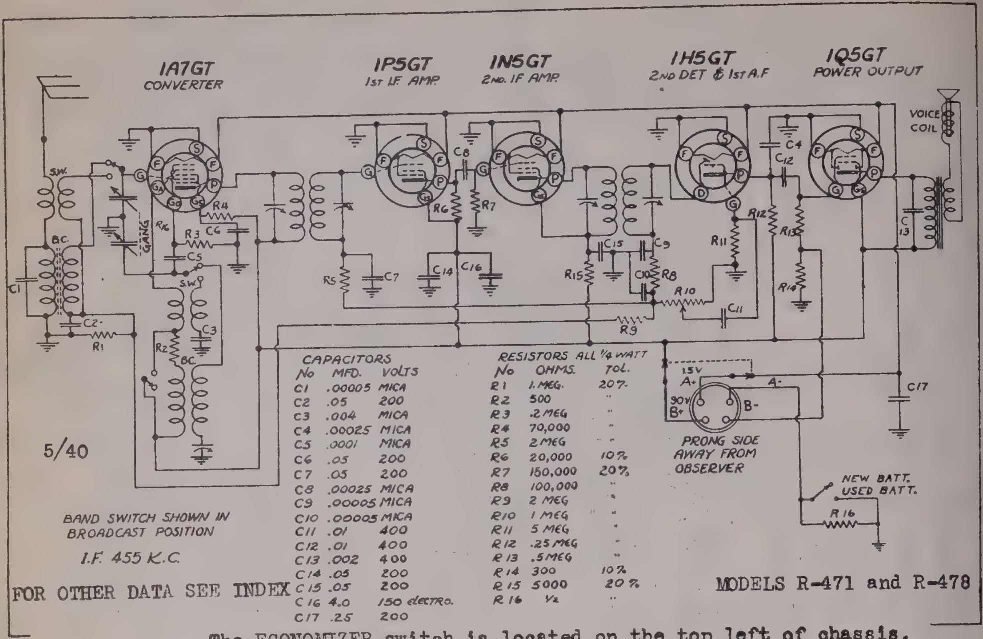
POINTER TENSION SPRINGS AND STRING HOLES IN DRUMS IN THIS POSITION WITH GANG AT MINIMUM CAPACITY POSITION (OUT).

DRIVE AND POINTER STRINGS MAKE APPROXIMATELY 1½ TURNS ON CONDENSER DRUMS.

BAND INDICATOR, TENSION SPRING AND STRING CLIPS IN THIS POSITION WITH SWITCH IN EXTREME CLOCKWISE (P.B) POSITION.

MODELS R-471,R-478
R-480

B. F. GOODRICH



5/40

BAND SWITCH SHOWN IN BROADCAST POSITION

I.F. 455 K.C.

CAPACITORS

No	MFD.	VOLTS
C1	.00005	MICA
C2	.05	200
C3	.004	MICA
C4	.00025	MICA
C5	.0001	MICA
C6	.05	200
C7	.05	200
C8	.00025	MICA
C9	.00005	MICA
C10	.00005	MICA
C11	.01	400
C12	.01	400
C13	.002	400
C14	.05	200
C15	.05	200
C16	4.0	150 electro.
C17	.25	200

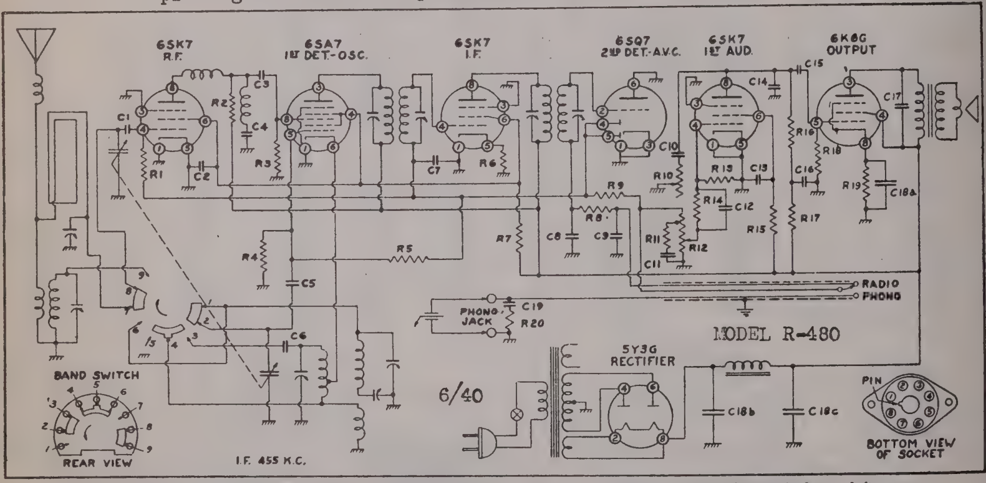
RESISTORS ALL ¼ WATT

No	OHMS.	TOL.
R1	1. MEG.	20%
R2	500	"
R3	.2 MEG	"
R4	70,000	"
R5	2 MEG	"
R6	20,000	10%
R7	150,000	20%
R8	100,000	"
R9	2 MEG	"
R10	1 MEG	"
R11	5 MEG	"
R12	.25 MEG	"
R13	.5 MEG	"
R14	300	10%
R15	5000	20%
R16	½	"

FOR OTHER DATA SEE INDEX

MODELS R-471 and R-478

The ECONOMIZER switch is located on the top left of chassis. Always have this switch in the "NEW" battery position when first placing the radio in operation or when installing a new battery.



MODEL R-480

Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

RESISTORS

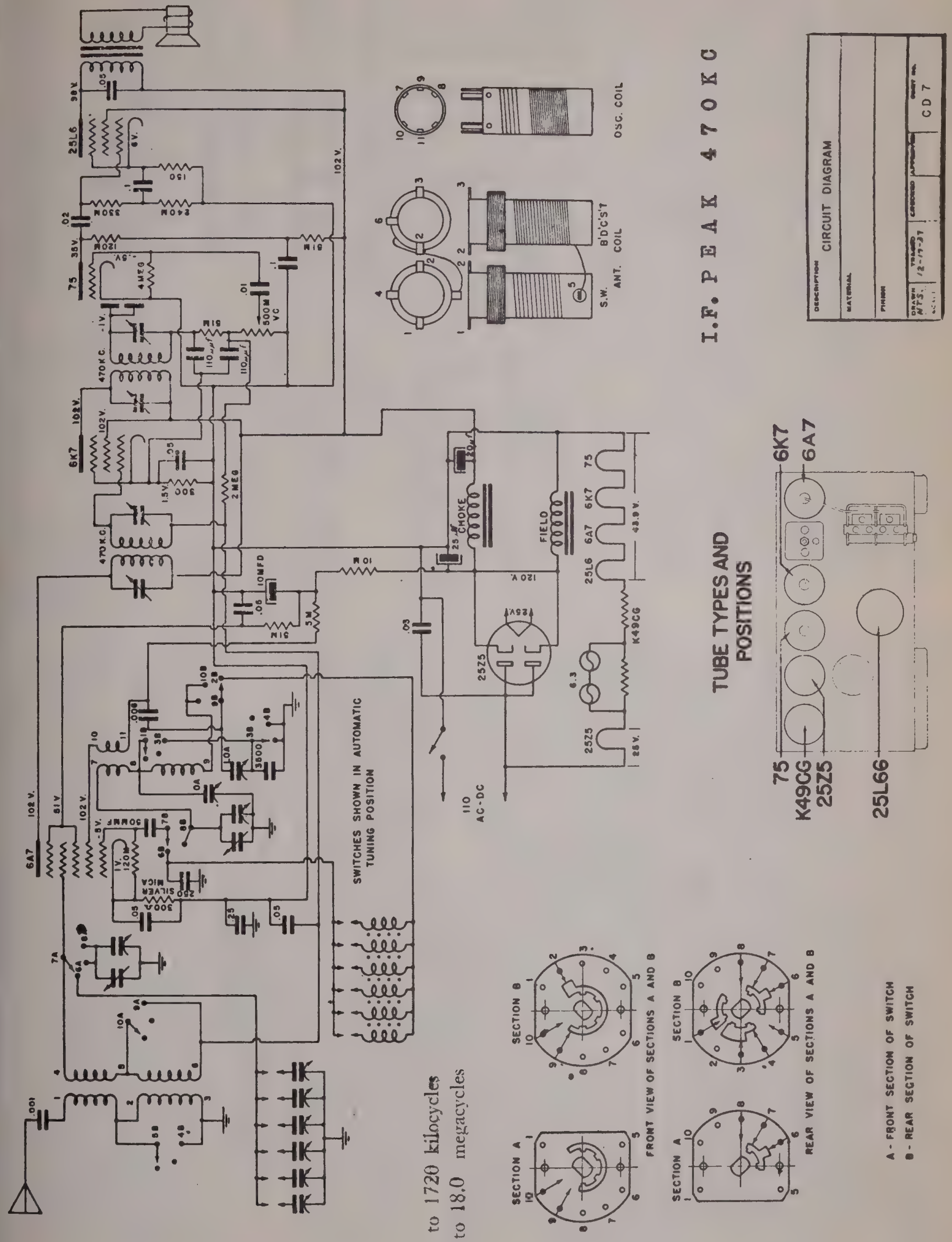
No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R12	500,000	V.C.
R2	2,500	½	R13	2,000,000	¼
R3	100,000	½	R14	2,000,000	¼
R4	25,000	½	R15	2,000,000	¼
R5	5,000,000	¼	R16	250,000	¼
R6	100	¼	R17	50,000	¼
R7	15,000	2	R18	500,000	¼
R8	50,000	¼	R19	600—10%	½
R9	1,000,000	¼	R20	50,000	¼
R10	500,000	T.C.			
R11	15,000	¼			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C12	.05	200
C2	.05	400	C13	.25	400
C3	.0001	Mica	C14	.00025	Mica
C4	.00006—5%	Mica	C15	.01	400
C5	.0001	Mica	C16	.25	400
C6	.003—5%	Mica	C17	.002	600
C7	.05	200	C18a	20.	25
C8	.00005	Mica	C18b	30.	350
C9	.0001	Mica	C18c	30.	350
C10	.002	600	C19	.005	400
C11	.05	200			

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 01006



©John F. Rider, Publisher

Automatic Unit

Principle of Operation

The basic circuit of any radio receiver is the inductance coil and tuning condenser which determines the frequency to which the system is tuned. The frequency at which this circuit resonates can be varied in two ways; either by holding the inductance coil at a fixed value of inductance and changing the capacity of the condenser, or by holding the condenser at a fixed value of capacity and changing the inductance of the coil. This is so because the frequency is proportional to the inductance times the capacity and changing one or the other will change their product.

Previous push-button systems accomplished their purpose in one of two ways. They either rotated the tuning condenser mechanically with an electric motor, or disconnected the tuning condenser by means of a switch and substitu ed pre-set padding condensers in the antenna and oscillator circuits.

In the push-button system the entire oscillator circuit (coil and gang condenser) is disconnected and in its place is put a silvered mica condenser of fixed capacity and a coil, the inductance of which can be varied by means of an iron slug that moves with a screw adjustment, inside the coil. This is the second system of tuning mentioned above and has the following advantages in this case. The condenser is made by electroplating a small deposit of silver on each side of a piece of mica and encasing the whole unit in a weatherproof compound. The silver, having a low temperature coefficient has a negligible expansion with changes in temperature, and humidity has no effect because of the weatherproof compound. Therefore, changes in the condenser capacity are controlled. The coil is impregnated with a moisture-proof wax and the whole circuit is tuned by varying the inductance of the coil. The only uncontrollable factor in the system is the variation in capacity of the wiring and other parts. But this variation is so small that its detuning effect is not noticeable to the ear.

In the system the silvered mica condenser which tunes all six of the push button coils is in the main part of the receiver and connected on the wave switch. The push-button coils are mounted on the push-button unit and are adjusted from the back by slotted screws. The adjustable padding condensers directly above the slotted screws are used to align the antenna coil in the receiver to each of the push-button coils depending on which button is pushed. Variation in capacity of this padder has no effect on the tuning of the system. It simply drops the sensitivity slightly.

Instructions for Pre-setting "Fingertip Control" Circuits for Six Stations in the Broadcast Tuning Range

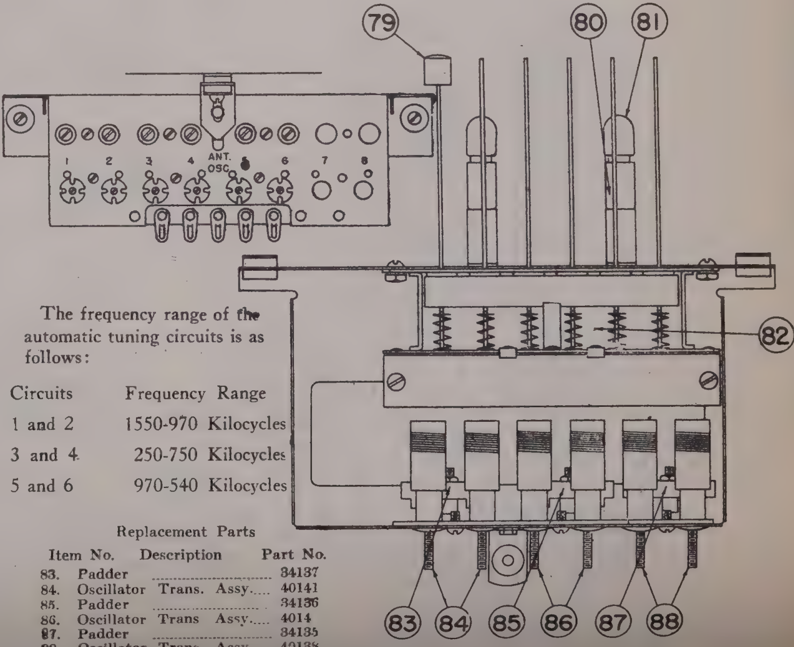
The automatic tuning unit is located immediately above the receiver chassis, the circuits being adjustable from the rear of this unit. Although it is possible to adjust the circuits without the aid of a signal generator, for best results it is recommended that a serviceman be allowed to pre-set the tuning circuits in the following manner.

Turn the wave change switch to the left. Six stations in the broadcast band may be chosen, and the tabs on which are printed the call letters of these stations should be selected from the sheet provided and inserted in the escutcheon slots. It is preferable to place the tabs in the slots according to frequency; that is to say, the low frequency stations should appear at the left as the unit is faced and the high frequency stations at the right.

The tuning circuits corresponding to a given station will be found at the rear of the automatic unit housing, immediately behind the station call letter tab slot. Assuming that you are facing the rear of the receiver and it is desired to set up WJZ at 760 kilocycles on the third circuit from the right, the following is the recommended procedure. Adjust the signal generator, modulated with an audio frequency, to 760 kilocycles. Using a small screw driver adjust the converter oscillator circuit, third hole from right in the lower row, until signal is loudest. Then adjust antenna circuit, third hole in upper row, until signal is at a maximum.

Readjust converter circuit carefully for maximum signal strength. Other frequencies may be set up in a similar manner on the remaining circuits.

If a signal generator is not available turn the wave switch to the middle position for manual tuning and tune the receiver to the desired station. Then turn the switch to the left ("fingertip-control" automatic position) and adjust the automatic unit oscillator and antenna circuits exactly as described abov Repeat procedure until all desired stations are set up. When all desired stations are set up recheck all oscillator adjustments for calibration accuracy

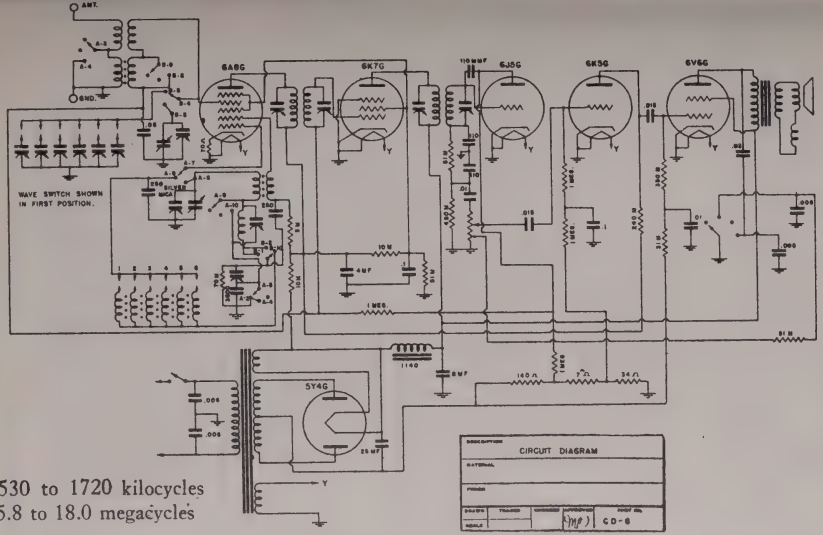


The frequency range of the automatic tuning circuits is as follows:

Circuits	Frequency Range
1 and 2	1550-970 Kilocycles
3 and 4	250-750 Kilocycles
5 and 6	970-540 Kilocycles

Replacement Parts

Item No.	Description	Part No.
83.	Padder	34137
84.	Oscillator Trans. Assy.	40141
85.	Padder	34136
86.	Oscillator Trans Assy.	4014
87.	Padder	34135
88.	Oscillator Trans. Assy	40138



530 to 1720 kilocycles
5.8 to 18.0 megacycles

Aligning I. F. System

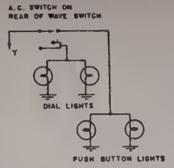
Connect a 470KC signal Generator to the grid of the 6A7 converter tube through a .002MFD condenser. Connect an output meter across the speaker voice coil. Turn receiver volume control on full and with wave switch in broadcast position, adjust trimmers (74) and (75) (See Fig. 2) for maximum output. Then adjust (71) and (73) for maximum reading. Repeat adjustments on (74) and (75).

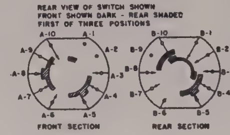
Broadcast and Short Wave Band Adjustments

Note: The following adjustments must proceed in the order specified

(1) Turn variable condenser to maximum capacity and set pointer as indicated in Fig. 3. Turn band selector switch to left or broadcast position. Tune set to a scale frequency of 1550KC and connect a 1550KC signal generator to the antenna post through a 200MMFD condenser. Loosen trimmer screw (66) and adjust trimmer (77) until signal is tuned in. Adjust trimmer (65) for maximum output.

(2) Then set band selector switch to extreme right or short wave position. Set signal generator to 18 megacycles and substitute a 400 ohm resistor for the 200MMFD condenser. Adjust trimmer (66) until signal is tuned in. At this point check the dial at 17.1 megacycles for the 18 megacycle image.




REAR VIEW OF SWITCH SHOWN FRONT SHOWN DARK - REAR SHADED FIRST OF THREE POSITIONS
FRONT SECTION
REAR SECTION

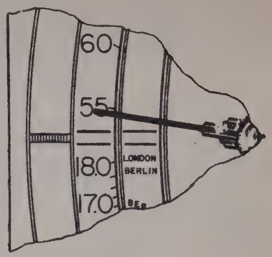
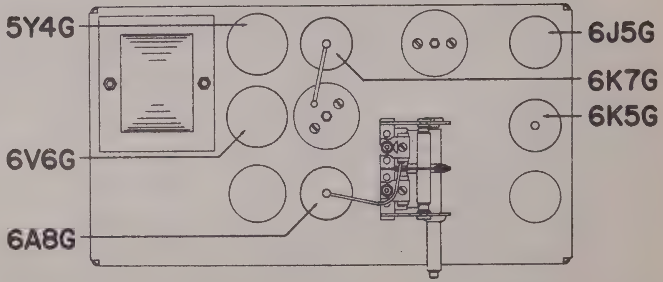


Fig. 3

TUBE TYPES AND POSITIONS



(3) Turn band selector switch to broadcast position and reset the signal generator to 1550KC. Substitute the 200MMFD condenser for the 400 ohm resistor in the generator lead and adjust trimmer screw (77) until signal is tuned in. Then tune receiver to 600KC on dial and with the signal generator, set to 600KC, rock the gang while adjusting trimmer (76) for maximum 1550KC and if incorrect, repeat 1550KC adjustment procedure outlined in Section (1).

All of the above adjustments must be made before pre-setting the "fingertip control" circuits.

MODELS 01006,01007 GOODYEAR TIRE & RUBBER CO., INC.

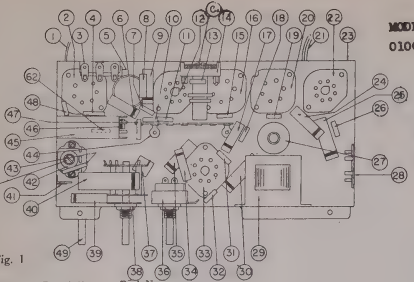
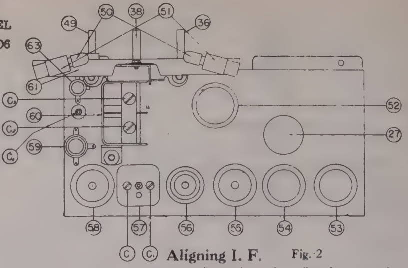


Fig. 1

MODEL

01006



Item No.	Description	Part No.
1.	Antenna Assembly	77110
2.	7 Prong Socket	15124
3.	Wire Panel 3 Lug	10103
4.	Resistor 300 Ohm 1 Watt	47122
5.	Tub. Cond. .001-1000 Volt	32113
6.	Tub. Cond. .05-200 Volt....	32114
7.	Res. 51,000 Ohm ½ Watt	47120
8.	Resistor, 300 Ohm 1 Watt	47122
9.	Tub. Cond. .05-200 Volt....	32114
10.	Res. 4,000,000 Ohm ½ Wt.	47125
11.	Res. 5,000 Ohm ½ Watt	47105
12.	8 Prong Socket	15118
13.	Res. 51,000 Ohm ½ Watt	47120
14.	2nd. I. F. Transformer	41102
15.	Res. 10,000 Ohm ½ Watt	47110
16.	6 Prong Socket	15123
17.	Tubular Cond. .02-200 Volt	32118
18.	Res. 240,000 Ohm ½ Watt	47128
19.	Res. 120,000 Ohm ½ Watt	47127
20.	6 Prong Socket	15128
21.	A. C. Cord & Plug	78110
22.	8 Prong Socket	15113
23.	Sub base	20110
24.	Tub. Cond. .03-400 Volt....	32113
25.	Tubular Cond. .1-200 Volt	32117
26.	Res. 51,000 Ohm ½ Watt	47120
27.	Electrolytic Condenser	31103
28.	Speaker Socket	15130
29.	Choke	42102
30.	Tubular Cond. .1-200 Volt	32117
31.	Res. 330,000 Ohm ½ Watt	47130
32.	Resistor 150 Ohm ½ Watt	47129
33.	8 Prong Socket	15113
34.	Tubular Cond. .01-200 Volt	32102
35.	Tubular Cond. .05-200 Volt	32114
36.	Volume Control	49102
37.	Mica Cond. 3500 MMFD	30102
38.	Wave Switch	65114
39.	Tub Cond. .05-200 Volt....	32123
40.	Tubular Cond. .25-200 Volt	32105
41.	Wire Panel 2 Lug	10101
42.	Padding Condenser	34109
43.	Mica Condenser Silvered.	30111
44.	Wire Panel 7 Lug	10107
45.	Oscil. Trans. Bc. & S. W.	40155
46.	Tub. Cond. .05-200 Volt....	32114
47.	Mica Cond. 600 MMFD....	30105
48.	Res. 120,000 Ohm ½ Watt	47127
49.	Tun. Cond Ft. & Dr. Assy.	20117
50.	Pilot Lamp	51101
51.	Pilot Lamp Socket Assy.	90111
52.	25L6G Tube	50113
53.	K49CG Tube	54109
54.	25Z5G Tube	50108
55.	75G Tube	50112
56	6K7M Tube	50127
57.	1st. I. F. Transformer	41109
58.	6A7G Tube	50110
59.	Ant. Trans. Broadcast	40153
60.	Variable Condenser	33107
61.	Dial Plate	20212
62.	Mica Cond. 50 MMFD....	30109
63.	Ant. Trans. Shortwave	40154
C-1	1st. I. F. Primary Padder	
C-2	Ant. Broadcast & S.W. Padder	
C-3	Shortwave & Oscillator Padder	
C-4	2nd. I. F. Padder	
C-5	Broadcast Oscillator Padder	
C-6	Broadcast Oscil. Series Padder	
C.	1st. I. F. Secondary Padder	
79.	Knob	13124
82.	Tuning Unit Switch	65114

Aligning I. F.

Fig. 2

Connect an output meter across the speaker voice coil and turn receiver volume control on full. Turn wave switch to manual position and variable condenser to extreme high frequency end of scale. Connect a 470 K.C. signal generator to the grid of the 6A7 tube through a condenser in the order of .002 Mfd capacity. Keep the signal to a low audible value and adjust trimmer (C4) (See Fig. 2) for maximum output. Then adjust trimmers (C) and (C1) (See Fig. 1 for maximum output. Finally repeat (C4) adjustment.

Broadcast and Shortwave Band Adjustments

Note: The following adjustments must proceed in order specified.

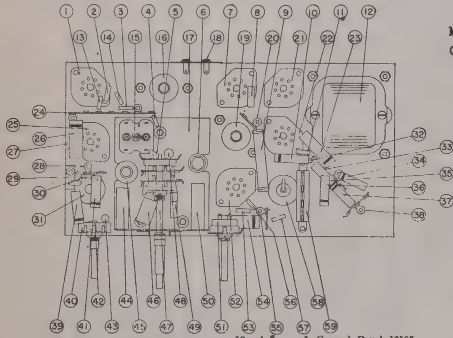
(1.) Turn variable condenser to maximum capacity and set pointer on small dot approximately 1-16 inch above top horizontal scale dividing line. Tune set to a scale frequency of 1550 K.C. and connect a 1550 K.C. generator to antenna lead through a 100 Mmfd condenser. Turn center knob to manual position. Volume control should be on full.

(2.) Loosen trimmer (C2) and adjust trimmer (C5), until signal is tuned in. Then adjust (C3) for maximum output.

(3.) Turn center knob to shortwave position, substitute a 400 ohm resistor for the condenser in the signal generator lead and set generator to a frequency of 18 megacycles. Tune set to 18 megacycles and adjust trimmer (C2) until signal is tuned in.

(4.) Turn center knob back to manual and substitute the 100 Mmfd condenser for the 400 ohm resistor in the generator lead. Set signal generator to 1550 K.C. Tune set to 1550 K.C. and adjust trimmer (C5) until signal is tuned in. Set signal generator to 600 K.C. With the set tuned close to 600 K.C. on the dial, vary the gang condenser slowly back and forth, adjusting (C6) at the same time until maximum output is indicated. Finally recheck dial for calibration accuracy against signal generator at the 1550 K.C. point. If found to be incorrect, repeat the 1550 K.C. adjustment procedure outlined in step number (1).

All of the above adjustments must be made before pre-setting the automatic circuits.



MODEL

01007

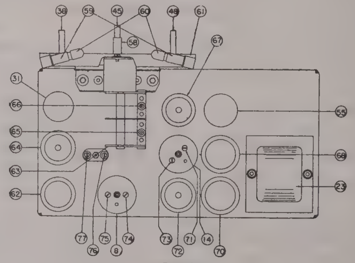
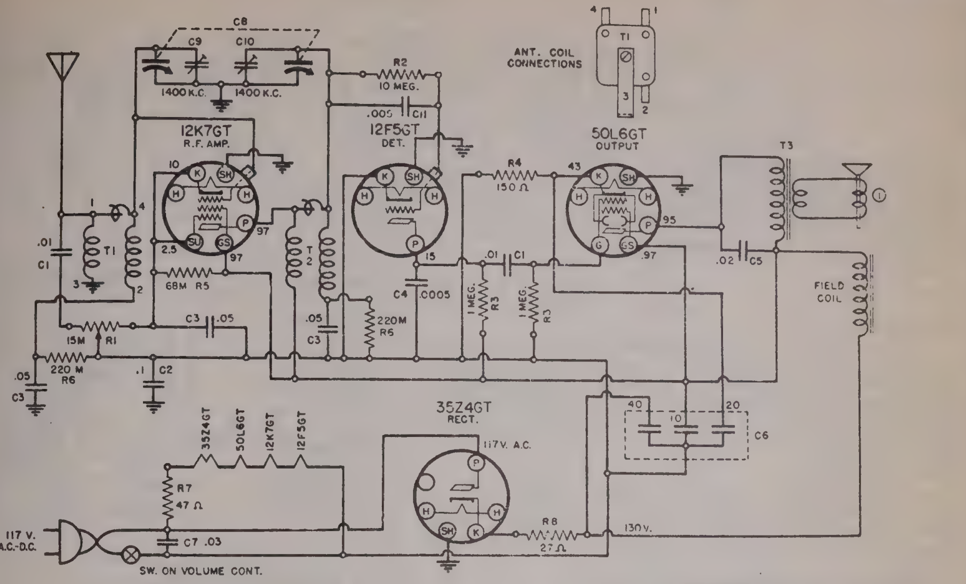


Fig. 2

Item No.	Replacement Parts Description	Part No.
1	7 Prong Socket	15119
2.	Mica Cond. 110 M. Mfd.	30101
3.	Res. 490,000 Ohm ½ Watt	47119
4.	Ris. 5,000 Ohm, ½ Watt	47105
5.	Res. 70,000 Ohm, ½ Watt	47135
6.	Ant. Trans. Short Wave	40116
7.	7 Prong Socket	15119
8.	Res. 10,000 Ohm, 1 Watt	47114
9.	Res. 10,000 Ohm; 3 Watt	47115
10.	Tubu. Cond. .01-200 Volt	32102
11.	Res. 330,000 Ohm, ½ Watt	47130
12.	Power Transformer	42101
13.	Res. 1,000,000 Ohm, ½ W.	47106
14.	Res. 1,000,000 Ohm, ½ W.	47106
15.	Padding Condenser	34108
16.	2nd. I. F. Transformer....	41104
17.	R. F. Base	20114
18.	Antenna & Ground Panel	10105
19.	Ist. I. F. Transformer	41105
20.	Wire Panel 2 Lug...........	10101
21.	7 Prong Socket...............	15119
22.	7 Prong Socket	11119
23.	Tubu. Cond. .03-600 Volt	32110
24.	Wire Panel 17 Lug	10106
25.	7 Prong Socket	15119
26.	Tubular Cond. .1-200 Volt	32117
27.	Res. 240,000 Ohm, ½ W..	47128
28.	Wire Panel 3 Lug	10103
29.	Wire Panel 2 Lug	10101
30.	Res. 1,000,000 Ohm, ½ W.	47106
31.	Electrolytic Condenser	31102
32.	Res. 51,000 Ohm, ½ W.....	47120
33.	Wire Panel 4 Lug	10104
34.	Pap. M'ld Cond. .006-400V	32125
35.	Tub. Cond. .015-400V.	32112
36.	Tub. Cond. .006-400V....	32107
37.	Pap. M'ld. Cond. .006-400V	32125
38.	Wire Panel 2 Lug	10102
39.	Tub. Condenser .01-200V	32102
40.	Volume Control	49107
41.	Tubuler Cond. .015-200V	32109
42.	Res. 51,000 Ohm, ½ Watt	47120
43.	Tub. Cond. .006-200V.....	32104
44.	Oscill'tr Trans. Broadc'st	40145
45.	Antenna Trans. Br'dc'st.	40144
46.	Mica Condenser Silvered	30111
47.	Wave Switch	65113
48.	Tub. Cond. .05-200V.........	32123
49.	Mica Cond. 3500 M-Mfd.	30103
50.	Oscillator Trans. Srt. W've	40117
51.	Tone Cont. & Line Sw't'ch	66101
52.	7 Prong Socket	15119
53.	Res. 51,000 Ohm, ½ Watt	47120
54.	Tubular Cond. .1-400 V.	32111
55.	Wire Panel 2 Lug	10101
56.	Res. 70 Ohm. ½ Watt.....	47134
57.	6A8G Tube	50105
58.	6V6G Tube	50104
59.	B. C. Resistor	48100
60.	Pilot Lamp	51102
61.	Scale Plate	20123
62.	6J5G Tube	50103
63.	Variable Condenser........	33104
64.	6K5G Tube	50109
65.	Bro'dc'st & Shortw've, Ant. Pad	
66.	Shortwave Oscillator Pad.	
67.	6T8G Tube	50106
68.	6V6G Tube	5010A
69.	Pilot Lamp. Soc. Assembly	90132
70.	5Y4G Tube	50105
71.	1st. I. F. Primary Pad	
72.	JK7G Tube	50107
73.	1st. I. F. Secondary Pad.	
74	2nd. I. F. Primary Pad	
75	2nd. I. F. Secondary Pad.	
76.	Br'd'c'st Series Oscillator Pad	
77.	Broadcast Parallel Oscil. Pad.	
78.	Drive Shaft	21126
79.	Knob	13124
80.	Pilot Lamp Soc't Assem.	
81.	Pilot Lamp	51102
82.	Push Button Switch	65112

©John F. Rider, Publisher

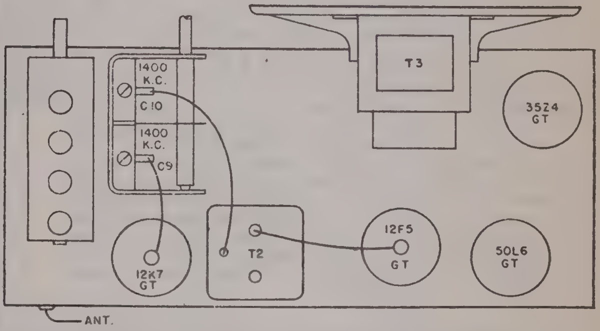
GOODYEAR TIRE & RUBBER CO., INC. MODELS 015140, 015141



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.

9-462



SETTING PUSH-BUTTONS:

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the top of the dial.
2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.
The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

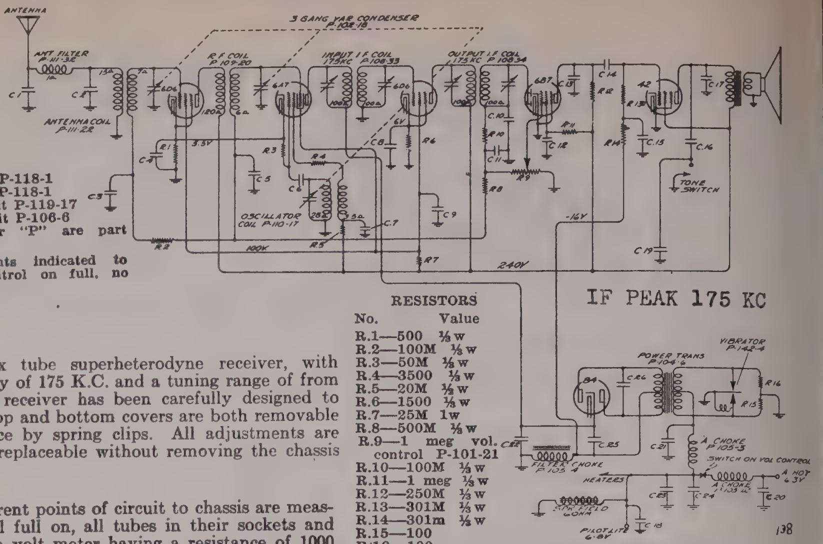
Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.

MODEL 690

GOODYEAR TIRE & RUBBER CO., INC.



IF PEAK 175 KC

NOTE:

C.4 and C.9 are in one unit P-118-1
C.7 and C.8 are in one unit P-118-1
C.22 and C.25 are in one unit P-119-17
R.16 and R.15 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.

Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

Serial No. 40001 up.

RESISTORS

No. Value
R.1—500 ⅓ w
R.2—100M ⅓ w
R.3—50M ⅓ w
R.4—3500 ⅓ w
R.5—20M ⅓ w
R.6—1500 ⅓ w
R.7—25M 1w
R.8—500M ⅓ w
R.9—1 meg vol. control P-101-21
R.10—100M ⅓ w
R.11—1 meg ⅓ w
R.12—250M ⅓ w
R.13—301M ⅓ w
R.14—301m ⅓ w
R.15—100
R.16—100

CONDENSERS

No. Value
C.1—20 mmf mica
C.2—20 mmf mica
C.3—.01x400v
C.4—.1x200v
C.5—.05x200v
C.6—100 mmf mica
C.7—.1x200v
C.8—.1x200v
C.9—.1x200v
C.10—100 mmf mica
C.11—100 mmf mica
C.12—.1x200v
C.13—100 mmf mica
C.14—.01x400v
C.15—.25x400v
C.16—.025x400v
C.17—.006x600v
C.18—500 mmf mica
C.19—500 mmf mica
C.20—2000 mmf mica
C.21—1.0 mfdx120v
C.22—8 mfd x300v
C.23—.5 mfd x120v
C.24—.01x400v
C.25—8 mfd x300v
C.26—.01x400v

DESCRIPTION:

Model 690 is a six tube superheterodyne receiver, with an intermediate frequency of 175 K.C. and a tuning range of from 520 to 1550 K.C. This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips. All adjustments are accessible and any part replaceable without removing the chassis from the cabinet.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

On open and convertible models where underslung strap or plate antennas are used it may be necessary to ground the exhaust pipe and muffler to the frame at both ends with heavy copper braid

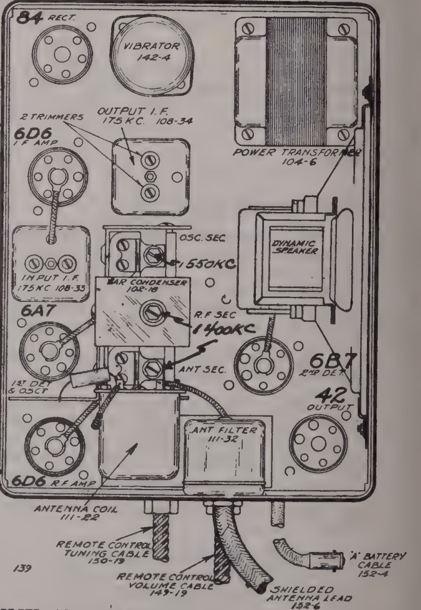
CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before connecting to short battery cable from receiver.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

GENERATOR INTERFERENCE:

Remove the generator cutout mounting screw and fasten the condenser (148-1) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely. Connect the condenser lead to the battery terminal of the cutout. The generator condenser is absolutely necessary as it is used to eliminate a high pitched whining noise which would otherwise be heard as the motor is accelerated.



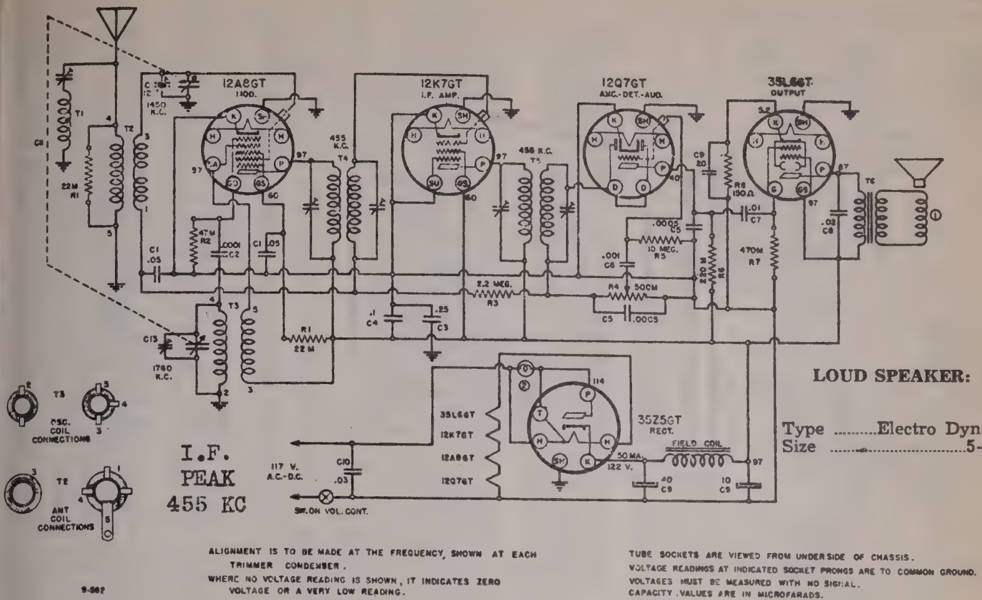
DUMMY ANTENNAS

I.F. —A .1 mfd. condenser connected in series with the test oscillator output lead.

Broadcast —A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

GOODYEAR TIRE & RUBBER CO., INC. MODELS 015150, 015151



ALIGNMENT IS TO BE MADE AT THE FREQUENCY, SHOWN AT EACH TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

LOUD SPEAKER:

Type	Electro Dynamic
Size	5-inch

PILOT LAMP:

The pilot lamp is a 6.3 volt 150 Mill. type (No. 47) and should be replaced with such, in order that the filament voltages across the radio tubes do not change.

FREQUENCY RANGE:

Broadcast	538 K.C. to 1760 K.C.

ALIGNMENT FREQUENCIES:

Antenna Trimmer	Oscillator Trimmer
1450 KC	1760 KC

INTERMEDIATE FREQUENCY ....455 K.C.

POWER SUPPLY:

Power Main	105-130 Volts AC/DC
Power Consumption	30 Watts

POWER OUTPUT:

Type	Single Class A
Undistorted	1.4 Watts
Maximum	2 Watts

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections	**Across Loud Speaker Voice Coil**
Output Meter Reading to Indicate 1 Watt	**1.95 Volts**
Generator Ground Lead Connection	**Receiver Chassis**
Dummy Antenna Value to Be in Series with Generator Output	**See Chart Below**
Connection of Generator Output Lead	**See Chart Below**
Generator Modulation	**30%, 400 Cycles**
Position of Volume Control	**Fully On**

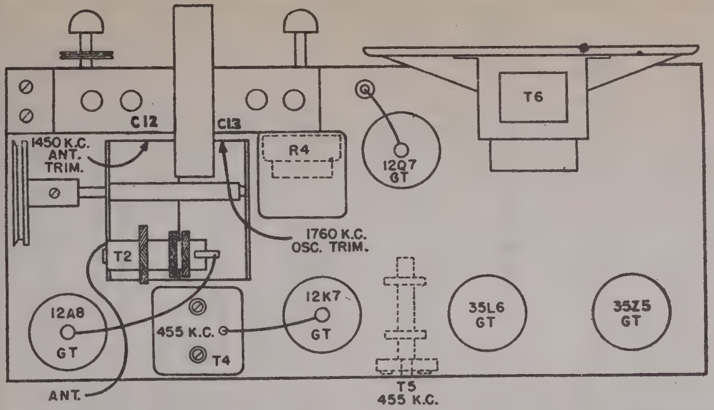
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTIONS	TRIMMER ADJUSTMENT (In Order Shown)	TRIMMER FUNCTION
Closed	455 Kc.	.1 mfd.	12A8GT	T4-T5	I. F.
Closed	455 Kc.	.0002 mfd.	Antenna Conn.	T1 (Min. Output)	Wave Trap
Fully Open	1760 K.C.	.0002 mfd.	Antenna Conn.	C13	Osc. Trimmer
Fully open	1450 K.C.	.0002 mfd.	Antenna Conn.	C12	Ant. Trimmer

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

When adjusting T1, Antenna Wave Trap, Trimmer, increase generator output. To obtain clearly defined trimmer setting for a minimum output.

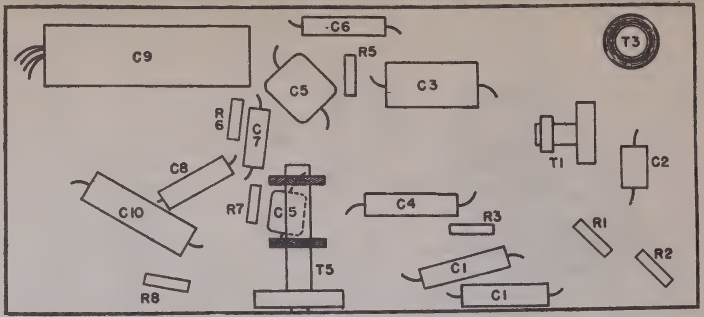
MAR. 21, 1939



LOCATION OF PARTS ON TOP OF CHASSIS

C10		Condenser .03 mf. 600V
C8		Condenser .02 mf. 400V
C5		Condenser .0005 mf. mica
C7		Condenser .01 mf. 200V
C2		Condenser .0001 mf. mica
C1		Condenser .05 mf. 200V
C6		Condenser .001 mf. 400V
C3		Condenser .25 mf. 200V
C4		Condenser .1 mf. 200V
C9	1012118239	Condenser Electrolytic (40x10) & 20 mf.
C11	1012019132	Condenser Variable C12 & C13
R4	1012524134	Control Volume 500M
R7		Resistor 470M ohm 1/3W
R6		Resistor 220M ohm 1/3W
R3		Resistor 2.2 meg. ohm 1/3W
R1		Resistor 22M ohm 1/3W
R2		Resistor 47M ohm 1/3W
R5		Resistor 10 meg. ohm 1/3W
R8		Resistor 150 ohm 1/3W
T2	1011810239	Transformer Antenna
T4	1015510241	Transformer 1st I.F.
T5	1015710283	Transformer 2nd I.F.
T3	1011810240	Transformer Oscillator
T1	1016310256	Wave Trap (coil & trimmer)

FOR SETTING OF PUSH-BUTTONS SEE MODEL 015140



LOCATION OF PARTS UNDER CHASSIS

HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS:

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser shaft must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the operation of the push-button to the variable gang condenser; first, a driver lever or link connected to the tuner lever bar, (see Pictorial); second, a driven lever arm connected to the gang condenser shaft; and third, a connecting link, connecting the two lever arms together mechanically.

The plunger bar that retains the screw type push-buttons, also holds a cam to itself by a shoulder rivet. This cam floats on the rivet proper and is locked into position with a small square plate, floating in the plunger bar. To lock cam into position, screw the push-button knob toward the right (clock-wise). The end of the push-button screw will then force a small square plate known as a brake shoe against the periphery of the cam. The push-button must be tightened firmly after the position of the station selection is determined. To change the setting of the cam, the push-button knob must be loosened by rotating it toward the left (counter-clockwise). When this push-button screw is loosened, it will automatically release the brake shoe from the cam, leaving the cam free to rotate and set its new position to the setting of the lever bar.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Attach driver arm to the lever bar by means of two machine screws, making sure that they are assembled with lockwashers and tightened securely.

2. Slip the drum assembly, which consists of the drum, drum hub, and the driven arm, over the variable condenser shaft but do not tighten set screws.

3. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight bend (offset) about 1/3 of its length and is to be installed with the shorter end towards the top and the offset towards the rear when looking at it from the drum end. Attach the tension spring between the two shoulder rivets. This spring is incorporated to take up all the unnecessary slack in the drive.

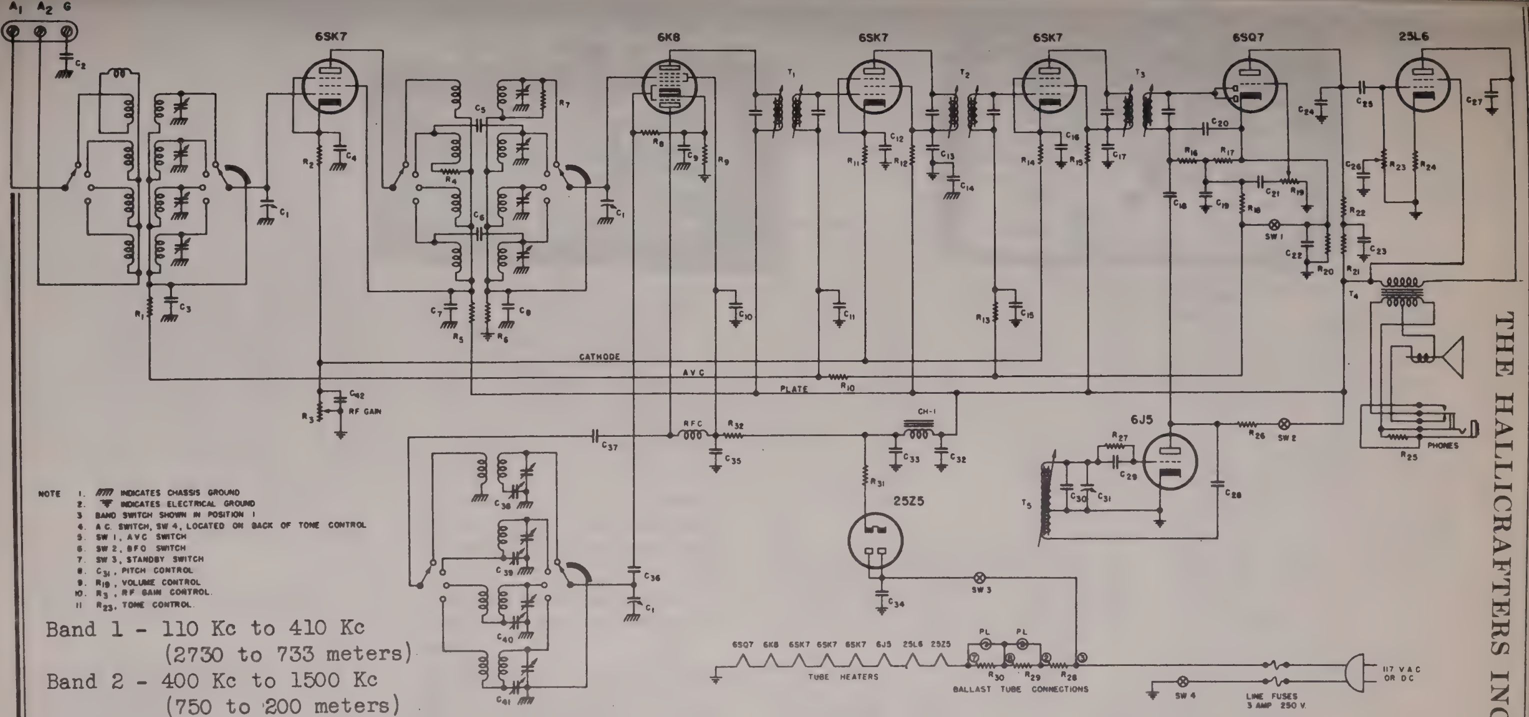
4. In making the final adjustment, that of setting the condenser in relation to the tuner, close the condenser completely to maximum capacity and rotate drum with the left hand in a clock-wise rotation, until the driver arm comes gradually down to within ⅛ of an inch of the variable condenser shaft. When in this position, tighten set screws in the drum hub with the right hand.

It is essential that all set screws be tightened securely so as to prevent a variation from original setting.

If, for some reason, a replacement is necessary for some particular item on the tuner proper, such as a lever bar, cam, plunger bar or brake shoe, it would be advisable to return the complete tuner proper for replacement.

THE HALLICRAFTERS INC.

MODEL S-22R
Skyrider Marine



NOTE
1. ⫽ INDICATES CHASSIS GROUND
2. ⏚ INDICATES ELECTRICAL GROUND
3. BAND SWITCH SHOWN IN POSITION 1
4. A.C. SWITCH, SW 4, LOCATED ON BACK OF TONE CONTROL
5. SW 1, AVC SWITCH
6. SW 2, BFO SWITCH
7. SW 3, STANDBY SWITCH
8. C_{31}, PITCH CONTROL
9. R_{19}, VOLUME CONTROL
10. R_3, RF GAIN CONTROL.
11. R_{23}, TONE CONTROL.

Band 1 - 110 Kc to 410 Kc
(2730 to 733 meters)
Band 2 - 400 Kc to 1500 Kc
(750 to 200 meters)
Band 3 - 1.7 Mc to 5.9 Mc
(177 to 51 meters)
Band 4 - 5.3 Mc to 18 Mc
(56 to 16.7 meters)

NOTE: The SKYRIDER MARINE Model S22R is an AC-DC receiver which operates on 110/125 volts only. Should operation be desired from a lower voltage DC source, an external converter delivering 110/125 volts should be used. A 220 volt DC Model S22R is available on order and uses a special line cord with dropping resistor.

If an inverted "L" antenna is used, connect lead-in to A_1 and leave the jumper between A_2 and G. If an "all wave" doublet is used, connect the transmission line to A_1 and A_2 with the jumper removed from A_2 and G. A separate antenna may be used for one s-w band; use a half-wave antenna whose length can be calculated from

$$\text{Length in feet} = \frac{463}{\text{Frequency in megacycles}}$$

MODEL S-22R
Skyrider Marine

THE HALLICRAFTERS INC.

ALIGNMENT PROCEDURE

ALIGNMENT INSTRUCTIONS:

Equipment needed for aligning:
1 - An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.
2 - Output indicating meter connected to a headphone plug, and inserted in the headphone jack.
3 - Non-metallic screw driver.
4 - Dummy antenna of .002 mfd. condenser and 400 ohm resistor.

SETTING OF CONTROLS PRIOR TO ALIGNMENT - IF AND RF.

1 - Tone control at maximum high frequency position.
2 - AVC switch OFF.
3 - BFO switch OFF.
4 - RF Gain at maximum.
5 - AF gain at maximum.

1600 Kc IF ALIGNMENT.

Tune receiver to 5,000 Kc with the band switch in #3 position.

Connect hot side of signal generator to 6K8 grid cap through 1 MFD condenser - ground of generator to the chassis. Signal generator output - 1,600 Kc.

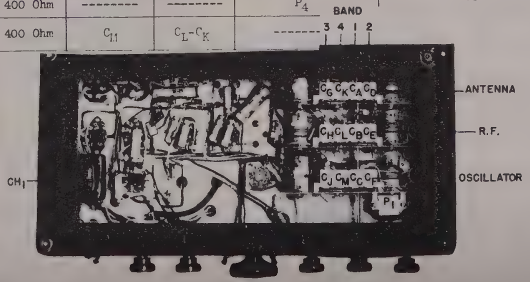
Adjust screws S1 to S6 inclusive on IF transformers T 1-2-3 for maximum gain.

BFO ADJUSTMENT - With a 1600 Kc signal being fed into the IF amplifier, and the BFO switch ON, place the Pitch Control with the white dot UP. Now adjust the screw S7 on the top of T5 for zero beat. Further adjustment of the Pitch Control from the front of the panel will enable you to vary the frequency of the beat note to your satisfaction.

R.F. ALIGNMENT

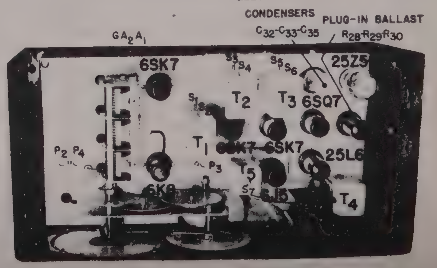
Connect hot Lead of Signal Generator to A_1 through dummy Antenna shown in Table. Leave Jumper connected between A_2 and G. Ground of Generator to Chassis.

BAND	REC. DIAL SETTING	SIG. GEN. FREQ.	DUMMY ANTENNA	HIGH FREQUENCY END		LOW FREQUENCY END
				ADJUST OSC WITH	ADJUST TRIMMERS WITH	ADJUST OSCILLATOR WITH
1	125 Kc	125 Kc	.002 mfd	--------	--------	P_1
	350 Kc	350 Kc	.002 mfd	C_C	C_A-C_B	--------
2	450 Kc	450 Kc	.002 mfd	--------	--------	P_2
	1400 Kc	1400 Kc	.002 mfd	C_F	C_E-C_D	--------
3	2 Mc	2 Mc	400 Ohm	--------	--------	P_3
	4.5 Mc	4.5 Mc	400 Ohm	C_J	C_G-C_H	--------
4	7 Mc	7 Mc	400 Ohm	--------	--------	P_4
	15 Mc	15 Mc	400 Ohm	C_M	C_L-C_K	--------



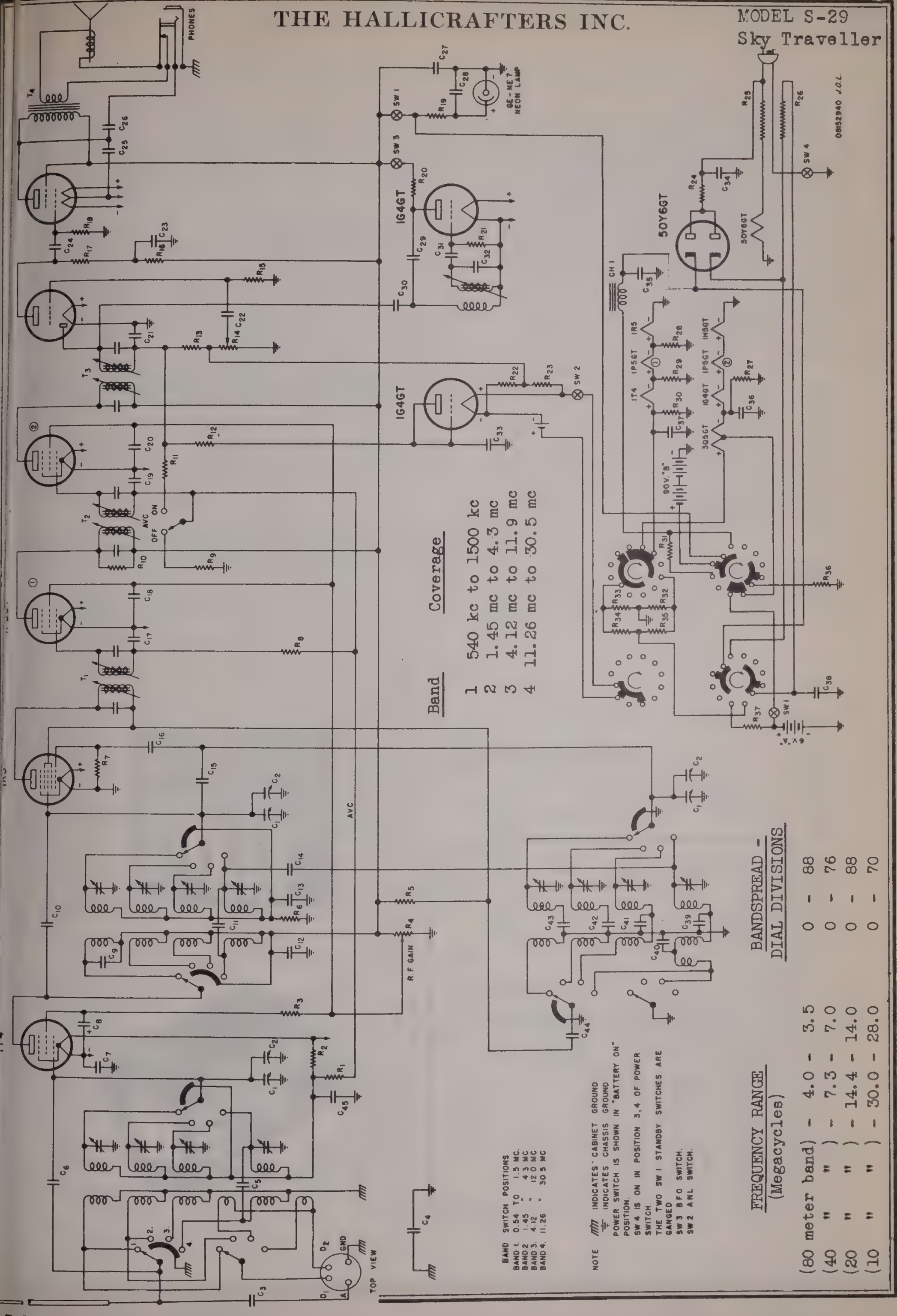
NO.	VALUE	VOLTAGE OR PURPOSE	TYPE
C_1	Tuning Condenser	563 mmfd per section	
C_2	.01 mfd	400 V.	Paper
C_3	.05 mfd	400 V.	Paper
C_4	.05 mfd	400 V.	Paper
C_5	5 mmf		Ceramicon
C_6	5 mmf		Ceramicon
C_7	.25 mfd	400 V.	Paper
C_8	.05 mfd	400 V.	Paper
C_9	.05 mfd	400 V.	Paper
C_{10}	.1 mfd	400 V	Paper
C_{11}	.02 mfd	400 V.	Paper
C_{12}	.02 mfd	400 V.	Paper
C_{13}	.01 mfd	400 V.	Paper
C_{14}	.25 mfd	400 V.	Paper
C_{15}	.02 mfd	400 V.	Paper
C_{16}	.02 mfd	400 V.	Paper
C_{17}	.01 mfd	400 V.	Paper
C_{18}	10 mmf		Ceramicon
C_{19}	100 mmf		Mica
C_{20}	100 mmf		Mica
C_{21}	.02 mfd	400 V.	Paper
C_{22}	10 mf	25 V.	Electrolytic
C_{23}	.05 mfd	400 V.	Paper
C_{24}	250 mfd		Mica
C_{25}	.05 mfd	400 V.	Paper
C_{26}	.01 mfd	400 V.	Paper
C_{27}	.005 mfd	600 V.	Paper
C_{28}	.01 mfd	400 V.	Paper
C_{29}	250 mmfd		Mica
C_{30}	200 mmfd		Mica
C_{31}	5 mmf	BFO Pitch Con.	Air Variable
C_{32}	40 mfd	150 V.	Electrolytic
C_{33}	40 mfd	150 V.	Electrolytic
C_{34}	.05 mfd	400 V.	Paper
C_{35}	30 mfd	150 V.	Electrolytic
C_{36}	100 mmfd		Mica
C_{37}	2000 mmfd		Mica
C_{38}	32 mmfd	Band 1 Pad	
C_{39}	110 mmfd	Band 2 Pad	
C_{40}	480 mfd	Band 3 Pad	
C_{41}	1300 mfd	Band 4 Pad	
C_{42}	.1 mfd	200 V.	Paper
SW1		A.V.C. "ON-OFF"	
SW2		B.F.O. "ON-OFF"	
SW3		Standby	
SW4		A.C.-D.C. Line	

NO.	VALUE IN OHMS	WATTAGE OR PURPOSE
R_1	100,000	1/3
R_2	300	1/3
R_3	25,000	R. F. Gain Control
R_4	400	1/3
R_5	1,000	1/3
R_6	100,000	1/3
R_7	100,000	1/3
R_8	50,000	1/3
R_9	400	1/3
R_{10}	100,000	1/3
R_{11}	500	1/3
R_{12}	1,000	1/3
R_{13}	100,000	1/3
R_{14}	400	1/3
R_{15}	1,000	1/3
R_{16}	100,000	1/3
R_{17}	250,000	1/3
R_{18}	1 Meg.	1/3
R_{19}	500,000	Audio Gain Control
R_{20}	7,500	1/3
R_{21}	100,000	1/3
R_{22}	250,000	1/3
R_{23}	500,000	Tone Control
R_{24}	140	1/2
R_{25}	100	1/2
R_{26}	5,000	1/3
R_{27}	250,000	1/3
R_{28}	Plug-in Ballast Tube	Muter-Type BK29D
R_{29}	Plug-in Ballast Tube	Muter-Type BK29D
R_{30}	Plug-in Ballast Tube	Muter-Type BK29D
R_{31}	25	1 Watt
R_{32}	4,000	½ Watt



THE HALLICRAFTERS INC.

MODEL S-29
Sky Traveller



Coverage

Band	
1	540 kc to 1500 kc
2	1.45 mc to 4.3 mc
3	4.12 mc to 11.9 mc
4	11.26 mc to 30.5 mc

BAND	SWITCH POSITIONS
BAND 1.	0.54 TO 1.5 MC.
BAND 2	1.45 " 4 3 MC
BAND 3.	4.12 " 12 0 MC
BAND 4.	11.26 " 30 5 MC

NOTE

▥ INDICATES CABINET GROUND

⏚ INDICATES CHASSIS GROUND

POWER SWITCH IS SHOWN IN "BATTERY ON" POSITION.

SW 4 IS ON IN POSITION 3, 4 OF POWER SWITCH.

THE TWO SW 1 STANDBY SWITCHES ARE GANGED

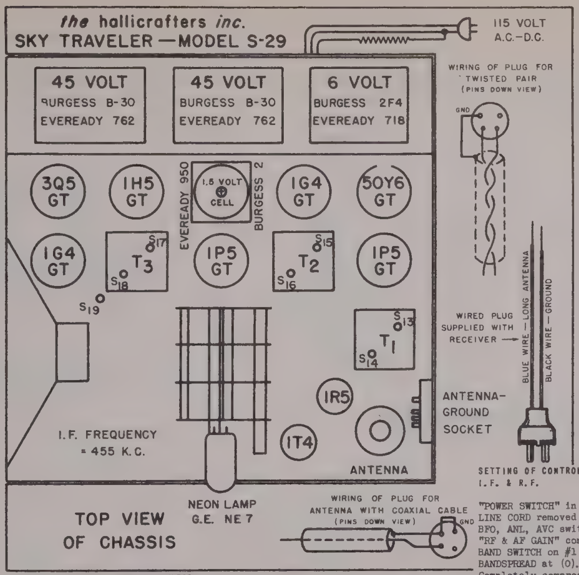
SW 3 BFO SWITCH.

SW 2 ANL SWITCH.

FREQUENCY RANGE (Megacycles)	BANDSPREAD - DIAL DIVISIONS
(80 meter band) - 4.0 - 3.5	0 - 88
(40 " ") - 7.3 - 7.0	0 - 76
(20 " ") - 14.4 - 14.0	0 - 88
(10 " ") - 30.0 - 28.0	0 - 70

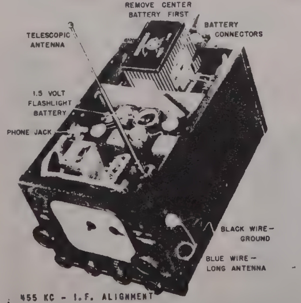
MODEL S-29
Sky Traveller

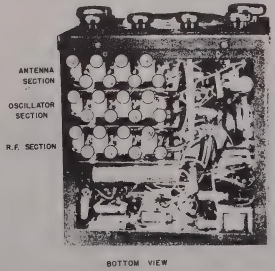
THE HALLICRAFTERS INC.


the hallicrafters inc.
SKY TRAVELER — MODEL S-29
115 VOLT A.C.–D.C.
45 VOLT BURGESS B-30 EVEREADY 762
45 VOLT BURGESS B-30 EVEREADY 762
6 VOLT BURGESS 2F4 EVEREADY 718
3Q5 GT
1H5 GT
1.5 VOLT CELL
EVEREADY 950
BURGESS 2
1G4 GT
50Y6 GT
1G4 GT
T3
S17
S18
S19
1P5 GT
T2
S15
S16
1P5 GT
T1
S13
S14
1R5
1T4
ANTENNA
I.F. FREQUENCY = 455 K.C.
NEON LAMP G.E. NE 7
TOP VIEW OF CHASSIS
WIRING OF PLUG FOR TWISTED PAIR (PINS DOWN VIEW)
GND
WIRED PLUG SUPPLIED WITH RECEIVER
BLUE WIRE — LONG ANTENNA
BLACK WIRE — GROUND
ANTENNA-GROUND SOCKET
WIRING OF PLUG FOR ANTENNA WITH COAXIAL CABLE (PINS DOWN VIEW)
GND

SETTING OF CONTROLS PRIOR TO ALIGNMENT I.F. & R.F.

"POWER SWITCH" in "BAT" position.
LINE CORD removed from outlet.
BFO, ANL, AVC switches "OFF".
"RF & AF GAIN" controls for maximum vol
BAND SWITCH on #1 Band.
BANDSPREAD at (0).
Completely compress the telescopic ant





BOTTOM VIEW

455 KC - I.F. ALIGNMENT

Set "MAIN TUNING" control at 1500 kc.
Have antenna plug removed from antenna socket.
Tune generator to 455 kc.
Connect low side (GND) of generator to chassis.
Connect high side (HOT) of generator to lug on rear Stator section (R.F.) of main tuning condenser through a 0.1 mfd condenser.
Proceed to adjust the screws S_{13} to S_{18} inclusive protruding from the tops of the I.F. transformers, T_1, T_2 and T_3, for maximum output.

Without changing the frequency of the generator after completing I.F. alignment - turn BFO switch "ON" and remove modulation from the signal generator. Adjust screw S_{19} to the desired tone (approximately 1000 cycles).

NOTE: - It is also possible to adjust the BFO without the aid of the signal generator by tuning a signal to exact resonance with the BFO switch "OFF" - with BFO "ON" adjust S_{19} to desired tone.

Insert "long-antenna" plug, furnished with receiver, into antenna socket and connect generator as indicated in chart below. A condenser in the receiver in series with the blue lead compensates for the reduction in capacity when the antenna is folded and the covers removed - thus, a dummy antenna is unnecessary.

NOTE: - On #3 and 4 Bands, it may be necessary to "rock" the main tuning condenser to compensate for slight shifts in oscillator frequency. When adjusting the trimmers and slugs for maximum gain, the oscillator frequency is 455 kc. less than the signal frequency on #4 band.

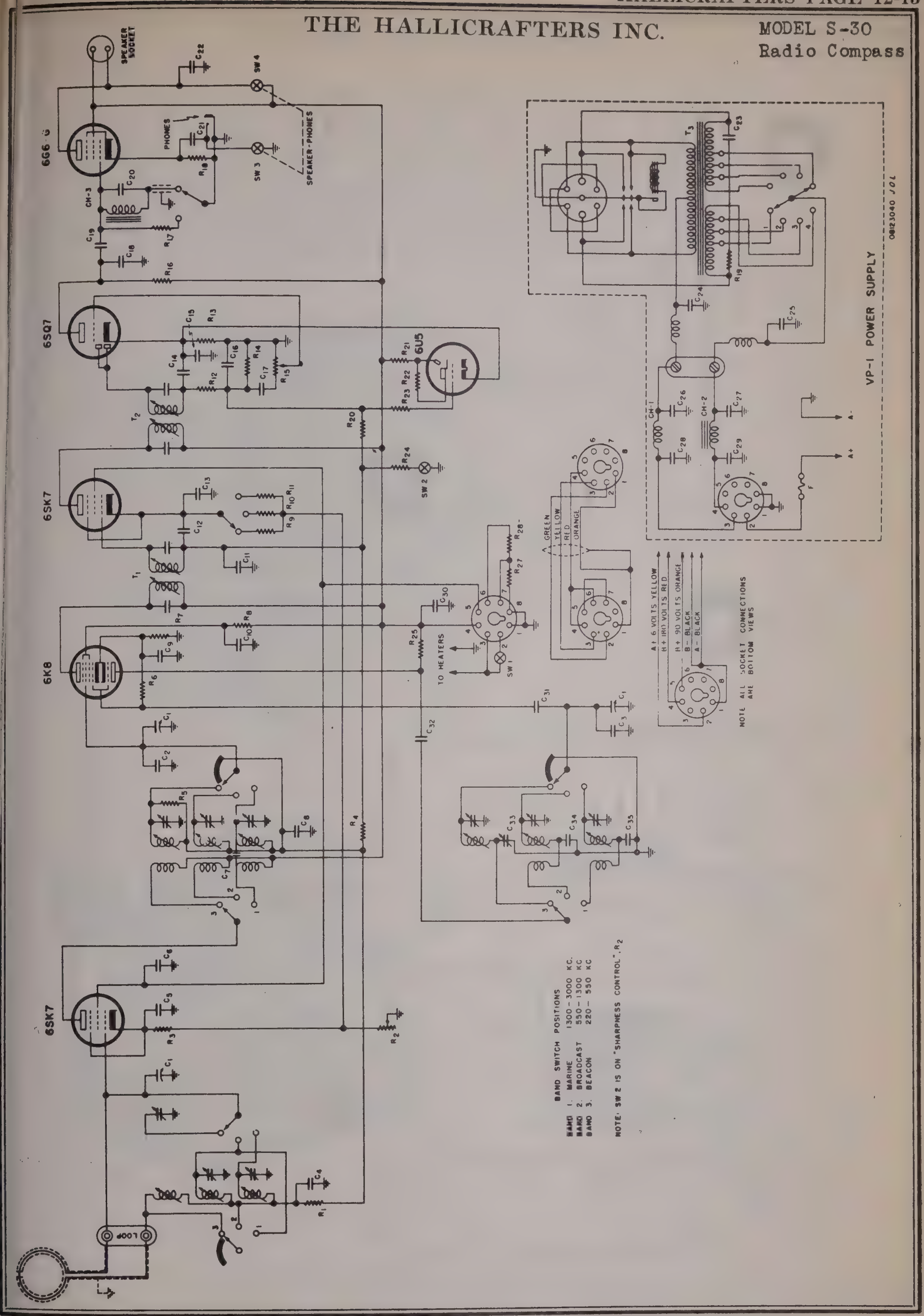
Connect hot lead of signal generator to BLUE wire of antenna plug and low side of generator to BLACK wire. A dummy antenna is unnecessary.

Band	Signal Generator Frequency and Receiver Dial Setting	Oscillator Frequency Relative to Signal	HIGH FREQUENCY END		LOW FREQUENCY END	
			Adjust Osc. with	Adjust Trimmers For Max. Grain	Adjust Osc. with	Adjust Slugs For Max. Grain
1	1.4 mc	Above	C_B	C_A C_C		
	.6				S_2	S_1 S_3
2	4.0	Above	C_E	C_D C_F		
	1.6				S_5	S_4 S_6
3	11.0	Above	C_H	C_G C_J		
	5.0				S_8	S_7 S_9
4	28.0	Below	C_L	C_K C_M		
	14.0				S_{11}	S_{10} S_{12}

No.	Capacity	Voltage	Type	No.	Ohms	Wattage
C1	Main Tuning Gang		air	R1	2 megs	1/3
2	Bandspread Gang		air	2	2 megs	1/3
3	25 mmfd		ceramicon	3	9000	1/3
4	0.1 mfd	400	paper	4	500,000 R.F. Gain	
5	10 mmfd		ceramicon	5	5,000	1/3
6	5 mmfd		ceramicon	6	2 megs	1/3
7	.05 mfd	200	paper	7	100,000	1/3
8	.01 mfd	400	paper	8	1 meg	1/3
9	15 mmfd		ceramicon	9	2 megs	1/3
10	5 mmfd		ceramicon	10	40,000	1/3
11	5 mmfd		ceramicon	11	2 megs	1/3
12	.05 mfd	200	paper	12	1 meg	1/3
13	.05 mfd	200	paper	13	100,000	1/3
14	3 mmfd		twisted pair	14	500,000 A.F. Gain	
15	2 mmfd		twisted pair	15	10 megs	1/3
16	50 mmfd		mica	16	100,000	1/3
17	.05 mfd	200	paper	17	500,000	1/3
18	.01 mfd	400	paper	18	500,000	1/3
19	.05 mfd	200	paper	19	400,000	1/3
20	.01 mfd	400	paper	20	50,000	1/3
21	50 mmfd		mica	21	50,000	1/3
22	.003 mfd	400	paper	22	300	1/3
23	0.1 mfd	200	paper	23	1100	1/3
24	0.01 mfd	400	paper	24	25	1
25	.005 mfd	400	paper	25	450	line cord
26	.01 mfd	400	paper	26	450	line cord
27	60 mfd	150	electrolytic	27	1100	1/3
28	.02 mfd	200	paper	28	500	1/3
29	.01 mfd	400	paper	29	550	1/3
30	2 mmfd		twisted pair	30	600	1/2
31	100 mmfd		mica	31	9000	1/3
32	500 mmfd		mica	32	900	1/3
33	.05 mfd	200	paper	33	800	1
34	.05 mfd	400	paper	34	800	3
35	60 mfd	150	electrolytic	35	845	3
36	100 mfd	40	electrolytic	36	750	1/3
37	60 mfd	40	electrolytic	37	2000	2
38	60 mfd	150	electrolytic			
39	4230 mmfd		mica			
40	250 mmfd		mica			
41	2030 mmfd		mica			
42	880 mmfd		mica			
43	380 mmfd		mica			
44	.01 mfd	400	paper			
45	.05 mfd	200	paper			

THE HALLICRAFTERS INC.

MODEL S-30
Radio Compass



MODEL S-30
Radio Compass

THE HALLICRAFTERS INC.

PARTS LIST

RESISTORS

NO.	OHMS	WATTAGE
1	200,000	1/2
2	10,000	R. F. Gain Control
3	400	1/2
4	200,000	1/2
5	250,000	1/2
6	50,000	1/2
7	300	1/2
8	30,000	1
9	1,000	1/2
10	400	1/2
11	200	1/2
12	50,000	1/2
13	2,000	1/2
14	200,000	1/2
15	500,000	Audio Gain Control
16	500,000	1/2
17	1 Meg.	1/2
18	600	1/2
19	200	1/2
20	1 Meg.	1/2
21	1 Meg.	1/2
22	1 Meg.	1/2
23	2 Meg.	1/2
24	200	1/2
25	15,000	1
26		
27	30,000	1/2
28	15,000	1/2

CONDENSERS

NO.	CAPACITY	VOLTAGE	TYPE
1	530 mmf	Per Section	Air
2	50 mmf		Ceramicon
3	50 mmf		Ceramicon
4	.05 mfd	400	Paper
5	.05 mfd	400	Paper
6	0.1 mfd	400	Paper
7	10 mmf		Ceramicon
8	.05 mfd	400	Paper
9	.05 mfd	400	Paper
10	.02 mfd	400	Paper
11	.05 mfd	400	Paper
12	.01 mfd	400	Paper
13	.01 mfd	400	Paper
14	.0001 mfd		Mica
15	10 mfd	25	Elect.
16	.0001 mfd		Mica
17	.01 mfd	400	Paper
18	.00025 mfd		Mica
19	.01 mfd	400	Paper
20	.0075 mfd		Mica
21	20 mfd	50	Elect.
22	.01 mfd	600	Paper
23	.01 mfd	1600	Paper
24	.02 mfd	600	Paper
25	.5	200	Paper
26	8 mfd	450	Elec.
27	30 mfd	25	Elec.
28	8 mfd	450	Elec.
29	30 mfd	25	Elec.
30	.25	400	Paper
31	.0001 mfd		Mica
32	.001 mfd		Mica
33	No.44066 800 mmf		Variable Pad
34	.0019 mfd		2½% Mica
35	.0037		5% Mica

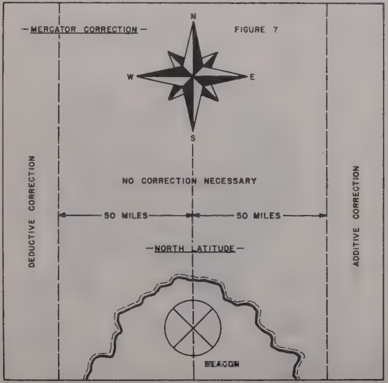


FIGURE 7

ERRORS TO BE CONSIDERED

1 - THE OPERATOR - Errors of the operator which depend entirely on his experience, may be difficult to predict. After he has familiarized himself with adjustment of the "SHARPNESS" control, he need only allow about ± 1/2 degree on strong static-free signals that produce a NULL of about 2 degrees width. If the NULL should cover some 10 degrees after complete adjustment, he cannot allow less than ± 2 degrees.

2 - MOTION OF THE VESSEL - Yawing and pitching usually only affect the ship's course. The HELMSMAN must apply the correct magnetic deviation to the compass indication and must sometimes estimate possible error at the time readings are taken.

3 - MERCATOR ERROR - occurs in plotting the earth - a spherical volume, on the conventional MERCATOR CHART - a plane area. Since MERCATOR CORRECTION is necessary only on rare occasions, as shown by Figure 7, it will not be treated in detail.

4 - LAND EFFECT - occurs when the signal passes over land before its course over water. In this respect, radio waves are comparable to light passing thru materials of various density. (Figure 8 illustrates the error).

CAUTION - Do not rely on readings taken over land or along a shoreline.

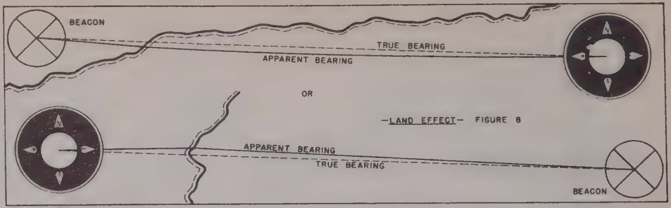
5 - NIGHT EFFECT - is most noticeable at sunrise and sunset. More radio waves are reflected back to earth at night than during daylight. It is evident by a broadening of the NULL and possible shifts in apparent bearings taken at distances greater than 250 miles. Over short ranges the effect is negligable.

6 - RADIO COMPASS DEVIATION - must be determined and accounted for as in the magnetic compass. A calibration curve (figure 10) determined as indicated by the self-explanatory Figure 9, must be made with the aid of the PELORUS, immediately after installation.

If the RADIO COMPASS is not in line with the LUBBER LINE, the CALIBRATION curve will be similar to that shown by the dotted line.

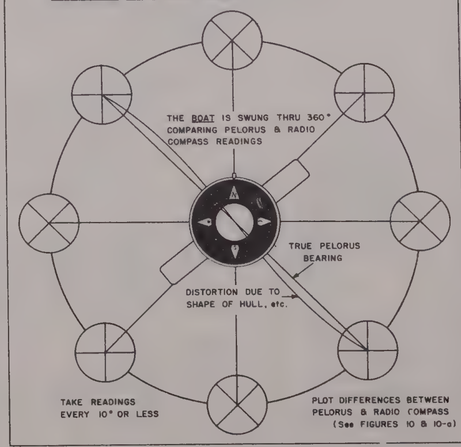
If the RADIO COMPASS is located too close to a metal object (see LOCATION) a curve similar to the other broken line will result.

REMEDIES are immediately evident to the operator.



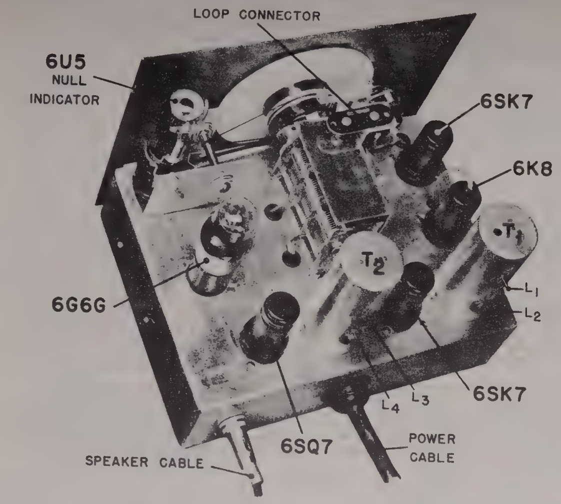
—LAND EFFECT— FIGURE 8

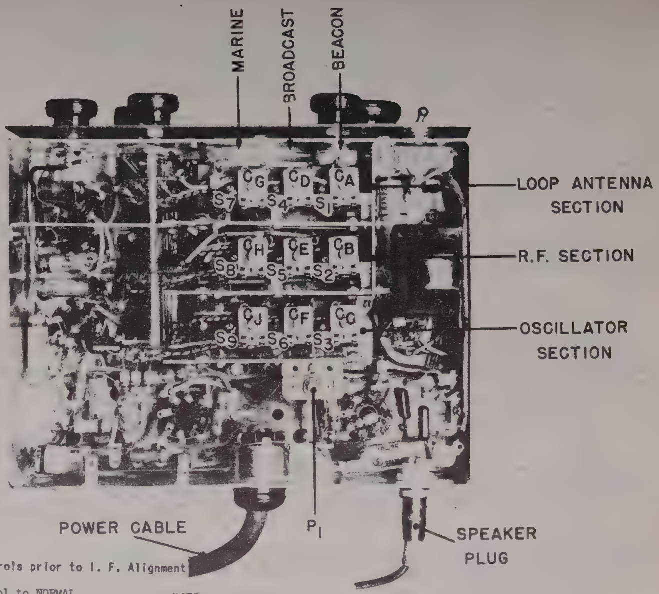
—CALIBRATION OF THE RADIO COMPASS— FIGURE 9

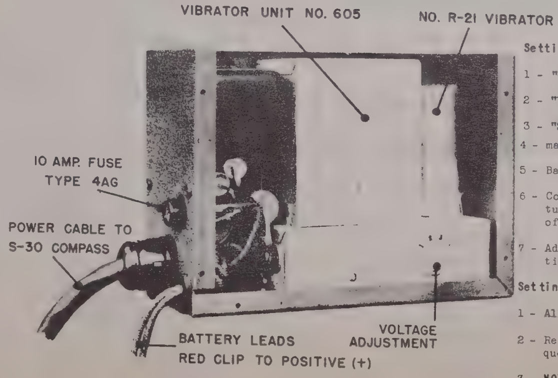

THE BOAT IS SWUNG THRU 360° COMPARING PELORUS & RADIO COMPASS READINGS
TRUE PELORUS BEARING
DISTORTION DUE TO SHAPE OF HULL, etc.
TAKE READINGS EVERY 10° OR LESS
PLOT DIFFERENCES BETWEEN PELORUS & RADIO COMPASS (See FIGURES 10 & 10-a)

THE HALLICRAFTERS INC.

MODEL S-30
Radio Compass







Setting of controls prior to I. F. Alignment

1 - "OFF" control to NORMAL

2 - "Volume" on full

3 - "Sharpness" on full

4 - main tuning dial set at 3 mc

5 - Bandswitch - Marine Band

6 - Connect signal generator to grid of 6K8 tube. Ground lead of generator to chassis of receiver

7 - Adjust indicated trimmers as per instructions.

Setting of controls for R. F. Alignment

1 - All controls similar to I. F. alignment

2 - Receiver dial adjusted to the aligning frequency

3 - **NOTE:** Generator connected to receiver inductively by forming a loop with a few turns of wire and placing it in the field of the loop on the receiver - leave end of wire free.

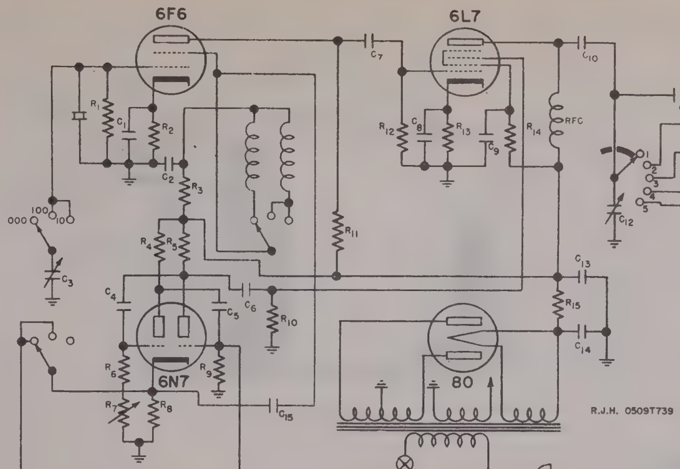
NOTE: On the beacon band the slug S_3, is used for calibrating the center of the band - the pad, P_1, for calibrating the low frequency end of the band.

Allow receiver and signal generator to reach operating temperature before making adjustments.

RANGE	SIG. GEN. & TUNING DIAL SETTING	DUMMY ANTENNA	PAD	TRIMMERS OR SLUGS	ADJUSTMENT
IF	175 kc 3 mc Marine	.1 mfd	None	L_1-L_2-L_3-L_4 on sides of I. F. cans T_1 & T_2	Adjust to maximum output
Beacon	250 kc	inductive	P_1	S_1-S_2-S_3	"
	500 kc	loop	None	C_A-C_B-C_C	"
Broadcast	600 kc	loop	Fixed	S_4-S_5-S_6	"
	1200 kc	loop	None	C_D-C_E-C_F	"
Marine	1300 kc	loop	Fixed	S_7-S_8-S_9	"
	2800 kc	loop	None	C_G-C_H-C_1	"

MODEL HT 7
Frequency
Standard

THE HALLICRAFTERS INC.



OPERATION

The Model HT 7 Frequency Standard is designed to be operated on 110-125 volt 50-60 cycle alternating current. It is suggested that the user connect the HT 7 to a receiver; "A" terminal on Standard to antenna post on receiver and "G" terminal to receiver ground post. After you have become familiarized with the way the unit should be operated, the wire which is connected to the "A" post on the standard can be more loosely coupled to the receiver by twisting this wire around the antenna lead until the most satisfactory amount of coupling has been reached.

1000 KC - Set the Freq.-KC Switch to the 1000 KC position after the OFF-ON switch has been placed in the "ON" position. Now turn the band switch on the Standard to #1 band. The receiver should be adjusted for standard broadcast band coverage during these initial steps of adjustment. With the beat oscillator in the receiver turned on you should be able to hear a strong signal at 1000 KC in the broadcast band and at every 1000 KC throughout the other tuning ranges of the receiver.

The 1000 KC frequency is ground to a tolerance of .05%, and has a temperature co-efficient of about 23 cycles per megacycle per degree centigrade. Obviously, the 1000 KC harmonics should be used only as markers to approximately locate the even 100 KC divisions. For accurate measurements, the crystal switch should be placed in the 100 KC position.

100 KC - Place the crystal switch at the 100 KC position. A signal from the standard will now be heard every 100 KC on the receiver.

NOTE - To accurately adjust the standard the following procedure should be carefully followed: Place the crystal switch at the 1000 KC position. Turn off the beat frequency oscillator in the receiver. Now tune in a broadcast station, or preferably WWV, transmitting on an even 100 KC frequency (600-700-800 KC). Tune in this signal accurately. Place the crystal switch in the 100 KC position. Undoubtedly a beat note will be heard. Now adjust the "Crystal Tuning" control slowly until you have reached zero beat. If the receiver is equipped with a resonance indicator, such as a meter or eye, this adjustment will be more accurately made by watching the pulses of the indicator while exact zero beat is being approached.

In the 100 KC position the crystal has a temperature drift of about 10 cycles per megacycle per degree centigrade. Temperature variations is normal service over several hours may cause frequency variations of approximately 50 parts per million.

RESISTOR			CONDENSERS		
R	OHMS	WATTAGE	C	CAPACITY	TYPE & VOLTAGE
1	5000000	1/2	1	.1 mfd	200
2	500	1/2	2	.1 "	400
3	25000	1	3	25 mmfd	air variable
4	2500	1	4	.002 mfd.	Mica
5	2500	1	5	.002 "	"
6	20000	1	6	.002 "	"
7	15000	variable	7	.001 "	"
8	300	1/2	8	.01 "	400
9	30000	1	9	.01 "	"
10	50000	1/2	10	.002 "	Mica
11	85000	1	11	10 mmfd	"
12	100000	1/2	12		
13	500	1/2	13	8 mfd	350 electrolytic
14	15000	1	14	8 "	350 electrolytic
15	4000	10	15	35 mmfd	Ceramic

The harmonics of the 100 KC oscillator become noticeably weak above 7 megacycles. A harmonic amplifier with a tunable output circuit is provided to raise the output level so that it will be usable through the 30 MC band. By setting the "Band Switch" to positions 2, 3, 4 or 5, and adjusting the "Output tuning" control a point will be found where sufficient output is provided for all checking purposes.

10 KC - With the crystal switch set at the 10 KC position, a multivibrator, locked to crystal frequency, is connected into the circuit. This will provide output signals which will be heard every 10 KC apart between the 100 KC points.

The presence of the 10 KC harmonics allows the standard to be set to zero beat with any domestic broadcast station inasmuch as they are spaced 10 KC apart. It is required by the F.C.C. that broadcast stations remain within 50 cycles plus or minus of their assigned frequency. Most station maintain 5 or 10 cycle deviation as maximum so they constitute accurate checking points. Highest accuracy is, of course, obtained when beating against WWV, but broadcast carriers allow sufficient accuracy for most purposes.

The adjustment screw on the rear of the unit selects the sub-harmonic of 100 KC on which the multivibrator operates. If this control is improperly adjusted, there may be more or less than 9 signals between 100 KC points - that is the signals may be $\frac{100}{8}$ or $\frac{100}{10}$ KC apart - 8 or 10 signals being heard instead of 9. Count the number of 10 KC harmonics between 100 KC points and if you find more or less than 9, adjust this control until 9 signals are heard between the 100 KC markers. This adjustment is originally made at the factory so it is improbable any further adjustment will be found necessary. Once the multivibrator has been locked to the proper sub-harmonic the output will be very stable.

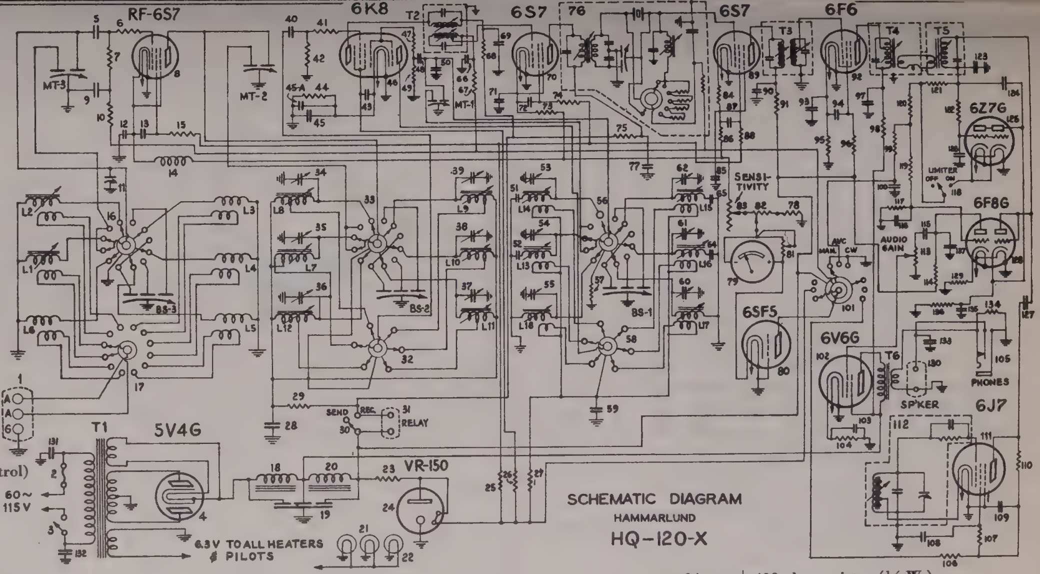
USES

The HT 7 will be of great help in providing an accurate source of signal energy for receiver alignment purposes. When aligning receivers connect the standard to the receiver as outlined previously; establish the 1000 KC marker positions and then align the receiver accurately from the 100 KC signals it delivers.

With the widespread use of the Electron coupled oscillator for frequency control in amateur transmitters, in addition to the most recent FCC regulations imposing the necessity for accurate frequency checking, the HT 7 fills a needed want. The edges of the various amateur bands can be immediately established roughly by using the 1000 KC signal output. Exact band edge location can then be determined by resetting to the 100 KC output frequency. In the 10 KC position the standard can then be used for frequency measurement purposes by interpolating between dial divisions and the frequency of the standard. Presume for example, that you wish to locate a signal on 7263 KC on the receiver. Set the standard to 1000 KC and locate the band edge at 7000 KC. Then switch the standard to the 100 KC position and count over two 100 KC points. We have now located 7200 KC. Now set to 10 KC crystal position and count over six 10 KC points from 7200. We now have 7260 KC. Log the dial setting for 7260 KC. Now tune over one more 10 KC harmonic to 7270 KC. Let us suppose that 7260 KC came in at 76 on the dial and 7270 KC was heard at 79. This represents a difference of three divisions to cover 10 KC, consequently each KC represents .3 divisions on the dial. To locate our exact frequency of 7263 KC simply move the dial .9 divisions past 76 (the 7260 calibration point) or namely to 76.9.

HAMMARLUND MFG. CO., INC.

MODEL HQ-120-X
(late)



SCHEMATIC DIAGRAM
HAMMARLUND
HQ-120-X

L-1	Antenna coil .54-1.32 mc. range
L-2	Antenna coil 1.32-3.2 mc. range
L-3	Antenna coil 3.2-5.7 mc. range
L-4	Antenna coil 5.7-10 mc. range
L-5	Antenna coil 10-18 mc. range
L-6	Antenna coil 18-31 mc. range
L-7	R.F. coil .54-1.32 mc. range
L-8	R.F. coil 1.32-3.2 mc. range
L-9	R.F. coil 3.2-5.7 mc. range
L-10	R.F. coil 5.7-10 mc. range
L-11	R.F. coil 10-18 mc. range
L-12	R.F. coil 18-31 mc. range
L-13	H.F. osc. coil .54-1.32 mc. range
L-14	H.F. osc. coil 1.32-3.2 mc. range
L-15	H.F. osc. coil 3.2-5.7 mc. range
L-16	H.F. osc. coil 5.7-10 mc. range
L-17	H.F. osc. coil 10-18 mc. range
L-18	H.F. osc. coil 18-31 mc. range
T-1	Power transformer 50-60 cycle, 115 V
T-2	First I.F. transformer
T-3	Third I.F. transformer
T-4	I.F. output coil assembly
T-5	Diode input coil
T-6	Audio output transformer 6 ohm
1	Antenna terminal strip
2	Fuse block (1.5A fuse Pt. No. 6065)
3	Power switch (comb. with audio gain control)
4	Rectifier tube socket 5V4-G
5-40-116	600 mmf. mica condensers
6-41	25. ohm resistor (½ W.)
7	500,000 ohm resistor (½ W.)
8	Tube socket 6S7-RF (iso.)
9-12-13-43-59-66-69-72-77-87-90-97	.02 mf. paper cond. (500 V.)
10-67-106	10,000 ohm resistor (½ W.)
11	Antenna compensating condenser
14	R.F. choke
15-29-68-74-75-88-91-98	2000 ohm resistor (½ W.)
16-33	R.F. and detector grid switch wafer
17	Antenna switch wafer
18	First filter choke
19	Filter condenser
20	Second filter choke
21	.15 amp. pilot lamps (6-8 V.)
22	Dial and meter lamps socket assembly
23	3000 ohm resistor (10 W. wire wound)
24	Tube socket VR-150
25	6000 ohm resistor (1 W.)
26	7000 ohm resistor (1 W.)
27-114	10,000 ohm resistor (1 W.)
28	.005 mf. mica condenser
30-118	Send-Receive and Limiter switches
31	Relay pin jack
32	Det. grid tap and osc. plate switch wafers
34-35-36-37-38-39-53-54-55-60-61-62	Special MEX trimmer cond.

HQ-120-X

CRYSTAL MODEL

FOR OTHER DATA,

SEE MODEL HQ-120-X VOL. X

Tuning Range

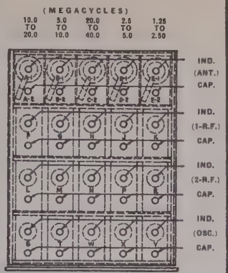
31-.54 MC

Form IM 3-4

42-49-119-121	50,000 ohm resistor (½ W.)
44-129	230 ohm resistor (½ W.)
126-131-132-133-45-71-85-94-100-108-109	.05 mf. condenser (500 V.)
45A	.005 mf. mica condenser
46	Tube socket 6K8-Conv. (iso.)
47	15 ohm resistor (½ W.)
48	50. mmf. condenser (silver)
50-127	5.5 mmf. condenser (silver)
51	673 mmf. condenser (silver)
52	300 mmf. condenser (silver)
56	H.F. osc. grid switch wafer
57	10. ohm resistor (½ W.)
64	.0015 mf. mica condenser
65	.001 mf. mica condenser
70-89	Tube socket 6S7
73	700. ohm resistor (½ W.)
76	Crystal filter
78	50. ohm resistor ½ (W.)
79	Tuning meter
80	Tube socket 6SF-5
81-82	80. ohm meter circ. potentiometers
83	Sensitivity control 10,000 ohms

84	400 ohm resistor (½ W.)
86	300. ohm resistor (½ W.)
92	Tube socket 6F6
93	.1 mf. condenser (500 V.)
95	600 ohm resistor (½ W.)
96	50,000 ohm resistor 1 watt
99-122	1-meg. resistor (½ W.)
101	AVC-MAN-BFO switch
102	Tube socket 6V6G—Audio
103	40 mf. electrolytic condenser
104	350. ohm resistor (1 W.)
105	Phone jack
136-107-110	100,000 ohm resistor (½ W.)
111	Tube socket 6J7
112	Beat oscillator
113	Audio gain control (500,000 ohm combined with power switch)
115	.01 mf. condenser (500 V.)
117	20,000 ohm resistor (½ W.)
120	25,000 ohm resistor (½ W.)
123-124-135	50. mmf. mica condenser
137	1000. mmf. mica condenser
125	Tube socket 6Z7-G
128	Tube socket 6F8-G
130	Speaker terminal strip
134	25 ohm resistor (1 W.)

H.F. OSCILLATOR AND R.F. ALIGNMENT



Connect the output of the test oscillator to the "A.A." terminal strip. Connect the output meter to the speaker voice coil terminals. The controls on the front panel should be set as follows:

(1) Band Change Switch on 540–1160 K.C. (2) Main Tuning Dial on 1100 K.C. (3) Band Spread Dial on 100. (4) Sensitivity Control "To Produce appropriate output meter reading." (5) Audio Gain Control "Full On." (6) C.W.-MOD switch on "MOD." (7) A.V.C.-MANUAL Switch on "MANUAL." (8) SEND-RECEIVE Switch on "RECEIVE." (9) "Phones-Speaker" Switch on "PHONES."

Turn the receiver over, bottom side up, placing a small block of wood under the rear of the switch section to protect the shield cans and tubes. The main tuning unit bottom plate should remain in place while H.F. oscillator and R.F. adjustments are being made. In order to facilitate the alignment of these stages, we have indicated in dotted lines, the coil positions beneath the bottom cover plate, together with all capacity and inductance adjusters. Capacity adjusting condensers are located on the coil bases and inductance adjusters extend through the top of each coil. The coil markings correspond to the designations on the schematic wiring diagram. Set the test oscillator to produce a 2.5 MC. signal. Adjust the trimmer capacitor "Y" until a peak reading is obtained in the output meter. Now set the main tuning condenser dial to 1.26 MC. and adjust the test oscillator for a 1.26 MC. signal. Turn the inductance adjustment on coil "Y" for a peak reading on the output meter. As these two adjustments react on each other it will be necessary to repeat them until no further change in either capacity or inductance is necessary. This realignment should only be done after making sure that the calibration of main dial is incorrect.

Turn the main tuning dial to 2.5 MC. and set the test oscillator for 2.5 MC. signal. Adjust each capacitor on coil "R"-"K"-"E2" in the order named, for peak reading on the output meter. The Sensitivity control should be adjusted so that no overloading occurs and an appropriate reading on the output meter is maintained. Now set the main tuning dial at 1.26 MC. and the test oscillator on the same frequency and turn the "inductance adjustments" on coil "R"-"K"-E1" for peak reading on the output meter. These adjustments are also interlocking and should be repeated until no further improvement can be noticed. This completes the H.F. Oscillator and R.F. coil alignment for the frequency range of 1.25 to 2.50 MC.

The alignment procedure of the H.F. Oscillator and R.F. coils in the remaining frequency ranges is exactly the same as outlined for the 1.25-2.50 MC. band. Test oscillator frequencies and main tuning dial settings vary as follows:

Range	*Capacity Frequency*	*Condensers*	*Inductance Frequency*	*Coils*
1.25 to 2.50 MC.	2.5 MC.	Y-R-K-E2	1.26 MC.	Y-R-K-E1
2.5 to 5.0 MC.	5.0 MC.	X-P-J-D2	2.5 MC.	X-P-J-D1
20.0 to 40.0 MC.	40 MC.	W-N-H-C2	20 MC.	W-N-H-C1
5.0 to 10.0 MC.	10.0 M.C.	T-M-G-B2	5.0 M.C.	T-M-G-B1
10.0 to 20.0 MC.	20.0 M.C.	S-L-F-A2	10.0 M.C.	S-L-F-A1

I. F. ALIGNMENT

The following adjustments should only be attempted after making *certain* that the I.F. channel of the receiver is out of alignment.

The alignment of the I.F. amplifier may be checked as follows: Connect a low reading (1 volt) output meter across the voice coil terminals. Connect a test oscillator (modulated at 400 cycles or less) to the antenna terminals of the receiver. Set the crystal selectivity switch on Number 1, the phasing control on the arrow, and the band-width control at 3. With the AVC-MANUAL switch on "manual" and the A.F. gain at 10, adjust the sensitivity control for an output meter reading of approximately 1 volt, with the test signal tuned accurately. Now, check the settings of the I.F. tuning condenser on T-2, T-3, and T-4 (*DO NOT DISTURB* the screw tuning adjustments of the Crystal Filter T-1). Then reduce the A.F. gain to protect the output meter and throw the AVC-MANUAL to "AVC" and turn the sensitivity control to 10. Then adjust T-6 for maximum "S" meter reading. This can be done most satisfactorily by adjusting the input from the test oscillator to produce an "S" reading of approximately 8.

To check the alignment of the Crystal Filter T-1, an oscillograph and sweep frequency oscillator are required. First adjust the sweep frequency oscillator to exact agreement with the crystal resonant frequency with the Crystal Selectivity switch on Number 5, and the phasing control on the arrow. Then, set the switch on Number 1 and adjust the lower screw on T-1 for maximum height, and the upper screw for symmetry of oscillograph image.

SELECTIVITY

The selectivity curves shown on page are representative curves made on a sample receiver and will hold reasonably true for all models. These curves were taken with the signal generator operating at the intermediate frequency and these curves will maintain throughout the entire range of the receiver, except at the very low frequency end of the broadcast band where the R.F. selectivity has a very slight narrowing effect. The selectivity of the "Super-Pro" is divided into two distinct ranges. In Fig. 5, appear the wide band curves. These curves were made at 4 different positions of the band width control. However, the actual selectivity obtainable is continuously variable between curves 3 and 16. Particular attention should be paid to the steepness of the sides of these curves. They are relatively straight and do not have the usual flare at the outer limits. This means that there will be less background interference from stations operating either higher or lower in frequency than the station being received. The advantage of having continuously variable selectivity over relatively wide limits in a receiver is readily apparent when one considers that the operator has absolute control and can adjust the receiver to compensate for almost any degree of interference that may be present. For example, when interference is not serious, the band width control can be set to the widest position and permit high quality reproduction of either voice or music. In other cases where interference is present, the band width control can be adjusted to the point where selectivity is just sufficient to eliminate interference. This adjustment provides maximum fidelity with a minimum of interference. It also permits the operator to utilize the extreme sensitivity of the "Super-Pro." Even in crowded bands, the selectivity can be adjusted to a point where interference is not bothersome and the sensitivity can be turned up to provide reception of extremely weak signals with marked clarity.

In Fig. 6, the variable selectivity crystal filter curves are illustrated. It will be noticed that the crystal filter fills in the gap very nicely between position "3" of the band width control and what would normally be maximum crystal selectivity for code reception. This variable selectivity crystal filter is an exclusive HAMMARLUND development and will be found only in a HAMMARLUND receiver. The crystal filter has five ranges of selectivity. The first three are intended for phone reception. The widest position of these, however, will permit good quality music under conditions where interference would, in most cases, make reception impossible. Positions four and five are for CW code reception and provide the usual single signal response.

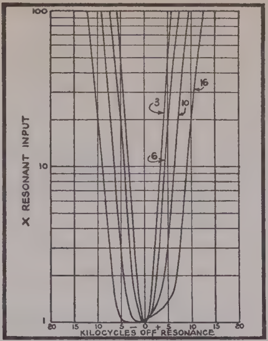


FIG. 5—I.F. curves taken at four positions of the band width control. The actual selectivity of the I.F. amplifier is continuously variable between curves 3 and 16. Particular attention should be paid to the sharp cut-off which greatly reduces back-ground interference.

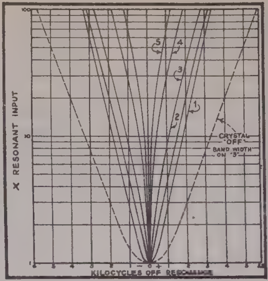


FIG. 6—Variable crystal filter selectivity curves showing five positions of the control switch. Positions 1, 2 and 3 are intended for voice reception. Position 1 is broad enough to permit reception of music. Positions 4 and 5 are for single signal code reception.

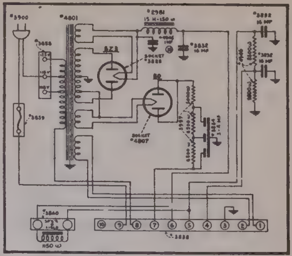


FIG. 12—Standard "Super-Pro" power supply for use with electro-dynamic speaker. Special models have filter choke connected in place of the speaker field.

POWER SUPPLY

1	Power transformer 110 volts 60 cycle A.C.
2	Filter choke
3	A.C. input Cord and Plug
4	Fuse Block for 2A. fuse
5	Line Voltage Adjusting Strip
6	Speaker Field Terminal Strip
7	Connecting Terminal Strip
8-9-10	Filter Condenser 16 mfd. electrolytic 450 volts
11	Filter Condenser 8-8-8 mfd. electrolytic 450 volts
12	Resistor 18,000 ohms (2 taps)
13	Resistor 18,000 ohms (1 tap)
14	Tube socket 80
15	Tube socket 5Z3
16	1 mf. paper filter condenser

The "Super-Pro" is available to cover several frequency ranges. Such information as is given in this book will pertain to all models. The two standard models have the following tuning ranges:

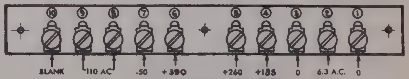
SP-200
540 – 1160 kc.
1160 – 2500 kc.
2.5 – 5 mc.
5 – 10 mc.
10 – 20 mc.

SP-200-S
1250 – 2500 kc.
2.5 – 5 mc.
5 – 10 mc.
10 – 20 mc.
20 – 40 mc.

Other models cover low frequencies in the neighborhood of 150 to 400 kc. as well as certain higher frequencies.

* In this model, the 1000 to 2000 meter band is substituted for the 60 to 120 meter band. *NOTE BELOW

Drawing below provides voltage readings at the various terminals on either the receiver or power supply when the two are connected together.



VOLTAGE CHART

	Tuning Range
SP-210-X	15–560 Meters
SPR-210-X	15–560 Meters
SP-220-X	15–560 Meters
SPR-220-X	15–560 Meters
SP-210-SX	7½–240 Meters
SPR-210-SX	7½–240 Meters
SP-220-SX	7½–240 Meters
SPR-220-SX	7½–240 Meters
SP-210-LX	*15–2000 Meters
SPR-210-LX	*15–2000 Meters
SP-220-LX	*15–2000 Meters
SPR-220-LX	*15–2000 Meters

*** SEE NOTE ABOVE**

MODEL SP-200-SX

TUBE	FUNCTION IN RECEIVER	VOLTS AT SOCKET TERMINAL No.							
		1	2	3	4	5	6	7	8
6K7	1st Radio Freq.	0	0	250	135	...	135	6.3 AC	0
6K7	2nd Radio Freq.	0	0	250	135	...	135	6.3 AC	0
6L7	1st Detector	0	0	250	115	...	...	6.3 AC	0
6J7	High Freq. Oscillator	0	0	160	160	160	...	6.3 AC	...
6K7	1st I.F. Amplifier	0	0	250	135	0	...	6.3 AC	0
6SK7	2nd I.F. Amplifier	0	0	0	—43.	0	135	6.3 AC	250
6SK7	3rd I.F. Amplifier	0	0	0	—2.	0	100	6.3 AC	240
6N7	Noise Limiter	0	0	+.4	—.2	—.2	+.4	4.0 AC	—.2
6H6	2nd Detector	0	0	—.3	+.4	—.2	...	6.3 AC	+.4
6SK7	AVC Amplifier	0	0	0	—2.	0	110	6.3 AC	240
6H6	AVC	0	0	—3.2	—3.4	—3.2	...	6.3 AC	—3.4
6SJ7	Beat Oscillator	0	0	0	—.1	0	40.	6.3 AC	155.
6C5	1st A.F. Amplifier	0	0	110	...	...	—3.3	6.3 AC	0
6F6	A.F. Driver	0	0	240	240	...	—20.	6.3 AC	0
6F6	P.P. A.F. Output	0	0	380	380	0	...	6.3 AC	38
6F6	P.P. A.F. Output	0	0	380	380	0	.	6.3 AC	38.

Measurements were made on 115 volt AC line, with line voltage adjustment set at 115 volt tap. Set sensitivity and audio gain controls at minimum. A.V.C. Manual Switch should be in manual position. CW-MOD Switch in C.W. position, Limiter Switch in "On" position, and "Send-Receive" switch in receive position. D.C. readings were obtained with voltmeter having a resistance of 1000 ohms per volt. Use chassis as a common terminal. Voltages within ± 10% are satisfactory. The 6.3 volt A.C. filament reading is obtained between chassis and terminal No. 2 on strip. Terminal No 10 on strip is blank except when used for battery operation.

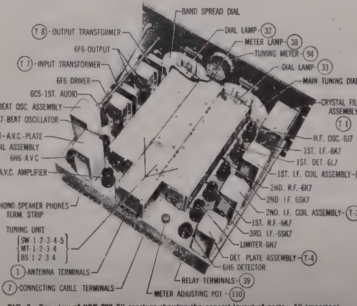
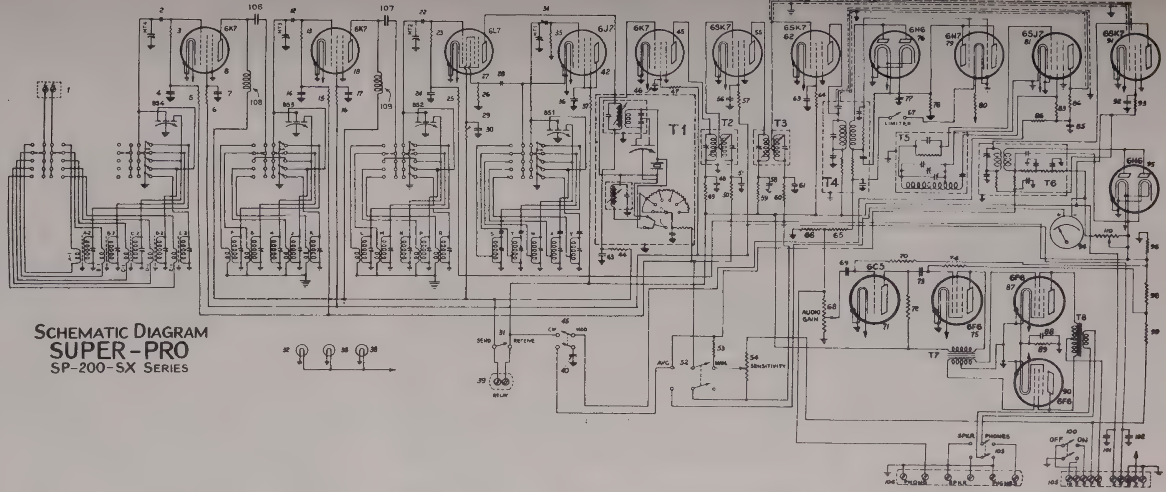


FIG. 7—Top view of "SP-200-X" receiver showing the general layout of parts. All important parts are labeled. Encircled numbers correspond to numbers appearing in the circuit diagram.

Form P-10-40



SCHEMATIC DIAGRAM
SUPER-PRO
SP-200-SX SERIES

FIG. 11

A1	Antenna Input Coil Assembly 10.0 to 20.0 m.c.	T-7	Push-Pull Input Transformer	64-72-93	Resistor 50,000 ohms metallized 1 watt
A2	Antenna Output Coil Assembly 10.0 to 20.0 m.c.	T-8	Push-Pull Output Transformer	65	Resistor 75,000 ohms metallized ½ watt
B1	Antenna Input Coil Assembly 5.0 to 10.0 m.c.	1	Antenna terminal strip	78	Resistor 250,000 ohms metallized ½ watt
B2	Antenna Output Coil Assembly 5.0 to 10.0 m.c.	2-12-22	Capacitor Fixed Mica type 600 mmf.	3-13-23	Resistor 250,000 ohms metallized ⅓ watt
C1	Antenna Input Coil Assembly 20.0 to 40.0 m.c.	28	Capacitor Fixed Silver type 95 mmf.	70-74-83	Resistor 500,000 ohms metallized ½ watt
C2	Antenna Output Coil Assembly 20.0 to 40.0 m.c.	34	Capacitor Fixed Silver type 50 mmf.	53	Resistor 2,000,000 ohms metallized ½ watt
D1	Antenna Input Coil Assembly 2.5 to 5.0 m.c.	77	Capacitor Fixed Mica type 50 mmf.	8-18-45	Tube socket 6K7
D2	Antenna Output Coil Assembly 2.5 to 5.0 m.c.	69	Capacitor Fixed Tubular type .02 mf. 500 V.	55-62-91	Tube socket 6SK7
E1	Antenna Input Coil Assembly 1250 to 2500 k.c.	4-14-24	Capacitor Fixed Tubular type .01 mf. 500 V.	76-95	Tube socket 6H6
E2	Antenna Output Coil Assembly 1250 to 2500 k.c.	7-17-30-36-43-46-48-51-56-58-61-63-73-85-92	Capacitor Fixed Tubular type .05 mf. 500 V.	79	Tube socket 6N7
F	1st R.F. Coil Assembly 10.0 to 20.0 m.c.			81	Tube socket 6SJ7
G	1st R.F. Coil Assembly 5.0 to 10.0 m.c.			71	Tube socket 6C5
H	1st R.F. Coil Assembly 20.0 to 40.0 m.c.			75-87-90	Tube socket 6F6
J	1st R.F. Coil Assembly 2.5 to 5.0 m.c.			27	Tube socket 6L7
K	1st R.F. Coil Assembly 1250 to 1160 k.c.	40-101-102	Capacitor Fixed Tubular type .25 mf. 400 V.	42	Tube socket 6J7
L	2nd R.F. Coil Assembly 10.0 to 20.0 m.c.	88	Capacitor Dry Electrolytic 40 mf. 150 V.	32-33	Dial lamps 6.3 volt .15 amp.
M	2nd R.F. Coil Assembly 5.0 to 10.0 m.c.	80	Resistor 4 ohms wire wound 5 watt	38	Meter lamp 6.3 volt .15 amp. Bayonet type
N	2nd R.F. Coil Assembly 20.0 to 40.0 m.c.	89	Resistor 750 ohms wire wound 10 watt	94	Tuning meter
P	2nd R.F. Coil Assembly 2.5 to 5.0 m.c.	96	Resistor 300 ohms metallized ½ watt	100	Off-on Switch
R	2nd R.F. Coil Assembly 1250 to 2500 k.c.	98	Resistor 1,700 ohms metallized ½ watt	52-103	AVC-MANUAL and SPEAKER-PHONES Switch
S	High Frequency Osc. Coil Assembly 10.0 to 20.0 m.c.	44-6-47-49-57-59-16	Resistor 2,000 ohms metallized ½ watt	41	CW-MOD Switch
T	High Frequency Osc. Coil Assembly 5.0 to 10.0 m.c.			31	Send-Receive Switch
W	High Frequency Osc. Coil Assembly 20.0 to 40.0 m.c.	99	Resistor 3,000 ohms metallized 1 watt	67	Limiter switch
X	High Frequency Osc. Coil Assembly 2.5 to 5.0 m.c.	86	Resistor 5,000 ohms metallized ½ watt	54	Sensitivity control 50,000 ohm
Y	High Frequency Osc. Coil Assembly 1250 to 2500 k.c.	5-15-25-50-60	Resistor 10,000 ohms metallized ½ watt	68	Audio Gain Control 250,000 ohm
T-1	Crystal filter assembly (465 kc.)			39	Relay terminal strip
T-2, T-3	1st and 2nd, I.F. Transformer Coil Assembly	37	Resistor 12,000 ohms metallized 2 watt	104	Phono-Speaker-Phones terminal strip
T-4	Detector plate coil assembly	29	Resistor 25,000 ohms metallized 2 watt	105	Connecting terminal strip
T-5	Beat oscillator coil assembly	35-26	Resistor 25,000 ohms metallized ⅓ watt	106-107	Capacitor Fixed Silver type 300 mmf.
T-6	A.V.C. Plate coil assembly	66-84	Resistor 50,000 ohms metallized ½ watt	110	Meter adjusting potentiometer 1,000 W wire wound.

HAMMARLUND MFG. CO., INC.

OPERATION

"SUPER-PRO" MODEL SP-200-SX

Although the "Super-Pro" is a highly technical piece of apparatus, with quite a large number of controls, it is relatively easy to operate. There are 15 controls on the panel. However, they are not all used at the same time. The number of controls necessary for operation will depend on the type of service for which the receiver is being used. The major controls are the band switch, main tuning, band spread, and audio gain. The remaining controls are brought into play as conditions demand their use. Assuming that the speaker, power supply and antenna have been connected according to instructions, the various controls should be set in the following positions: crystal selectivity, off; "phasing" on zero; "band width" on 6; "limiter," off; switch under the limiter control in "AVC" position; "sensitivity," maximum (10); band spread dial on 100; "signal" switch, on "modulation"; the toggle switch just beneath, should be set on "Speaker"; "audio gain" on 6; send-receive switch on "Rec."; beat oscillator on zero. Then, turn the main switch in the center of the panel marked "On-and-Off" to the on position. This puts the entire receiver in operation. The band switch should be adjusted to either the broadcast band or the next highest frequency band. This should permit reception of local stations and allow the operator to familiarize himself with various adjustments. The band width control should be adjusted to provide the most pleasing tone when there is no serious interference. Otherwise, it should be adjusted to the point providing best tone quality with a minimum of interference. The beat oscillator is turned on when the "signal" switch is in the "CW" position. The beat oscillator control varies the pitch of the heterodyne. This feature is used for code reception and for locating weak signals. The "limiter" control turns the noise limiter on and off. The noise limiter is most valuable on the shorter waves where automobile ignition interference is more serious. So far, we have considered the receiver adjustments necessary for phone reception. For code reception, the "AVC-Man." control should be set in the "Man." position and the sensitivity control turned down to provide proper sensitivity. On strong signals, this control should not be turned all the way on because there will be a tendency to overload the receiver. Volume is controlled with the "audio gain" control and not with the "sensitivity" control. The crystal filter is very effective and easy to operate because of its excellent stability. The first three positions are generally used for phone reception and will serve for code reception where interference is not severe. The last two positions are for code reception exclusively. When the crystal selectivity control is adjusted for optimum selectivity, the phasing control should be used to reject heterodyne interference or "whistle." The receiver can be temporarily silenced by turning the "Send-Receive" switch in the "Send" position. This allows the receiver to be ready for instant service and is more commonly called the "stand by switch" when the receiver is used for communication purposes. All tuning can be done with the main tuning control. In this case, the band spread dial is left at 100. The band spread dial operates so as to spread out a narrow band of frequencies in the neighborhood of the frequency at which the main dial is set. The band spread dial works continuously throughout the entire range of the receiver except on the lowest frequency bands. In this manner, many short wave broadcast or amateur bands can be spread out over the band spread dial for easy tuning. The wave ranges of the receiver are so arranged that when the band spread and main dial are set for 80 meter amateur band reception, the 40-meter band as well as the other amateur bands will appear on the band spread dial merely by turning the wave change switch. This is a great convenience and eliminates the necessity for searching each time for the amateur band which is to be covered by the band spread dial. For ear-phone operation, ear-phones are plugged into the terminal strip so marked on the rear of the chassis, and a switch on the front panel changes the receiver from ear-phone to loud speaker operation.

The next feature for consideration is the "S" Meter. This is used to judge relative signal levels and also as a tuning indicator. Maximum reading of the meter always indicates that the receiver is in exact tune with the station. The meter is calibrated in "S" units from 1 to 9, and the relative reading on any particular signal can be changed by re-setting the meter control adjustment which is located toward the rear of the chassis. The chassis drawing shows the position of this adjustment. A suggested method of adjusting the meter would be to tune in a signal of moderate strength. If you are accustomed to calling this signal, "S-8" or "S-9," then adjust the meter control so that it indicates that value. This adjustable meter arrangement allows the operator to provide reports consistent with his usual system of reporting. No amount of explaining will teach the operator exactly how to control a receiver. Experience is absolutely necessary in order to obtain best results.

CIRCUIT ARRANGEMENT

TWO-STAGE T.R.F. AMPLIFIER: For maximum sensitivity, high image ratio, and low noise level, the "SP-200" has two stages of tuned radio frequency amplification ahead of the mixer stage. The antenna input circuit is electrostatically shielded from the grid circuit of the first tube. This permits the use of low impedance transmission lines between the antenna and the receiver with a minimum of noise pick-up. When lines or lead-ins of the two wire type having an impedance of approximately 100 ohms are employed, no matching transformer is necessary. The input impedance of the receiver is approximately 112 ohms. The two tuned R.F. stages are employed on all bands covered by the receiver. Both inductive and capacitive trimming are employed in all signal frequency circuits.

OSCILLATOR AND MIXER: Two separate tubes are employed in the oscillator and mixer stages to improve stability and prevent pulling. There is a very respectable gain in the mixer stage which tends to minimize any noise that may be generated in the rest of the receiver. In fact, the gain in this stage is so great that the noise contributed by the following stages is negligible.

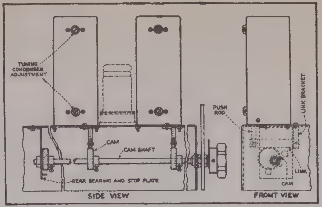


FIG. 1—Band width control which varies selectivity and permits the operator to adjust the receiver for best quality obtainable with minimum interference.

BAND SPREAD: In order to maintain relatively uniform band spread in the various tuning ranges of the receiver, every gang of the band spread condenser is subdivided into three sections. This allows the use of a proper sized condenser for maximum spread regardless of the position of the wave change switch. There are approximately 85 degrees spread for each of the important amateur bands, and there is also a corresponding spread over the other frequencies outside the amateur band.

CRYSTAL FILTER UNIT: The crystal filter used in the "Super-Pro" is an exclusive HAMMARLUND development and will be found only in HAMMARLUND receivers. This new filter has five ranges of selectivity varying from broad for phone reception, to knife-edge selectivity for single signal code reception. There are three positions for voice reception, and two for C.W. telegraph. The output of the filter is relatively constant over the entire selectivity range and has, therefore, little effect on "S" meter readings. Selectivity in the crystal filter circuit is not varied by detuning the load circuit. All circuits remain exactly in tune and selectivity is varied by changing the "Q" of the load circuit. This, together with the balanced phasing condenser, eliminates interlocking of controls and changes in filter gain when the selectivity is varied. Every precaution has been taken to effectively shield all circuits so that there is no feed-back or instability to impair the performance on even the highest frequencies. Stability is further insured by employing isolating resistor networks in every circuit that offers the slightest path for feed-back.

I.F. AMPLIFIER: There are three I.F. amplifier stages in the "SP-200." This elaborate amplifier is required in order to obtain a very high degree of selectivity. Special transformers are employed to hold down the gain per stage in order to maintain a high degree of selectivity and maximum stability. The band width of the I.F. amplifier is controlled by a cam arrangement which varies the coupling in two of the I.F. transformers. The I.F. channel is variable from 16 kc. down to 3 kc. with the crystal filter out of the circuit. The crystal filter, when in the circuit, is variable down to better than 100 cycles. Thus, full range selectivity is available. This wide degree of variable selectivity permits the operator to select the band width providing highest quality reproduction with a minimum of interference. In the "SP-200," the band width can be adjusted to suit operating conditions.

AVC SYSTEM: The automatic volume control system in the "SP-200" is extremely efficient. Both R.F. stages and the first two I.F. stages are automatically controlled by the incoming signal in order to compensate for variation in signal strength due to fading. This system is very fast in operation and will hold a rapidly fading signal to a relatively constant output. Special amplifier and rectifier stages are employed in order to obtain maximum efficiency.

BEAT FREQUENCY OSCILLATOR: The beat frequency oscillator circuit is designed to effectively heterodyne signals of various magnitudes. This oscillator is of the electron coupled type and is thoroughly isolated from the rest of the receiver. Careful selection of circuit values has resulted in excellent stability.

SECOND DETECTOR: A 6H6 connected in a half-wave rectifier circuit is employed for the second detector. The proper selection of circuit values in this circuit has resulted in a minimum of distortion. This circuit is more or less conventional and complete technical details are available by referring to the diagram.

NOISE LIMITER: The noise limiter in the "SP-200" is the latest development in audio peak limiting devices. It is designed to work with or without the AVC system and will follow variations in incoming signal strength. It is automatic and needs no adjustment. The limiter is designed to cut off interference of the automobile ignition nature at a point equal to approximately 100% modulation of the carrier of the signal being received. This provides for reception of 100% modulated signals without seriously affecting the quality of the voice or music. It must be remembered that this limiter will only limit interference of very short pulse duration. Such interference, as caused by auto ignition systems and similar disturbances will be reduced to a negligible quantity.

A.F. AMPLIFIER: The audio frequency channel of the series 200 "Super-Pro," is designed for high quality reproduction. The first stage is a 6C5 triode voltage amplifier. The second stage is a single 6F6 triode connected and used as a driver for the output amplifier which is a pair of 6F6's operated in push-pull, class AB. The rated output of this amplifier is approximately 14 watts. The fine quality of the A.F. amplifier in the "Super Pro" is particularly apparent when the band width control is set in the wide position. There is no tone control in this amplifier and none is needed. The A.F. portion of the "Super-Pro" will respond equally well to both low and high frequencies. Attenuation of the higher frequencies is accomplished by narrowing the I.F. band width. In this manner, the band width control serves to control tone.

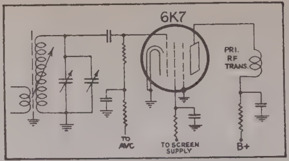


FIG. 2—Circuit diagram of first T.R.F. amplifier showing the electrostatic shield which reduces noise pickup.

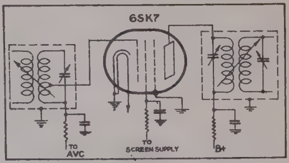


FIG. 3—Typical I.F. amplifier circuit with variable selectivity characteristics. Each circuit has isolating resistor and condenser to assure stability.

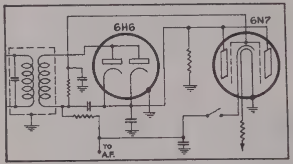


FIG. 4—"Super-Pro" noise limiter designed to reduce automobile ignition interference and other disturbances having similar characteristics.

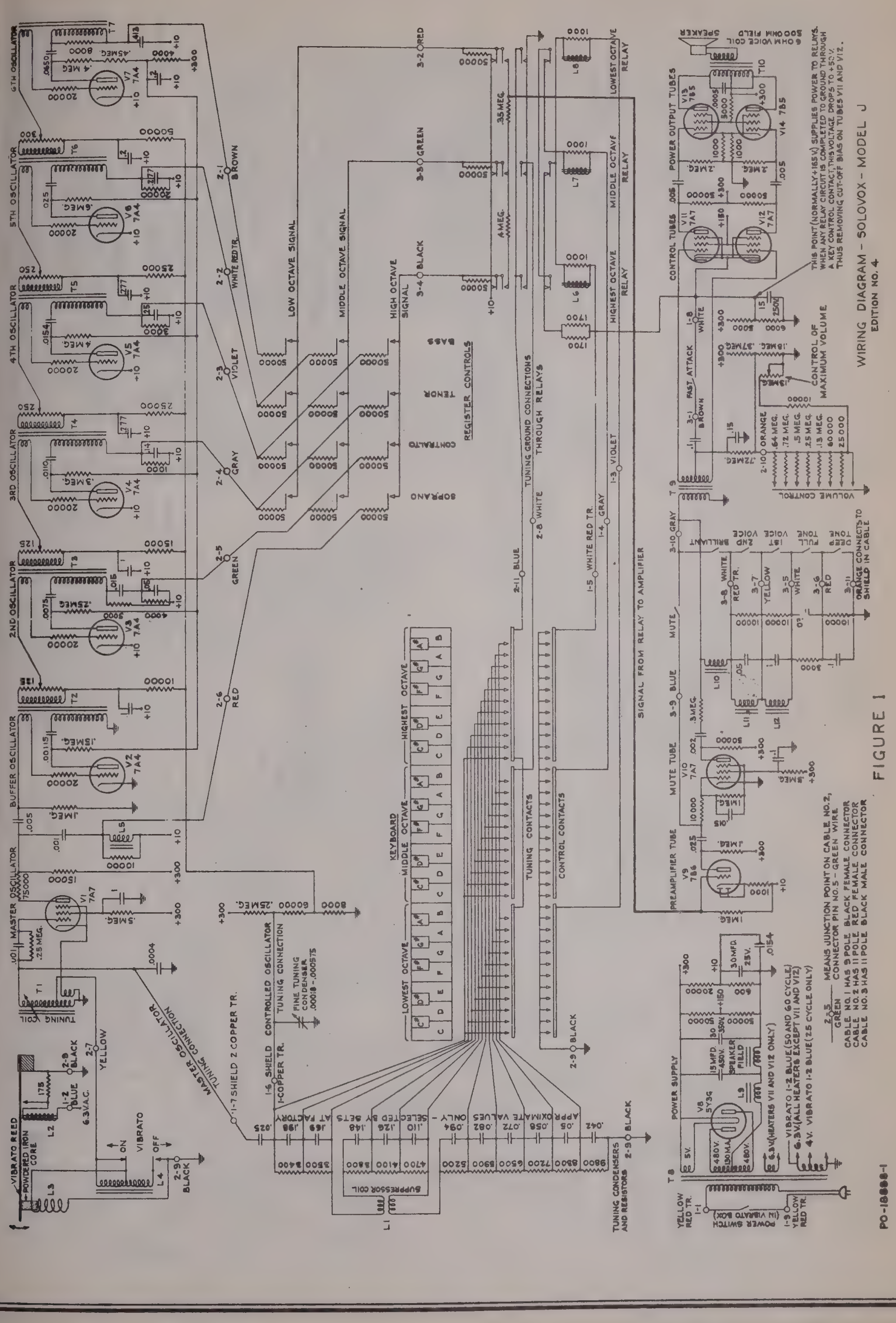
POWER SUPPLY: The power supply for the "SP-200" is an extra heavy duty unit designed to furnish filament plate and grid bias voltages. The power supply is a separate unit connected to the receiver by a flexible cable. Being a separate unit, the power supply introduces a minimum of hum in the receiver and also reduces the overall temperature rise of the receiver, and thus permits better stability. The high voltage rectifier in the power supply is a 5Z3 connected in a full wave circuit with a two-section filter consisting of 32 mf. capacity and a 15 henry filter choke. The field of the speaker serves as a second filter choke in standard model receivers. In special models, a choke is mounted in the power supply to take the place of the speaker field. Grid bias for the entire receiver is supplied by an 80 rectifier tube operating from a tap on the high voltage secondary. The C-Bias supply also has a multi-section filter consisting of three 8 mf. condensers, and three resistors. The primary of the standard power supply has three taps for operation on 105, 115, and 125 volt power lines. A fuse is also provided to guard against damage in cases of overload.

CALIBRATION: The main tuning dial of the "Super-Pro" is calibrated for all frequencies covered by the receiver. In the process of manufacture, every effort is made to maintain accuracy and, as a result, the accuracy of the calibration is guaranteed to be within ½ of 1% of the highest frequency of the band in use. When using the calibrated dial, it should be remembered that the figures are intended as a tuning guide and not for frequency measuring purposes.

"S" METER": The "S" meter in the "Super-Pro" was designed to provide greatest satisfaction to the operator. It is, in no way, limited by fixed, factory-made adjustments. A variable control on the rear of the chassis allows the operator to set the maximum reading of the meter to conform with his particular system of reporting signal strength in "S" numbers. The meter can be adjusted to read "S-9" on any signal from 10 to 10,000 microvolts. It is adjusted at the factory to indicate "S-9" on a 25 microvolt signal, but as pointed out above, this can readily be changed. Another feature is the centrally located scale. This is much more convenient than a scale that starts at the extreme left of the meter dial, and brings the indicating pointer well out in the clear. Special meter design has also eliminated the possibility of damage due to an extremely strong signal.

HAMMOND INSTRUMENT CO.

MODEL J
SOLOVOX



THIS POINT (NORMALLY +165 V.) SUPPLIES POWER TO RELAYS. WHEN ANY RELAY CIRCUIT IS COMPLETED TO GROUND THROUGH A KEY CONTROL CONTACT, THIS VOLTAGE DROPS TO +50 V. THUS REMOVING CUT-OFF BIAS ON TUBES V11 AND V12.

2-5 GREEN — MEANS JUNCTION POINT ON CABLE NO. 2, CONNECTOR PIN NO. 5 - GREEN WIRE

CABLE NO. 1 HAS 9 POLE BLACK FEMALE CONNECTOR
CABLE NO. 2 HAS 11 POLE RED FEMALE CONNECTOR
CABLE NO. 3 HAS 11 POLE BLACK MALE CONNECTOR

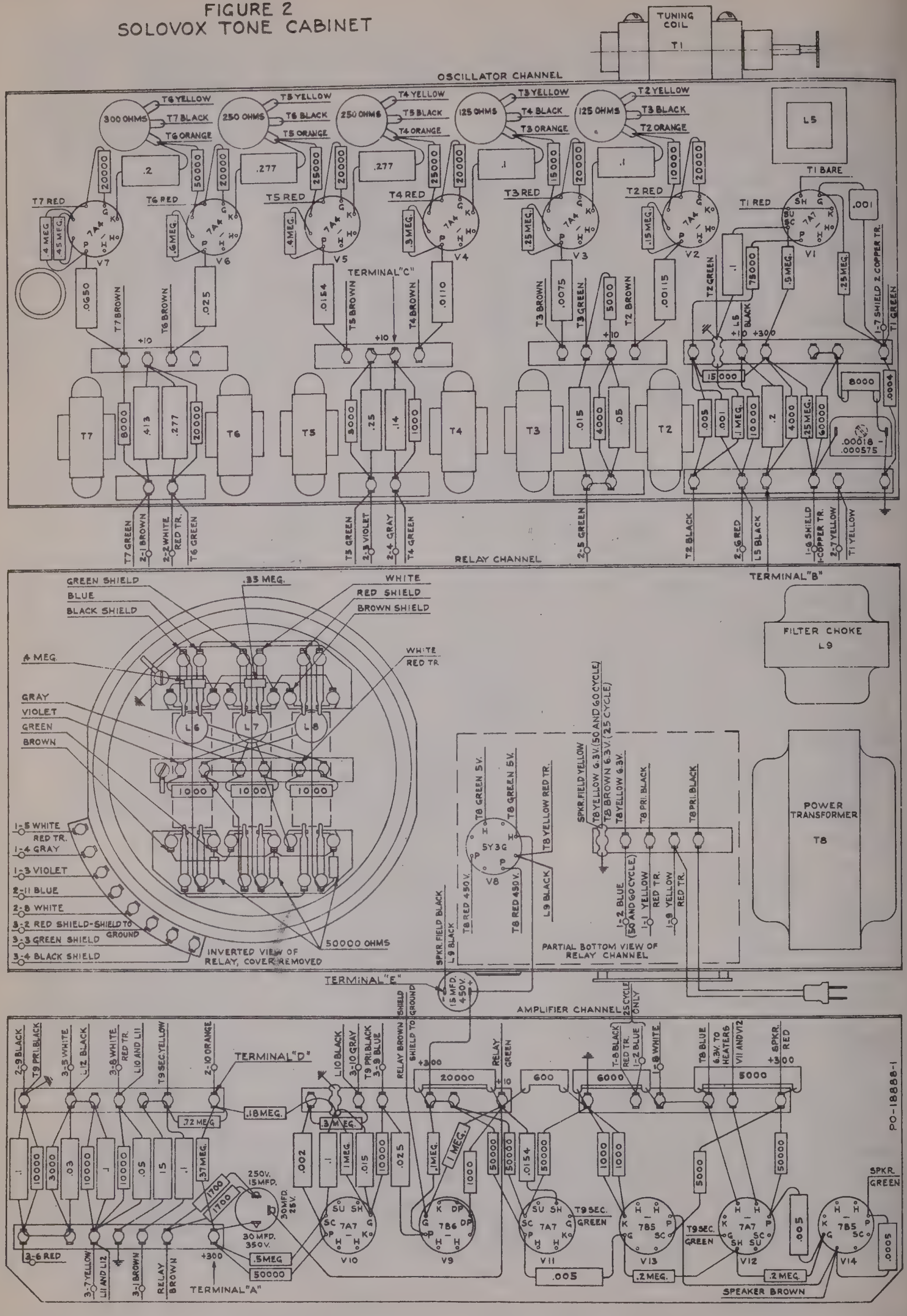
WIRING DIAGRAM - SOLOVOX - MODEL J
EDITION NO. 4

FIGURE 1

PO-18888-1

HAMMOND INSTRUMENT CO.

FIGURE 2
SOLOVOX TONE CABINET



HAMMOND INSTRUMENT CO.

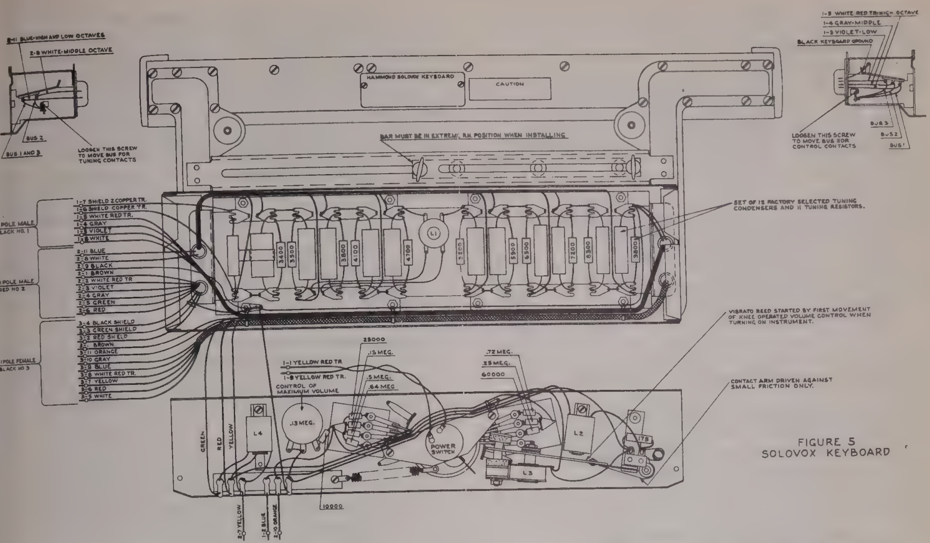


FIGURE 5
SOLOVOX KEYBOARD

SOLOVOX TUBE SOCKET VOLTAGES

These readings are taken with a 1000 ohms-per-volt meter, having three scales of 15, 150 and 600 volts. All voltages are taken with a line voltage of 117 and deviations of as much as 20% may be caused by line voltage variations. All controls are off, the volume control is in its softest position, and no key is depressed unless specified. The negative lead of the voltmeter is connected to chassis ground.

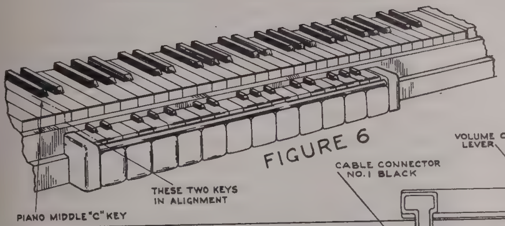
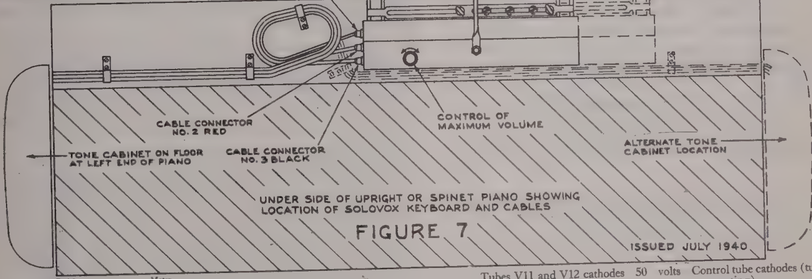


FIGURE 6


VOLUME CONTROL LEVER
KEYBOARD IN NORMAL POSITION
KEYBOARD IN DUET POSITION
CABLE CONNECTOR NO. 1 BLACK
CABLE CONNECTOR NO. 2 RED
CONTROL OF MAXIMUM VOLUME
TONE CABINET ON FLOOR AT LEFT END OF PIANO
CABLE CONNECTOR NO. 3 BLACK
ALTERNATE TONE CABINET LOCATION
ISSUED JULY 1940

UNDER SIDE OF UPRIGHT OR SPINET PIANO SHOWING LOCATION OF SOLOVOX KEYBOARD AND CABLES

FIGURE 7

Connect Positive Voltmeter Lead to	Meter Should Read	This Shows Voltage of
Terminal A (amplifier channel)	300 volts	Amplifier and master oscillator B +
Terminal B (oscillator channel)	290 volts	Controlled oscillator B +
Terminal C (oscillator channel)	10.5 volts	Controlled oscillator cathodes
Tube V1 plate	135 volts	Master oscillator plate
Tube V1 screen	35 volts	Master oscillator screen
Tube V9 plate	150 volts	Preamplifier plate
Tube V9 cathode	12.5 volts	Preamplifier bias
Tube V10 plate	137 volts	Mute plate
Tube V10 screen	26 volts	Mute screen
Tubes V11 and V12 plates	195 volts	Control tube plates
Tubes V11 and V12 screens	135 volts	Control tube screens
Tubes V11 and V12 cathodes (no key depressed)	170 volts	Control tube cathodes (tubes cut off)
Tubes V11 and V12 cathodes (any key depressed)	50 volts	Control tube cathodes (tubes operating)
Tubes V13 and V14 plates	305 volts	Output tube plates
Tubes V13 and V14 screens	290 volts	Output tube screens
Tubes V13 and V14 cathodes	24 volts	Output tube bias
Terminal D (volume control in softest position)	0 volts	Control tube grids
Terminal D (volume control in loudest position)	35 volts	Control tube grids (voltage will vary depending on setting of maximum volume control)
Terminal E (positive lead connected to ground)	76 volts	Speaker field

A. C. VOLTAGES

Heater voltage to all tubes except V8	=	6.3 volts R.M.S.
Rectifier tube V8 filament voltage	=	5.0 volts R.M.S.
Ground to either plate of rectifier tube	=	490 volts R.M.S.
A.C. Ripple voltage across speaker field	-	3.5 volts R.M.S.

HAMMOND INSTRUMENT CO.

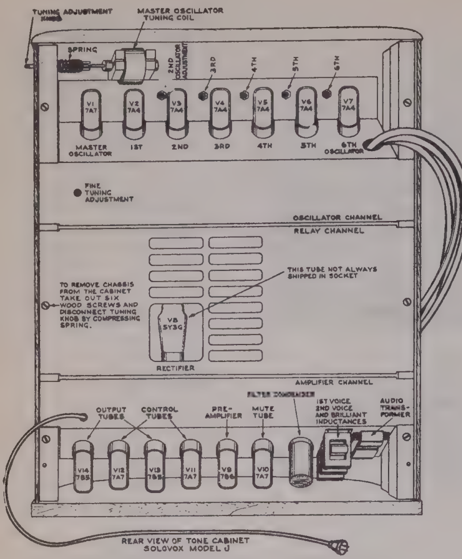


FIGURE 4

Tuning

The Solovox remains in tune indefinitely. However, because of the variation in pitch of the piano or other instrument with which the Solovox is to be played, a tuning adjustment knob has been provided. (The tuning knob, about the size of the end of a pencil, projects through the curved surface of the woodwork near one corner of the tone cabinet.)

Tuning the Solovox is a very simple matter as all of the tones are simultaneously tuned by making this single adjustment. Clockwise turning of the knob lowers the pitch and counter-clockwise turning raises it. For greatest accuracy, only the "CONTRALTO", "VIBRATO OFF" and "DEEP TONE" control tablets should be "in" and the middle octave F, F# or G keys of the Solovox tuned to the corresponding piano notes. (A control tablet is "in" when the top of the tablet is pushed in.)

Some favor tuning the Solovox a little sharper than the piano. We do not recommend too much of this, but in no case should it be at all flat to the piano.

There is another so-called "fine tuning adjustment" in the form of a control on the back of the tone cabinet. We suggest that you leave this alone, unless you want to get into something considerably more complicated, which is described further on in the technical section of this leaflet.

Limit of Tuning

Whereas the turning of the single tuning knob tunes all notes of the Solovox, there is of course a limit which cannot be exceeded before something starts to go wrong with the notes in some octaves. (Notes "*GARGLE,*" or play *exactly* one octave up, or an *exact* musical fifth down.)

A second very simple adjustment will then fix these notes as well, and you will find it easy to make this adjustment, if the occasion should arise, by following the procedure given below, called "Adjustment of Oscillators."

Of course you need not bother with these adjustments unless you hear the "*GARGLE*" or the wrong octave effect.

Adjustment of Oscillators

If some notes are noisy or play the wrong pitch, adjust the oscillators as follows: Push in the "SOPRANO," and "DEEP TONE" controls, with all others off. Tune highest F# to corresponding F# on piano with tuning knob, paying no attention to what other notes do. Notes in the highest octave of the Solovox will now have the same pitch as the top octave of the piano.

Holding down the F# key in the middle octave of the Solovox, place a screwdriver in the "second oscillator adjustment" slot (See Figure 4 on backside of this leaflet) and turn it, first one way and then the other. The instrument will play higher than the right pitch in one direction, and lower in the other, while in the range between it will play an F# note of the same pitch as the second highest F# key on the piano. The pitch can be checked by making sure that there is no sudden jump in pitch between the Solovox middle octave B and the highest octave C. When the proper pitch is determined, find the farthest point in each direction where it will play this note, and place the slot *exactly* midway between these limits.

Holding down the lowest octave Solovox F# key, repeat this procedure with the "third oscillator adjustment." As before, there should be a smooth transition in pitch between the B note of the octave being adjusted, and the C note of the next octave above, which has already been adjusted.

To adjust the fourth oscillator, hold down the lowest octave F# key with only the "CONTRALTO," and "DEEP TONE" controls in. For the fifth oscillator use "TENOR" and "DEEP TONE," and for the sixth oscillator adjustment, use "BASS," and "DEEP TONE," holding the lowest F# key in each case.

Adjustment of Maximum Volume Control Knob

The maximum volume obtainable is controlled by a knob located under the keyboard to the left of the volume control, and regulates the maximum loudness when the knee-operated lever is all the way to the right. With the lever in this position the knob may be turned by the player to suit himself.

To determine where to set this knob, first set the controls to some useful setting such as "TENOR" and "DEEP TONE." Now move the knee-operated volume control as far as it will go to the right, hold down some key such as middle C, and turn the maximum volume control knob to the right until the volume becomes as loud as is useful. Do not turn the knob to the right any farther as to do so will only mean that the knee-operated volume control will become unnecessarily sensitive which is particularly undesirable for the novice and beginner.

When playing in large halls, or with other instruments, it may be found advantageous to increase this maximum volume very materially. Under these conditions, when a very loud tone is played, the quality will become very bright. This increase in brilliance produces many novel tone qualities which are useful under conditions where a loud piercing tone is desirable.

HOW THE SOLOVOX WORKS

All of the notes of the Solovox are controlled by a single radio vacuum tube master oscillator operating at the audio frequencies of the highest octave of the instrument (2093-3951 c.p.s.). Each time a key is depressed, a switch under it tunes this master oscillator to the pitch associated with the key in this highest octave range. Thus, whenever a "C" key is depressed (the tuning key contacts for all the "C's" are in parallel), this oscillator is tuned to 2093 c.p.s., which is its lowest frequency. If a "B" note is depressed the frequency will be 3951 c.p.s., which is its highest frequency.

The output of this master oscillator controls the frequency of a first controlled oscillator (called the "buffer oscillator") which is adjusted to operate at the same frequency as the master oscillator. The output of this buffer oscillator, in turn, controls the frequency of the second controlled oscillator so adjusted to oscillate at one-half the frequency of the first oscillator. This new frequency corresponds to a note of pitch one octave lower than the buffer oscillator.

Similar cascaded oscillators provide pitches of two, three, four and five octaves below that of the buffer oscillator. In this way, each time the master oscillator is tuned to some given note, each of these six controlled oscillators produces a note which is in exact octave relation to the master, thus forming a series of six notes in exact octave relationships. The particular oscillator selected for sounding through an amplifier and speaker depends upon the particular playing key depressed, and also upon which of the BASS, TENOR, CONTRALTO or SOPRANO controls are used. A second contact under each key operates an electrical relay, having contacts to select the desired oscillator.

There are three relays—one for each of the three octaves of keys. A further function of the second key contact is to transmit the signal to the speaker with a controlled rate of attack so as not to be musically abrupt. Tuned electrical circuits and tone controls similar to radio tone controls alter the quality of tone over a wide range.

The Oscillators

All the tones of the Solovox are controlled by a single vacuum tube oscillator called the "MASTER OSCILLATOR" (V1, Figure 1). This oscillator operates at any one of the twelve audio frequencies comprising the twelve notes of the highest octave range of the instrument (2093 cycles to 3951 cycles). Each time a key is depressed, a contact under it closes to tune this oscillator to the pitch associated with that key. For instance, whenever any C key is depressed (there are three C keys on the keyboard), this master oscillator is tuned to 2093 cycles, its lowest frequency. If, on the other hand, any one of the three B keys is depressed, the master oscillator will operate at 3951 cycles, its highest frequency.

If, on the other hand, any one of the three B keys is depressed, the master oscillator will operate at 3951 cycles, its highest frequency.

The condensers which tune the master oscillator are shown at the left of Figure 1, and are located in the vibrato box fastened to the Solovox keyboard.

The output of this master oscillator controls the frequency of the first controlled oscillator, called the "BUFFER OSCILLATOR" (V2, Figure 1), which operates at the same frequency as the master oscillator.

Following this buffer oscillator is the SECOND CONTROLLED OSCILLATOR, whose frequency is tuned to approximately one-half that of the frequency of the buffer oscillator. Furthermore, its frequency is stabilized to be exactly one-half that of the buffer oscillator by applying a "locking" signal from the buffer oscillator to its grid circuit. The amount of this locking signal is regulated by a potentiometer. Thus, the output frequency of the second controlled oscillator is an octave lower in pitch than the master oscillator.

Similarly, the third, fourth, fifth and sixth CONTROLLED OSCILLATORS provide respective outputs of exactly two, three, four and five octaves lower in pitch than that of the master oscillator. A potentiometer associated with each provides the correct amount of locking signal. It is to be noted that these controlled oscillators (being of the relaxation type), are readily tuned by altering their grid bias. It is the function of the tuning resistors in parallel with the tuning condensers to apply the appropriate grid bias to tune all of the controlled oscillators simultaneously to their approximate sub-octave frequencies. The amount of bias varies, depending upon which tuning contact is connected by a playing key, and the frequencies of the controlled oscillators shift correspondingly.

When no key is depressed, all the oscillators operate at their highest pitches ("B" notes). Thus, whenever a key other than "B" is depressed, all oscillators shift simultaneously from their "B" frequencies to the frequencies corresponding to the key depressed. *The tuning condensers accurately tune the master oscillator, and the tuning resistors tune the controlled oscillators. By interconnecting the controlled oscillators in*

Register Controls and Relays

From the above, we see that whenever any one of the three G# keys, for instance, is depressed, the oscillators are tuned to provide a series of G# notes in exact octave relations. The selection of the particular oscillator output to sound through the speaker is determined by a second contact under each of the playing keys. This second contact is called the CONTROL CONTACT. There are three relays connected to the control contacts—one relay is operated any time a key in the lowest octave of playing keys is depressed, another relay for the middle octave of playing keys, and a third relay for the highest octave of playing keys.

Also, whenever a control contact is closed, a cutoff bias is removed from push-pull control tubes V11 and V12, causing them to transmit the signal with a smooth rate of tonal attack to the power output tubes and speaker. This function of the control tubes will be explained subsequently.

Each of the three relays has a contact to connect the grid of the preamplifier tube V9 to the desired oscillator through the register controls ("BASS-TENOR-CONTRALTO-SOPRANO"). For example, if we push in the "SOPRANO" control and depress the G key in the middle of the keyboard, the tuning contact will tune all the oscillators to the G notes of the respective octaves, and the control contact will operate the middle octave relay. This relay completes a circuit from the output of the second controlled oscillator, whose wire is numbered 2-5, through a 50,000 ohm register control resistor to the middle octave relay contact, and then to the preamplifier tube V9. Thus, the register controls function to shift the pitch range of the Solovox keyboard as a whole to four different positions. By simultaneously depressing two or more of these controls, a composite tone will be heard, consisting of the outputs of several oscillators simultaneously sounding in their octave relations to each other.

Other contacts associated with each of the relays serve to prevent undesirable tones from occurring when two keys are simultaneously depressed in adjoining octave groups through a legato style of playing on the part of the musician. If two keys are depressed within one of the three octave groups, the lowest pitched of the two will be automatically selected for sounding through the speaker.

The "Mute"

The signal from the plate of the preamplifier tube V9 is fed to the grid of the "MUTE" tube. This tube operates nonlinearly to suppress the sharp curvature of the input signal wave form, and thus renders the tone more mellow. When this muted effect is not desired, the mute switch is used to by-pass this portion of the circuit.

"Deep Tone," "Full Tone," "First Voice," "Second Voice" and "Brilliant" Controls

Following the "mute" is a series of tone controlling circuits arranged to alter the frequency characteristic of the amplifier in a manner similar to radio tone controls. For instance, with "DEEP TONE" the signal develops across a condenser which emphasizes the low frequencies; with "FULL TONE" the signal develops across a resistor with a small condenser in shunt, which leaves the frequency characteristic essentially flat except for the very high frequencies; "FIRST VOICE" puts a resonance in the 500 cycle zone; "SECOND VOICE" puts a resonance near 1000 cycles; and with "BRILLIANT" the signal develops across an inductance, L10, emphasizing the higher frequencies. It is to be noted that these tone control circuits are connected in series, and may be used singly or in groups.

Control Tubes V11 and V12

As mentioned before, the control contacts under the playing keys serve to remove the cutoff bias from control tubes V11 and V12, as well as to operate one of the three relays. This is explained by considering that the cathodes of tubes V11 and V12 are connected to the mid-point of the voltage divider shown to the left of the control tubes in Figure 1. When no playing key is down, this voltage is about 165 volts positive with respect to ground, and, therefore, these tubes are cut off. When any playing key control contact is closed, the resistance of the relay coil is put in parallel with the 6000 ohm resistor and this causes the cathode voltage to drop to 50 volts. This removes the cutoff bias from tubes V11 and V12, which are of the remote cutoff type. The 16 mfd. condenser across the 6000 ohm resistor serves to make the tonal attack and decay rate smooth. A .1 mfd. condenser connected between the control tube cathodes and the center tap of transformer T9 produces a slow rate of attack but can be disconnected if desired by operating the "fast attack" switch.

Volume Control

The volume of the Solovox is controlled by a knee-operated rheostat. This rheostat is actually a switch connected to seven fixed resistors, and is, therefore, not subject to wear as is the usual type of volume control. This rheostat forms part of a voltage divider circuit which varies the grid bias to the remote cutoff control tubes V11 and V12, and, therefore, changes the gain of these tubes to produce a corresponding change of volume in sound from the speaker. The grid potential varies from approximately +45 volts at the maximum volume position (depending on setting of maximum volume control), to ground potential at the minimum position.

The Vibrato

The vibrato effect is produced by means of a magnetically driven reed having a small piece of powdered iron attached to it in such a way as to vibrate in and out of a coil placed beside the reed. Thus, the inductance of the coil varies periodically as the powdered iron core swings in and out of it. This coil is connected to a tap on the master oscillator tuning coil, and causes the oscillator frequency to vary, producing a vibrato effect. This reed is caused to swing when the volume control lever is pulled forward in starting the instrument. After the reed is once started, the magnetic drive keeps it in motion as long as the instrument is on.

Tuning

The Solovox, as a whole, is tuned by adjusting the frequency of the master oscillator. The tuning knob accomplishes this by moving a powdered iron core in and out of inductance L1.

Power Output Tubes

V13 and V14 are power output pentodes connected in the usual push-pull manner to drive the loud speaker. The speaker field functions as a choke coil in the power supply system.

Power Supply

The power supply of the Solovox uses a single rectifier tube V8.

Note that control tubes V11 and V12 have a separate heater winding on power transformer T8. This prevents an appreciable difference in potential from arising between the heaters and cathodes of control tubes V11 and V12.

PRACTICAL SERVICE SUGGESTIONS

The materials and electrical parts in the Hammond Solovox are of the finest quality available. Aside from occasional replacement of a vacuum tube, no service problems need be expected to arise. A few conditions which might possibly be encountered are listed below with information which will enable a radio service technician to correct them without difficulty. Some additional information useful to the service technician is in the first section entitled "TUNING AND SIMPLE ADJUSTMENTS."

If any of the following conditions appear, first make sure that the three cable connectors in the left end of the keyboard under the piano are secure. The faces of the plugs and their receptacles should be together. If the Solovox does not play properly, this is the most likely cause.

1. *Changing tubes*—There are fourteen tubes in the Solovox: Six type 7A4, four type 7A7, two type 7B5, one type 7B6, and one type 5Y3G. These are all standard radio tubes, and can be tested and replaced, if necessary, by any radio dealer. All tubes can be reached from the back of the tone cabinet. A metal guard covering the lower row of tubes is easily removed by taking out two screws—see Fig. 4. Be sure to replace all tubes in the exact sockets from which they came.

If any of the 7A4 tubes are replaced, the oscillators should be readjusted as described under "Adjustment of Oscillators," Page 2.

The two type 7A7 control tubes (V11 and V12, located in the amplifier channel, Fig. 4) should be matched to avoid undesirable thumps when keying. It is therefore recommended that both be replaced at the same time with new tubes of the same make.

2. *Some notes are noisy or play the wrong pitch.* If a note is noisy, it may be due to (A) a faulty oscillator adjustment, (B) a faulty relay contact, or (C) a faulty key contact. To ascertain which of these is the cause, follow this procedure:

(A) If the trouble lies in a faulty oscillator adjustment, the corresponding note one octave lower in pitch will also be noisy because it is controlled by the higher oscillator. If, on the other hand, the lower note is not noisy, it indicates that the oscillator adjustment is satisfactory. In the event that readjustment is necessary, check as described in "TUNING AND SIMPLE ADJUSTMENTS." If any notes still do not play correctly, replace the 7A4 tube associated with the highest pitched oscillator that fails to operate properly on any note. The following chart will be helpful in finding the oscillator associated with notes of any particular octave.

	Lowest Octave of Playing Keys	Middle Octave of Playing Keys	Highest Octave of Playing Keys
"BASS" Control Connects to............	6th Osc.	5th Osc.	4th Osc.
"TENOR" Control Connects to..........	5th Osc.	4th Osc.	3rd Osc.
"CONTRALTO" Control Connects to...	4th Osc.	3rd Osc.	2nd Osc.
"SOPRANO" Control Connects to.......	3rd Osc.	2nd Osc.	Master Osc.

After the tube has been replaced, reset the oscillator adjustment potentiometers—see page 2, "Adjustment of Oscillators."

(B) If the trouble lies in a faulty relay contact, it will be present on all 12 keys of one of the octave groups and will persist on these 12 keys regardless of the combination of playing controls used. All contacts used are of precious material so that in all probability a particle of lint has lodged between the contacts which may be easily cleared by lifting and wiping the contact. Note that the relays are accessible without disconnecting any wires, it merely being necessary to first remove the two large nuts which hold the relay assembly to the tone cabinet frame work. After removing these two nuts, turn over the assembly and remove the four screws which hold the cover plate. After removing the cover plate, all contacts will be readily accessible.

(C) If the trouble lies in a faulty key contact, trouble will be present, of course, only on one note. In this case, move the bus bar shifters as described in the following suggestions numbered "6" and "7".

3. *Instrument fails to play.* Ordinarily the first thing to do in this case is to test all the tubes. If the tubes are lighted, the cable plugs are making proper connection, and the controls are in playing position, the most likely source of trouble is in the amplifier circuit. In most respects this is a conventional amplifier circuit, and the voltage measurements given on page 13 will enable a radio service technician to locate the trouble.

4. *Key thumps or clicks.* If a transient effect in the form of an annoying thump appears each time a key is released, the two type 7A7 control tubes (V11 and V12) are probably not matched properly. In this case, install two new tubes of the same make. A loud click each time a key is released indicates that the control tube cathode condenser is probably open, or partially open.

5. *Hum.* An excessive 120 cycle hum in the speaker indicates that the filter choke (L9) is defective, or one of the filter condensers is open.

6. *One key does not sound.* If a certain key fails to play on any of the register controls, it probably has a dirty control contact which can be cleared easily by shifting the control contact bus-bar whose adjustment is at the right end of the keyboard. To reach the bus-bar shifters, first remove the two molded bakelite end pieces. A drawing accompanying the keyboard (Figure 5), shows how the contact shifters are arranged. Loosen the clamping screw and shift the bus-bar about 1/32". Be sure to tighten the clamping screw carefully.

7. *One key plays note "B" instead of its correct pitch (with adjacent keys playing correctly).* If this occurs, the key under question has a dirty tuning contact which can be cleared easily by shifting the tuning contact bus-bar having adjustment at the left end of the keyboard. This is reached as described in the preceding paragraph.

8. *One octave of notes fails to play.* If a single octave of the Solovox keyboard fails to play for any combination of the register controls, the trouble is probably in the relay associated with that octave or a wire leading to it. Check voltage at the relay coil and the control tube cathodes (V10 and V11).

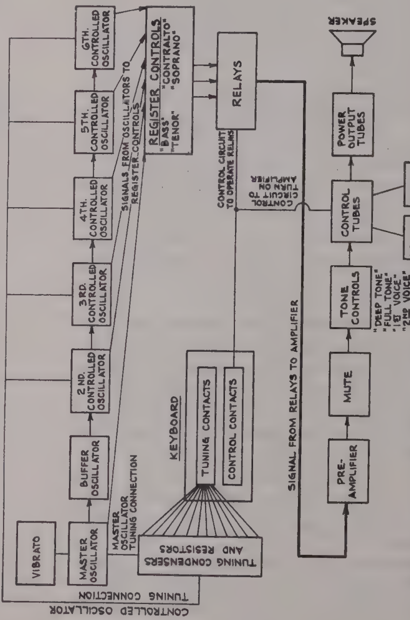
9. *Adjustment of Master Oscillator Fine Tuning Condenser.* An additional tuning adjustment is provided in the form of a screw driver operated trimming condenser at the back of the tone cabinet, upper left hand corner (See Fig. 4). After several years of use under very adverse conditions of humidity, or if an exceedingly accurate tuning is required, this adjustment may need to be made. First, however, always tune as described on page 1. If, after tuning F, F# or G, it is found that other notes (most likely C or B) are out of tune, the tuning breadth of the octave may be readjusted as follows:

(a) Depress the middle "C" key with the "VIBRATO OFF," "CONTRALTO," and "DEEP TONE" controls pushed in. Tune to zero beat, preferably with a Hammond Organ, or piano which has just been tuned. In tuning this "C," use the tuning knob of the tone cabinet. If it is found impossible to tune the "C" with the tuning knob, the two wood screws at the top of the tuner may be loosened, and the black bakelite tube moved to a position in the tuning coil such that the range of the tuning knob does cover the correct "C" pitch. Before making this adjustment, be sure the "VIBRATO" switch tablet is not set midway between its on and off positions. For tuning purposes, the "VIBRATO" tablet should be pushed in at the top of the tablet.

(b) After tuning the "C" key with the tuning knob, depress a "B" key and tune to zero beat with the screw driver operated trimming condenser located in back of the tone cabinet, see Fig. 4. The instrument will now be exceedingly accurately tuned.

DIRECTIONS FOR CONNECTING ADDITIONAL AMPLIFIERS TO SOLOVOX

When the Solovox is used in large auditoriums or with a large orchestra, additional amplifiers may be connected across the Solovox voice coil terminals which are accessible for this purpose on the speaker framework. Standard Hammond Organ Tone Cabinets are recommended as they may be connected with no changes necessary other than securing a push-pull ground with two 200 ohm resistors connected to the Solovox voice coil terminals and their junction point used as a ground for the Hammond Organ Tone Cabinet. By locating the resistors in the Hammond Organ Tone Cabinet, it is only necessary to run two wires (they need not be shielded and may be as long as 200 feet) to the extra tone cabinet.


6TH. CONTROLLED OSCILLATOR
5TH. CONTROLLED OSCILLATOR
4TH. CONTROLLED OSCILLATOR
3RD. CONTROLLED OSCILLATOR
2ND. CONTROLLED OSCILLATOR
BUFFER OSCILLATOR
MASTER OSCILLATOR
VIBRATO
SIGNALS FROM OSCILLATORS TO REGISTER CONTROLS
REGISTER CONTROLS
"BASS" "TENOR" "CONTRALTO" "SOPRANO"
MASTER OSCILLATOR TUNING CONNECTION
RELAYS
CONTROL CIRCUIT TO OPERATE RELAYS
KEYBOARD
TUNING CONTACTS
CONTROL CONTACTS
TUNING CONDENSERS AND RESISTORS
CONTROLLED OSCILLATOR TUNING CONNECTION
SIGNAL FROM RELAYS TO AMPLIFIER
CONTROL CIRCUIT TO TURN ON AMPLIFIER
SPEAKER
POWER OUTPUT TUBES
CONTROL TUBES
ATTACK CONTROL
"FAST ATTACK"
VOLUME CONTROL
TONE CONTROLS
"DEEP TONE" "FULL TONE" "1ST VOICE" "2ND VOICE" "BRILLIANT"
MUTE
PRE-AMPLIFIER

BLOCK DIAGRAM - SOLOVOX - MODEL J

FIGURE 3

HOWARD RADIO CO.

MODELS 302R,302RA 302RT (Late)

ANTENNA SYSTEM = Built-in loop with available connection from outside antenna. On short wave band, outside antenna required. BROWN lead to antenna, and BLACK lead to ground.

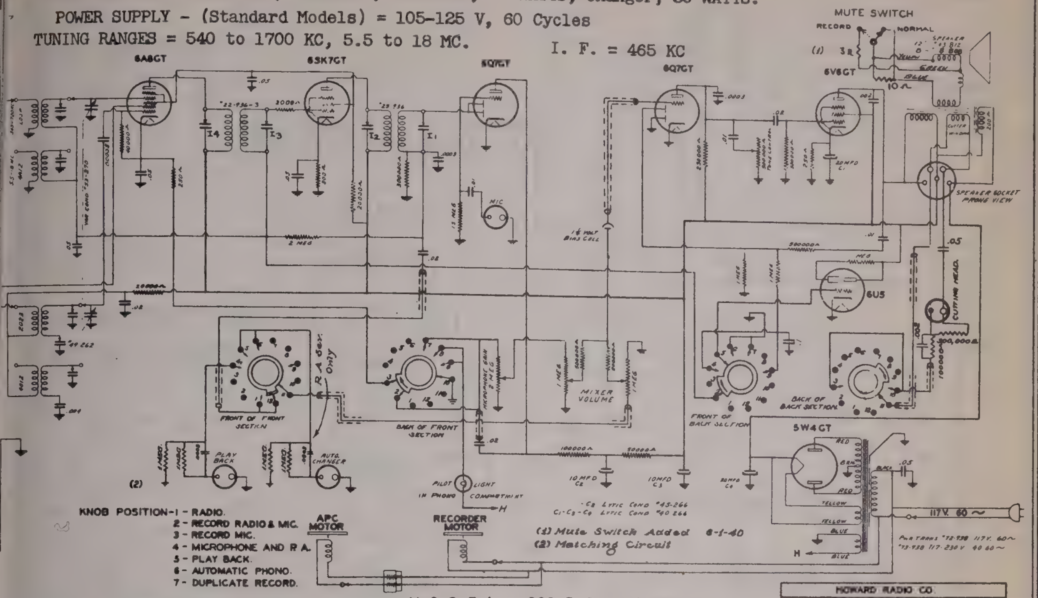
TYPE = Conventional | POWER OUTPUT – (MAX.) = 6 Watts; UPO = 4 Watts

CONSUMPTION – Receiver, 70 WATTS; Recorder, 30 WATTS; Changer, 30 WATTS.

POWER SUPPLY – (Standard Models) = 105-125 V, 60 Cycles

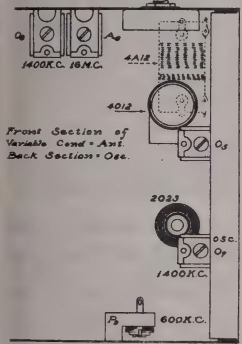
TUNING RANGES = 540 to 1700 KC, 5.5 to 18 MC.

I. F. = 465 KC



M O D E L – 302-R Console Recorder
302-RT Table Model Recorder
302-RA Console Recorder with Automatic Record Changer

HOWARD RADIO CO.		
MODELS 302 R. (RA)	302 R T	
DWG. NO. C71-715		2-21-40
DWN. BY.	CHCKD. BY.	APPVD. BY.
R.B.M.		JFR



ALIGNMENT PROCEDURE

Wave-Band Switch position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
BC	540	465 KC	Grid of 6A8GT	A,D	I_1,I_2,I_3,I_4	IF
SW	16 MC	16 MC	Brown Ant. lead	B,E	O_5,A_6	Osc. Ant.
BC	1400 KC	1400 KC	Brown Ant. lead		O_7,A_8	Osc. Ant.
BC	600 KC	600 KC	Brown Ant. lead	C	P_9	Osc. Pad.

Each step of the alignment should be repeated in e original order for greater accuracy. Keep output om Signal Generator low. The I. F. trimmers are ached through the two holes on the top of each I.F. can. When aligning the short wave bands, do not adjust the IMAGE frequency. For example, if the adjust- nt is correctly made at 16 MC, then a weaker image ll be heard at 15,070 KC, in other words 930 KC less the dial.

C- When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.

D- See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.

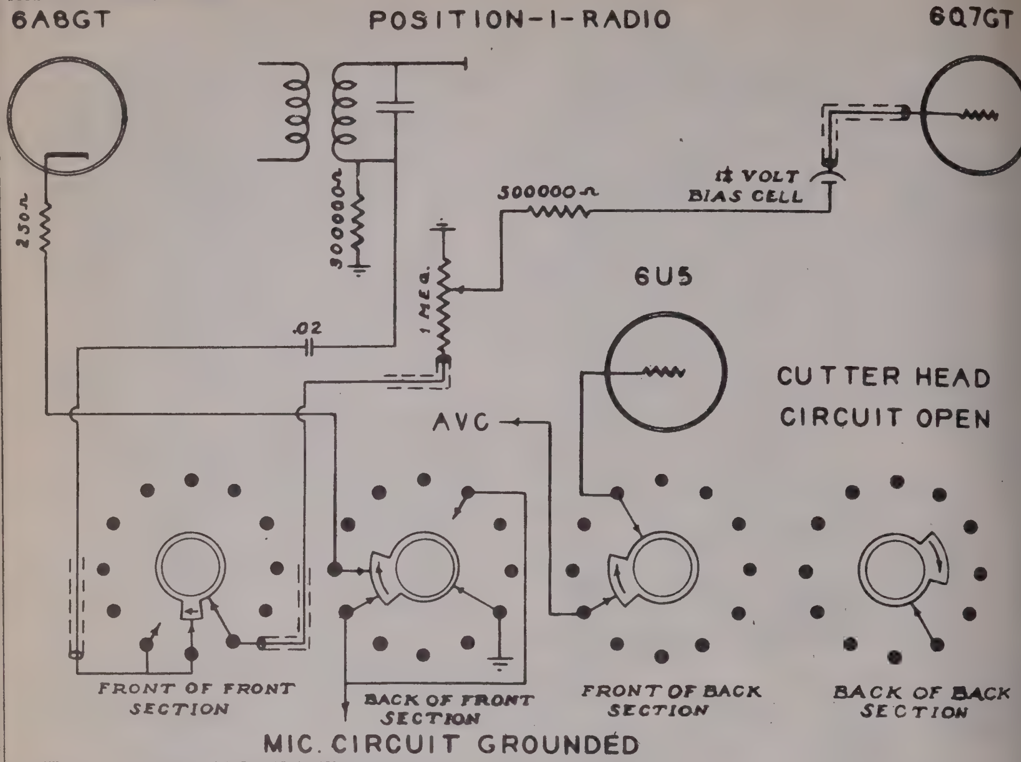
E- Check for oscillator cross-over between 16 and 18 MC. If necessary for stability, turn the antenna trimmer "IN" slightly.

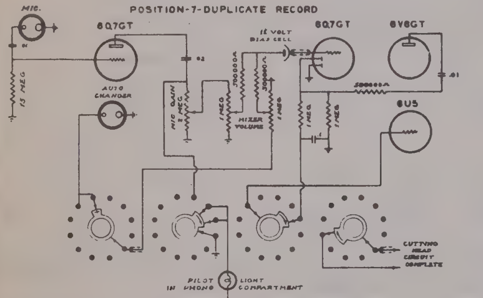
SOCKET VOLTAGE READINGS:

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6A8GT	Mixer	3	95	225	140
6SK7GT	I.F.Amp	3	95	225	
6Q7GT	Diode & Mic.Gain			90	
6Q7GT	Audio			75	

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE
6U5	Tunning & level cont.			220
6V6GT	Output	12	230	220
5W4GT	Rect.			

HOWARD RADIO CO.



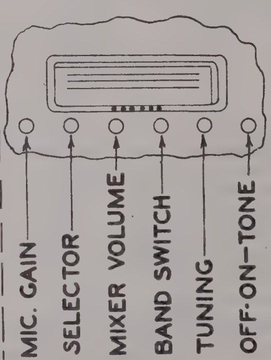


In the "Duplicate Record" position, the tuning-eye is again in the circuit, for indication of proper cutting level, the cutting head circuit is complete, and the duplication is made from the original blank in position on the automatic turntable. The microphone is in use for another superimposed registration if desired.

With our automatic record changer models when duplicating from a small 6½" record, due to the fact that this record, having a small surface, is liable to slip on the turntable, we have provided a spring finger that slips over the spindle that locks this record in place.

All chassis models have the input socket for the automatic changer pick-up, or if the model is not equipped with the automatic changer, a conventional turntable and crystal pick-up may be plugged into this socket and the duplication of the record can be accomplished.

CONTROL LAYOUT FOR 568R [RA] SERIES



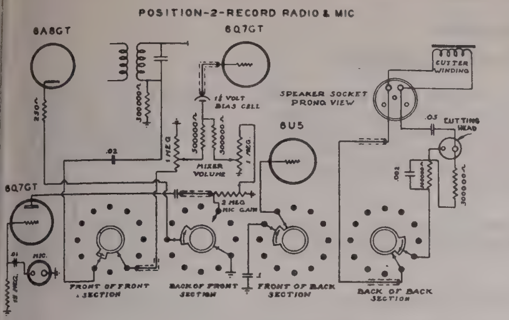
THE MASTER SWITCH with which these features are selected has seven positions as follows:

1. Radio
2. Record Radio & Microphone
3. Record Mic.
4. Microphone for P.A. System
5. Play-back
6. Automatic Phono
7. Duplicate Record

AUTOMATIC RECORD CHANGER WITH RA SERIES: USE ALSO FOR PLAYING RECORDS WHILE THEY ARE BEING DUPLICATED BY CUTTING ARM

HOWARD RADIO CO.

MODELS 302R, 302RA
302RT (Late)
MODELS 568R, 568RA


POSITION-2-RECORD RADIO & MIC

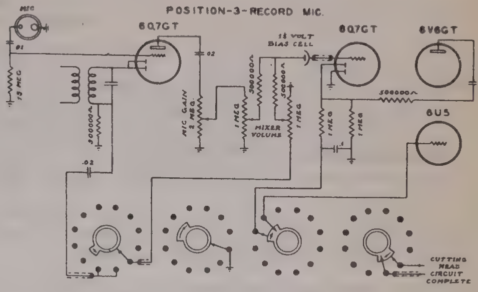
In the "Record-Radio & Mic." position, the radio circuit remains the same as in "Radio" position. The microphone circuit becomes effective as the short is removed from the Mic. Gain Control. The The percentage of radio and/or microphone is then controlled with the dual control feeding the 6Q7GT Audio and the Mic. Gain Control.

The 6U5 now becomes the visual amplitude indicator of the recording voltage. The voltage is taken from the output plate (6V6), rectified and applied to the grid of the 6U5.

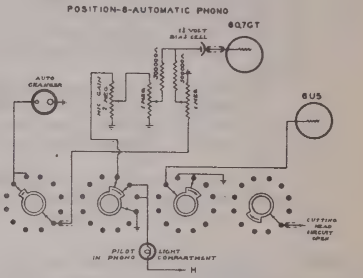
The cutter head circuit is completed.

THE PROPER VOLTAGE LEVEL FOR THE CUTTING OPERATION IS VERY IMPORTANT. TOO HIGH A LEVEL AS INDICATED BY THE CONTINUOUSLY OVERLAPPING OF THE TUNING-EYE RESULTS NOT ONLY IN FEED-BACK, BUT ACTUAL OVERCUTTING OF THE RECORD, RESULTING IN DISTORTION. HOWEVER, IT SEEMS THAT THE GENERAL PRACTICE IS FOR THE OPERATOR TO MORE OFTEN "UNDERCUT" THE RECORDING BY NOT PROVIDING SUFFICIENT CUTTING VOLTAGE. THIS RESULTS IN A HIGH BACKGROUND LEVEL AND POOR QUALITY.

The series condenser (.002) in one side of the cutting head circuit is a controlling compensator for high response when recording. Increasing the value of this condenser will increase the high frequency effect in recording.

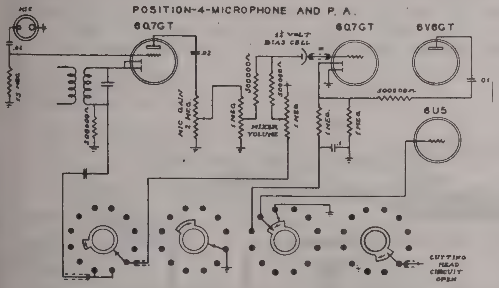

POSITION-3-RECORD MIC.

In the "Record Mic." position, the radio diode circuit is opened, the bias circuit is opened at the mixer tube, cutting out the radio, and cutting head circuit is closed.


POSITION-6-AUTOMATIC PHONO

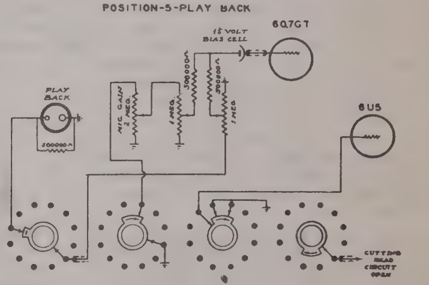
With the Howard "RA" Series, the automatic changer is included. With the switch in this position the audio system remains the same as in "Play-Back" position, except the pick-up arm of the changer is in use.

A pilot light is switched on over the changer unit when switch is in this position.


POSITION-4-MICROPHONE AND P. A.

In the "Mic. P.A." position, only the microphone is in the circuit. An additional microphone extension is usually used with the microphone at a remote point, using the receiver as a public address system.

As shown in the above diagram, the tuning-eye becomes inactive.


POSITION-5-PLAY BACK

In the "Play-Back" position the pick-up connects to one section of the dual volume control from which the audio output is regulated in the conventional manner.

The resistor directly in shunt with the play-back or pick-up circuit is a compensator controlling the low frequency response at "Play-Back" position. Decreasing this value will decrease the low response.

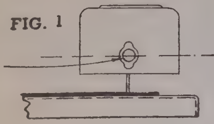
MODELS 302R,302RA
302RT (Late)
MODELS 568R,568RA

HOWARD RADIO CO.

GENERAL ADJUSTMENTS
ON
RECORDER MECHANISM.

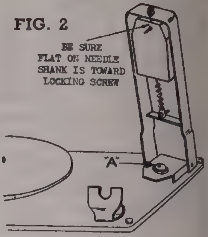
CUTTING HEAD POSITIONING ADJUSTMENT

FIG. 1



The cutting head position has been adjusted properly at the factory, using HOWARD Home Recording Blanks. However, check this adjustment by noticing if the Cutting Needle Locking Screw will locate itself in the Vertical Center of the clearance slot (See Fig. 1), when the record is being cut.

FIG. 2

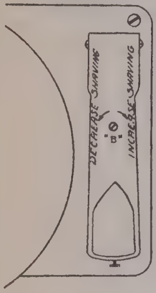


When necessary to change the position of this screw in the slot, loosen locking nut (See Fig. 2) and turn screw "A" to RIGHT to raise needle locking screw; or turn to LEFT to lower.

After any adjustment is completed, be sure to tighten locking nut.

CUTTING NEEDLE PRESSURE ADJUSTMENT

FIG. 3



For quality recordings, it is of vital importance that the right amount of pressure is obtained with the cutting needle. Observe the character of the shaving as the record is being cut. The size of the shaving should be about the size of a human hair (approx. .003"). If it is too heavy, the groove in the record may be too close to the adjacent groove which would cause distortion. If the shaving appears to be too fine and "kinky", an insufficient pattern will be cut with distortion as a result.

Before making any change in the amount of pressure, FIRST BE SURE THE CUTTING NEEDLE ITSELF IS NOT DEFECTIVE, LOOSE OR MOUNTED WRONG, since the conditions as mentioned above due to improper pressure can also be caused by a defective needle. Check needle first.

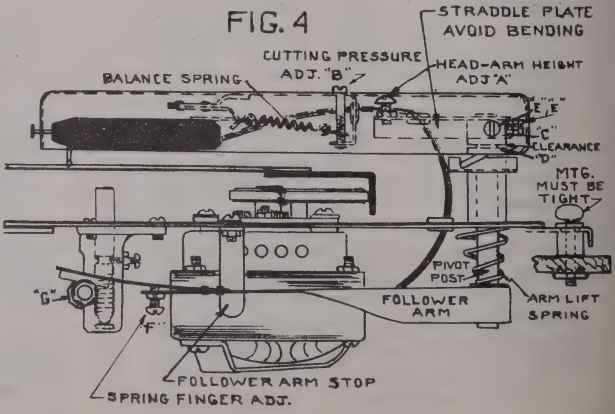
When necessary to INCREASE thickness of shaving thread (See Fig. 3) TURN CUTTING PRESSURE adjustment "B" to the right. TO DECREASE thickness of shaving thread, turn adjustment to the left.

THE CORRECT HEIGHT OF FOLLOWER ARM IN RELATION TO THE CUTTER ARM is obtained by seeing that the pivot post (which is a fixed part of the follower arm) is flush with the bushing on the top side of the arm platform. See Fig. 4. Also see that there is a small clearance between the pivot post bushings "C" and "D" when the cutting arm is lowered to the cutting position. The two hex. head screws "E" - "E" permits both this adjustment and at the same time the very important FOLLOWER ARM ADJUSTMENT IN RELATION TO THE SWING OF THE CUTTERARM as follows: When the follower arm touches the follower arm stop, the cutting stylus should be just outside the edge of the paper label on the Howard Record blanks.

THE BRONZE SPRING ADJUSTMENT ON THE FOLLOWER ARM. When the cutting arm is in cutting position, the bronze spring tongue should seat firmly into the bottom of the spiral groove of the lateral feed screw. This pressure should be great enough so that there will be no tendency of the knife edge tongue to climb out of the thread causing uneven grooves and distortion. However, too much pressure is to be avoided. The screw "F" controls this tension, and if the spring lifts itself away from the tip of this screw in the cutting position, it indicates too much pressure. This may also be caused by the follower arm being too low or bent downward for some reason.

END PLAY ADJUSTMENT OF LATERAL FEED SCREW. Loosen locking nut for screw "G"; turn screw slowly to right until the end play cannot be felt; reverse screw slightly to left to allow running clearance,and tighten lock nut.

FIG. 4



HOWARD RADIO CO.

MODELS 302R,302RA
302RT (Late)
MODELS 568R,568RA

AUDIO FEED-BACK is controlled by placing Selector Switch in position for a recording. Turn fader to extreme left and adjust Mic. Gain Control just below the feed-back point.

THE CRYSTAL TYPE CUTTING HEAD is energized by a special 70,000 Ohm secondary winding (a part of the output transformer) that matches the impedance of the cutting head.

THE CUTTING HEAD CRYSTAL MICROPHONE AND CRYSTAL PLAY-BACK units are so designed and compensated to provide uniform frequency response for recording and play-back.

In the "Radio" position, the ground circuit return for the mixer tube bias is completed through the switch. Radio silencing is accomplished by opening the mixer tube cathode.

The 6U5 becomes the conventional tuning eye tube since the grid is connected through the switch directly to the AVC line.

The Microphone output circuit is shorted out.

Before we consider the cause and remedy of some of the troubles that may be encountered with any recording device, it is necessary to review the fundamental purpose of the records and needles themselves.

RECORD BLANKS

The ideal record material is that substance that has the right quality of material to respond to the variations of the cutting stylus and yet have the right amount of "GRAINING" so when used with the play-back needle, the needle takes most of the wear and not the record pattern.

Needle scratch will be objectionable with records having too coarse a grain material base. However, we do not recommend the use of non-metallic needles to reduce this needle scratch condition. For practical use the loss of volume with this type needle requires increase of audio volume and the background increases likewise.

NEEDLES

The function of a play-back needle is to act as a transmission medium between the modulated record groove and the reproducing unit. Therefore, the frequency characteristic of a needle depends upon its shape, material, and size. The metallic needles are superior to non-metallic for a greater range of response; likewise the heavier shank needles will naturally have a greater range.

Regarding the playing life of a needle, generally speaking the metallic type may be grouped into about three classes: (1) The soft metallic one-play type; (2) Hard steel types, 10 or 25 plays; (3) Semi-permanent and permanent types, 1000 or 2000 plays.

It must be remembered that the causes of faulty reproduction and the quick wearing out of records can more often be due to dull or rough edge needles than from the type of needle or record blank. This also applies to the cutting needle which, although it may be in the permanent life class, can become chipped by rough handling or damaged when used with inferior grade blanks on which the coating is insufficient, and the cutting needle may cut through to the hard core of the blank.

Since the actual depth of the groove is nearly three thousandths of an inch (.003") for safety the coating should be at least twice that thickness.

Getting back to the reproducing needle, since the variations that the needle is to follow are lateral in nature, it is obvious that the needle is not supposed to be extremely pointed so as to ride in the bottom of the groove; and at the other extreme it is obvious that the needle should not be too blunt (like a dull needle) so as to ride near the top edge of the groove, losing all of the higher frequencies. Since the bearing surface, or radius point, of the needle should be slightly over two thousandths of an inch (.002") it becomes apparent as to what happens to the quality when the point becomes blunt so that the diameter is greater than what we can call the "Wave Length" of the higher frequency pattern in which the blunt needle could not follow the small curve variation for the high frequency reproduction. Never rotate the needle in the socket once it has been used.

SERVICE NOTES

THE CUTTING HEAD

This crystal unit similar in structure to the regular reproducing head, is likewise subject to extreme temperatures both hot and cold.

Heat at about 123° Fahrenheit will begin to soften the crystals and permanently damage the unit. Average temperatures encountered in the home a distance from the radiator should not cause trouble.

Coldness does not cause permanent damage, the effect being to "stiffen" the unit resulting in an increase of background "rumble" if a recording is made during that period.

ROUGH HANDLING

To bounce either the play-back or the cutter head around carelessly will invite trouble. Severe shock against the end of the needle may not fracture the crystal, but at least the needle (or stylus) mounting will be damaged or the edge of the needle may be roughened which would ruin the next record.

Forcing the cutting arm by hand when it is not raised enough for the follower arm to become disengaged may throw arms out of alignment with each other.

CUTTING SHAVING TOO HEAVY

Under a magnifying glass, the grooves should appear as about the width as the spaces between them for proper cut. If the thread is coarse and stiff, try new cutting needle, then if necessary, refer to procedure of adjustments given herein.

When the record is being cut, watch the shavings as it leaves the needle and see that it winds toward the center of the record and does not work back underneath the cutting needle causing it to bounce over the shavings.

CUTTING SHAVING TOO FINE

If the thread is light, fluffy, or not continuous, after trying new cutting needle, refer to procedure of adjustment given herein.

MODELS 302R,302RA
302RT (Late)
MODELS 568R,568RA

HOWARD RADIO CO.

MICROPHONICS OR FEED-BACK

This condition is the normal result of improper use of the "Mic. Gain Control" with the visual indicator for proper cutting voltage. Overcutting of the record is also possible with too high an input. At the other extreme, lack of sufficient input results not only in poor quality, but also raises the background level.

RUMBLE

Any recording system as sensitive as the Howard Recorder, is capable of picking up the mechanical vibrations of the motor. The sacrificing of this sensitivity to eliminate any possibility of motor rumble is not the cure or is it necessary. Under normal conditions of operation in which both the motor frame and turntable unit are suspended on soft rubber cushions, the rumble will not be recorded if:

(1) The amplitude of the signal is sufficient when the blank is being cut.

(2) The Tone Control is in the treble position at the time of recording.

(3) The cutting stylus is in good condition and is MOUNTED TIGHT.

(4) The crystal is at room temperature at the time of recording.

(5) The play-back needle is not dull or has become "shouldered".

WARBLE

By "warble" we mean the sing-song effect with the low frequencies predominating. We first consider the possibility that something has happened to vary the motor speed during recording. (See Speed Regulation below).

Although the recorder base is mounted on rubber feet at each corner, it is essential that the wing screws remain drawn tight against the washers. When the base floats too freely, vibrations are introduced from the drive mechanism causing a warble effect when played back. Examine the grooves closely if there appears to be a shaded spiral effect across the blank, you can be sure that the vibrations have created a regular pattern of their own due to the wing screws being too loose at each corner of the base. Tighten them.

Consider the possibility that the cutting needle might have been loose.

After the customary trial of a new play-back needle, check the mounting of the play-back arm. It is held in place with a "Y" shaped hand that could lose its tension causing the arm to vibrate. It can be tightened by removing arm and spreading out fingers for more tension.

"Warble" effect can be caused if the original cutting was made too heavy and which might be reproduced satisfactorily with one type needle having a wide point, but another type needle having an extremely fine point will wobble around the bottom of the groove with incomplete, uneven registration.

SPEED REGULATION

The motor being of a constant speed synchronous type, operating at its rated frequency, should not vary. However, we must check the frequency marking as shown on the Motor Frame with the power line.

It is suggested that the speed of the motor be checked in the conventional manner by the use of a cardboard stroboscope disc using a gas illuminated electric light.

The correct speed with the play-back arm in place on the record is 78 R.P.M.

The speed of the motor when used in a district requiring a converter cannot be depended upon.

Irregularities of speed can be caused by excessive shavings wound around the motor spindle and rubber drive mechanism beneath the turntable.

LOW RESPONSE

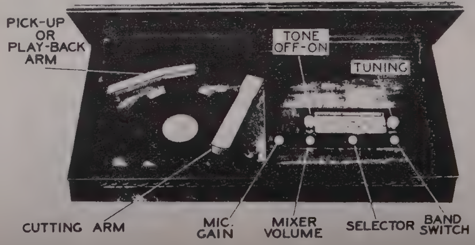
There is a compensating resistor in the cutter circuit that will tend to make the play-back apparently to have a lower frequency response.

In recordings where the high frequencies seem to be missing, be sure to ascertain if the original recording was incorrectly made with the Tone Control in the "Bass" position.

Another reason for lack of "highs" is of course either a blunt play-back needle, or the ruination of the record during a previous play-back by a damaged needle that has trimmed the groove of its pattern for "highs".

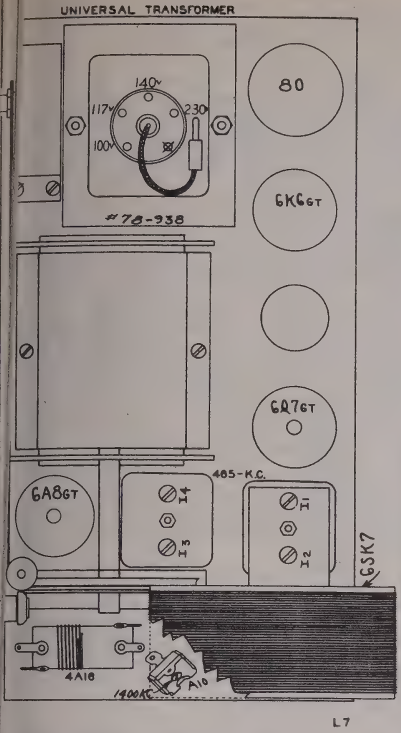
QUALITY RECORDINGS

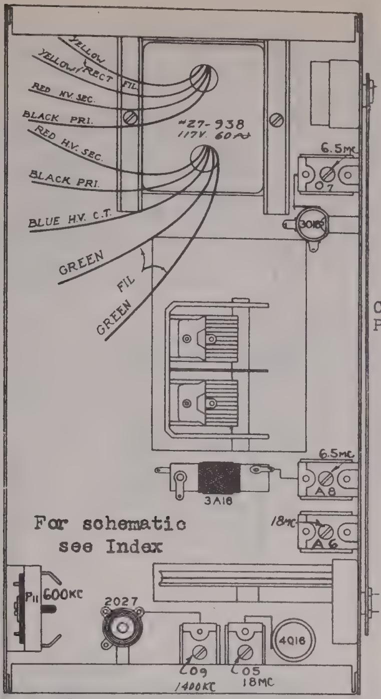
The elements effecting the cutting and reproducing of a blank have been outlined above. We are making no mention of the audio system of the radio since it is conventional and requires no special service attention other than the usual check of tubes, operating voltages and master switch contact points.



HOWARD RADIO CO.

MODEL 307
MODEL 307TP



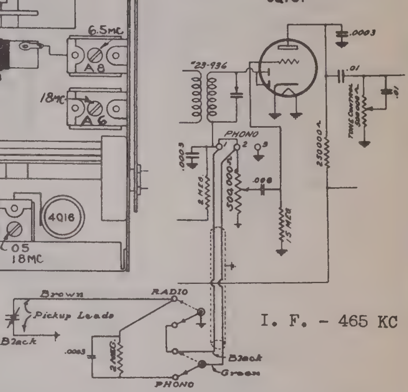


For schematic see Index

TUNING RANGES -
540 to 1700 KC,
2.2 to 7 MC, 7 to 22 MC,
(555-175, 140-47,
47-13 Meters)
POWER OUTPUT - (MAX.) -
2.7 Watts; UPO 1.5 W.
ANTENNA SYSTEM =
Connect Antenna
to BROWN lead -
Connect Ground
to BLACK lead.
CONSUMPTION 50 WATTS
Plus 15 Watts for TP Model.

Phono Circuit
307TP Only

Otherwise same as
Model 307. See Index



I. F. - 465 KC

POWER SUPPLY - (Standard Models) = 105-125 V. 60 Cycles AC

ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
BC	Min.Cap.	465 KC	6A8 Grid	A	I_1, I_2, I_3, I_4	IF
SW	18 MC	18 MC	Brown lead	B,D,E	O_5, A_6	Osc. Ant.
Int.	6.5 MC	6.5 MC	Brown lead		O_7, A_8	Osc. Ant.
BC	1400 KC	1400 KC	Brown lead		O_9, A_{10}	Osc. Ant.
BC	600 KC	600 KC	Brown lead	C	P_{11}	Osc. Pad.

NOTES

A - Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B - When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 18 MC, then a weaker image will be heard at 17,070 KC, in other words 930 KC less on the dial.

C - When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.

D - See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.

E - Check for oscillator cross-over between 18 and 22 MC. If necessary for stability, turn the antenna trimmer "IN" slightly.

SPEAKER = Electro-Dynamic SIZE = 6" V.C.IMP.(400CPS) = 4 Ohms FIELD = 1300 Ohms

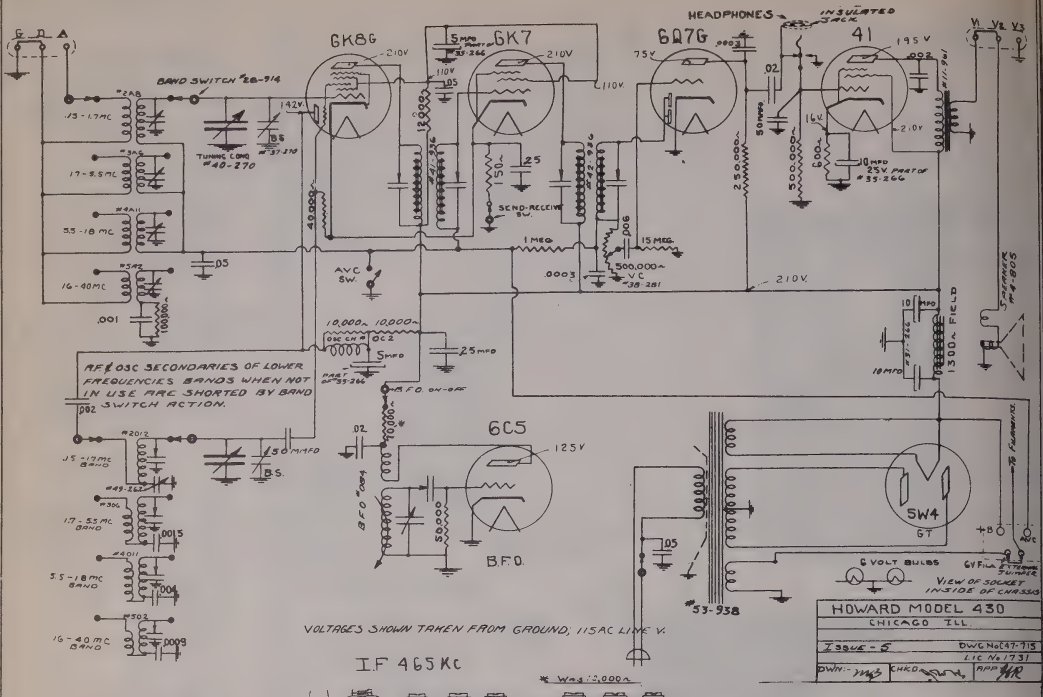
SOCKET VOLTAGE READINGS:

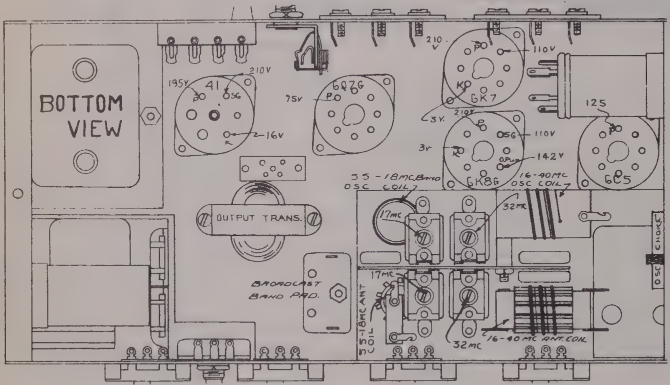
Voltage taken from ground with line voltage at - 117 AC.
High voltage reading off rectifier - 275 V.
Drop across speaker field = 75 V.
Voltage taken with 1,000 Ohm per volt meter.

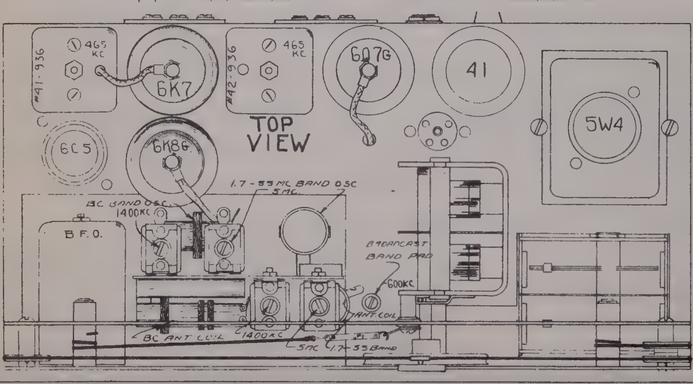
TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6A8GT	Mixer	1.5	105	195	195
6SK7	IF	4.5	105	195	
6Q7GT	Det.			60	
6K6GT	Output	16	195	185	

MODEL 430

HOWARD RADIO CO.







NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

NOTE 4: After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

NOTE 5: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

HOWARD RADIO CO.

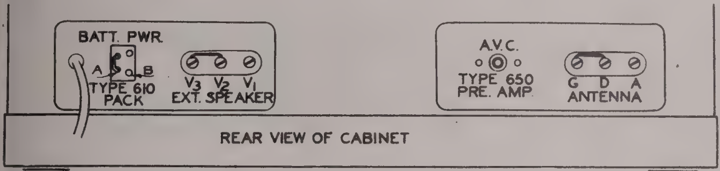
MODEL 435
MODEL 436
MODEL 437

MODELS—435-436-437 "PROGRESSIVE SERIES"

TYPE 3-820 EXTERNAL SPEAKER is designed especially for use with Howard Communications Receivers. The input impedance is of the correct value to perfectly match the output transformer of Models 435, 436, 437, and 460. The speaker unit consists of a heavy duty high efficiency permanent magnet, 8" dynamic speaker mounted in an acoustically treated (felt lined) welded steel cabinet finished in fine suede wrinkle, supplied with a 5 ft. spade terminal cable.

TYPE 610 "B" POWER PACK. For conversion of 6 Volts d.c. to 300 Volts d.c. for operation of Howard Models 435, 436, and 437 Communications Receivers from 6 Volt Storage Battery, the Type 610 Power Pack is a convenient and practical converter. A four prong plug fits the socket on Model 435, 436, and 437 Receivers, carrying both A and B power to the set. Only two connections from the Power Pack to the storage battery are required. Ample length of cable is provided. Battery current drawn for Model 435 is 6.6 amps; for Model 436 is 6.9 amps; and Model 437 is 7.75 amps. ON and OFF Switch on Power Unit.

(NOTE:- The Progressive Series 435, 436, 437, is based on the Model 435 receiver. The 436 is the 435 circuit with the addition of the noise silencer and additional features. The progressive additions to the original 435 circuit may include: 605 Carrier Level Meter, 3-820 External Speaker, 650 Pre-Selector, 660 Frequency Monitor, 655 Loop Kit, and 610 Power Pack. For data on these, SEE INDEX).



REAR VIEW OF CABINET

EXTERNAL CONNECTIONS

As we face the back of the receiver, the first terminal strip at the right coded G, D, A are the Antenna and Ground connections. For the conventional type of flat top antenna systems leave the shorting wire between "G" and "D" and connect Antenna to "A". Connect ground to "G".

If a doublet antenna is used, remove the jumper between G and D and attach doublet wires to D and A and a ground to "G".

We have found it inadvisable to recommend a definite length of antenna due to variable conditions. We do, however, suggest that you refer to the recommendations as given in the A. R. R. L. Antenna handbook.

The single terminal next to the antenna-ground strip is coded for use with the Howard Model 650 Pre-Amplifier,

The three screw terminals coded V3, V2, and V1, of which V3 and V2 must be shorted when using the built-in speaker, can be adapted for the use of the Howard external speaker No. 3-820, by removing the shorting wire and connecting leads from the external permanent dynamic speaker to lugs V3 and V1.

The socket coded for use with the Howard 610 Power Pack must have the jumper in place between the two socket terminals as shown in the diagram below. See description of this Model 610, 6 Volt Power Supply.

ADAPTATION FOR BATTERY SUPPLY

When it is desired to use "A" and "B" batteries when the Howard 610 Power Pack is not available, connect as follows:

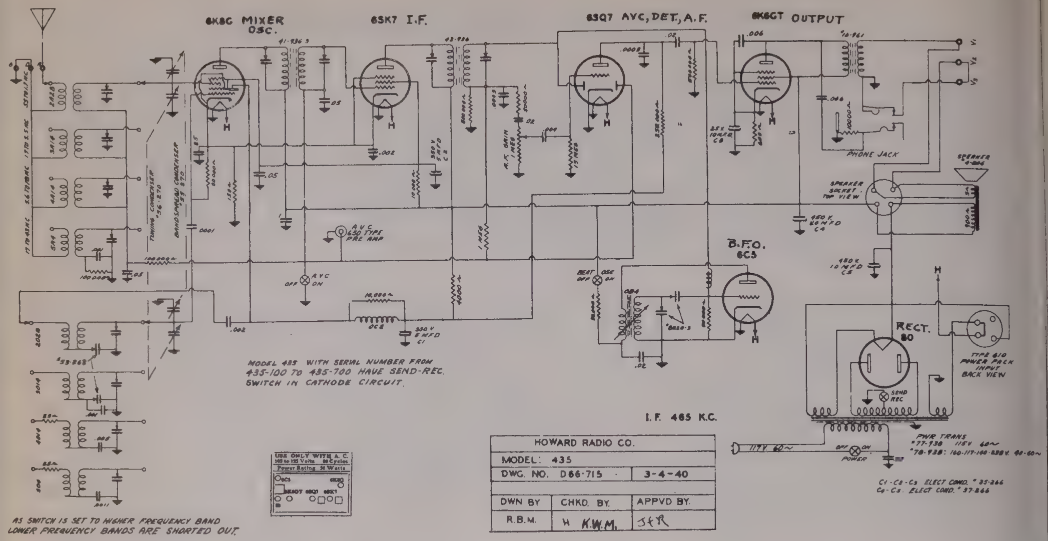
Remove the jumper from the battery power socket. Connect "B +" 250 Volts to terminal marked "B +" in diagram. Connect one side of the 6 Volt "A" supply to terminal marked "A". Connect the other side of the "A" supply and "B -" to the chassis ground terminal.

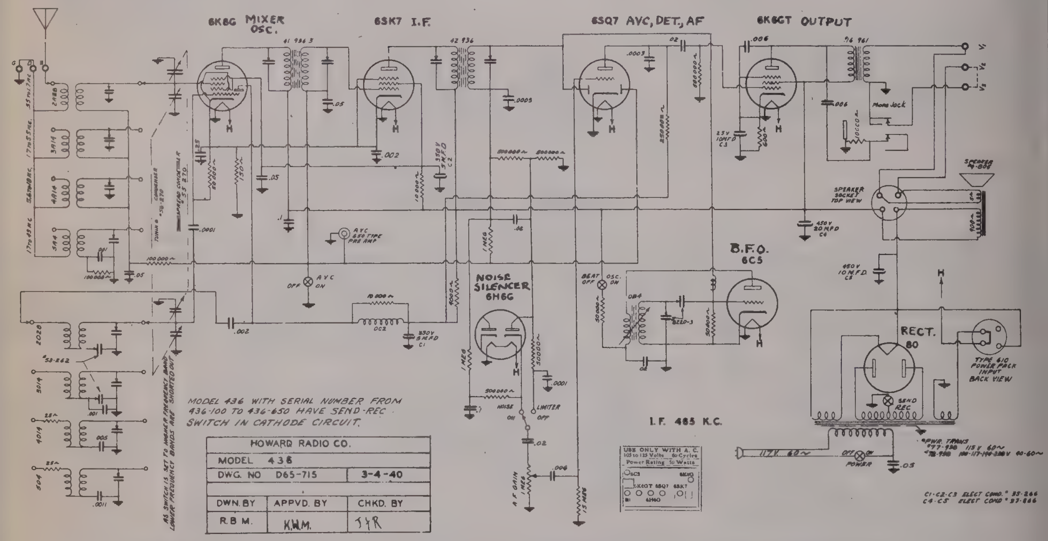
The "B" current required for Models 435 and 436 is 60 Mills. The "A" current requirement is 2.9 Amps. This includes the 605 Carrier Level Meter.

The "B" current required for Model 437 is 82 Mills. The "A" current requirement is 3.5 Amps, allowing for the 605 Carrier Level Meter.

MODEL 435
MODEL 436

HOWARD RADIO CO.


6K8G MIXER OSC.
6SK7 I.F.
6SQ7 AVC, DET., A.F.
6K6GT OUTPUT
PHONE JACK
SPEAKER 4-806
SPEAKER SOCKET TOP VIEW
B.F.O. 6C5
BEAT OSC. OFF ON
A.V.C. OFF ON
AVC 650 TYPE PRE AMP
TUNING CONDENSER
BANDSPREAD CONDENSER
RECT. 80
TYPE 610 POWER PACK INPUT BACK VIEW
SEND REC
I.F. 465 K.C.
117V. 60~
OFF ON POWER
PWR TRANS
*77-938 115V 60~
*78-938: 100-117-140-230V. 40-60~
C1-C2-C3 ELECT COND. * 35-266
C4-C5. ELECT COND. * 37-266
MODEL 435 WITH SERIAL NUMBER FROM 435-100 TO 435-700 HAVE SEND-REC. SWITCH IN CATHODE CIRCUIT.
AS SWITCH IS SET TO HIGHER FREQUENCY BAND LOWER FREQUENCY BANDS ARE SHORTED OUT.
USE ONLY WITH A.C. 105 to 125 Volts 60 Cycles Power Rating 50 Watts
HOWARD RADIO CO.
MODEL: 435
DWG. NO. D66-715
3-4-40
DWN BY
CHKD. BY.
APPVD BY.
R.B.M.
H K.W.M.
J+R



The following are the Engineering Specifications for Model 435,436.

POWER CONSUMPTION. . . . . .50 Watts, 105-125 Volts, A.C. 60 Cycle

INTERMEDIATE FREQUENCY . . . . .465 KC

FREQUENCY RANGE - Divided into four bands as follows:

.55 to 1.7 mc (545-176 meters)
1.7 to 5.6 mc (176-54 meters)
5.6 to 18 mc (54-16.6 meters)
17 to 43 mc (17-7 meters)

SPEAKER SYSTEM

Built-in 6½" Electro Dynamic
Connections provided for External
Speaker (Howard Type 3-820)

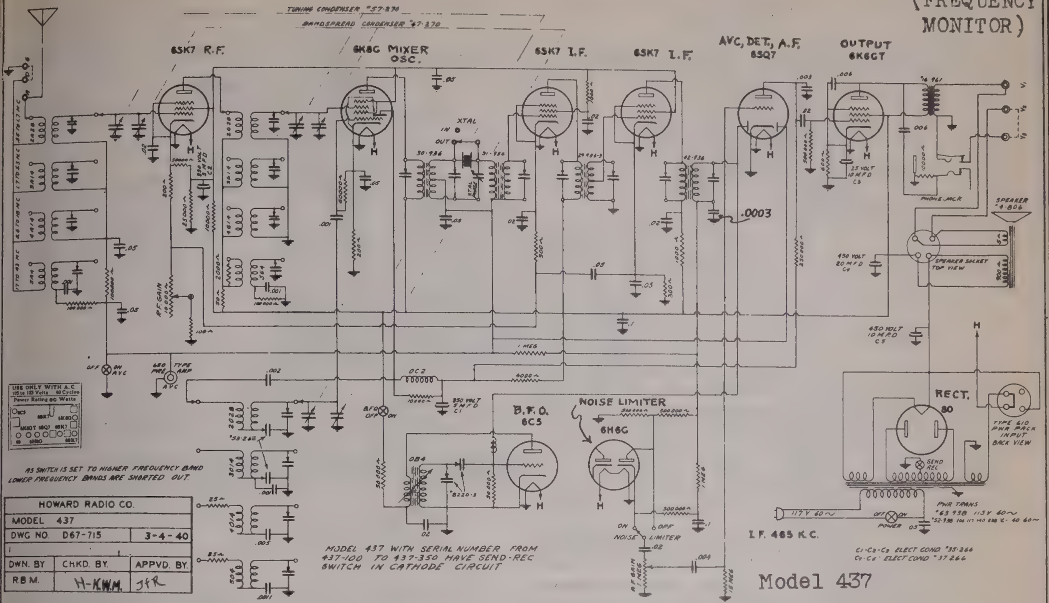
POWER OUTPUT

Type. . . . . .Single 6K6G
Maximum . . . . 2½ Watts

HOWARD RADIO CO.

MODEL 437

MODEL 660 (FREQUENCY MONITOR)



Model 437

FREQUENCY RANGE - Divided into four bands as follows:

.55 to 1.7 mc (545-176 meters)	5.6 to 18 mc (54-16.6 meters)
1.7 to 5.6 mc (176-54 meters)	17 to 43 mc (17-7. meters)

POWER CONSUMPTION. . . . . .60 Watts, 105-125 Volts, A.C. 60 Cycle

INTERMEDIATE FREQUENCY . . . . .465 KC

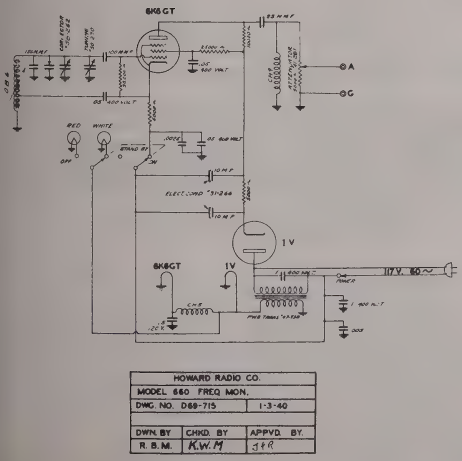
SPEAKER SYSTEM

Built-in 6½" Electro Dynamic
Connections provided for External
Speaker (Howard Type 3-820)

POWER OUTPUT

Type. . . . . .Single 6K6G
Maximum . . . . .4 Watts

TYPE 660 FREQUENCY MONITOR



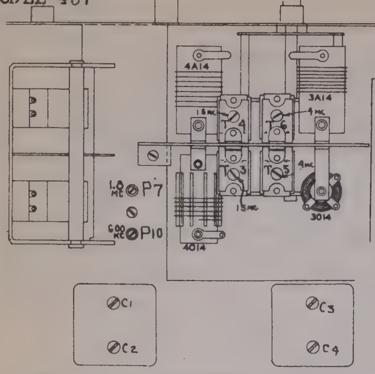
The Howard Frequency Monitor Model 660 consists of a highly stabilized oscillator covering the fundamental frequency range of 850 to 1030 kilocycles, harmonics of which are used as reference or measurement points on the higher bands. The R. F. Output of this oscillator is loosely coupled to the antenna circuit of the receiver, and the voltage applied to the receiver is controlled by a variable resistance attenuator.

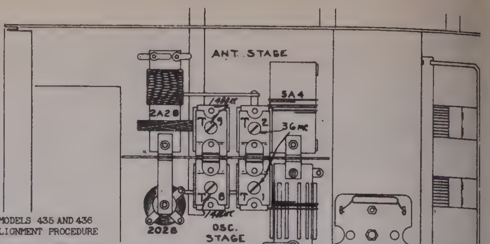
The Oscillator is tuned by a precision ceramic insulated variable condenser carrying an extremely accurate frequency scale covering the 10, 20, 40, 80 and 160 meter amateur bands as well as the fundamental range. The range is so selected that harmonics cover the entire length of all amateur bands, and these are calibrated so that frequency can be read within one kilocycle on the lower frequency bands and five kilocycles on the highest band.

The Power Supply for this unit is self-contained, and is for use on 105-125 Volts, A.C. 40-60 Cycle. Available at other voltages and frequencies on special order.

MODEL 435
MODEL 436
MODEL 437

HOWARD RADIO CO.





MODELS 435 AND 436
ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
1.7-.55	.55	465 KC	Mixer Grid	1	C1,C2,C3,C4	IF
43-17	36	36 MC	A and DG	2	T1,T2	Osc,Ant.
18-5.6	15	15 MC	A and DG	3	T3,T4	Osc,Ant.
5.5-1.7	4	4 MC	A and DG	3	T5,T6	Osc,Ant.
5.5-1.7	1.8	1.8 MC	A and DG	4	P7	Osc.Pad.
1.7-.55	1.4	1400 KC	A and DG		T8,T9	Osc,Ant.
1.7-.55	.60	600 KC	A and DG	4	P10	Osc.Pad.

The alignment is made with the BFO Off, the AVC Off, and the Band Spread set to 100.

The main dial hand must stop EXACTLY ON the last line at the end of the scale when the condenser is fully closed without force on the tuning control.

There should be an overload effect on powerful broadcast stations when the AVC is OFF.

NOTE 1: After the alignment of the I.F. stages is completed, align the BFO system as follows:

1. Set pitch control 3 turns back from the "IN" position and turn on the BFO Switch.
2. Adjust the trimmer in the BFO can to obtain maximum sound which will be a hissing noise. Turn tuning knob to be sure this sound is not some tunable frequency that is causing it.
3. Check beats against some broadcast station to determine if the strength of the beat is normal.

NOTE 2: In this band (17 to 43 MC) only the oscillator follows the received signal 465 KC lower in frequency. Therefore when checking for the image, if the alignment has been made at 36 MC, it will be found at about 37 MC. This will determine if the alignment was correctly made at 36 MC.

NOTE 3: Check for image on all bands except the 17 to 43 MC band at a point 930 KC lower on the dial.

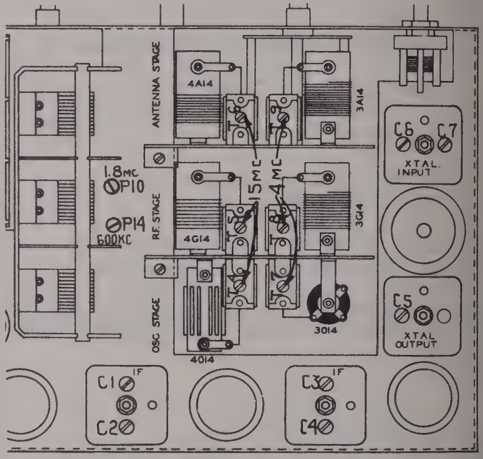
NOTE 4: Rock main dial slightly for point of maximum signal as the padding condenser is being adjusted.

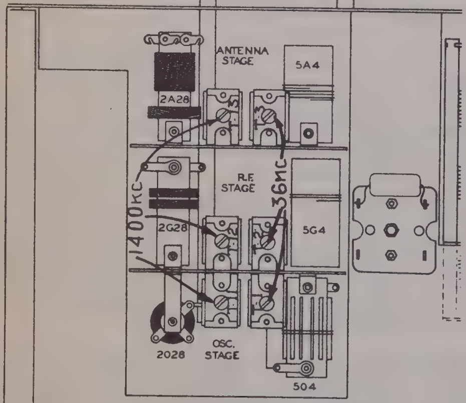
MODELS 435 AND 436
SOCKET VOLTAGES

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6K8G	Mixer	3	100	195	170
6SK7	I.F.Amp.	3	100	195	
6SQ7	Det.			70	

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6C5	BFO			70	
6K6GT	Output	14	195	180	
80	Rect.	High Voltage = 250 V.			
	Drop across field = 55 V.				

Readings from ground with 1000 Ohm per V. Meter
Line Voltage 117 V.
Main Filament Voltage 6.2 V.
Rectifier filament Voltage 4.9 V.





MODEL 437
ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
1.7-.55	.55	465 KC	Mixer Grid	1	C1,C2,C3,C4	IF
43-17	36	36 MC	A and DG	2	T1,T2,T3	Osc,RF,Ant.
18-5.6	15	15 MC	A and DG	3	T4,T5,T6	Osc,RF,Ant.
5.5-1.7	4	4 MC	A and DG	3	T7,T8,T9	Osc,RF,Ant.
5.5-1.7	1.8	1.8 MC	A and DG	4	P10	Osc, Pad.
1.7-.55	1.4	1400 KC	A and DG		T11,T12,T13	Osc,RF,Ant.
1.7-.55	.60	600 KC	A and DG	4	P14	Osc, Pad.

The alignment is made with the BFO Off, the AVC Off, and the Band Spread set to 100.

The main dial hand must stop EXACTLY ON the last line at the end of the scale when the condenser is fully closed without force on the tuning control.

There should be an overload effect on powerful broadcast stations when the AVC is OFF.

NOTE 1: After the alignment of the I.F. stages is completed, align the BFO system as follows:

MODEL 437
SOCKET VOLTAGES

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6SK7	RF	3	92	240	
6K8G	Mixer	3	92	240	
6SK7	I.F.Amp	3	92	240	200
6SK7	I.F.Amp	3	92	233	

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6SQ7	Det.			70	
6K6GT	Output	17½	240	223	
6C5	BFO			75	
80	Rect.	High Voltage = 313V.			
	Drop across Spkr. Field = 73 V.				

R.F. Gain Full On
Readings from ground with 1000 Ohm per V. Meter
Line Voltage 117 V.
Main Filament Voltage 6.2 V.
Rectifier Filament Voltage 5 V.

1. Set pitch control 3 turns back from the "IN" position and turn on the BFO Switch.
2. Adjust the trimmer in the BFO can to obtain maximum sound which will be a hissing noise. Turn tuning knob to be sure this sound is not some tunable frequency that is causing it.
3. Check beats against some broadcast station to determine if the strength of the beat is normal.

NOTE 2: In this band (17 to 43 MC) only the oscillator follows the received signal 465 KC lower in frequency. Therefore, when checking for the image, if the alignment has been made at 36 MC, it will be found at about 37 MC. This will determine if the alignment was correctly made at 36 MC.

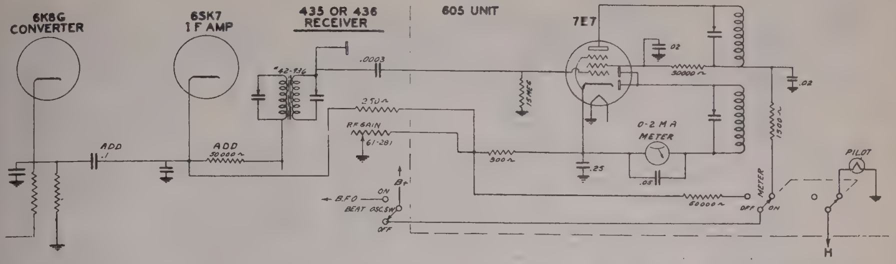
NOTE 3: Check for image on all bands except the 17 to 43 MC band at a point 930 KC lower on the dial.

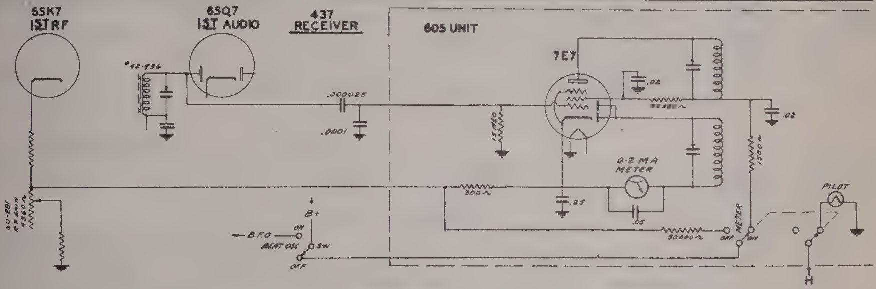
NOTE 4: Rock main dial slightly for point of maximum signal as the padding condenser is being adjusted.

HOWARD RADIO CO.

MODEL 435
MODEL 436
MODEL 437

TYPE 605 CARRIER LEVEL METER ADAPTABLE TO MODELS 435, 436, 437





THE HOWARD CARRIER LEVEL METER gives an indication of the strength of the signal carrier in microvolts as delivered at the receiver.

MODEL 605		
DWG. NO. 68-715		3-1-40
DWN BY	CHCKD BY	APPVD BY
R B M	K.W.M.	J + R.

The meter scale is calibrated from 0 to 50. When the meter set control (R. F. Gain) located directly below meter, is set exactly on the 50 division, the reading on the meter will be the actual microvolts delivered to the receiver.

Before using the carrier level meter, tune the signal to exact resonance with the meter switch in the OFF position, and adjust the R. F. GAIN CONTROL to a point where the signal is just audible. This will not throw the meter off scale when the meter switch is thrown to the ON position. Follow instructions given below.

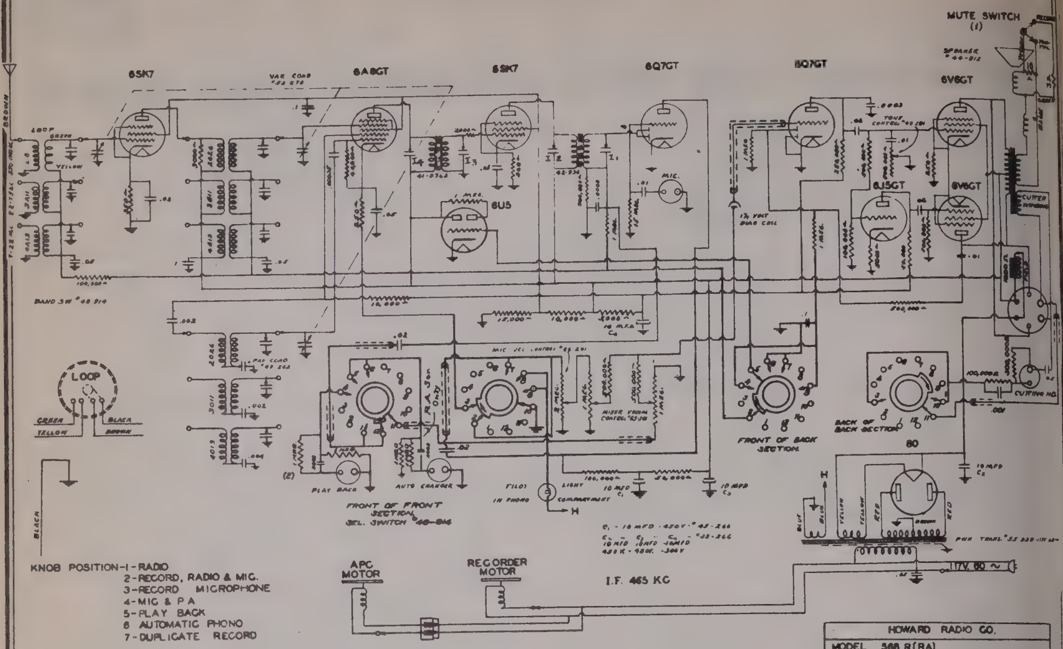
The AVC Switch must be ON.
The Meter Switch must be ON.
The BFO Switch must be OFF.

To avoid the possibility of introduced error, the BFO Switch is so connected that the meter is not in the circuit when the BFO Switch is in the ON position. Therefore the meter can be used only when the BFO Switch is in the OFF position.

The maximum deflection of meter pointer is the true indication of resonance in tuning. With a strong signal the meter will naturally be thrown off scale until the R. F. Control is rotated counter-clockwise. A point will be reached during this rotation where the meter hand is at 50. Then the input value in microvolts is read direct at the position of the pointer knob. For better accuracy this reading is multiplied by a correction factor as given on a separate chart to cover the various bands calibrated for each receiver.

MODELS 568R,568RA Late

HOWARD RADIO CO.



KNOB POSITION-1-RADIO
2-RECORD, RADIO & MIC.
3-RECORD MICROPHONE
4-MIC & P A
5-PLAY BACK
6 AUTOMATIC PHONO
7-DUPLICATE RECORD

HOWARD RADIO CO.		
MODEL 568 R(RA)		
DWG. NO. C73-715		
DWN. BY.	CHCKD. BY.	APPVD. BY
R.E. S.		JFR

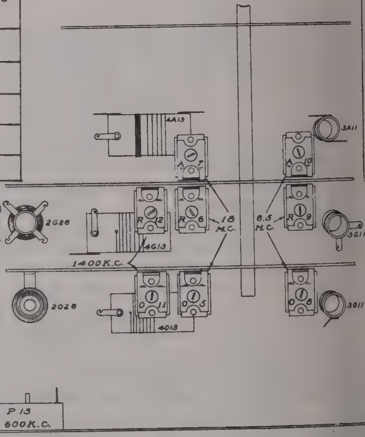
(1) Mute Switch Added 6-1-40
(2) Matching Circuit

FOR OTHER DATA,SEE INDEX

ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function	Check for Image at
BC	Min.Cap.	465 KC	Grid of 6A8GT	A,D	I_1, I_2, I_3, I_4	IF	
SW	18 MC	18 MC	Ant.Brown lead	B,E	O_5, R_6, A_7	Osc.RF.Ant.	17
PB	6.5 MC	6.5 MC	Ant.Brown lead		O_8, R_9, A_{10}	Osc.RF.Ant.	
BC	1400 KC	1400 KC	Ant.Brown lead		O_{11}, R_{12}	Osc.RF	
BC	600 KC	600 KC	Ant.Brown lead	C	P_{13}	Osc.Pad.	

A- Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.
B- When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 18 MC, then a weaker image will be heard at 17,070 KC, in other words 930 KC less on the dial.
C- When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.
D- See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.
E- Check for oscillator cross-over between 18 and 22 MC. If necessary for stability, turn the mixer trimmer "IN" slightly.



SOCKET VOLTAGE READINGS:

Voltage taken from ground with line voltage at - 117 V.
High voltage reading off rectifier = 340 V.
Drop across speaker field = 95 V.
Voltage taken with 1,000 Ohm per volt meter.

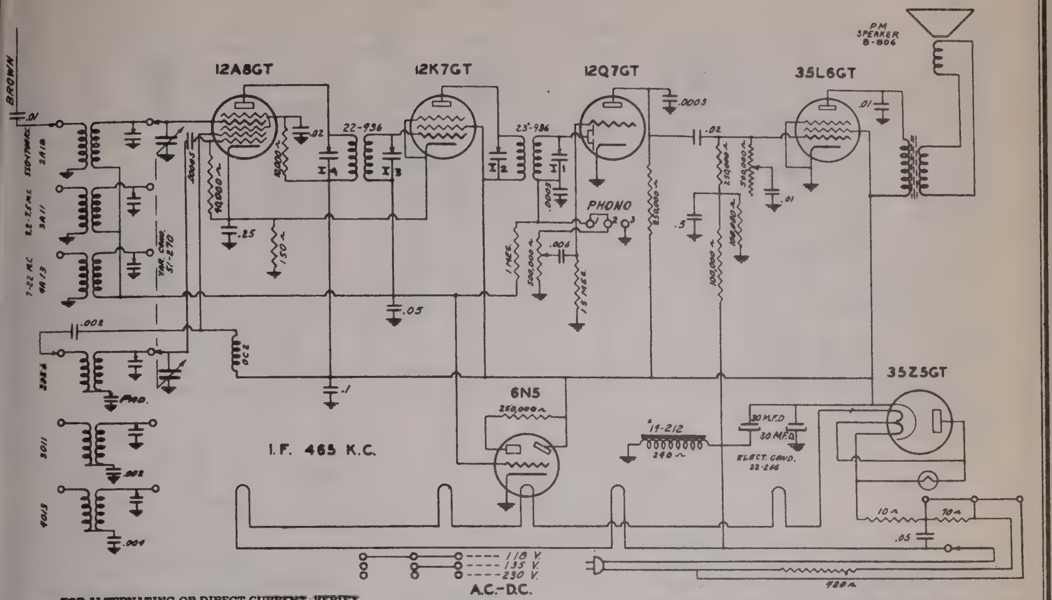
TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE	TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE	OSC. PLATE
6SK7	RF	2½	100	245		6J5GT	Inverter	7		125	
6A8GT	Mixer	3½	100	245	140	6V6GT	Output	16	245	240	
6SK7	I.F.Amp.	3½	100	245		6V6GT	Output	16	245	240	
6Q7GT	Diode & Mic.Gain			80		6U5	Tuning & level cont.				
6Q7GT	Audio			70		80	Rect.				

CONSUMPTION - Receiver, 90 WATTS;
POWER SUPPLY - (Standard Models)
= 105-125 V. 60 Cycles
Changer, 30 WATTS. Recorder, 30 WATTS;
I.F. = 465 KC TYPE = Iron Core
POWER OUTPUT - (MAX.)
= 11 Watts; UPO = 8 Watts
TUNING RANGES = 540 to 1700 KC,
2.2 to 7.5 MC and 7 to 22 MC.

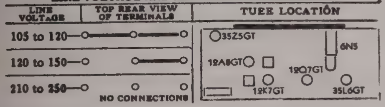
MODEL - 568-R
10 tube console Recorder
568-RA
Recorder with Automatic Record Changer

HOWARD RADIO CO.

MODEL 585



FOR ALTERNATING OR DIRECT CURRENT, VERIFY LINE VOLTAGE AND ARRANGE VOLTAGE TAPS.



POWER SUPPLY - (Standard Models) = AC-DC 3 Range 118V, 135V, 230V.

CONSUMPTION 25-50 WATTS

POWER OUTPUT - (MAX.) = 2.7W. upo 1.3

SPEAKER = Permanent Magnet SIZE = 6½"

V.C.IMP. (400CPS) = 4 Ohms

Tubes:

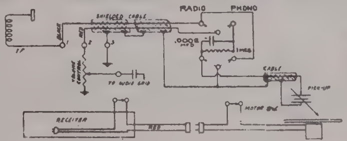
12A8GT	Converter
12K7GT	I F Amp.
12Q7GT	Det. - Audio
35L6GT	Output
6N5	Tuning Eye
35Z5GT	Rectifier

SOCKET VOLTAGE READINGS

Voltage taken from ground with line voltage at - 117 AC.
High voltage reading off rectifier = 107 V.
Drop across speaker field - x
Voltage taken with 1,000 Ohm per volt meter

TUBE	FUNCTION	CATHODE.	SCB. GRID	PLATE
12A8 gt	Mixer	3	72	105 OR105
12K7 gt	IF	3	105	105
12Q7 gt	Det.	x	x	85
35L6 gt	Output		105	105

THE ADAPTION OF THE SET FOR USE WITH PHONOGRAPH



HOWARD RADIO CO.		
MODEL: 585		
DWG. NO. D60-715		9·18·39.
DWN. BY.	CHKD. BY.	APPVD. BY.
R.B.M.	H	

ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
BC	Min. Cap.	465 KC	6A8 Grid	A, E	I_1 I_2 I_3 I_4	IF
SW	18 MC	18 MC	Brown lead	B, D	O_5, A_6	Osc., Ant.
PB	6.5 MC	6.5 MC	Brown lead		O_7 A_8	Osc., Ant.
BC	1400 KC	1400 MC	Brown lead		O_9 A_{10}	Osc., Ant.
BC	600 KC	600 KC	Brown lead	C	P_{11}	Osc., Pad.

NOTES

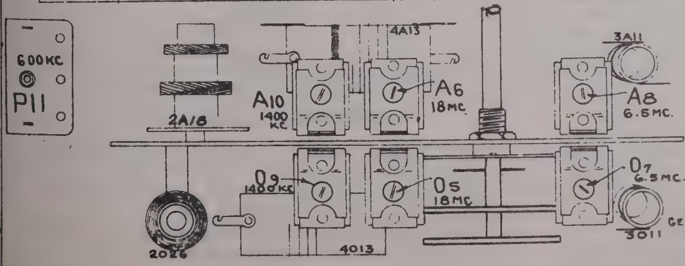
A- Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

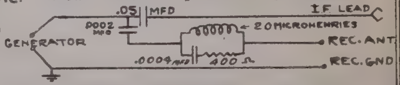
B- When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,070 KC on the dial.

C- When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.

D- See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.

E- The following dummy antenna circuit is recommended, since it is adaptable for any frequency range. The grid cap should remain in place during alignment.

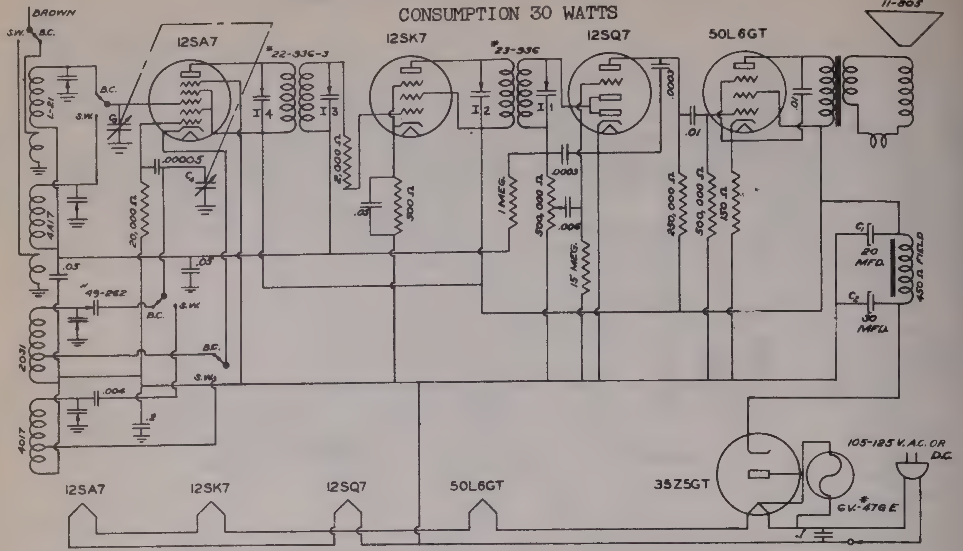




MODEL 702

HOWARD RADIO CO.

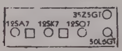
POWER SUPPLY - (Standard Models) = 105-125 V. AC-DC
POWER OUTPUT - (MAX.) = 1 Watt UPO .5 W.
CONSUMPTION 30 WATTS



C1 C2-20, 30 MFD.-150, 150 V.-NO. 47-266.
C3 C4-VARIABLE CONDENSER-NO. 63-270.
VOLUME CONTROL AND SWITCH-NO. 69-281

V.C.IMP.(400CPS) = 5 Ohms|FIELD =450 Ohms
SPEAKER = Electro-dynamic
SIZE = 5"

I. F.-465 K. C.



HOWARD RADIO CO.		
MODEL 702		
D78-715		4-5-40
DWN BY.	CHKD. BY	APPVD. BY

TUNING RANGES = 540 to 1720 KC and 4.6 to 16 MC (178-550 and 18-65 Meters)

ALIGNMENT PROCEDURE

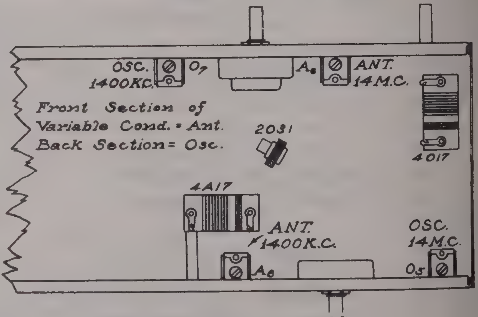
Wave-Band Switch Position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function	Check for Image at
KC	540	456	Grid of 12SA7	A	I_1, I_2, I_3, I_4	IF	
MC	14 MC	14 MC	Ant. (Brown)	B	O_5, A_6	Osc. Ant.	13 MC
KC	14 KC	14 KC	Ant. (Brown)		O_7, A_8	Osc. Ant.	

A- Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B- When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 14 MC, then a weaker image will be heard at 13,070 KC, in other words 930 KC less on the dial.

The tubes are connected in series in the order as shown by the schematic diagram.

The dual section filter condenser has a common negative, but note that it does not return to ground as the can is insulated from the chassis.



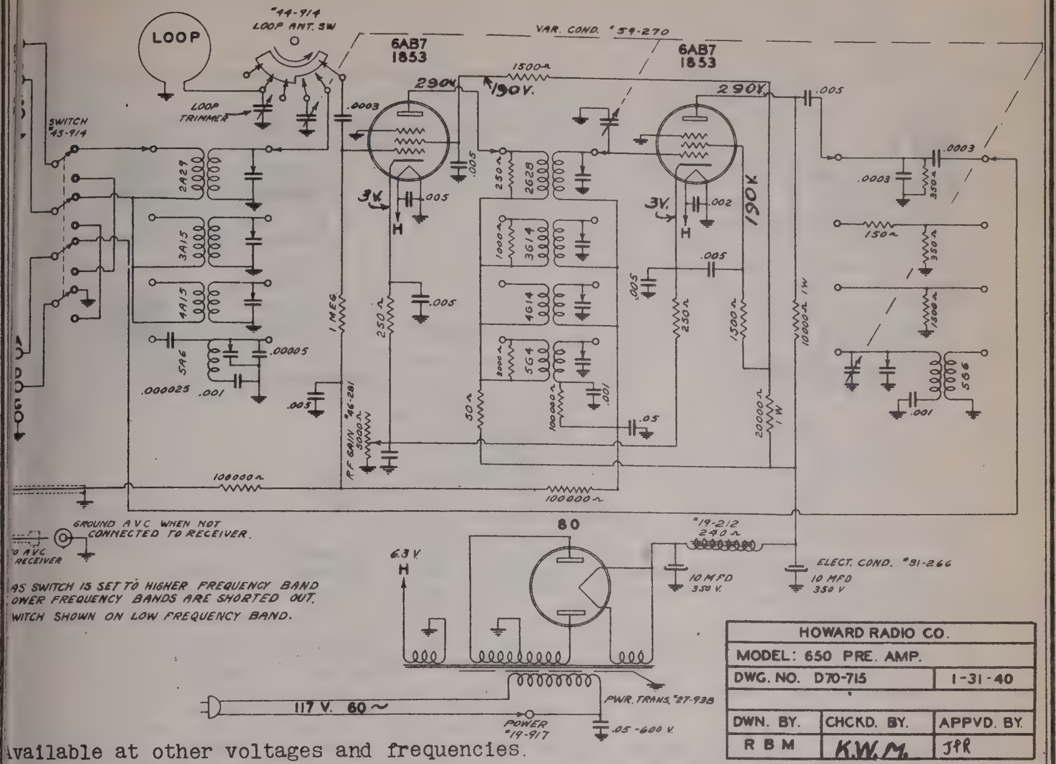
TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
12SA7	Mixer		95	95	95
12SK7	I.F. Amp.	3.5	95	95	
12SQ7	Det.			45	
50L6GT	Output	6	9	82	

SOCKET VOLTAGE READINGS:

Voltage taken from ground with line voltage at - 117 V. AC.
High voltage reading off rectifier = 115 V.
Drop across speaker field = 20 V.
Voltage taken with 1,000 Ohm per volt meter, from cathode return to points as given.

HOWARD RADIO CO.

MODEL 650 Pre.Amp.
MODEL 655
LOOP KIT



HOWARD RADIO CO.		
MODEL: 650 PRE. AMP.		
DWG. NO. D70-715		1-31-40
DWN. BY.	CHCKD. BY.	APPVD. BY.
R B M	K.W.M.	JfR

Available at other voltages and frequencies.

Te Howard Type 650 Pre-Amplifier is designed to be used with ANY RECEIVER and covers a fequency range of .55 mc. to 43 mc. The Pre-Amplifier is constructed for the use with a antenna having either single wire or doublet lead-in or the Howard Type 655 Loop Atenna Kit.

Te use of the Loop Kit, Type 655, with this Pre-Amplifier will be indispensable in sparating interfering signals and reducing certain noise conditions.

Te Antenna-Loop Switch provides a convenient shift from either the loop or an external tenna system.

is unit is coupled at the back to the regular receiver without changing the receiver any way.

e "IN-OUT" Switch allows the unit to be switched out of the input system allowing the gular antenna to be coupled direct to the receiver.

TYPE 655 LOOP KIT

The Kit consists of four separate loops having band coverage as follows:

NO. OF LOOP	COVERAGE
L14	1700 KC to 550 KC
L13	5.6 MC to 1.7 MC
L12	18 MC to 5.6 MC
L11	34 MC to 22 MC

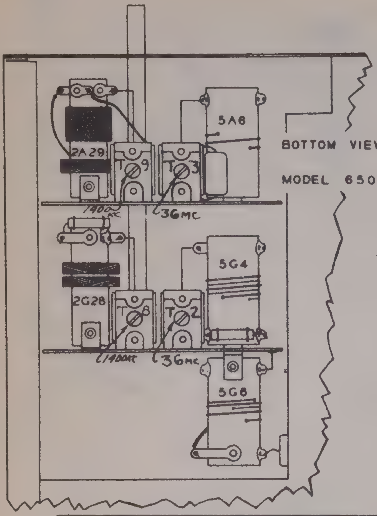
he Pre-Amplifier has a special switch position for the 30 MC LOOP (L11). When the switch s on this position, the Loop Trimmer is connected directly to the Loop, and the main ariable condenser disconnected from the Loop. This is done to secure a loop of more ffective height on the 30 MC BAND.

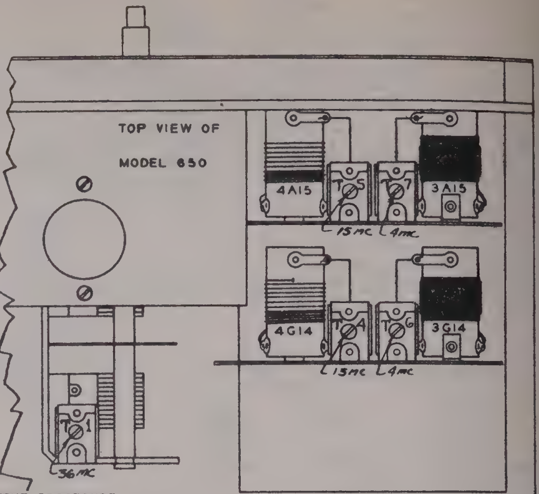
hen using loops covering the three lower frequency ranges and with switch at Loop, the oop Trimmer is used to bring the Loop into exact resonance with the incoming signal to ecure greater loop performance. The High Frequency end range of the three lower frequency loops can be extended by having loop switch on 30 MC LOOP. In this position the oop Trimmer will cover the following ranges:

L14 1400-1990 KC L13 4.4-6 MC L12 15.5-22 MC

MODEL 650 Pre.Amp.
MODEL 660 Freq. Mon.

HOWARD RADIO CO.





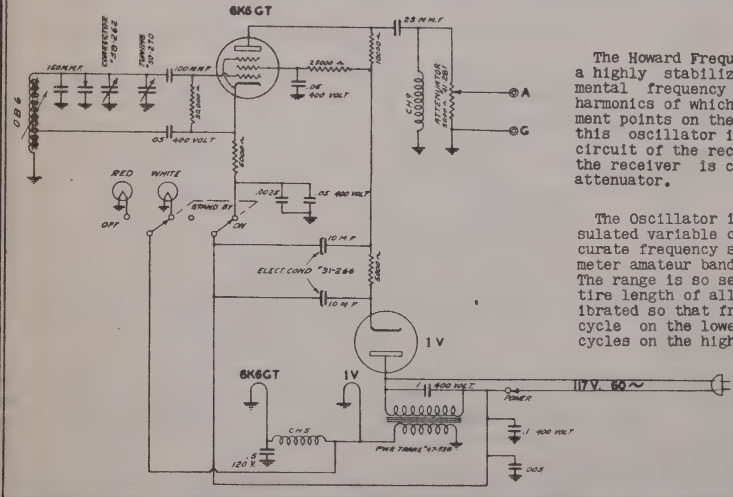
ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
43-17	36	36 MC	A and DG	5	T1,T2,T3	RF,RF,Ant.
18-5.6	15	15 MC	A and DG		T4,T5	RF,Ant.
5.5-1.7	4	4 MC	A and DG		T6,T7	RF,Ant.
1.7-.55	1.4	1400 KC	A and DG		T8,T9	RF,Ant.

NOTE 5: Align regular receiver first.
Set "Ant. Loop" to "Ant." position.

DUE TO THE CRITICAL ADJUSTMENTS THAT ARE REQUIRED WITH THE FREQUENCY MONITOR, MODEL 660, WE DO NOT ADVISE THAT ANY ATTEMPT BE MADE TO CALIBRATE THIS UNIT; WE THEREFORE SUGGEST IF IT HAS BEEN DETERMINED THAT THE UNIT IS OFF CALIBRATION, IT SHOULD BE SENT BACK TO THE FACTORY FOR A RECALIBRATION.

TYPE 660 FREQUENCY MONITOR



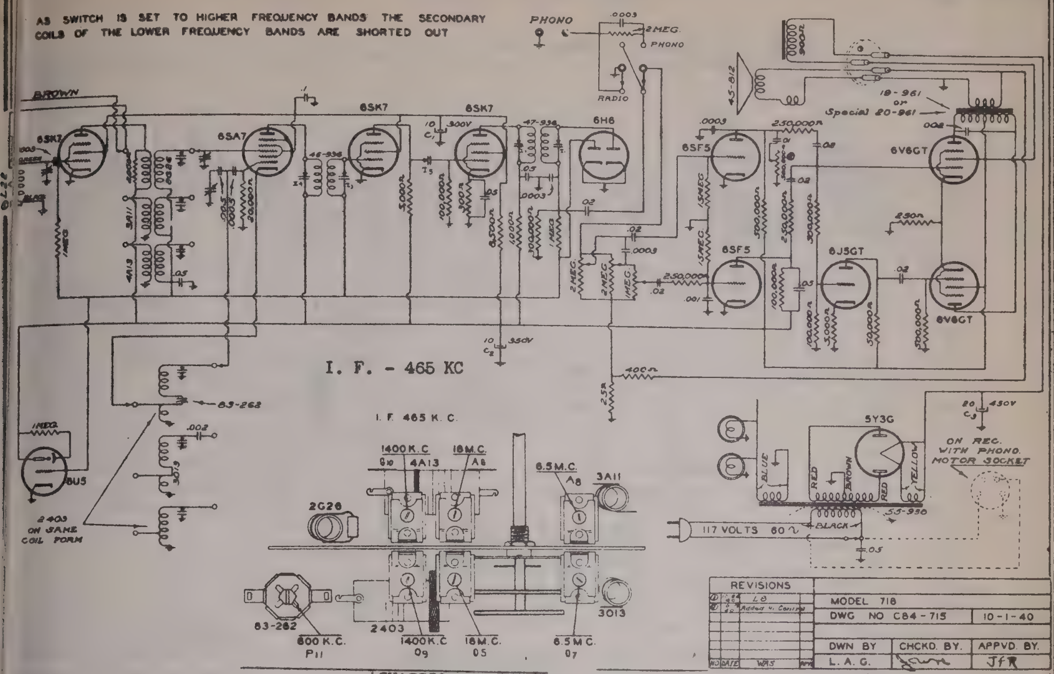
The Howard Frequency Monitor Model 660 consists of a highly stabilized oscillator covering the fundamental frequency range of 850 to 1030 kilocycles, harmonics of which are used as reference or measurement points on the higher bands. The R. F, Output of this oscillator is loosely coupled to the antenna circuit of the receiver, and the voltage applied to the receiver is controlled by a variable resistance attenuator.

The Oscillator is tuned by a precision ceramic insulated variable condenser carrying an extremely accurate frequency scale covering the 10,20,40,80 and 160 meter amateur bands as well as the fundamental range. The range is so selected that harmonics cover the entire length of all amateur bands, and these are calibrated so that frequency can be read within one kilocycle on the lower frequency bands and five kilocycles on the highest band.

HOWARD RADIO CO.		
MODEL 660 FREQ. MON.		
DWG. NO. D69-715		1-3-40
DWN. BY	CHKD. BY	APPVD. BY.
R. B. M.	K.W.M	J+R

HOWARD RADIO CO.

MODEL 718



CONSUMPTION: CHASSIS -- 105 W.
CHANGER -- 30 W.

VOICE COIL - 8 OHMS

FIELD - 900 OHMS

ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Con- nection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
BC	Max.Cap.	465 KC	Converter	A,E	I_1,I_2,I_3,I_4	IF
7-22	18	18 MC	Ant. Lead	B,D	O_5,A_6	Osc.,Ant.
2.2-7	6.5	6.5 MC	Ant. Lead		O_7,A_8	Osc.,Ant.
BC	1400	1400 KC	Ant. Lead		O_9,G_{10}	Osc., RF
BC	600	600 KC	Ant. Lead	C	P_{11}	Osc.,Pad.

A - Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B - When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,070 KC on the dial.

C - When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.

D - See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.

E - The Interstage resistance coupled I.F. stage is coupled by a trimmer. Adjust to maximum capacity for Maximum gain.

Voltage taken from ground with line voltage at - 115 V.Ac.
High voltage reading off rectifier - 320 V.
Drop across speaker field - 100 V.
Voltage taken with 1,000 Ohm per volt meter.
Tune set off station

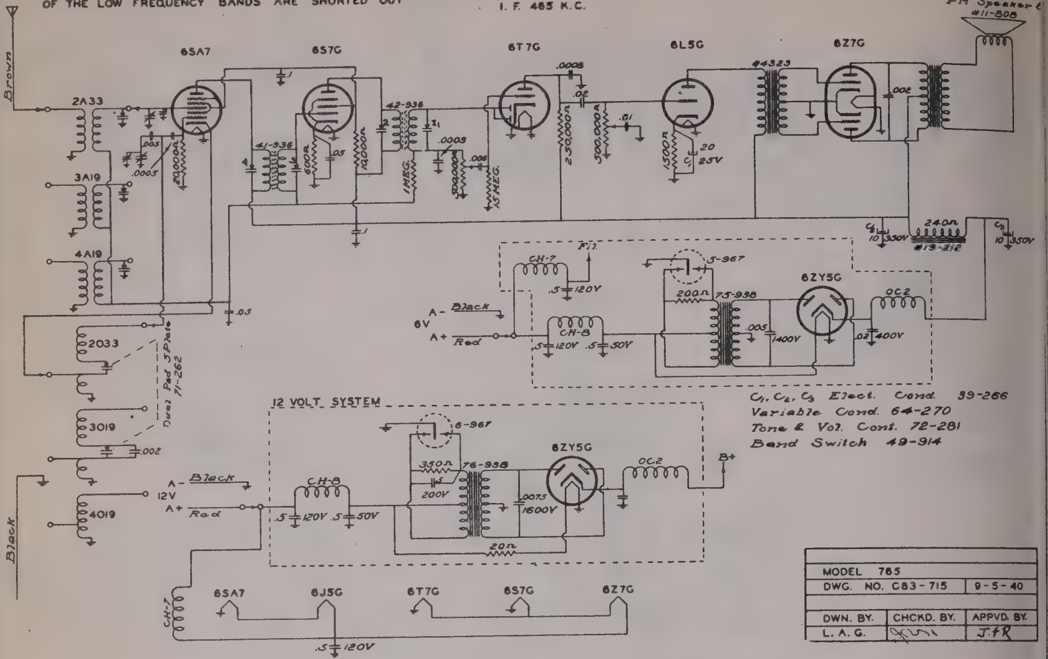
TUBE	FUNCTION	CATHODE	SCR.GRID	PLATE	OSC. PLATE
6SK7	RF		75 - 100	212	
6SA7	Converter		75 - 100	215	75-100
6SK7	I.F.Amp.		75 - 100	150	
6SK7	I.F.Amp.	3	75 - 100	205	
6H6	Det.				
6SF5	Audio			25	

TUBE	FUNCTION	CATHODE	SCR.GRID	PLATE
6SF5	Bass Amp.			112
6J5GT	Inverter	6.5		130
6V6GT	Output	13	220	205
6V6GT	Output	13	220	210
5Y3G	Rectifier			
6U5	Tuning Eye			

MODEL 765
MODEL 768

HOWARD RADIO CO

AS SWITCH IS SET TO HIGHER FREQUENCY BANDS THE SECONDARY COILS OF THE LOW FREQUENCY BANDS ARE SHORTED OUT

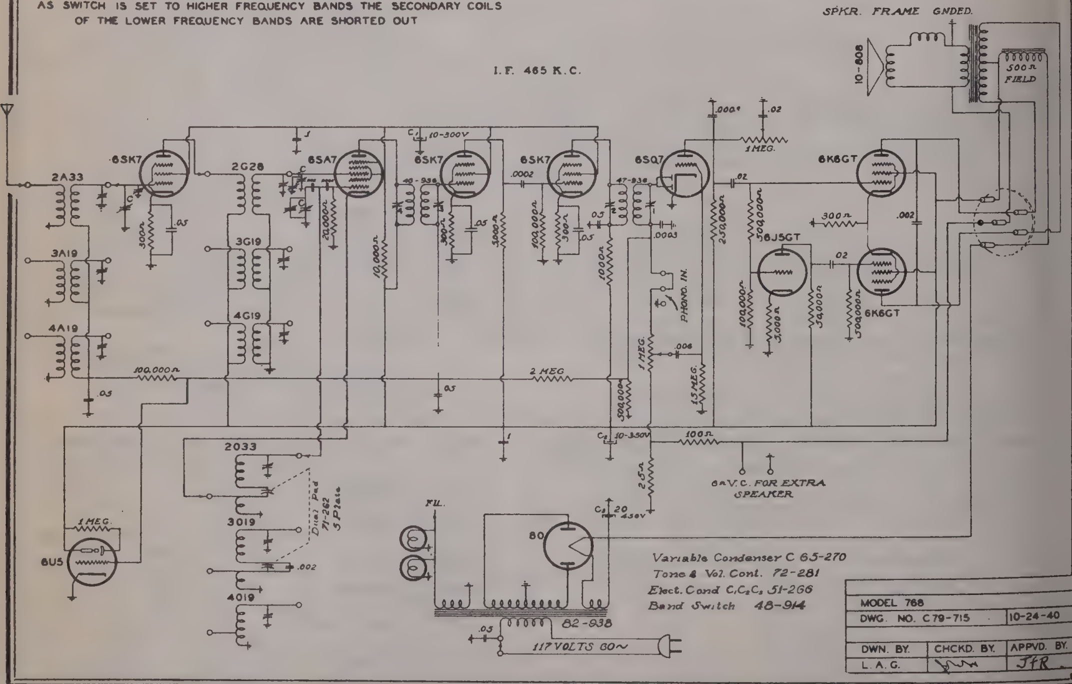


C1, C2, C3 Elect. Cond. 39-266
Variable Cond. 64-270
Tone & Vol. Cont. 72-281
Band Switch 49-914

MODEL 765		
DWG. NO. C83-715		9-5-40
DWN. BY.	CHCKD. BY.	APPVD. BY.
L. A. G.		J.F.R

FOR OTHER DATA, SEE INDEX

AS SWITCH IS SET TO HIGHER FREQUENCY BANDS THE SECONDARY COILS OF THE LOWER FREQUENCY BANDS ARE SHORTED OUT

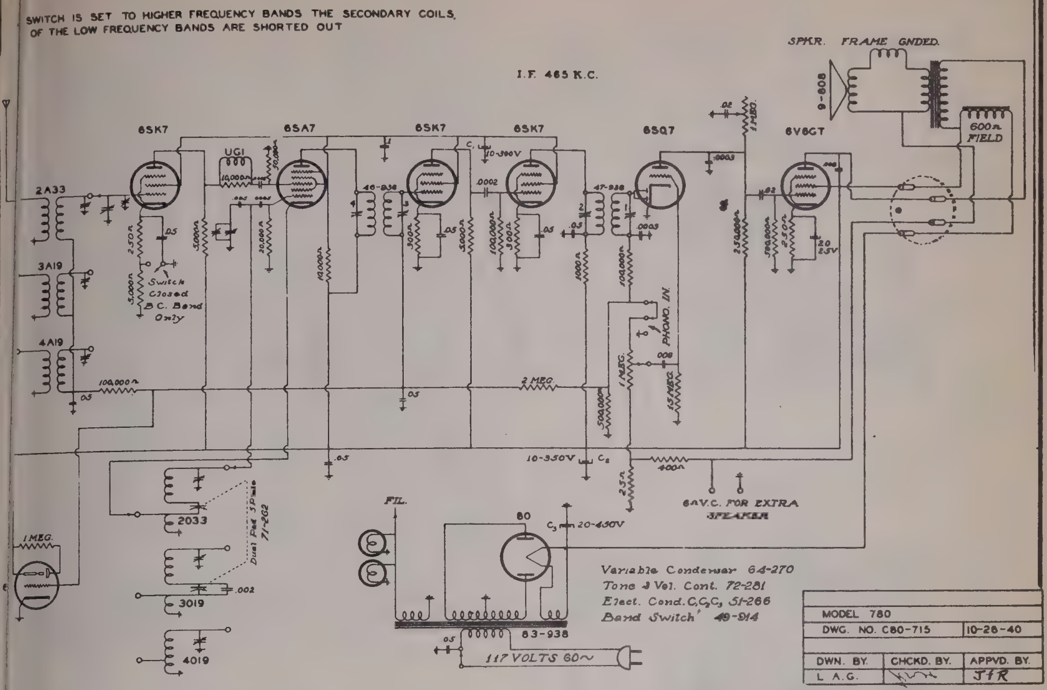


Variable Condenser C 65-270
Tone & Vol. Cont. 72-281
Elect. Cond C1C2C3 51-266
Band Switch 48-914

MODEL 768		
DWG. NO. C79-715		10-24-40
DWN. BY.	CHCKD. BY.	APPVD. BY.
L. A. G.		J.F.R

HOWARD RADIO CO.

MODEL 780



ave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
Broadcast	Max. Cap.	465 KC	Converter Grid	A,D	I_1, I_2, I_3, I_4	IF
7-22 MC	21	21 MC	Ant. (Brown)	B	O_5, A_6	Osc., Ant.
2.2-7 MC	6	6 MC	" "		O_7, A_8	Osc., Ant.
2.2-7 MC	2.2	2.2 MC	" "		P_9	Osc. Pad.
Broadcast	1400	1400 KC	" "		O_{10}, A_{11}	Osc., Ant.
Broadcast	600	600 KC	" "	C	P_{12}	Osc. Pad.

A--Each step of the alignment should be repeated in the original order for greater accuracy. Keep output om Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B--When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustnt is correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,070 on the dial.

C--When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest tensity is obtained.

D--See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum pacity.

Voltage taken from ground with line voltage at - 120 V.
High voltage reading off rectifier - 325 V.
Drop across speaker field - 58 V.
Voltage taken with 1,000 Ohm per volt meter.
Band Switch in BC position except R.F. Stage measurements.

MODEL 780 SOCKET VOLTAGE READINGS:

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
6SK7	R.F. BC SW	8.5 2.5	110 98	260 210	
6SA7	Mixer		110	265	110
6SK7	I.F. Amp.	2	110	230	
6SK7	I.F. Amp.	4	110	250	

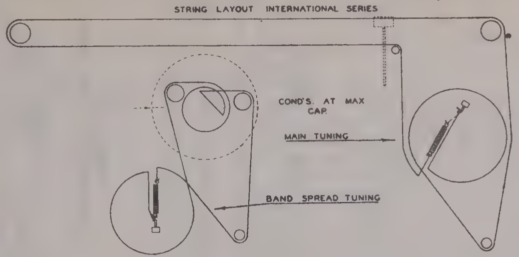
TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE
6SQ7	Diode-AVC			50
6V6GT	Output	12.5	265	250
80	Rect.			
6U5	Tuning Eye	265		

MODEL 765
MODEL 768
MODEL 780

HOWARD RADIO CO.

This sheet is a part of Form 75-480, 76-480, or 77-480 for International Models 780, 768, 765, etc.

The below layout shows the order of the drive cord for the tuning and Band Spread mechanisms should any servicing or replacement be necessary.



Trimmer Location for Models 765 and 780

FIG. 1

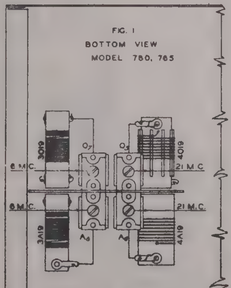
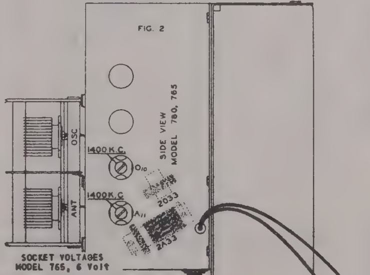


FIG. 2



SOCKET VOLTAGES
MODEL 765, 6 Volt

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE
6SA7	Mixer	3	70	145
6S7G	IF	3	70	145
6T7G	Det.	x	x	50
6L5G	Audio	6 V. Bias	x	145
6Z7G	PP Output	x	x	140

Voltage taken from ground with line voltage at - 120 V.
High voltage reading off rectifier - 300 V.
Drop across speaker field - 65 V.
Voltage taken with 1,000 Ohm per volt meter.

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
6SK7	R.F.	2.5	95	235	
6SA7	Mixer		95	235	95
6SK7	I.F.Amp.	3	95	196	
6SK7	I.F.Amp.	3	95	215	
6SQ7	Diode-AVC			47	

MODEL 768
SOCKET VOLTAGE READINGS:

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE
6K6GT	Output	17	235	225
6K6GT	Output	17	235	225
6J5GT	Inverter	7.5		145
80	Rect.			
6U5	Tuning Eye			235

The below diagrams are the trimmer location layout for the International Series, such as the Model 768.

FIG. 3

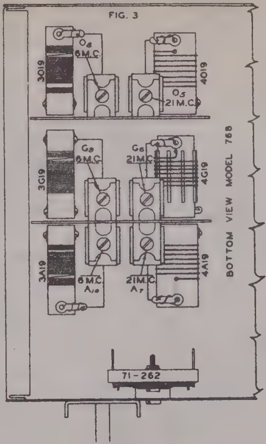
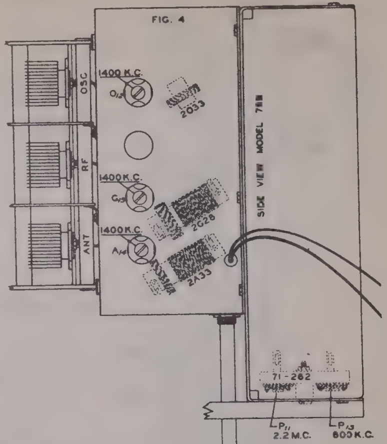


FIG. 4



MODEL 765
ALIGNMENT PROCEDURE

See Fig. 1 and Fig. 2.

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
Broadcast	Max. Cap.	465 KC	Converter Grid	A,D	I_1, I_2, I_3, I_4	IF
7-22 MC	21	21 MC	Ant. (Brown)	B	O_5, A_6	Osc.,Ant.
2.2-7 MC	6	6 MC	" "		O_7, A_8	Osc.,Ant.
2.2-7 MC	2.2	2.2 MC	" "		P_9	Osc.Pad.
Broadcast	1400	1400 KC	" "		O_{10}, A_{11}	Osc.,Ant.
Broadcast	600	600 KC	" "	C	P12	Osc.Pad.

MODEL 768
ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
Broadcast	Max. Cap.	465 KC	Converter Grid	A,D	I_1, I_2, I_3, I_4	IF
7-22 MC	21	21 MC	Ant. (Brown)	B	O_5, G_6, A_7	Osc,RF,Ant.
2.2-7 MC	6	6 MC	" "		O_8, G_9, A_{10}	Osc,RF,Ant.
2.2-7 MC	2.2	2.2 MC	" "		P_{11}	Osc,Pad.
Broadcast	1400	1400 KC	" "		O_{12}, G_{13}, A_{14}	Osc,RF,Ant.
Broadcast	600	600 KC	" "	C	P_{15}	Osc,Pad.

A--Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B--When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,070 KC on the dial.

C--When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.

D--See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.

HUDSON MOTOR CAR CO.

MODEL JA-40

ELECTRICAL SPECIFICATIONS

I.F. Frequency 455 K.C.

I.F. Sensitivity (from 6K8 Grid)=60 Microvolts for ½ Watt Output

Power Output, Max. 5 Watts; Undistorted 2.3 Watts

SPEAKER

5-inch P. M. Dynamic

Voice Coil Impedance 3.5 Ohms at 400 cycles

TUNING RANGE

540 K.C. to 1580 K.C.

VOLTAGE READINGS

6 volts at the set

0Z4 cathode to chassis=225 volts.

Output of filter=205 volts (set B+).

Plate to cathode of 6V6 output tube pins=3(+) and 8(−)=205 volts.

Cathode of 6V6 output (pin #8) to chassis 10 volts.

Screens of 6K7—6K8 (pin #4) to chassis 95 volts.

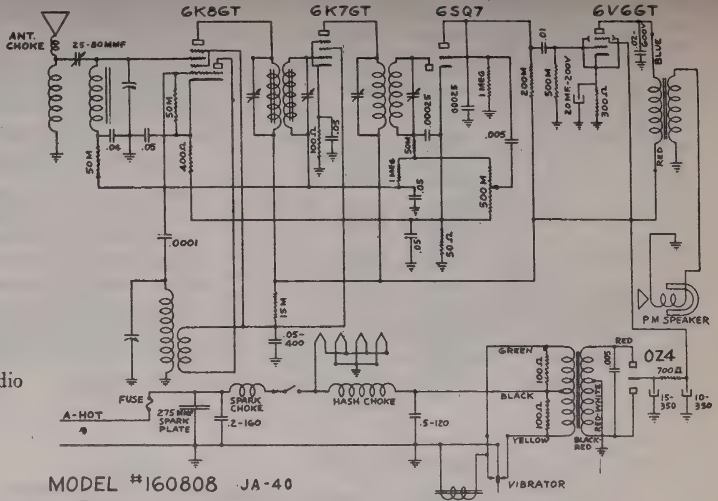
Screen of 6V6 to chassis (pin #4) 205 volts.

TUBE COMPLEMENT

6K8GT	Mixer
6K7GT	I.F. Amplifier
6SQ7	2nd Detector AVC Audio
6V6GT	Output
0Z4	Rectifier

VIBRATOR

Non Synchronous Type



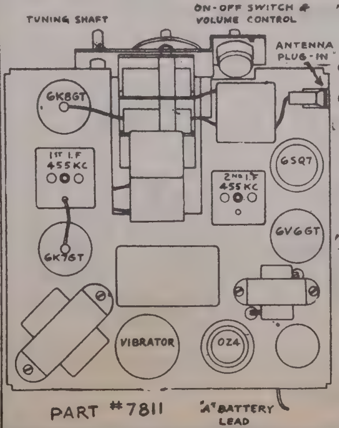
MODEL #160808 JA-40

Current Drain 5.25 Amps at 6.3 Volts

Fuse 14 Ampere

1940—Hudson

NOTE. Receivers with serial numbers above 14000 have a 1/10 MF condenser across vibrator points and a 200 ohm resistor in the cathode of the 6K8GT tube.



TO ALIGN I.F.

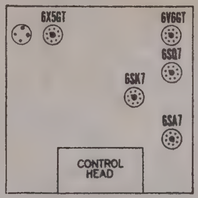
Attach signal generator "hot" lead to grid of 6K7 through a 1/10 MF condenser, connect ground side of generator to case. Set signal generator at 455 K.C., turn volume control to maximum, attach an output meter or resonance indicator, either the plate circuit of the 6V6 tube or across the voice coil terminals of the speaker. Adjust 2nd I.F. transformer for maximum output. Shift hot generator lead to 6K8 grid and adjust 1st I.F. transformer for maximum output. Recheck 2nd I.F. adjustment, with generator connected to 6K8 grid. Do not use greater generator signal than is necessary to obtain good output meter reading. For location of 1st and 2nd I.F. transformers, see tube layout diagram. I.F. sensitivity=approximaely 60 micrtovolts for ½ watt output, measured from 6K8 grid.

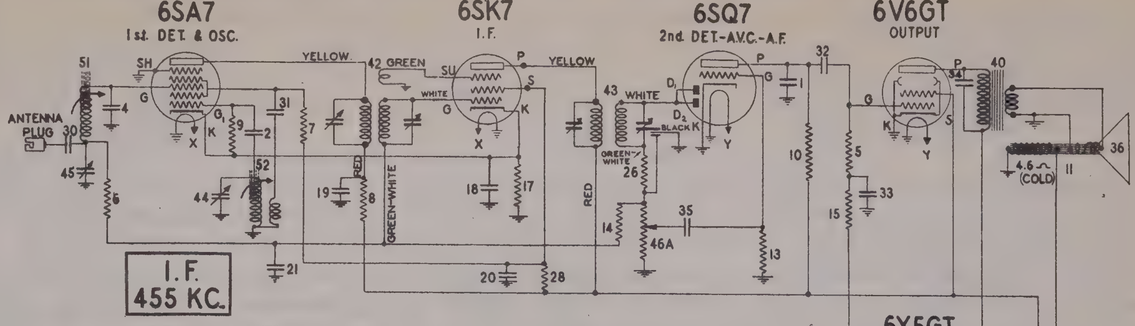
TO ALIGN R.F.

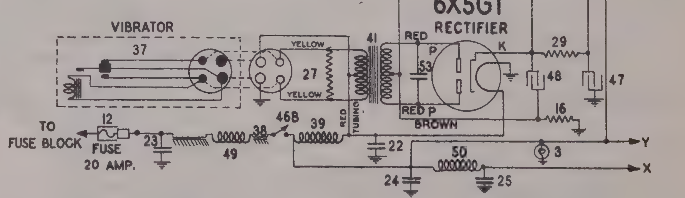
Use standard cowl antenna cable to connect signal generator to set. Connect a 35 micrmicro farad condenser to the signal generator "hot" terminal and the other side of the condenser to the antenna cable. Connect the ground side of the signal generator to the shield side of the cable. Turn variable condenser to zero capacity. Set signal generator to 1580 K.C. Adjust trimmer on oscillator section (front section of condenser) until signal is heard. Tune set to approximately 1400 K.C., set signal generator to this frequency, and adjust antenna compensator for maximum output. R.F. sensitivity 6 micro volts at 1400 K.C. and 10 micro volts at 600 K.C. for ½ watt output.

HUDSON AUTOMOBILE RADIO RECEIVER—JUNIOR MODEL JA-41

TUBE LOCATIONS



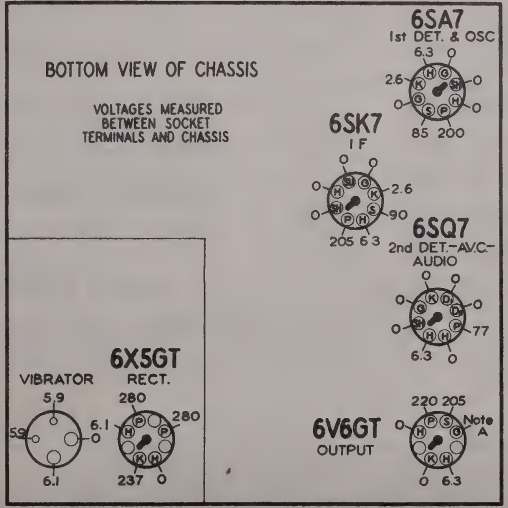




FOR PARTS NOT SHOWN BELOW SEE LIST ON PAGE 11

SOCKET VOLTAGES

6.6 V. BATTERY TOTAL DRAIN 5.7 AMP

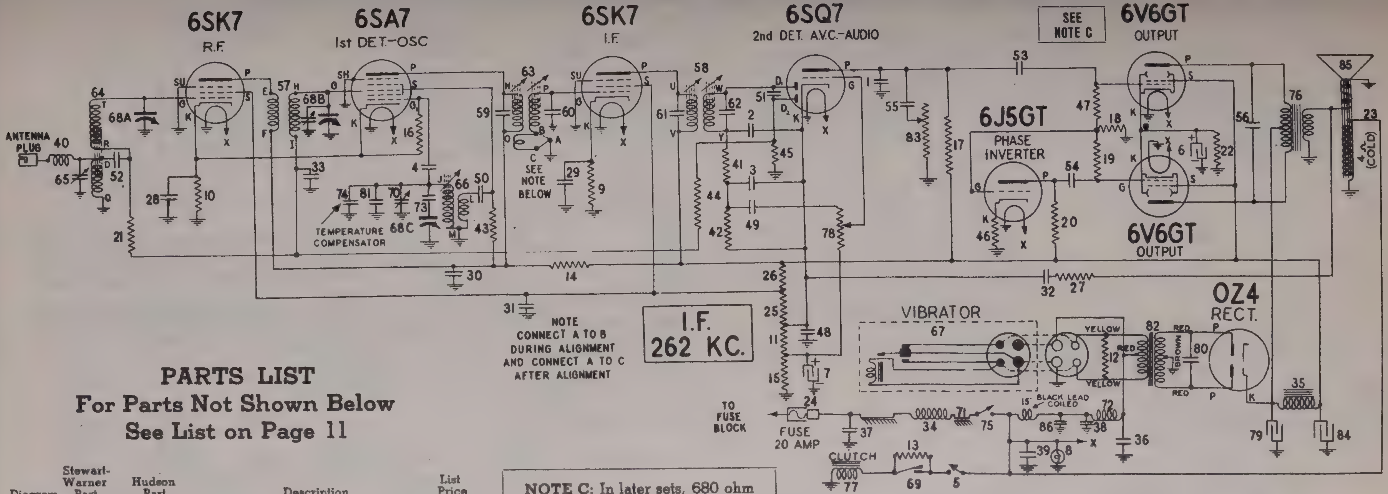


IMPORTANT: Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6V6GT tube is—12 volts measured across resistor No. 16.

Diagram Number	Stewart-Warner Part Number	Hudson Part Number	Description	List Price
1	83539	BO-158447	Condenser—mica 260 mfd.	$0.20
2	85061	BO-158450	Condenser—mica 51 mmfd.	.15
3	110629	BO-200571	Dial light—6.3 volt	.15
4	112008	BO-200204	Condenser—mica 120 mmfd.	.16
5-6	112971	BO-158477	Resistor—insulated 470,000 ohm ¼ watt	.15
7	112977	BO-158481	Resistor—insulated 470 ohms ¼ watt	.15
8	112980	BO-158483	Resistor—insulated 1000 ohms ¼ watt	.15
9-10	112987	BO-158489	Resistor—insulated 220,000 ohms ¼ watt	.15
11	U-115121	BO-200681	Speaker—dynamic 5"	3.80
12	116049	BO-170420	Fuse—20 amp. 25 volt	.05
13	116050	BO-200231	Resistor—insulated 10 meg. ¼ watt	.12
14	116056	BO-200232	Resistor—2.2 meg. ¼ watt	.10
15	116058	BO-161479	Resistor—insulated 47,000 ohms ¼ watt	.12
16	116083	BO-200236	Resistor—insulated 300 ohms 2 watts wire wound	.24
17	116095	BO-161488	Resistor—220 ohms ¼ watt	.12
18-19-20	116625	BO-161461	Condenser—1. mfd. 600 volt	.25
21	116819	BO-161465	Condenser—.05 mfd. 600 volt	.20
22-23	118225	BO-161473	Condenser—.5 mfd. 150 volt	.45
24-25	118231	BO-200205	Condenser—.25 mfd. 150 volt	.32
26	118829	BO-200239	Resistor—47,000 ohms 1/10 watt	.10
27	118833	BO-200240	Resistor—220 ohms 1 watt	.15
28	118834	BO-200241	Resistor—insulated 15,000 ohms 1 watt	.15
29	118835	BO-200242	Resistor—insulated 1500 ohms 1 watt	.15
30-31	119193	BO-200206	Condenser—.01 mfd. 600 volt	.15
32-33	119414	BO-200207	Condenser—.02 mfd. 600 volt	.15
34	119415	BO-200208	Condenser—.015 mfd. 600 volt	.15
35	119817	BO-200211	Condenser—.004 mfd. 600 volt	.15
36	U-160762	BO-200684	Cone & voice coil for U-115121 speaker	1.60
37	160796	BO-200577	Vibrator	3.00
38	160845	BO-200218	Condenser—metal clad—.0002 mfd.	.18
39	160858	BO-200583	Choke coil	1.00
40	160938	BO-200586	Output transformer	1.50
41	160940	BO-200587	Power transformer—6 volt primary	3.65
42	160976	BO-200589	Transformer—1st I.F.	1.35
43	160981	BO-200590	Transformer—2nd I.F.	1.35
44	161006	BO-200221	Condenser—trimmer	.25
45	161007	BO-200222	Condenser—trimmer	.22
46A-46B	161019	BO-200592	Volume control—1 mg. with switch	1.30
47	161024	BO-200223	Condenser—electrolytic 10 mfd. 450 volt	.70
48	161025	BO-200224	Condenser—electrolytic 10 mfd. 450 volt	.70
49-50	161078	BO-200593	Choke coil	.25
51	161081	BO-200594	Antenna coil & tuning core (less shield can)	1.40
52	161086	BO-200595	Oscillator coil & tuning core (less shield can)	1.40
53	161101	BO-200227	Buffer condenser—.01 mfd. 2000 volts	.35

HUDSON AUTOMOBILE RADIO RECEIVER—CUSTOM MODEL DB-41



PARTS LIST

For Parts Not Shown Below
See List on Page 11

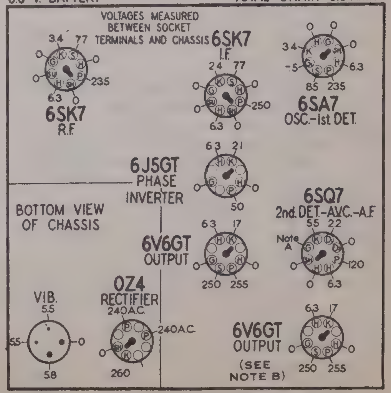
Diagram Number	Stewart-Warner Part Number	Hudson Part Number	Description	List Price
1	83539	BO-158447	Condenser—mica 260 mmfd.	$0.20
2-3	83783	BO-158448	Condenser—mica 110 mmfd.	.20
4	85563	BO-200203	Condenser—mica 26 mmfd.	.15
5	88054	BO-200570	Switch for "set-up"	.30
6-7	110377	BO-158460	Condenser—electrolytic 10 mfd. 35 volt	.80
8	110629	BO-200571	Dial light—6.3 volt	.15
9-10-11	112963	BO-158470	Resistor—insulated 330 ohms ¼ watt	.15
12-13	112976	BO-158480	Resistor—wire wound 220 ohms ½ watt	.15
14-15	112980	BO-158483	Resistor—insulated 1000 ohms ¼ watt	.15
16-17-18 19-20	112987	BO-158489	Resistor—insulated 220,000 ohms ¼ watt	.15
21	112993	BO-161477	Resistor—carbon 470,000 ohms 1/10 watt	.12
22	114335	BO-158493	Resistor—wire wound 430 ohms 2 watts	.20
23	M-115123	BO-200683	Speaker—dynamic 8"	5.80
24	116049	BO-170420	Fuse—20 amp. 25 volt	.05
25	116075	BO-200234	Resistor—27000 ohms 1 watt	.18
	116080	BO-200235	Resistor—680 Ohms ¼ Watt	.15
26	116084	BO-200237	Resistor—insulated 27000 ohms 2 watts	.15
27	116091	BO-161486	Resistor—insulated 6800 ohms ¼ watt	.15
28-29 30-31 32	116625	BO-161461	Condenser—.1 mfd. 600 volt	.25
33	116819	BO-161465	Condenser—.05 mfd. 600 volt	.20
34	117332	BO-161495	Choke coil in "A" line	30
35	117334	BO-200702	Filter Choke—Iron Core	.95
36-37	118225	BO-161473	Condenser—.5 mfd. 150 volt	.45
38-39	118231	BO-200205	Condenser—.25 mfd. 150 volt	.32
40	118726	BO-161580	Antenna motor noise choke	.24
41	118829	BO-200239	Resistor—47,000 ohm 1/10 watt	.10
42	118836	BO-200243	Resistor—330,000 ohms 1/10 watt	.10
43	118837	BO-200244	Resistor—39,000 ohms 1 watt	.15
44-45	118839	BO-200246	Resistor—1.5 megohm 1/10 watt	.10
46	118840	BO-200247	Resistor—2,200 ohms ¼ watt	.10
47	118841	BO-200248	Resistor—130,000 ohms ¼ watt	.10
48-49 50-51	119193	BO-200206	Condenser—.01 mfd. 600 volt	.15
52-53-54	119414	BO-200207	Condenser—.02 mfd. 600 volt	.15
55	119416	BO-200208	Condenser—.008 mfd. 600 volt	.15
56	160430	BO-200212	Condenser—.001 mfd. 600 volt	.15

NOTE C: In later sets, 680 ohm resistors (Part No. 116080) are connected in series with each output tube grid. A few sets used 800 ohms.

Diagram Number	Stewart-Warner Part Number	Hudson Part Number	Description	List Price
57	160661	BO-200572	Coil—R. F.	1.25
58	160681	BO-200573	Transformer—2nd I.F.	2.20
59-60 61-62	160685	BO-200213	Condenser mica 110 mmfd. (5%)	.25
63	160721	BO-200573	Transformer—1st I.F.	2.20
64	160735	BO-200575	Coil—antenna	2.00
65	160760	BO-200214	Condenser—trimmer	.24
66	160765	BO-200576	Coil—oscillator	1.20
67	160796	BO-200577	Vibrator	3.00
68A to C	160801	BO-200215	Condenser variable gang	3.65
69	160817	BO-200619	Contact switch for clutch	.90
70	160844	BO-200217	Condenser—air trimmer	.85
71	160845	BO-200218	Condenser metal clad—.0002 mfd.	.18
72	160858	BO-200583	Choke coil	1.00
73	160859	BO-200219	Condenser—mica 840 mmfd.	.45
74	160860	BO-200220	Temperature compensator condenser	.40
75	160861	BO-200584	Switch—on-off	1.20
76	160863	BO-200585	Output transformer	1.70
77	160919	BO-200645	Clutch case & coil assembly	1.25
78	160954	BO-200588	Volume control—1 megohm	1.00
79	161025	BO-200224	Condenser—electrolytic 10 mfd. 450 volt	.70
80	161101	BO-200227	Buffer condenser—.01 mfd. 2000 volts	.35
81	161126	BO-200228	Condenser—mica 21 mmfd. (5%)	.20
82	161130	BO-200599	Power transformer—6 volt primary	4.90
83	161156	BO-200600	Tone control—500,000 ohms	.75
84	161168	BO-200229	Condenser—electrolytic 15 mfd. 450 volt	.80
85	161185	BO-200686	Cone & voice coil assembly	1.90
86	88205	BO-158455	Condenser .0021 mfd. mica	.35

SOCKET VOLTAGES

6.6 V. BATTERY TOTAL DRAIN 8.3 AMP.



IMPORTANT. Use a 1000 ohm per volt voltmeter.

NOTE A: The voltage on the control grid of the 6SQ7 tube is 4.5 volts measured across resistor No. 15.

NOTE B: This socket mounted with keyway in opposite direction in later sets.

MODEL DB-41
MODEL JA-41
MODEL SA-41

HUDSON MOTOR CAR CO.

ALIGNMENT PROCEDURE FOR MODEL JA-41 ONLY

IMPORTANT: The "Simplified Alignment Procedure" should always be used unless the adjustments on the tuner cores have become loose or if someone has tampered with them.

Use the "General Alignment Procedure" only in instances of poor calibration, and poor sensitivity at the low frequency end even after the Simplified Procedure has been completed. The General Alignment Procedure is also necessary if the antenna or oscillator coils or cores are replaced.

SIMPLIFIED ALIGNMENT PROCEDURE

REMOVE TOP COVERS OF RECEIVER - BOTH SPEAKER SECTION AND CONTROL COVER

Dummy Antenna in Series with Signal Generator	Connection of Sig. Gen. output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Antenna Connection on Set	455 KC	Any point where it does not affect the Signal.	1—2	2ND I.F.	Adjust for maximum output.
				3—4	1ST I.F.	
50 MMFD. Mica Condenser	Antenna Connection on Set	1600 KC	Turn tuning knob to max. clockwise position.	5	Oscillator (Shunt) Condenser	Carefully adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection on Set	1400 KC	Accurately tune to 1400 KC generator Signal.	6	Antenna (Shunt) Condenser	Adjust for maximum output.

CALIBRATE DIAL AS SHOWN UNDER HEADING "DIAL CALIBRATION" OVER FIG. 2 BELOW

After the set has been installed in the car, tune in a fairly weak station near 1400 KC and adjust trimmer No. 6 until maximum volume is obtained. This trimmer can be reached by removing the plug button at the left front corner of the bottom of the case.

GENERAL ALIGNMENT PROCEDURE

TO PERFORM THIS ALIGNMENT PROCEDURE THE RECEIVER CHASSIS MUST BE REMOVED FROM THE CASE.

Dummy Antenna in Series with Signal Generator	Connection of Sig. Gen. output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Antenna Connection on Set	455 KC	Any point where does not affect the signal.	1—2	2ND I.F.	Adjust for maximum output.
				3—4	1ST I.F.	

ADJUSTMENT OF TUNING CORES IN ANTENNA AND OSCILLATOR COILS:

1. Loosen the lock nuts at the ends of the threaded tuning core shafts (see Fig. 2 below).
2. Rotate the tuning knob of the receiver to the maximum clockwise position so that tuning cores are out as far as possible.
3. Rotate each tuning core so it extends out of the coil form exactly the amount shown in Fig. 2, below. Hold the core stationary, tighten the lock nut on the oscillator core (top coil) (see Fig. 2 below). Use a small amount of speaker cement on the lock nut to insure against change in setting. Do not tighten the lock nut on the antenna core as further adjustment is necessary.

50 MMFD. Mica Condenser	Antenna Connection on Set	1600 KC	Turn tuning knob to max. clockwise position.	5	Oscillator (Shunt) Condenser	Carefully adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection on Set	1600 KC	Same as above	6	Antenna (Shunt) Condenser	Adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection on Set	1400 KC	Accurately tune to 1400 KC generator signal.	7	Tuning core of Antenna coil.	Rotate core in or out for max. output. Tighten lock nut; use speaker cement on nut.

CALIBRATE DIAL AS SHOWN UNDER HEADING "DIAL CALIBRATION" OVER FIG. 2 BELOW

After the set has been installed in the car, tune in a fairly weak station near 1400 KC and adjust trimmer No. 6 until maximum volume is obtained. This trimmer can be reached by removing the plug button at the left front corner of the bottom of the case.

DIAL CALIBRATION: Place the case nose on the receiver case. Check the calibration by tuning in a station of known frequency on the high frequency end of the dial. If calibration is incorrect, hold the tuning knob and turn the dial drum, using the eraser on your pencil to rotate the drum, to the correct frequency. Repeat this after set is installed in car.

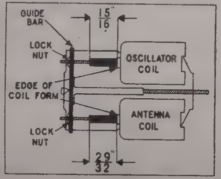


FIG. 2

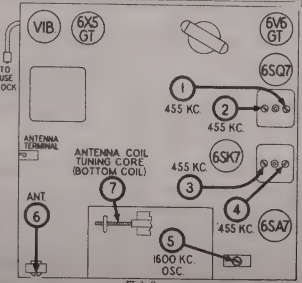


FIG. 3

ALIGNMENT PROCEDURE FOR MODELS DB-41 OR SA-41

For alignment an output meter and accurately calibrated signal generator are required.

1. Remove the top and bottom covers of the receiver case.
2. Connect output meter across voice coil or between the plates of the 6V6GT output tubes.
3. Connect the ground lead of the signal generator to the receiver chassis and leave it connected throughout this procedure.
4. Turn volume control to maximum volume position.
5. Check to see that pointer is ¾" from end of dial window (Vol. Control end) when gang condenser is fully meshed.

Dummy Antenna in Series with Signal Generator	Connection of Sig. Gen. output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment

I. F. ALIGNMENT FOR MODEL DB-41 ONLY (8 tube Set)

BEFORE ALIGNING THE I.F. TRANSFORMERS, CONNECT GREEN-WHITE JUMPER LOCATED UNDER 1ST I.F. TRANSFORMER BETWEEN TERMINALS A AND B AS SHOWN IN FIGURE 6.

.1 MFD. Condenser	To point Marked "X" in Fig. 6	262 KC	Any point where it does not affect the signal.	1—2 (See Figs. 5 & 6)	2ND I.F.	Adjust for maximum output. Reconnect green-jumper (under 1st I. F.) between terminals A and C (see Fig. 6). This must be done before alignment of the rest of the receiver.
				3—4 (See Figs. 5 & 6)	1ST I.F.	

I. F. ALIGNMENT FOR MODEL SA-41 ONLY (6 tube Set)

.1 MFD. Condenser	To point marked "X" in Fig. 8	455 KC	Any point where it does not affect the signal.	1—2 (See Figs. 7 & 8)	2ND I.F.	Adjust for maximum output. Then repeat adjustment.
				3—4 (See Fig.s 7 & 8)	1ST I.F.	

R. F. ALIGNMENT FOR EITHER MODEL SA-41 OR DB-41

50 MMFD. Mica Condenser	Antenna Connection of Set	1600 KC	Gang condenser completely open. Dial pointer as far to right as possible.	5	Oscillator (Shunt) Condenser	Carefully adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection on Set	1400 KC	Carefully tune to 1400 KC. generator signal.	8 This trimmer used on model DB-41 only (See Fig. 5)	R.F. (Shunt) Condenser	Adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection on Set	1400 KC	Carefully tune to 1400 KC. generator signal.	6	Antenna (Shunt) Condenser	Adjust for maximum output.
50 MMFD. Mica Condenser	Antenna Connection of Set	600 KC	Tune to 600 K.C. generator signal.	7	Ajustable core of oscillator coil.	Adjust for maximum output. Try to increase output by detuning adjusting screw and retuning receiver dial until maximum output is obtained.

NOW REPEAT ADJUSTMENTS MADE ON TRIMMERS 5, 8, 6 AND 7

After the set had been installed in the car tune in a fairly weak station near 1400 KC. and adjust trimmer No. 6 until maximum volume is obtained. This trimmer can be reached by removing the plug button at the left front corner of the bottom of the case.

TOP VIEW OF MODEL DB-41

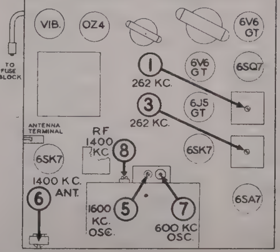
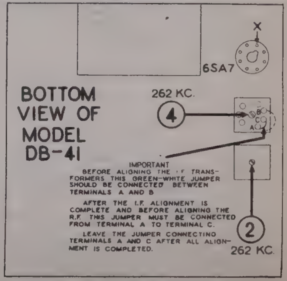


FIG. 5



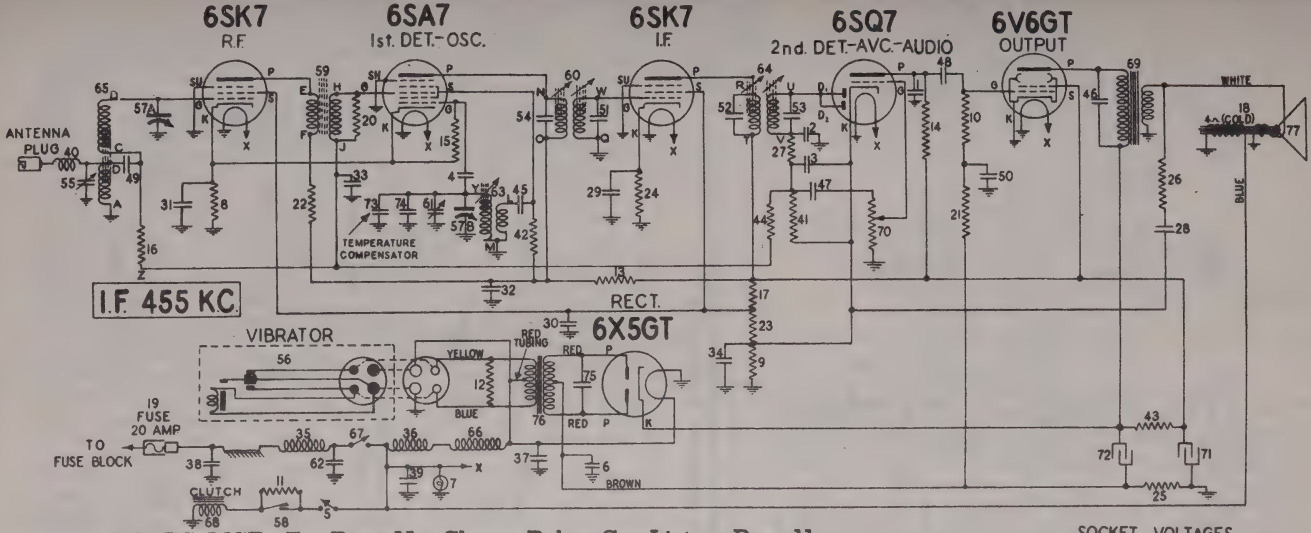
IMPORTANT
BEFORE ALIGNING THE I.F. TRANSFORMERS THIS GREEN-WHITE JUMPER SHOULD BE CONNECTED BETWEEN TERMINALS A AND B

AFTER THE I.F. ALIGNMENT IS COMPLETE AND BEFORE ALIGNING THE R.F. THIS JUMPER MUST BE CONNECTED FROM TERMINAL A TO TERMINAL C.

LEAVE THE JUMPER CONNECTING TERMINALS A AND C AFTER ALL ALIGNMENT IS COMPLETED.

FIG. 6

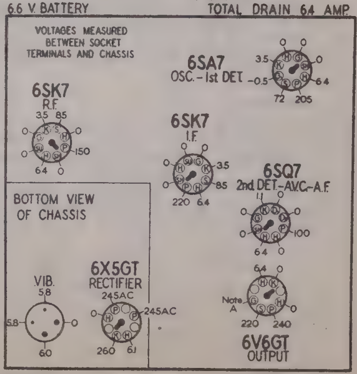
HUDSON AUTOMOBILE RADIO RECEIVER—DELUXE MODEL SA-41



PARTS LIST—For Parts Not Shown Below See List on Page 11

Diagram Number	Stewart-Warner Part Number	Hudson Part Number	Description	List Price
1	83539	BO-158447	Condenser—mica 260 mmfd.	$0.20
2-3	83783	BO-158448	Condenser—mica 110 mmfd.	.20
4	85563	BO-200203	Condenser—mica 26 mmfd.	.15
5	88054	BO-200570	Switch—for "set-up"	.30
6	88205	BO-158455	Condenser—mica 2100 mmfd.	.35
7	110629	BO-200571	Dial light—6.3 volt	.15
8-9	112963	BO-158470	Resistor—insulated 330 ohms ¼ watt	.15
10	112971	BO-158477	Resistor—insulated 470,000 ohms ¼ watt	.15
11-12	112976	BO-158480	Resistor—wire wound 220 ohms ½ watt.	.15
13	112980	BO-158483	Resistor—insulated 1000 ohms ¼ watt	.15
14-15	112987	BO-158489	Resistor—insulated 220,000 ohms ¼ watt	.15
16	112993	BO-161477	Resistor—carbon 470,000 ohms 1/10 watt	.12
17	112998	BO-200230	Resistor—insulated 22,000 ohms 2 watts	.20
18	M-115122	BO-200682	Speaker—dynamic 6 inch	4.50
19	116049	BO-170420	Fuse—20 amp. 25 volt	.05
20	116052	BO-161478	Resistor—insulated 33,000 ohms 1/10 watt	.12
21	116066	BO-200233	Resistor—insulated 68,000 ohms ¼ watt	.12
22	116073	BO-161480	Resistor—insulated 10,000 ohms ½ watt	.15
23	116075	BO-200234	Resistor—27,000 ohms 1 watt	.18
24	116080	BO-200235	Resistor—insulated 680 ohms ¼ watt	.15
25	116083	BO 200236	Resistor—insulated 300 ohms 2 watts wire wound	.24
26	116091	BO-161486	Resistor—insulated 6800 ohms ¼ watt	.15
27	116096	BO-200238	Resistor—22,000 ohms 1/10 watt	.10
28-29-30 31-32	116625	BO-161461	Condenser—.1 mfd. 600 volt	.25
33-34	116819	BO-161465	Condenser—.05 mfd. 600 volt	.20
35-36	117332	BO-161495	Choke coil in "A" line	.30
37-38	118225	BO-161473	Condenser .5 mfd. 150 volt	.45
39	118231	BO-200205	Condenser—.25 mfd. 150 volt	.32
40	118726	BO-161580	Antenna motor noise choke	.24
41	118836	BO-200243	Resistor—330,000 ohms 1/10 watt	.10
42	118837	BO-200244	Resistor—39,000 ohms 1 watt	.15
43	118838	BO-200245	Resistor—1500 ohms 2 watts	.15
44	118839	BO-200246	Resistor—1.5 megohm 1/10 watt	.10
45-46-47	119193	BO-200206	Condenser—.01 mfd. 600 volt	.15
48-49-50	119414	BO-200207	Condenser—.02 mfd. 600 volt	.15
51-52 53-54	160685	BO-200213	Condenser—mica 110 mmfd. (5%)	.25
55	160760	BO-200214	Condenser—trimmer	.24
56	160796	BO-200577	Vibrator	3.00
57A-57B	160808	BO-200216	Condenser—variable gang	2.40
58	160817	BO-200619	Contact switch for clutch	.90
59	160839	BO-200578	Coil—R. F. with shield	1.00
60	160841	BO-200579	Transformer—1st I.F.	.25
61	160844	BO-200217	Condenser—air trimmer	.85
62	160845	BO-200218	Condenser—metal clad—.0002 mfd.	.18
63	160846	BO-200580	Coil—oscillator	1.00
64	160847	BO-200581	Transformer—2nd I.F.	1.25
65	160849	BO-200582	Antenna coil & shield	2.00
66	160858	BO-200583	Choke coil	1.00
67	160861	BO-200584	Switch—on-off	1.20
68	160919	BO-200645	Clutch case & coil assembly	1.25
69	160938	BO-200586	Output transformer	1.50
70	160954	BO-200588	Volume control—1 megohm	1.00
71	161024	BO-200223	Condenser—electrolytic 10 mfd. 450 volt	.70
72	161025	BO-200224	Condenser—electrolytic 10 mfd. 450 volt	.70
73	161066	BO-200225	Temperature compensator condenser	.40
74	161098	BO-200226	Condenser—mica 15 mmfd.	.20
75	161101	BO-200227	Buffer condenser—.01 mfd. 2000 volts	.35
76	161120	BO-200598	Power transformer—6 volt primary	4.50
77	161158	BO-200685	Cone & voice coil assembly	1.80

SOCKET VOLTAGES

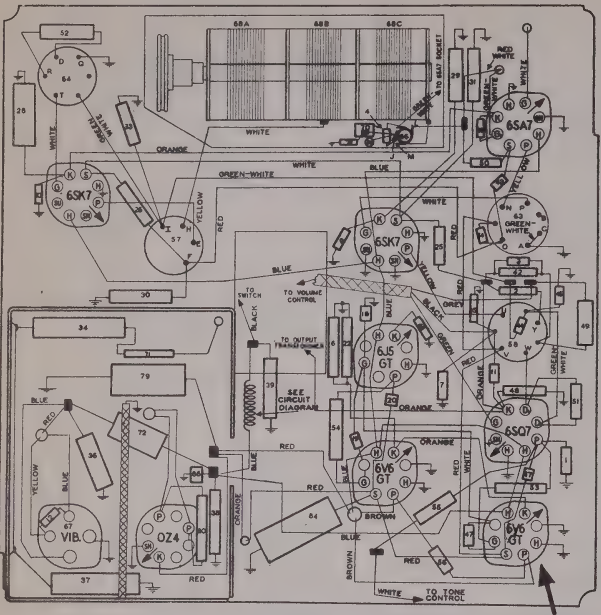


IMPORTANT: Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6V6GT tube is —13.5 volts measured across resistor No. 25.

HUDSON MOTOR CAR CO.

CHASSIS WIRING DIAGRAM FOR MODEL DB-41



THIS SOCKET MOUNTED WITH KEYWAY IN OPPOSITE DIRECTION IN LATE SETS

TOP VIEW OF MODEL SA-41

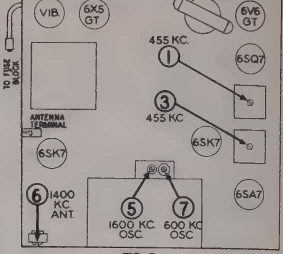


FIG. 7

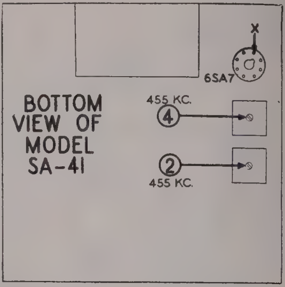


FIG. 8

CHASSIS WIRING DIAGRAM FOR MODEL SA-41

HOW TO SET UP PUSH BUTTONS ON MODELS SA-41 AND DB41

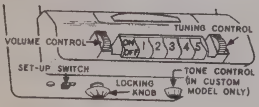
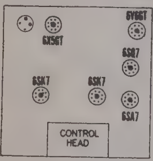


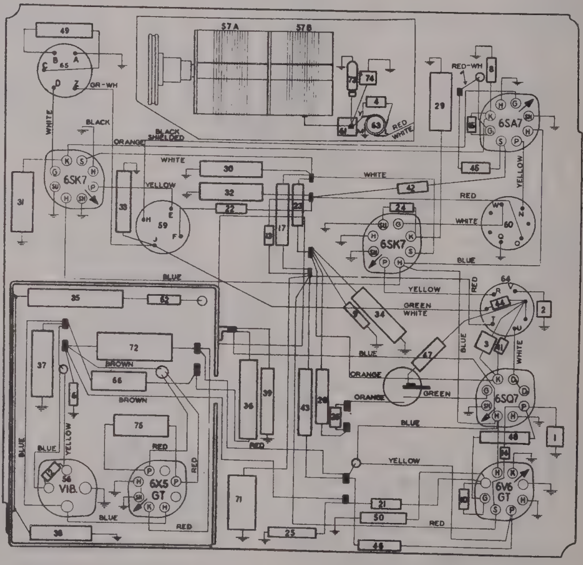
FIG. 4

(Radio must be connected to battery when buttons are operated). Numbered buttons can be set to stations on any part of the dial.

1. Operate set for 10 minutes before set-up.
2. TO UNLOCK MECHANISM
   (a) Rotate tuning control downward until dial pointer is at "RE-SET."
   (b) Move black set-up switch to right.
   (c) Push up locking knob and turn counter-clockwise approximately 2 turns, or until slight resistance is felt. Pull locking knob down to disengage.
3. Push in selected button as far as it will go and tune manually to desired station, while holding button in. Release button.
4. Follow same procedure for other buttons. After setting any button, do not touch it again until mechanism is locked as in 5. Otherwise, it must be reset as in 3.
5. TO LOCK MECHANISM
   (a) Rotate tuning control downward until dial pointer is at RESET.
   (b) Push up locking knob and turn clockwise as tightly as possible by hand. Pull locking knob down to disengage.
   (c) Push set-up switch to the left.

MODEL SA-41 TUBE LOCATIONS

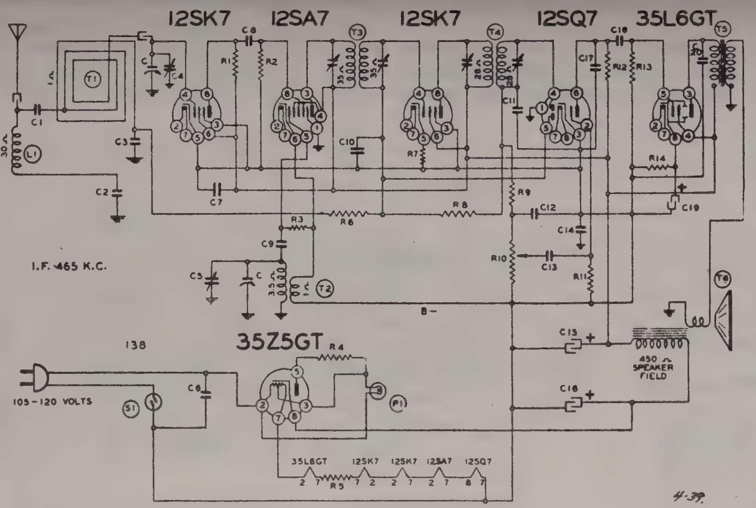




Terminals of coils shown in the circuit diagrams on the adjacent page are lettered to correspond to similarly lettered terminals on the chassis wiring diagrams and coil illustrations shown on this page. Terminals which are connected together carry the same letter.

LAFAYETTE RADIO MFG. CO.

MODEL FE-5



1—Type 12SK7 R. F. Amplifier.
1—Type 12SA7 Mixer, First Detector-oscillator.
1—Type 35L6GT Beam Output Amplifier.
1—Type 35Z5GT High Vacuum Rectifier.
1—Type 12SK7 I. F. Amplifier.
1—Type 12SQ7 Second Detector, A.V.C. and First Audio.

R1	130218	5M ohm—⅓ w.
R2	13020	100M ohm—⅓ w.
R3	130176	20M ohm—⅓ w.
R4	130295	25 ohm—1 watt
R5	130295	25 ohm—1 watt
R6	130100	150M ohm—⅓ w.
R7	130203	40 ohm—⅓ w.
R8	1304	3 megohm—⅓ w.
R9	13012	50M ohm—⅓ w.
R10	101127	1 megohm volume control
R11	130257	5 megohm—⅓ w.
R12	13011	250M ohm—⅓ w.
R13	1303	500M ohm—⅓ w.
R14	130166	150 ohm—⅓ w.

CONDENSERS

C	102104B	2 gang variable condenser
C1	12951	.000125 Mica
C2	12912	.00025 Mica
C3	10026	.02 x 400 v.
C4		Antenna Trimmer on gang
C5		Oscillator trimmer on gang
C6	1001	.1 x 400 v.
C7	1006	.25 x 200 v.
C8	1295	.0001 Mica
C9	1295	.0001 Mica
C10	1009	.05 x 200 v.
C11	1295	.0001 Mica
C12	1295	.0001 Mica
C13	10012	.003 x 600 v.
C14	100110	.2 x 400 v.
C15	11953E	30 mfd. lytic—150 w. v.
C16	11953E	30 mfd. lytic—150 w. v.
C17	1295	.0001 Mica
C18	10078	.01 x 200 v.
C19	11953E	40 mfd.—25 w. v. lytic
C20	10026	.02 x 400 v.
		C15, C16, and C19 in same unit

T1	111139	Loop Antenna
T2	110128	Oscillator Coil
T3	108140F	Input I. F. Coil
T4	108145B	Output I. F. Coil
T5	10588B	Output Transformer
T6	114116G	5" Dynamic Speaker (450 ohm field)
L1	1237	Antenna Loading Coil
P1	107249	6-8 volt, Pilot light - T-47
S1		Off-on Switch on Volume Control

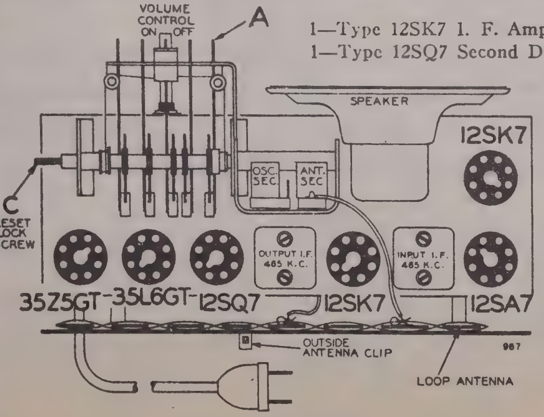
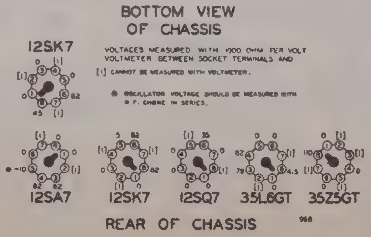


FIG. 1—TOP VIEW



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND

[1] CANNOT BE MEASURED WITH VOLTMETER.

* OSCILLATOR VOLTAGE SHOULD BE MEASURED WITH R.F. CHOKE IN SERIES.

REAR OF CHASSIS

ALIGNMENT

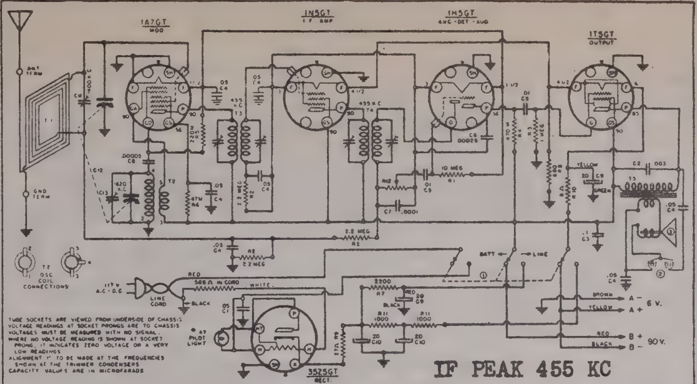
Connect B- of radio chassis to ground post of signal generator through .1 mf condenser.

I.F. peak 465 KC. I.F. alignment conventional---see Vol. V111. Special Sect.

Trim oscillator at 1650 KC. Trim antenna at 1400 KC. (Lay signal generator lead near, but not on, loop---when adjusting trimmer.)

MODEL D-9
MODEL D-93

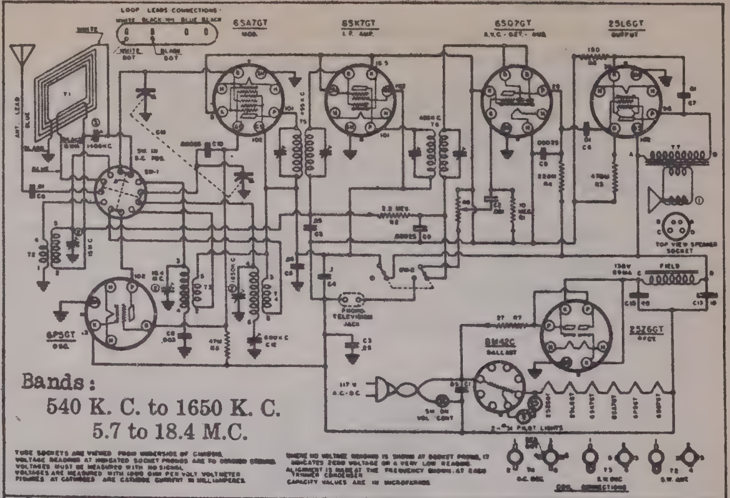
LAFAYETTE RADIO MFG. CO.



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READINGS
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
CAPACITY VALUES ARE IN MICROFARADS

IF PEAK 455 KC

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION D-93
C1	1607	.05 MFD. 400 V. TUBULAR COND	R1	60-193	10 MEGOHM 1/4 W. RESISTOR	T1	02-17	LOOP ANTENNA
C2	16-139	.003 " " " "	R2	60-179	2.2 " " "	T2	10-310	OSCILLATOR COIL
C3	16-115	.1 " 200 V. " "	R3	60-195	1 " " "	T3	10-355	1 ST. I.F. TRANSFORMER
C4	1622	.05 " " " "	R4	60-178	470 M OHM " "	T4	10-343	2 ND " "
C5	16-121	.01 " " " "	R5	60-180	220 M " " "	T5	80-196	OUTPUT TRANSFORMER
C6	1504	.00025 MFD. MICA CONDENSER	R6	60-177	47 M " " "			
C7	1501	.0001 " " "	R7	60-383	2200 " " "	1	69-151	POWER SWITCH
C8	1503	.00005 " " "	R8	60-379	680 " " "	2	12-3	PHONE JACK
C9	18-263	20 X 20 " 150 W.V. ELECTROLYTIC	R9	60-220	27 " " "	3	79-290	5" P.M. SPEAKER
C10	18-262	20 X 20 " 150 W.V. "	R10	60-128	8 " 1/2 W. "			
C11	20-129	TRIMMER ON LOOP	R11	60-544	1000 " 3 W "			
C12	19-167	2 GANG VARIABLE COND. ALSO C13	R12	24-150	1 MEGOHM VOLUME CONTROL			



Bands:
540 K. C. to 1650 K. C.
5.7 to 18.4 M.C.

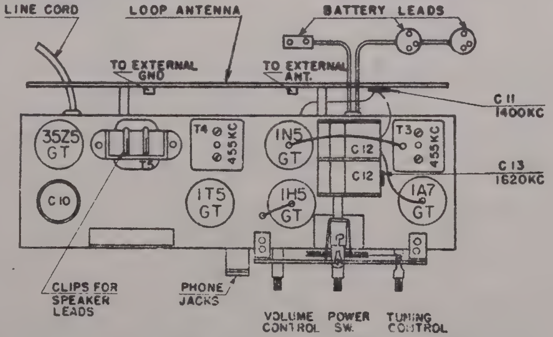
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION D-78
C1	[illegible]	.05 MFD. 400 V. TUBULAR CONDENSER	R1	60-193	10 MEGOHM 1/4 W RESISTOR	T1	02-13	LOOP ANTENNA (B.C.)
C2	[illegible]	.001 " " " "	R2	60-179	2.2 " " "	T2	[illegible]	S.W. ANTENNA COIL
C3	[illegible]	.25 " 200 V. " "	R3	60-178	470M OHM " "	T3	[illegible]	S.W. OSCILLATOR COIL
C4	[illegible]	.1 " " " "	R4	60-180	220M " " "	T4	[illegible]	B.C. " "
C5	[illegible]	.05 " " " "	R5	60-177	47M " " "	T5	[illegible]	1ST I.F. TRANSFORMER
C6	[illegible]	.01 " " " "	R6	[illegible]	150 " " "	T6	[illegible]	2ND " "
C7	[illegible]	.01 " 400 V. " "	R7	60-220	27 " " "	T7	------	OUTPUT TRANSF. (ON SPKR.)
C8	[illegible]	[illegible] MFD. MICA CONDENSER	R8	24-144	[illegible] " VOLUME CONTROL			
C9	[illegible]	.00025 " " "				1	70-077	6-1/2" DYNAMIC SPEAKER
C10	[illegible]	.00005 " " "				2	[illegible]	TRIMMER BLOCK
C11	[illegible]	2 GANG VARIABLE CONDENSER	SW1	60-141	BAND SWITCH	3	[illegible]	TRIMMER (ON LOOP)
C12	[illegible]	PADDING CONDENSER	SW2	60-140	PHONO "			
C13	[illegible]	40 X 10 MFD. 150 W.V. ELECTROLYTIC						

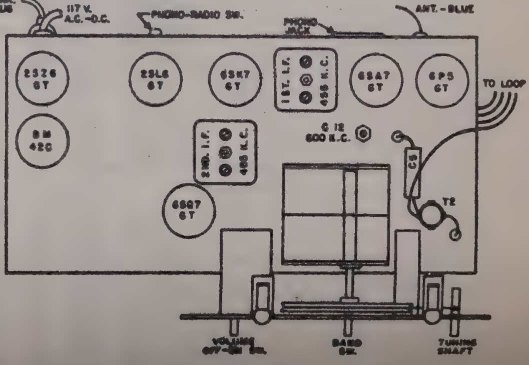
IF PEAK 455 KC

Model No. D-9



LOCATION OF PARTS ON TOP OF CHASSIS

MODEL D-93

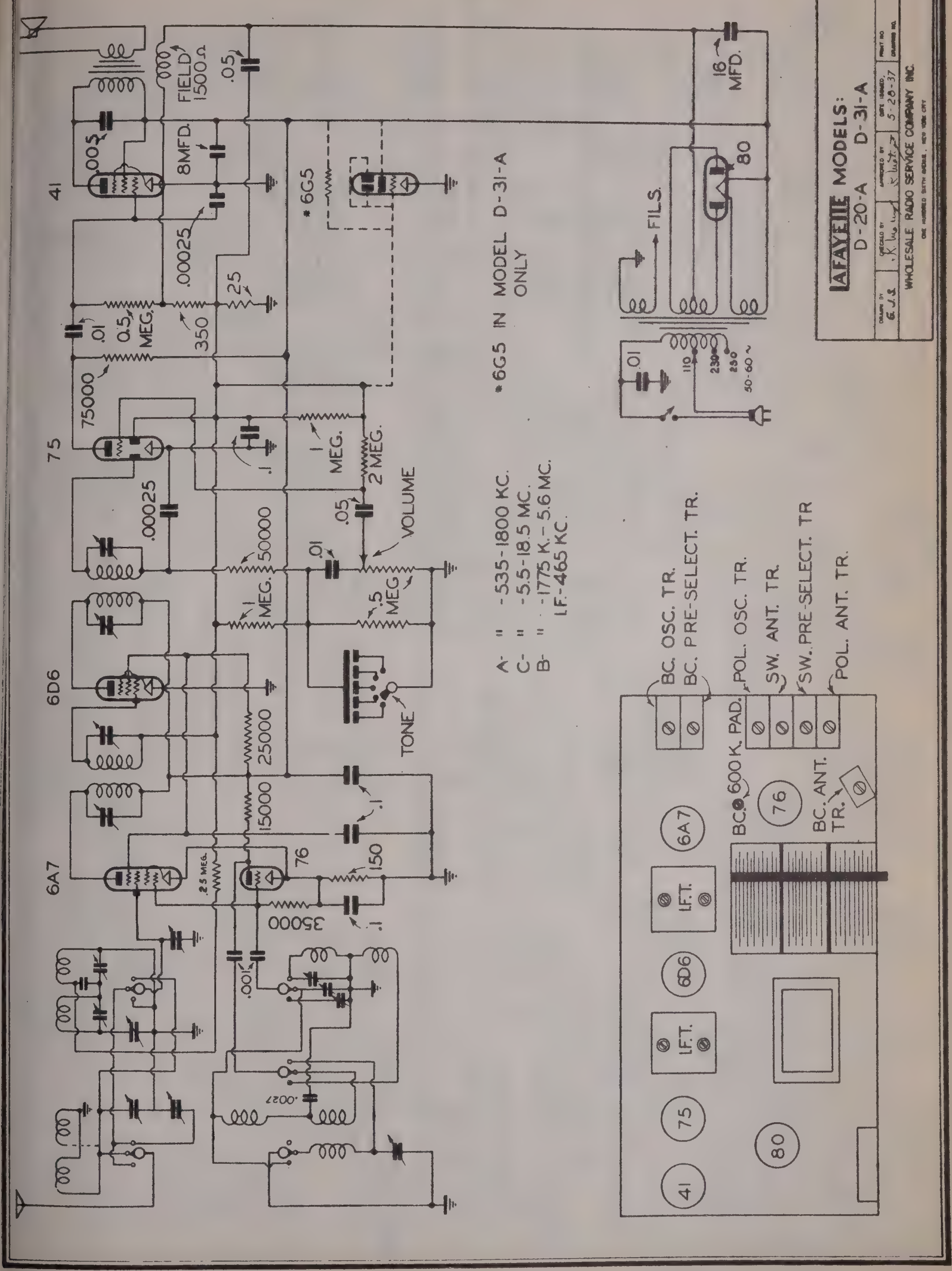


LOCATION OF PARTS ON TOP OF CHASSIS

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

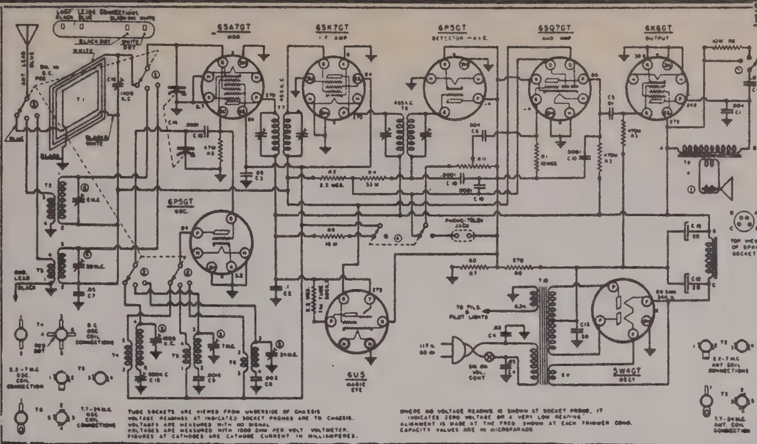
Model No. D-93 radio receiver is a portable five (5) tube, 117 volt, 50-60 cycle A.C. or 117 volt D.C. or battery operated superheterodyne with self-contained loop antenna and batteries, designed to cover the standard broadcast band from 1620 to 535 K.C.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII


41
75
6D6
6A7
76
80
*6G5
.005
8MFD.
FIELD 1500 Ω
.05
.00025
.01
0.5 MEG.
350
25
75000
.00025
.1
1 MEG.
2 MEG.
.05
.01
VOLUME
50000
1 MEG.
.5 MEG
TONE
25000
15000
.1
.1
.25 MEG.
150
35000
.1
.001
.0027
16 MFD.
FILS.
.01
110
230
250
50-60 ~
*6G5 IN MODEL D-31-A ONLY
A- " -535-1800 KC.
C- " -5.5-18.5 MC.
B- " -1775 K.-5.6 MC.
I.F.-465 KC.
BC. OSC. TR.
BC. PRE-SELECT. TR.
POL. OSC. TR.
SW. ANT. TR.
SW. PRE-SELECT. TR
POL. ANT. TR.
BC 600 K. PAD.
BC. ANT. TR.
I.F.T.
I.F.T.
LAFAYETTE MODELS: D-20-A D-31-A
DRAWN BY G.J.S.
CHECKED BY
APPROVED BY
DATE ISSUED 5-28-37
PRINT NO.
DRAWING NO.
WHOLESALE RADIO SERVICE COMPANY INC.
ONE HUNDRED SIXTH AVENUE, NEW YORK CITY

MODEL D-69
MODEL D-71
LATE

LAFAYETTE RADIO MFG. CO.

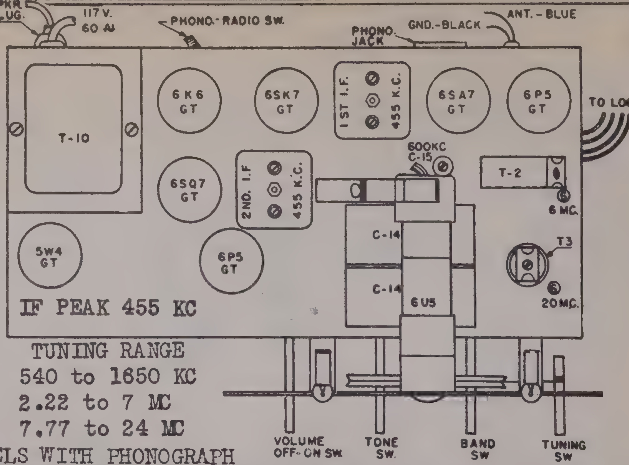


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES ARE MEASURED WITH NO SIGNAL
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS MADE AT THE FREQ. SHOWN AT EACH TRIMMER COND.
CAPACITY VALUES ARE IN MICROFARADS

CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION
C 1	1051	.004 MFD. 600 V TUBULAR CONDENSER	R 1	60-193	10 MEGOHM 1/4 W RESISTOR	T 1	85-13	LOOP ANTENNA (B.C.)
C 2	18-116	.1 " 400 V " "	R 2	60-179	2.2 " " "	T 2	10-324	ANTENNA TRANSFORMER (2.2-7 M.C.)
C 3	1007	.05 " " " "	R 3	60-178	470 M OHM " "	T 3	10-322	" " (7.7-24 M.C.)
C 4	1008	.02 " " " "	R 4	60-186	33 M " " "	T 4	10-318	OSCILLATOR " (B.C.)
C 5	18-118	.01 " " " "	R 5	60-177	47 M " " "	T 5	10-327	" " (2.2-7 M.C.)
C 6	18-120	.004 " " " "	R 6	60-218	10 M " " "	T 6	10-329	" " (7.7-24 M.C.)
C 7	1022	.05 " 200 V. " "	R 7	60-198	68 " 1/2 W "	T 7	10-318	1ST I.F. TRANSFORMER
C 8	18-118	.003 MFD. MICA CONDENSER	R 8	60-248	270 " 1 W. "	T 8	10-312	2ND " "
C 9	18-119	.0016 " " "	R 9	60-231	16 M " 2 W. "	T 9		OUTPUT TRANSFORMER (ON SPKR)
C 10	1504	.0001 " " "				T 10	80-103	POWER TRANSFORMER
			R 11	64-100	500 M " VOLUME CONTROL (WITH SW)	1	79-204	8" DYNAMIC SPEAKER
C 12	18-238	20 X 20 " 450 W.V. ELECTROLYTIC				2	63-142	BAND SWITCH
C 13	18-243	20 MFD. " 25 W.V. "				3	63-143	TONE "
C 14	18-186	2 GANG VARIABLE CONDENSER				4	63-140	PHONO "
C 15	20-128	PADDING CONDENSER				5	80-127	TRIMMER BLOCK
C 16	20-125	TRIMMER (ON LOOP)				6	2052	3 PLATE TRIMMER

Model D-71



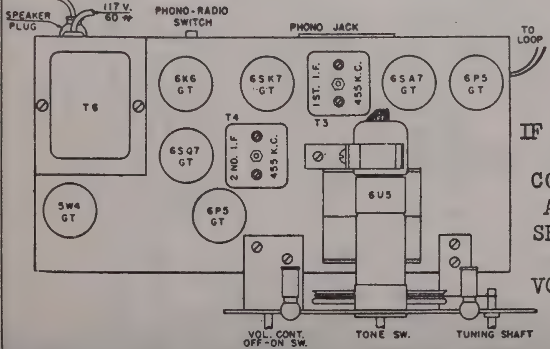
IF PEAK 455 KC

TUNING RANGE
540 to 1650 KC
2.22 to 7 MC
7.77 to 24 MC

MODELS WITH PHONOGRAPH

These models are distinguished from Model No. D-71 in that the Phono-Radio attachment is wired thru a cable, directly to Phonograph unit. The Phono-Radio switch will therefore be found mounted to the motor board of the phonograph instead of to the radio chassis.

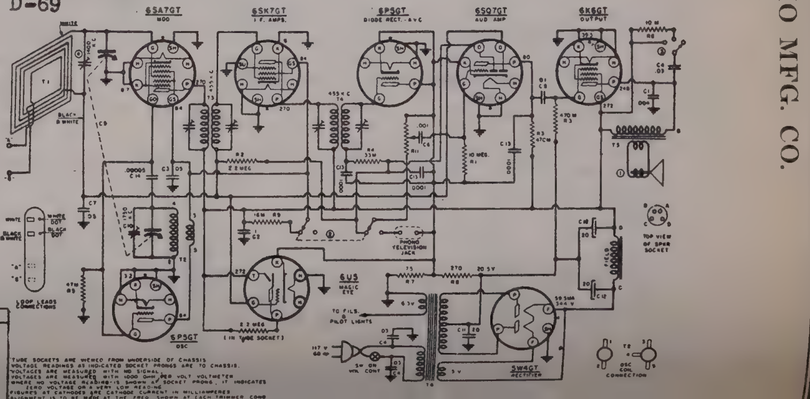
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



Model No. D-69

IF PEAK 455 KC

CONVENTIONAL
ALIGNMENT
SEE SPECIAL
SECTION
VOLUME VIII



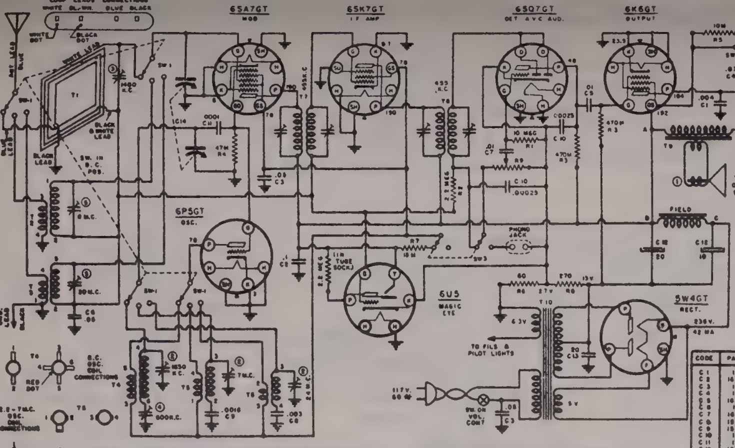
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES ARE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
ALIGNMENT IS TO BE MADE AT THE FREQ. SHOWN AT EACH TRIMMER COND.

CODE	PART NO	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO	DESCRIPTION 0 83
C 1	1051	.004 MFD 600 V TUBULAR CONDENSER	R 1	60-193	10 MEGOHM 1/4 W. RESISTOR	T 1	82-12	LOOP ANTENNA
C 2	18-116	.1 400 V " "	R 2	60-179	2.2 " " "	T 2	10-325	OSCILLATOR COIL
C 3	1007	.05 " " " "	R 3	60-178	470 M OHM " "	T 3	10-315	1ST I.F. TRANSFORMER
C 4	1008	.02 " " " "	R 4	60-186	33 M " " "	T 4	10-312	2ND " "
C 5	18-118	.01 " " " "	R 5	60-177	47 M " " "	T 5	- - -	OUTPUT TRANSFORMER (ON SPKR)
C 6	18-124	.001 " " " "	R 6	60-218	10 M " " "	T 6	80-105	POWER TRANSFORMER
C 7	1022	.05 " 200 V " "	R 7	60-252	75 " 1/2 W "			
			R 8	60-245	270 " 1 W "	1	79-204	8" DYNAMIC SPEAKER
C 8	18-157	2 GANG VARIABLE CONDENSER (ALSO C10)	R 9	60-231	16 M " 2 W "	2	63-140	PHONO SWITCH
C 11	18-243	20 MFD 25 V ELECTROLYTIC				3	63-143	TONE SWITCH
C 12	18-238	20 x 20 MFD 450 W.V. ELECTROLYTIC	R 11	64-140	500 M " VOLUME CONTROL WITH SW.	4	20-129	TRIMMER (ON LOOP)
C 13	1501	.0001 MFD MICA CONDENSER						

LAFAYETTE RADIO MFG. CO.

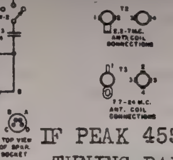
MODEL D-42
MODEL D-90

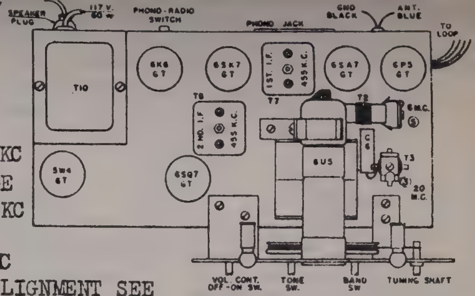
Model No. D-42



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES ARE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT
INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS MADE AT THE FREQ. SHOWN AT EACH TRIMMER COND.
CAPACITY VALUES ARE IN MICROFARADS


T2
2.2-7 M.C. ANT. COIL CONNECTIONS
T3
7.7-24 M.C. ANT. COIL CONNECTIONS
TOP VIEW OF SPKR SOCKET



IF PEAK 455 KC
TUNING RANGE
540 to 1650 KC
2.22 to 7 MC
7.77 to 24 MC

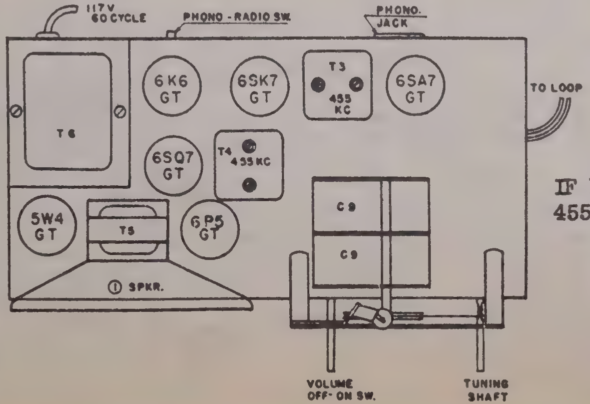
CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII

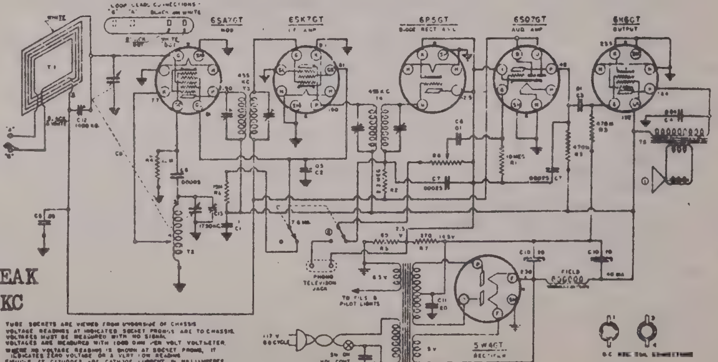
CODE	PART NO	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION D-79
C 1	1631	.004 MFD. 600V. TUBULAR CONDENSER	R 1	60-193	10 MEGOHM 1/4 W. RESISTOR	T 1	82-13	ANTENNA LOOP
C 2	16-116	.1 " 400V. " "	R 2	60-179	2.2 " " "	T 2	10-324	ANTENNA TRANSFORMER (2.2-7 M.C.)
C 3	1607	.05 " " " "	R 3	60-170	470M OHM " "	T 3	10-322	" " (7.7-24 M.C.)
C 4	1648	.03 " " " "	R 4	60-177	47M " " "	T 4	10-316	OSCILLATOR " (B.C.)
C 5	16-119	.01 " " " "	R 5	60-219	10M " " "	T 5	10-327	" " (2.2-7 M.C.)
C 6	1622	.05 " 600V " "	R 6	60-182	60 " 1/2 W. "	T 6	10-329	" " (7.7-24 M.C.)
C 7	16-121	.01 " " " "	R 7	60-236	15M " 1 W. "	T 7	10-315	1ST. I.F. TRANSFORMER
C 8	15-119	.003 MFD. MICA CONDENSER	R 8	60-248	270 " " "	T 8	10-312	2ND. I.F "
C 9	15-118	.0016 " " "	R 9	24-144	500M " VOLUME CONTROL	T 9	------	OUTPUT TRANS (ON SPKR.)
C 10	1604	.00025 " " "				T 10	80-179	POWER TRANSFORMER
C 11	1601	.0001 " " "	SW-1	69-142	BAND SWITCH	1	79-270	6 1/2" DYNAMIC SPKR
C 12	18-284	20 X 10 " 350 W.V. ELECTROLYTIC	SW-2	69-143	TONE "	2	20-127	TRIMMER BLOCK
C 13	18-243	20 MFD. 25 W.V. ELECTROLYTIC	SW-3	69-140	PHONO "	3	20-128	TRIMMER (ON LOOP)
C 14	19-186	2 GANG VARIABLE CONDENSER				4	20-126	PADDING CONDENSER
						5	2032	2 PLATE TRIMMER

Model No. D-90

540 K. C. to 1750 K. C.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII





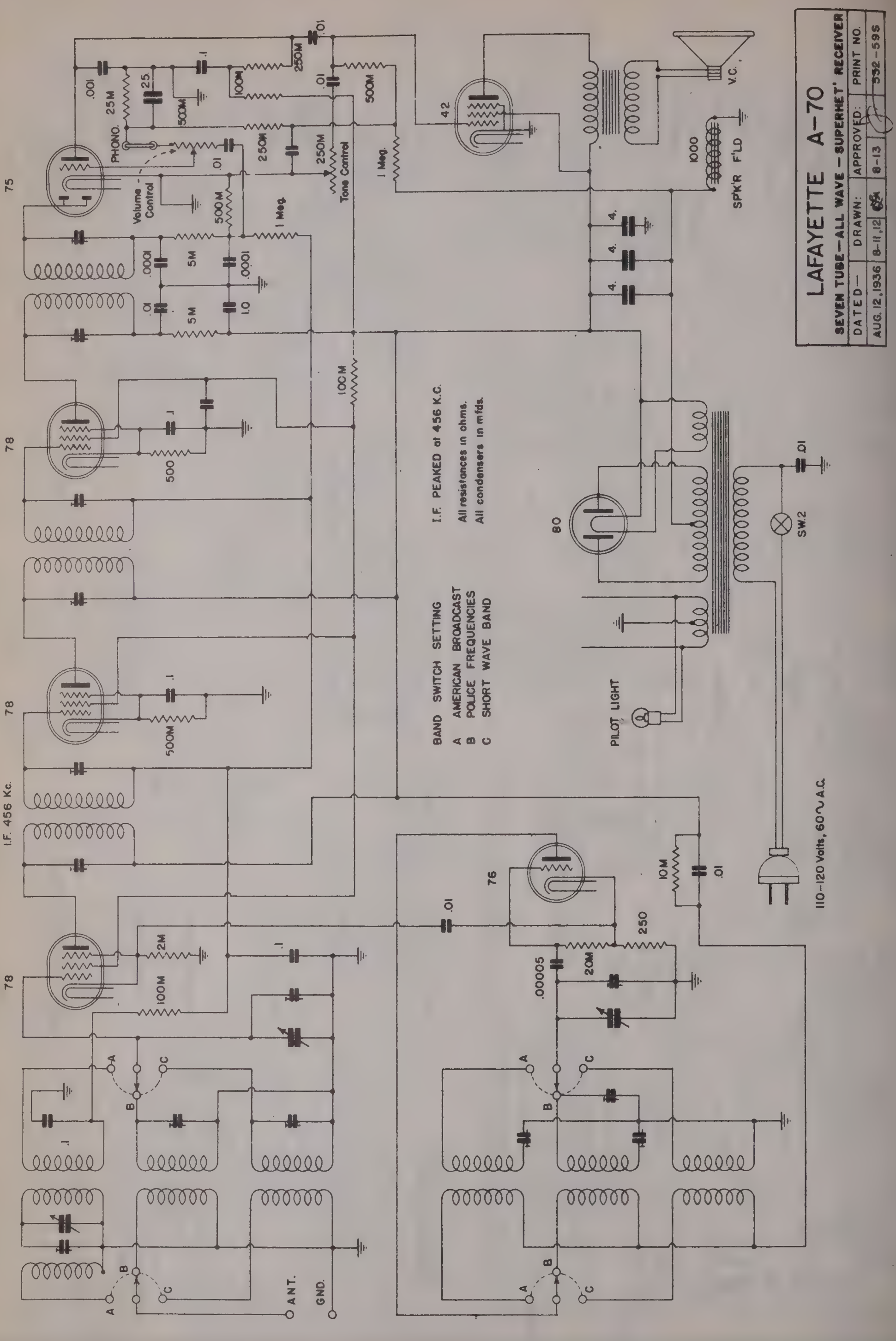
IF PEAK
455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT
INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH
TRIMMING CONDENSER
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION D-87
C1	16-116	.1 MFD 400V. TUBULAR CONDENSER	R 1	60-193	10 MEGOHM 1/4 W RESISTOR	T1	82-10	LOOP ANTENNA
C2	1607	.05 " " " "	R 2	60-179	2.2 " " "	T2	10-311	B.C. OSCILLATOR COIL
C3	16-119	.01 " " " "	R 3	60-178	470M OHM	T3	10-317	1ST I.F TRANSFORMER
C4	1631	.004 " 600V " "	R 4	60-185	22 M	T4	10-318	2ND I.F TRANSFORMER
C5	1622	.05 " 200V " "	R 5	60-182	60 1/2 W	T5		OUTPUT TRANSFORMER (ON SPKR)
C6	16-121	.01 " " " "	R 6	60-236	15M 1 W	T6	80-170	POWER TRANSFORMER
C7	1504	.00025 MICA CONDENSER	R 7	60-248	270 "			
C8	1503	.00005 " "	R 8	24-146	500M VOLUME CONTROL (WITH SW)			
C9	19-188	2 GANG VARIABLE CONDENSER (C9) (3)				1	79-275	5" DYNAMIC SPEAKER
C10	18-284	20 X 10 MFD 350 W.V. ELECTROLYTIC				2	69-140	PHONO SWITCH
C11	18-243	20 MFD. 25V ELECTROLYTIC						
C12	20-128	TRIMMER (ON LOOP)						

MODEL A-70

LAFAYETTE RADIO MFG. CO.



I.F. PEAKED at 456 K.C.

All resistances in ohms.
All condensers in mfds.

BAND SWITCH SETTING
A AMERICAN BROADCAST
B POLICE FREQUENCIES
C SHORT WAVE BAND

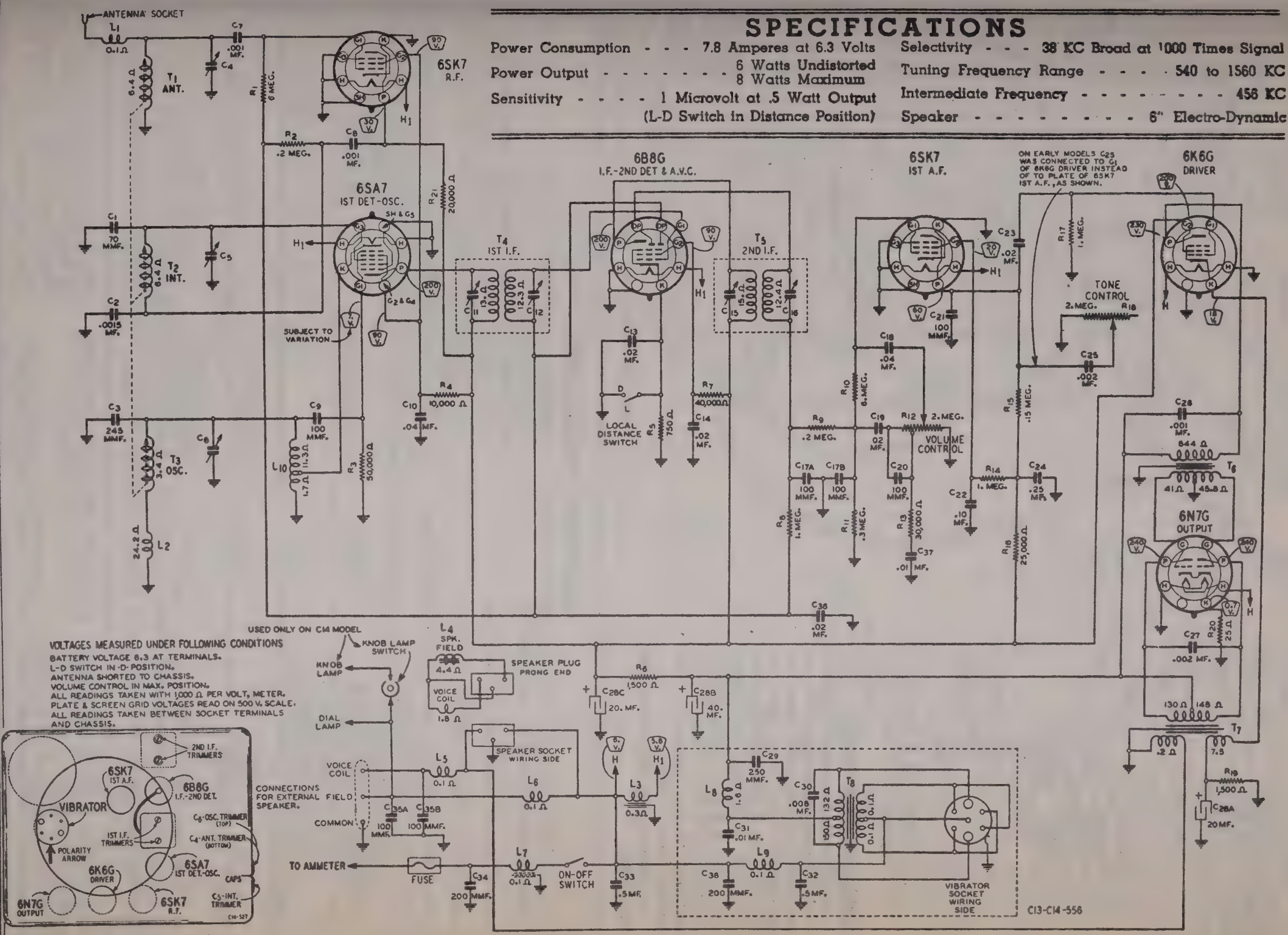
©John F. Rider, Publisher

LAFAYETTE RADIO MFG. CO.

MODEL BB-75

SPECIFICATIONS

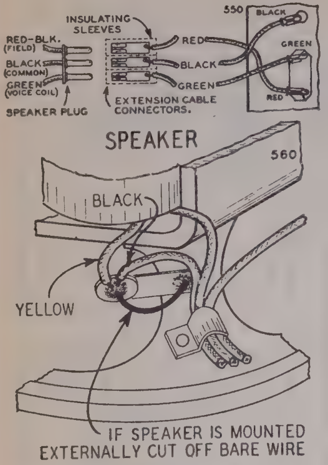
Power Consumption	7.8 Amperes at 6.3 Volts	Selectivity	38 KC Broad at 1000 Times Signal
Power Output	6 Watts Undistorted 8 Watts Maximum	Tuning Frequency Range	540 to 1560 KC
Sensitivity	1 Microvolt at .5 Watt Output (L-D Switch in Distance Position)	Intermediate Frequency	456 KC
		Speaker	6" Electro-Dynamic



VOLTAGES MEASURED UNDER FOLLOWING CONDITIONS

BATTERY VOLTAGE 6.3 AT TERMINALS.
L-D SWITCH IN D POSITION.
ANTENNA SHORTED TO CHASSIS.
VOLUME CONTROL IN MAX. POSITION.
ALL READINGS TAKEN WITH 1,000 Ω PER VOLT, METER.
PLATE & SCREEN GRID VOLTAGES READ ON 500 V. SCALE.
ALL READINGS TAKEN BETWEEN SOCKET TERMINALS AND CHASSIS.

Fig. 5—Location of Tubes and Vibrator



Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the control unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine bladed screwdriver and turn this screw until the pointer is at the frequency of the station being received.

A short insulated screwdriver will be helpful.

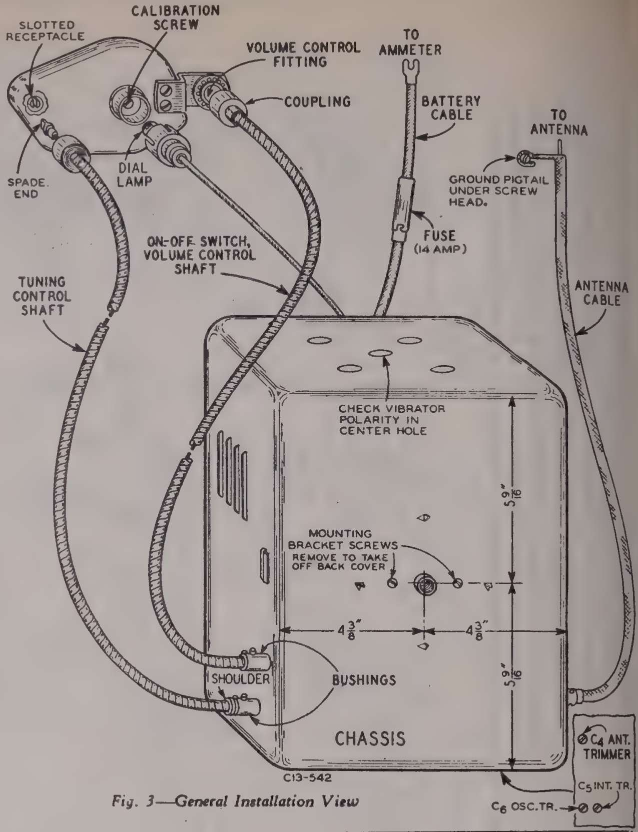


Fig. 3—General Installation View

ALIGNMENT PROCEDURE

Remove Grille, Speaker, Trimmer Caps and Rear Cover From Chassis Case—(See Figs. 3 and 5).

Volume Control—Maximum All Adjustments.

Local-Distance Switch—"Distance" Position.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR				
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 5)
I.F.				
456 KC	Control Grid (prong No. 8) 6SA7 1st Det. Tube	.05 mf.		1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
OSCILLATOR				
1560 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C6)
1000 KC ADJUSTMENT				
1000 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

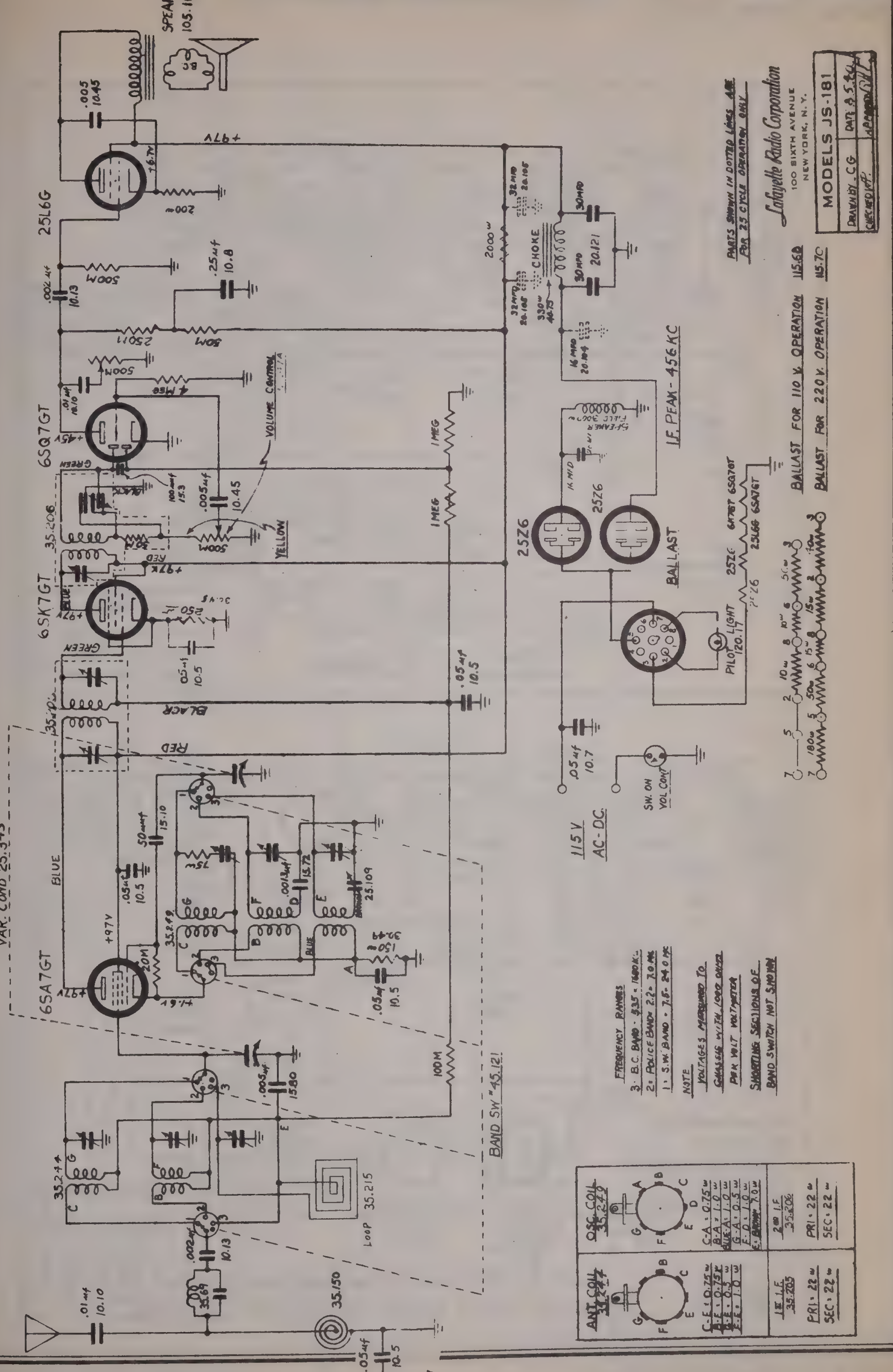
Car Antenna Readjustment—Tune in weak signal near 1000 KC—Readjust Antenna Trimmer C4 for maximum output.

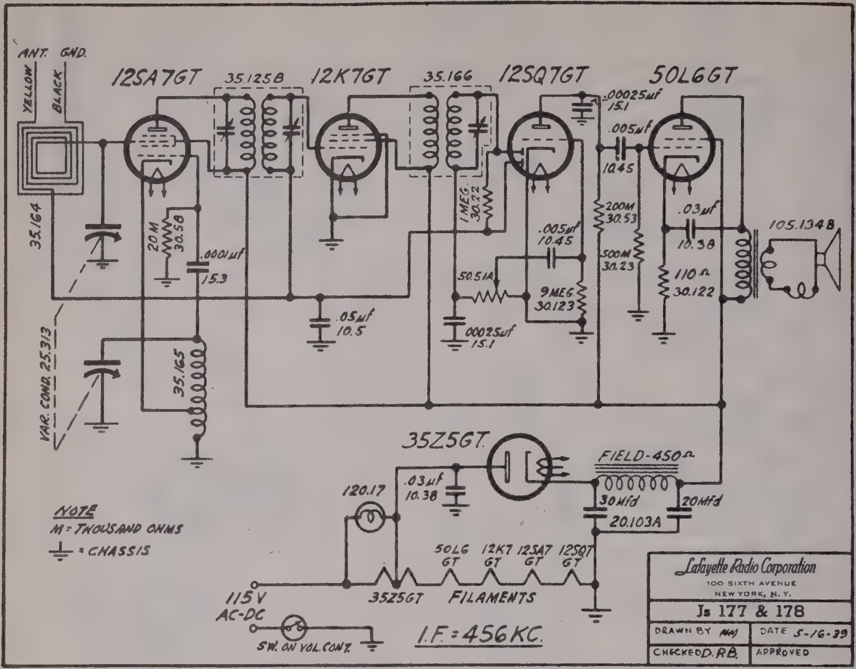
NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

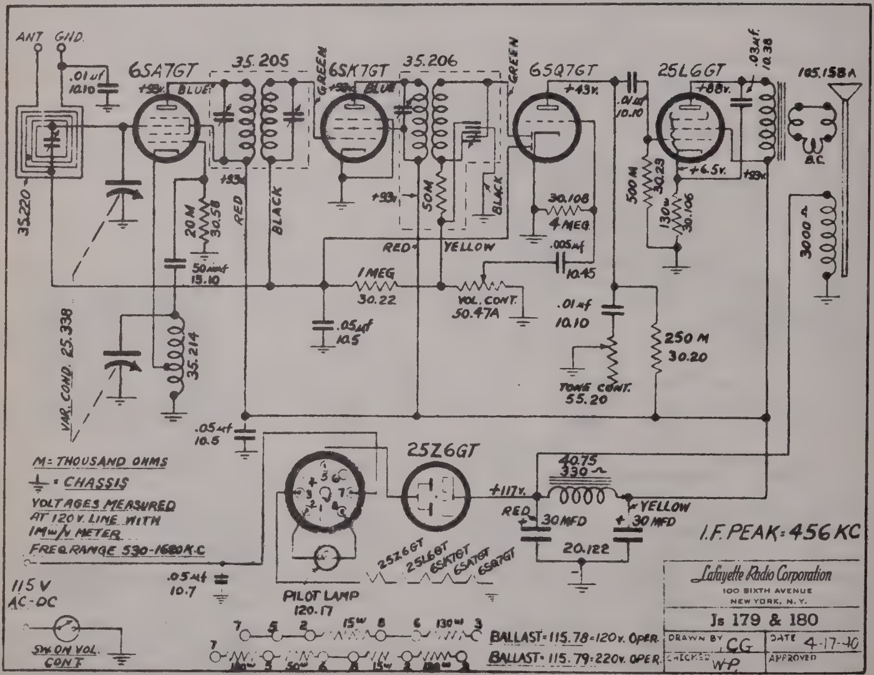
CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the control unit is the calibration screw. Remove the dial lamp assembly. Hold the tuning knob. Insert a fine bladed screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

LAFAYETTE RADIO MFG. CO.

MODEL JS-181




ANT. GND.
YELLOW
BLACK
12SA7GT
35.125B
12K7GT
35.166
12SQ7GT
50L6GT
.00025uf 15.1
.005uf 10.45
35.164
20M 30.58
.0001uf 15.3
1 MEG. 30.22
.005uf 10.45
200M 30.53
.03uf 10.38
105.134B
50.51A
9 MEG 30.123
500M 30.23
110Ω 30.122
.05uf 10.5
.00025uf 15.1
VAR. COND. 25.313
35.165
35Z5GT
FIELD-450Ω
.03uf 10.38
120.17
30 Mfd
20 Mfd
20.103A
NOTE
M = THOUSAND OHMS
= CHASSIS
50L6 GT
12K7 GT
12SA7 GT
12SQ7 GT
115V AC-DC
35Z5GT
FILAMENTS
SW. ON VOL. CONT.
I.F. = 456KC.
Lafayette Radio Corporation
100 SIXTH AVENUE
NEW YORK, N.Y.
Js 177 & 178
DRAWN BY MM
DATE 5-16-39
CHECKED D.RB.
APPROVED


ANT GND.
.01uf 10.10
6SA7GT
+93v.
BLUE
35.205
GREEN
6SK7GT
+93v.
BLUE
35.206
GREEN
6SQ7GT
+43v.
.01uf 10.10
25L6GT
+88v.
.03uf 10.38
105.158A
B.C.
35.220
+93v.
20M 30.58
RED
BLACK
+93v.
50M
BLACK
30.108
4 MEG.
500M 30.23
+6.5v.
+93v.
130Ω 30.106
3000Ω
50mmf 15.10
RED
YELLOW
.005uf 10.45
1 MEG 30.22
VOL. CONT. 50.47A
.01uf 10.10
250M 30.20
VAR. COND. 25.338
35.214
.05uf 10.5
TONE CONT. 55.20
.05uf 10.5
25Z6GT
40.75 330Ω
M = THOUSAND OHMS
= CHASSIS
VOLTAGES MEASURED AT 120V. LINE WITH 1MΩ/V METER
FREQ. RANGE 530-1680 K.C
+117v.
RED
30 MFD
YELLOW
30 MFD
20.122
I.F. PEAK = 456 KC
.05uf 10.7
115V AC-DC
SW. ON VOL. CONT
PILOT LAMP 120.17
25Z6GT 25L6GT 6SK7GT 6SA7GT 6SQ7GT
7 5 2 15w 8 6 130w 3
7 100w 5 50w 6 8 15w 3 130w 3
BALLAST = 115.78 = 120v. OPER.
BALLAST = 115.79 = 220v. OPER.
Lafayette Radio Corporation
100 SIXTH AVENUE
NEW YORK, N.Y.
Js 179 & 180
DRAWN BY CG
DATE 4-17-40
CHECKED WP
APPROVED

THE MAGNAVOX CO. INC.

CHASSIS CR-149

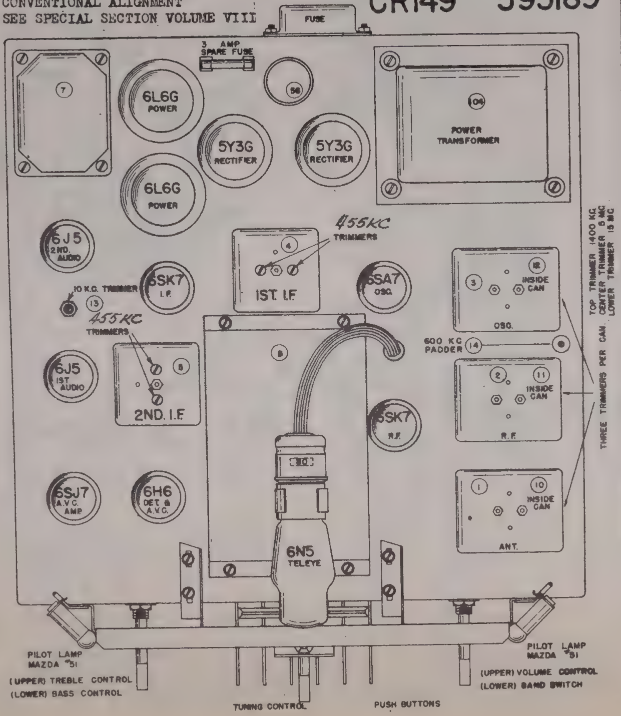
SPECIFICATIONS

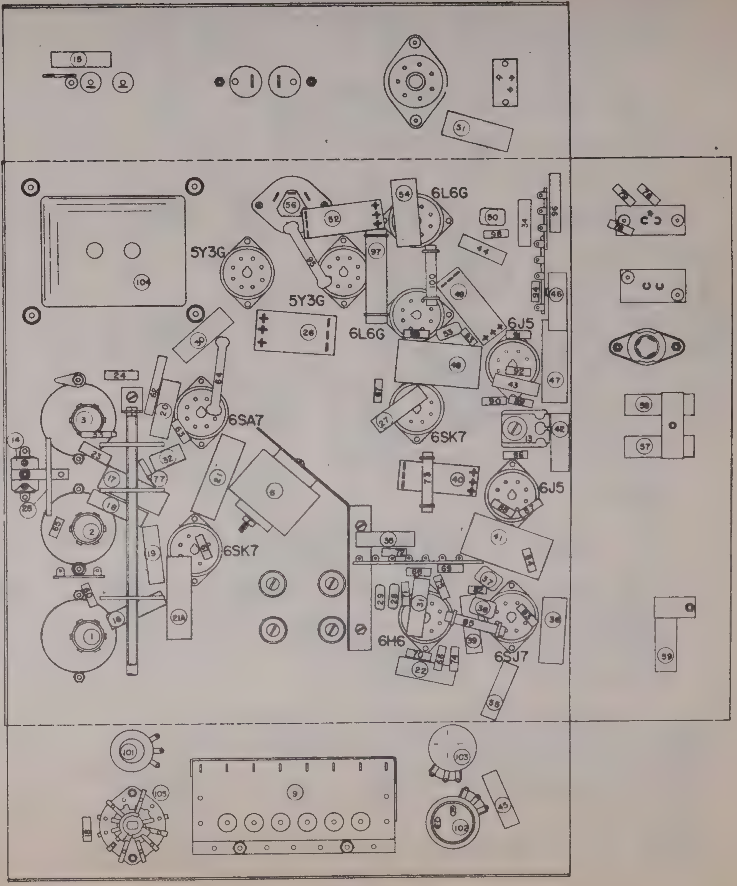
Primary voltage..117 V. AC; Intermediate frequency..............455 KC;
Power consumption180 watts; Tuning frequency range: 535 - 1720 KC;
1667 - 5680 KC;
5.6 - 18.4 MC;

Speaker (120131):
Field Coil...250 ohms; Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, A.V.C., inverse feedback circuit, bass compensation in volume control for phonograph pickup, push button condenser-type tuner temperature stabilized.
Transformer..NONE
Speaker (302):
Field Coil...250 ohms;
Transformer.. 5M ohms;
(for dual speakers)

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

CR149 595189





THE MAGNAVOX CO. INC.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

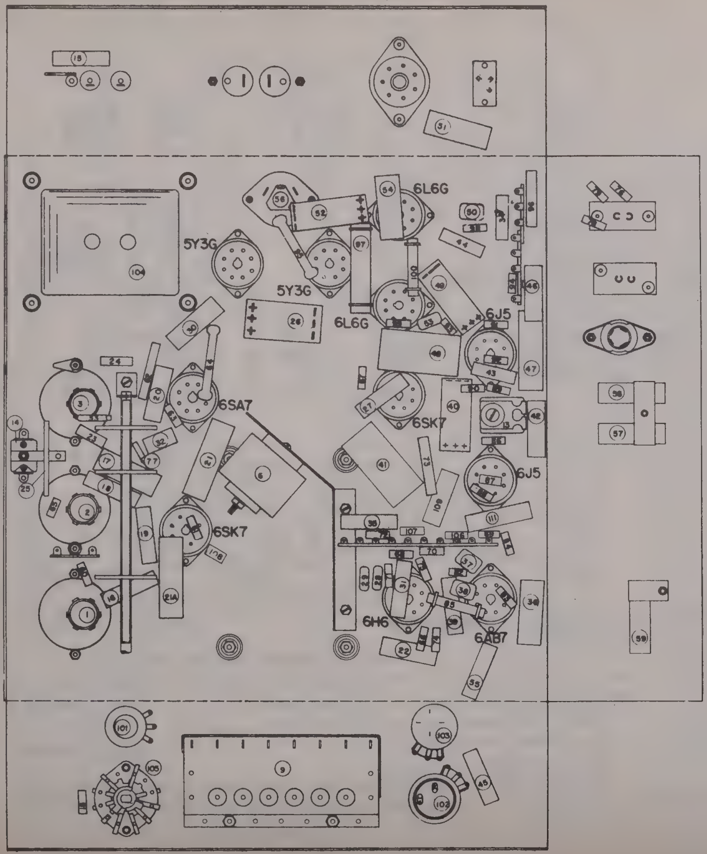
BE SURE THAT THE BAND EXPANDER SWITCH IS SET IN "SHARP-TUNE" POSITION, WHEN ALIGNING THE SET. THIS IS DONE BY ROTATING THE TREBLE CONTROL TO THE LEFT AS FAR AS POSSIBLE.

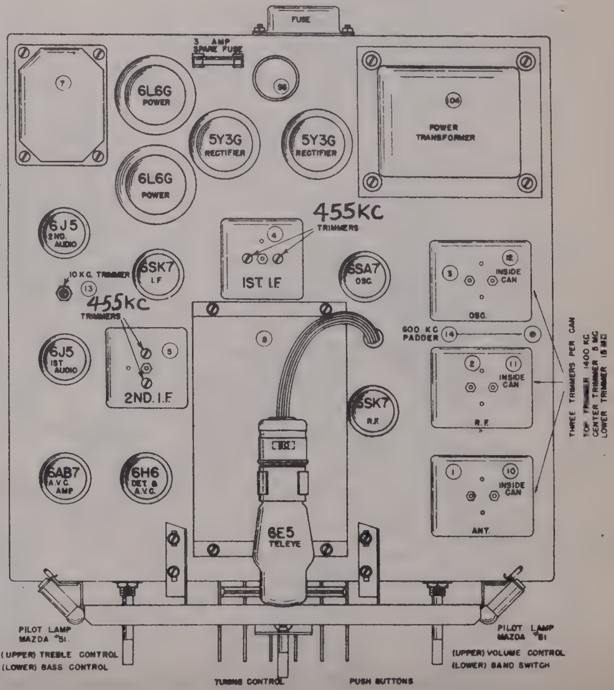
SPECIFICATIONS

Primary voltage..........117 V. AC; Intermediate frequency..............455 KC;
Power consumption.......180 watts; Tuning frequency range: 535 - 1720 KC; 1667 - 1720 KC; 5.6 - 18.4 MC;

Speaker (12C131):
Field Coil......... 250 ohms;
Transformer........ NONE
Speaker (302):
Field Coil......... 250 ohms;
Transformer........ 5M ohms;
(for dual speakers)

Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, amplified A.V.C., inverse feedback circuit, bass compensation in volume control for phonograph pickup, push button condenser-type tuner temperature stabilized.

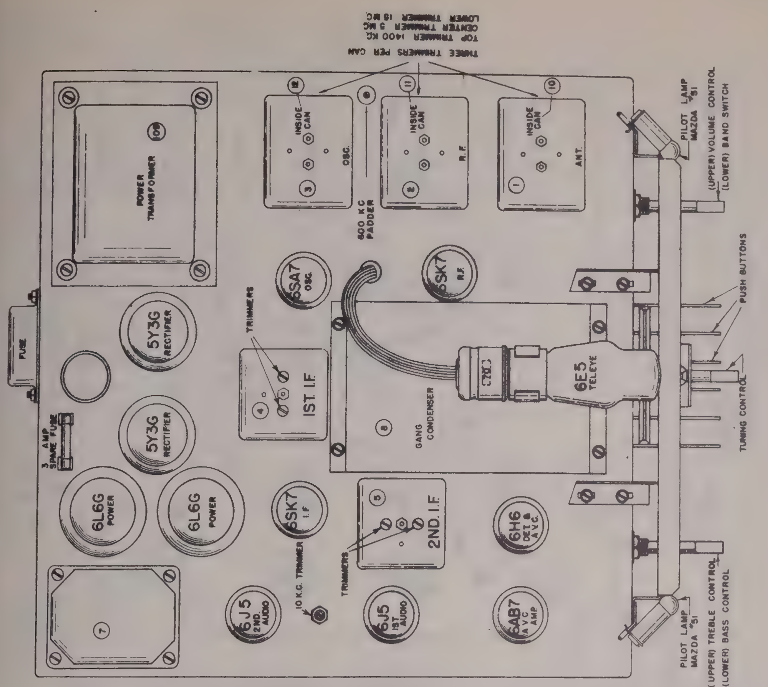


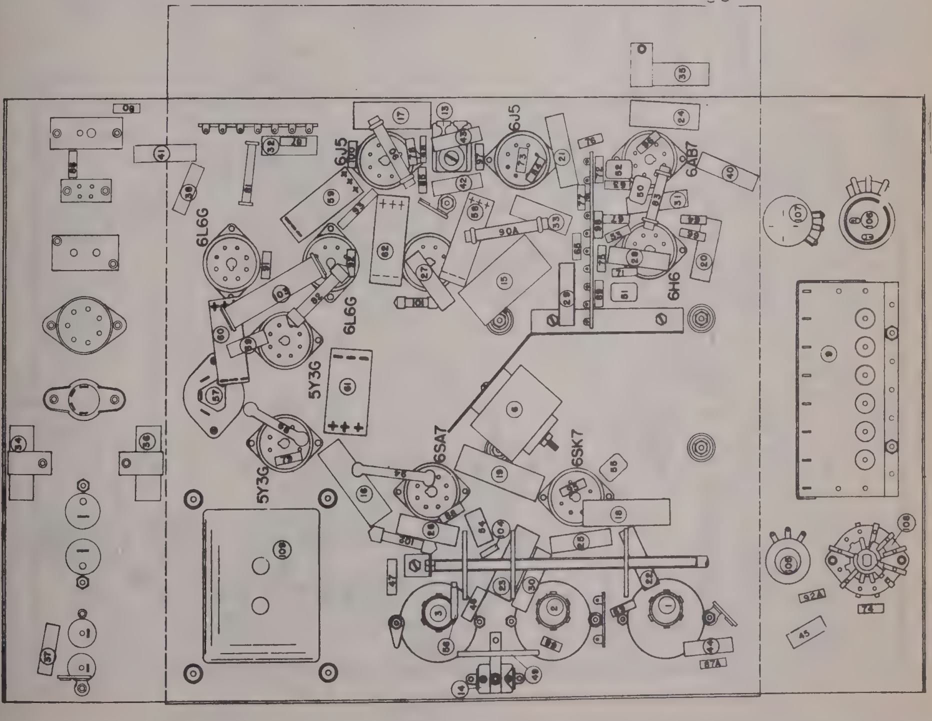


CR152 595195

THE MAGNAVOX CO. INC.

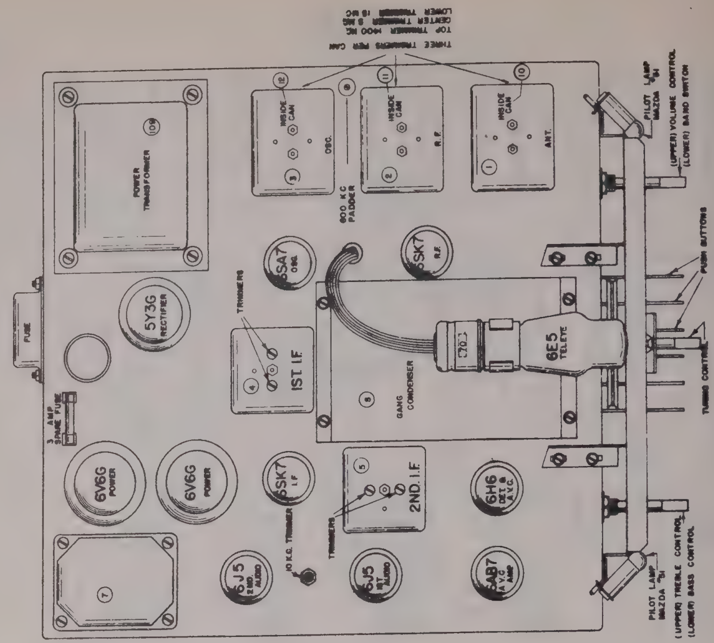
CHASSIS CR-154

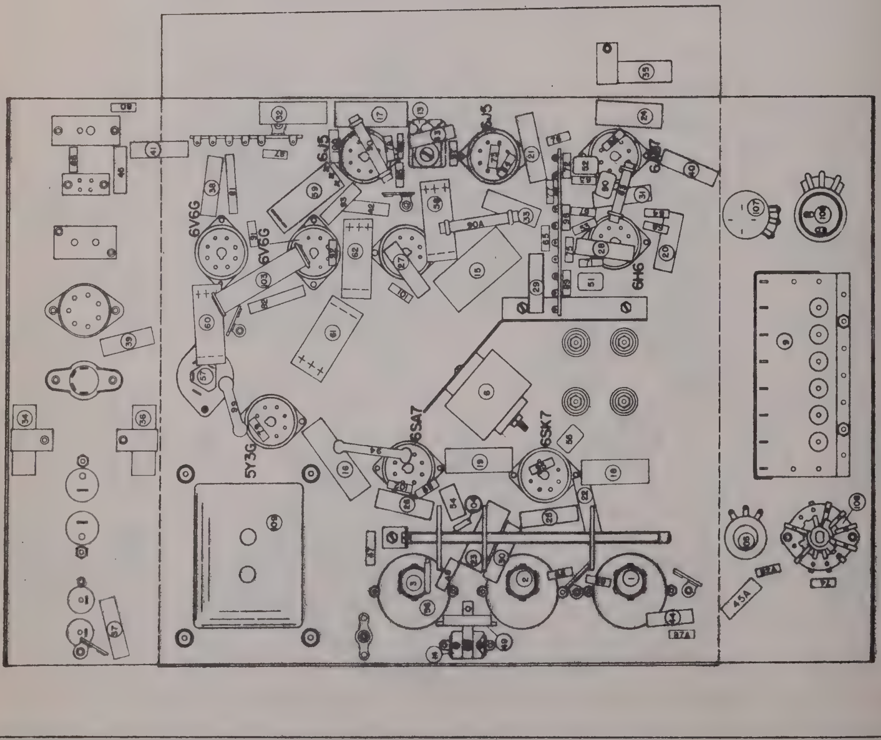




CHASSIS CR-155

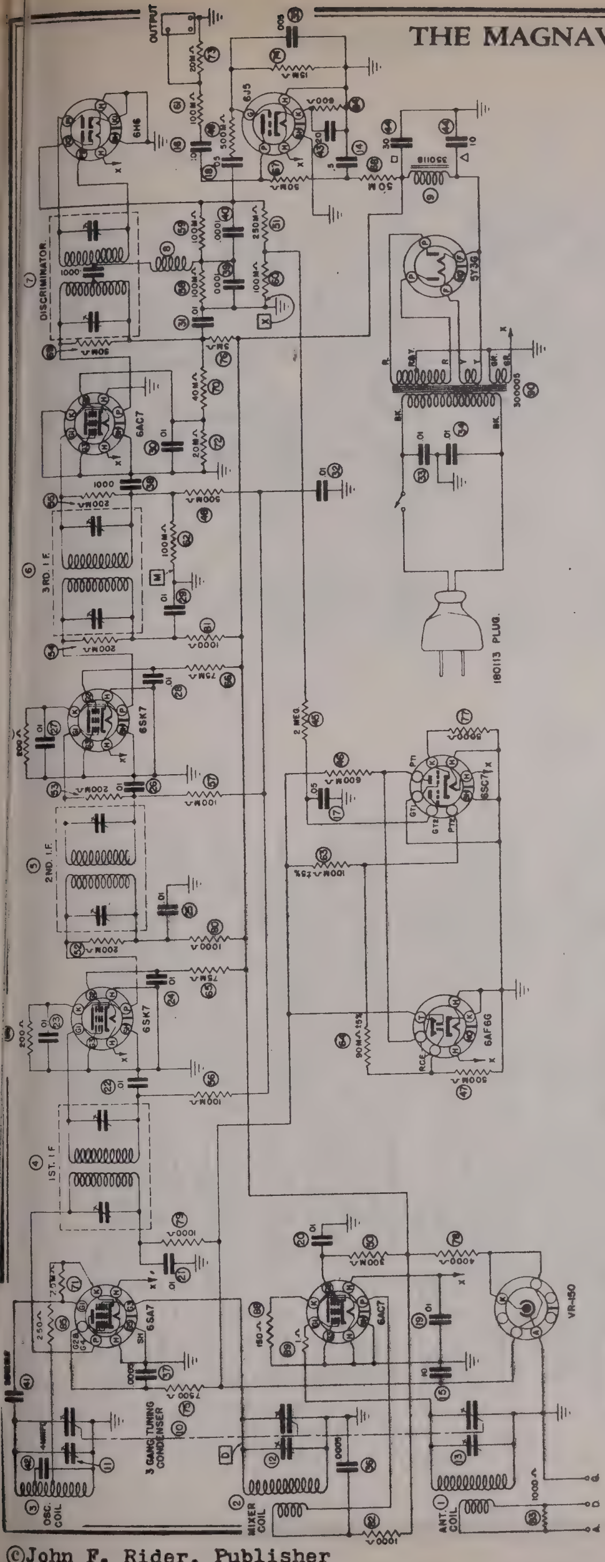
THE MAGNAVOX CO.INC.





THE MAGNAVOX CO. INC.

CHASSIS CR-158



F. M. TUNER

I.F.— 4.3 MC.

BAND RANGE —41.25— 50.70 MC.

CR-158
595204

VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)

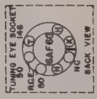
MEASURE FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

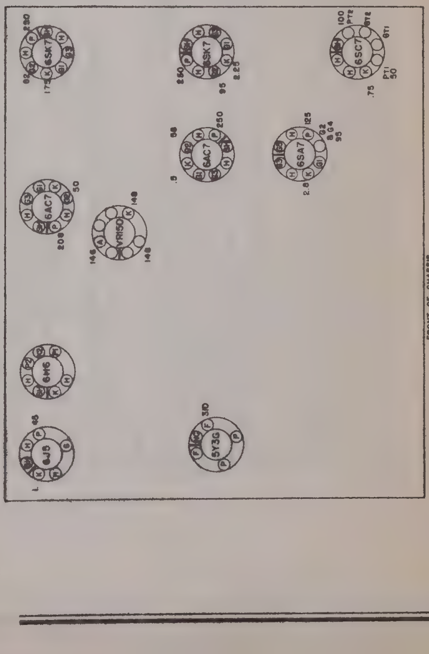
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER.

(H) HEATERS 6.3 VOLTS A.C.

MEASURE CATHODES ON 10V SCALE ALL OTHERS ON 500V. SCALE.

LINE VOLTAGE 117V. A.C.





CHASSIS CR-158

THE MAGNAVOX CO. INC.

1. Connect the "high" side of the generator output to the grid (G3) of the 6SA7 converter, and the "low" side of the generator to the ground of the chassis. The connection to the grid is most easily made by connecting to the stator of middle condenser in the tuning gang. If it is found that the generator does not furnish enough signal, it will be necessary to make this connection directly to the control grid of the 6SA7 tube and to disconnect the mixer coil from this grid. This point is indicated at "D" on the schematic diagram.

2. Connect a 0-50 or 0-200 microammeter in series with the "ground " end of the 100,000 ohm resistor (62). This is point "M" on the diagram. Connect the positive terminal of the meter to ground. This will measure the grid current of the 6AC7 tube. A reading of 30 to 100 microamperes is all that should be expected at this point. If an Analyst or a D.C. electronic voltmeter is available, it can be connected directly across this 100,000 ohm resistor (62) without disconnecting the resistor. This measures the limiter grid bias voltage. A reading of 3 to 10 volts should be considered normal.

3. Set the generator at 4300 kc. and align the I.F. trimmers for maximum gri current in the 6AC7 tube as indicated by the microammeter or voltmeter.

4. The I.F. stages are now aligned. Remove the microammeter and re-connect the 100,000 ohm resistor (62) as it was before.

5. The discriminator will be adjusted next. Connect the microammeter in series with the "ground" end of the 100,000 ohm resistor (60). This is indicated as point "X" on the diagram. The positive side of the meter is connected to ground. Instead of this, a high impedance electronic voltmeter, such as an Analyst or similar device, can be connected across this resistor. This measures the detector output current or voltage.

6. Adjust the test generator to 4375 kc. Adjust both trimmers on the discriminator transformer (7) for a peak. Adjust the output of the generator so that the meter reads at least 60 microamperes or 6 volts. Readjust the oscillator to 4300 kc. Adjust the trimmer nearest the 6H6 tube until the current or voltage is zero. A non-metallic screwdriver is essential; this is an extremely important operation. Re-set the oscillator to 4375 kc. and note the meter reading.

   Now reverse the meter connections so that the negative terminal is connected to ground. Set the generator to 4225 kc. and the meter reading should be within 10% of being the same. If not, the tuning of the discriminator transformer was not done carefully enough and must be repeated. This completes the adjustment of the discriminator. Re-connect the 100,000 ohm load resistor (60) to restore the circuit to its original condition.

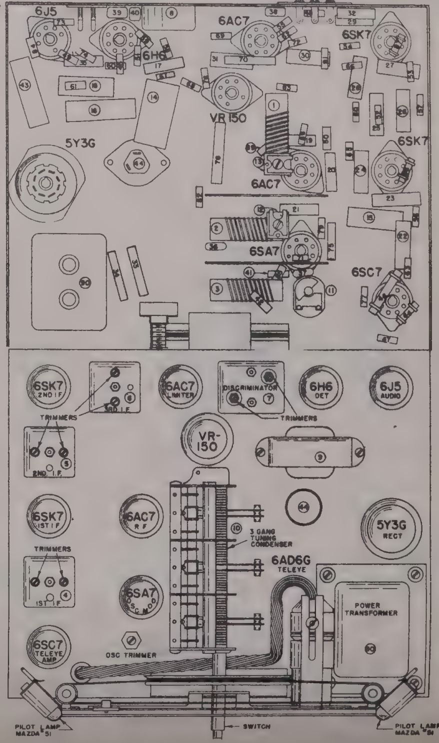
7. Re-connect the control grid of the 6SA7 to the mixer coil if this connection had been removed and disconnect the generator from this point.

8. The antenna, mixer, and oscillator coils are now ready to be aligned. Check to see that the dial pointer is at the end of the dial calibration (41.25 mc.) when the tuning gang is fully meshed.

9. Prepare to measure the limiter grid current by again connecting the microammeter as described in paragraph 2.

10. If an extremely accurate signal generator is available, it may be used for setting the oscillator to the dial calibration. The generator is connected to the antenna post through a 70 ohm resistor. Otherwise it will be necessary to connect an antenna to the receiver and use a F.M. transmitter for the frequency standard, preferably one between 47 mc. and 50 mc.

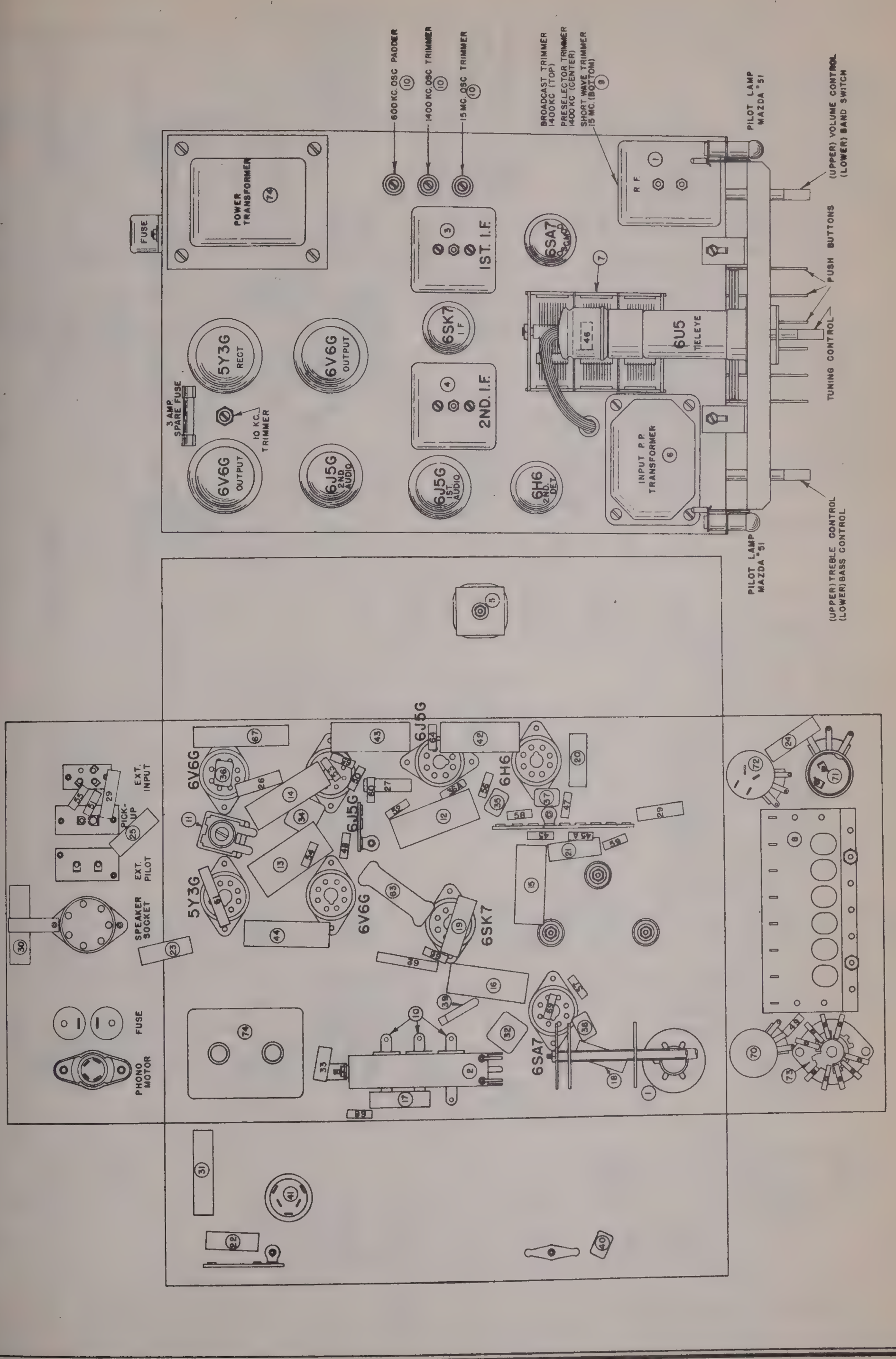
11. Set the dial to the known frequency of the transmitter and adjust the oscillator air trimmer (11) until the signal produces a maximum reading on the microammeter. Then adjust the trimmers (12) and (13) on the mixer and antenna coils for maximum reading. If too much signal is fed to the receiver, it will appear at several settings of the dial and confuse the adjusting. These trimmers should align rather loosely. If they are tightened so that the frequency of the R.F. circuit equals the oscillator frequency, suprious oscillations and responses are produced. The oscillator frequency is normally 4300 kc. lower than the signal frequency. When the above adjustments are completed and the 100,000 ohm resistor (60) is again grounded, the receiver has been aligned.



©John F. Rider, Publisher

THE MAGNAVOX CO.INC.

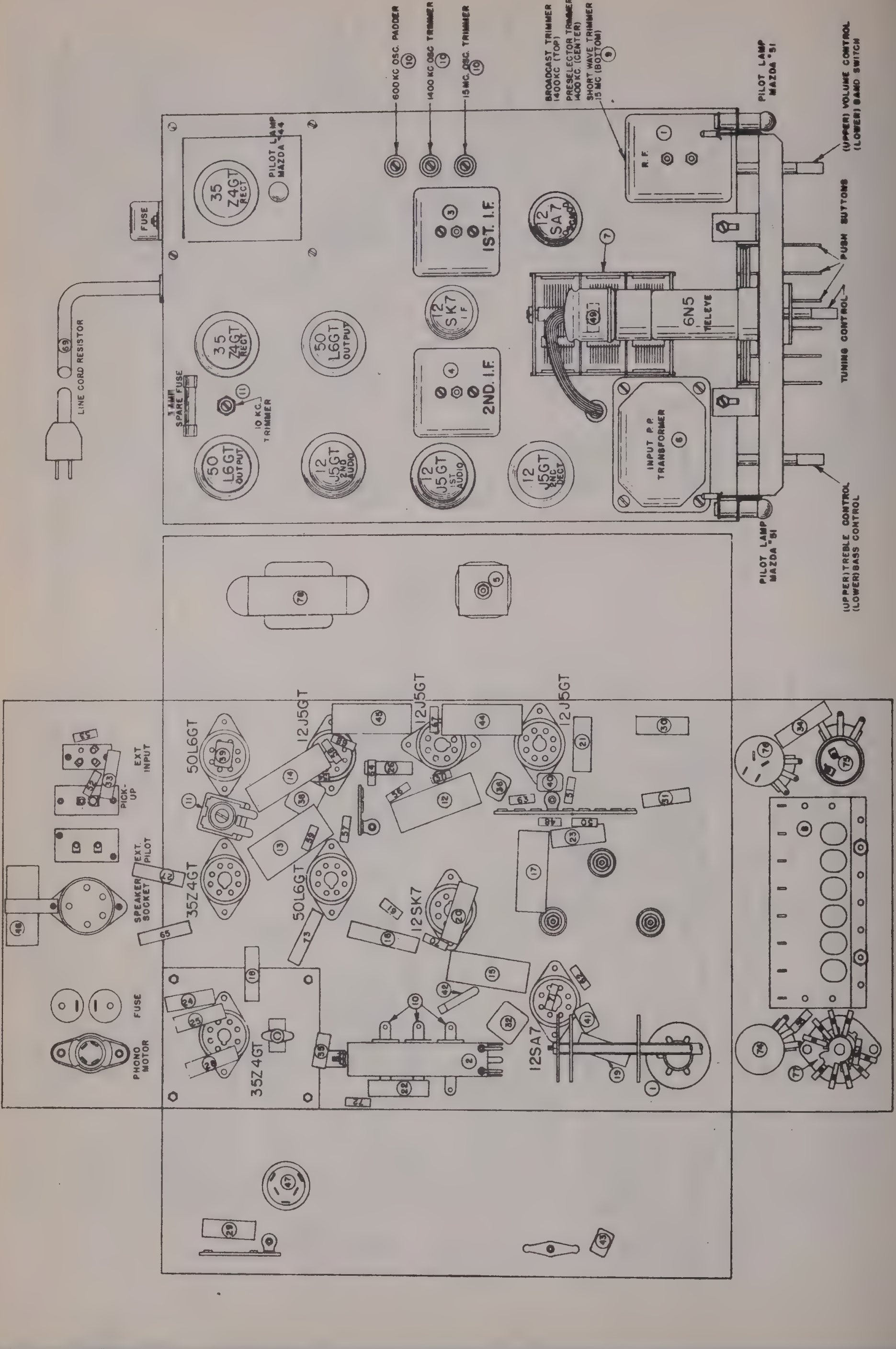
CHASSIS CR-156



©John F. Rider, Publisher

CHASSIS CR-165

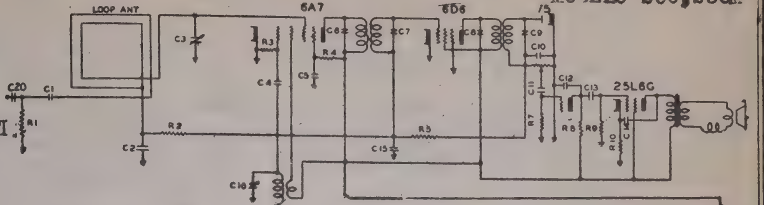
THE MAGNAVOX CO. INC.



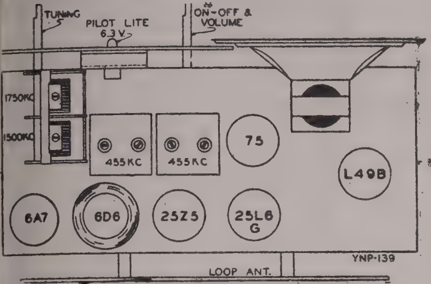
MODEL 1D59-L
MODELS 2D60,5CAA
MODELS 250,250M

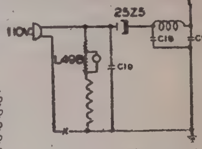
MAJESTIC RADIO & TELEV. CORP.

MODEL 1D59-L



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



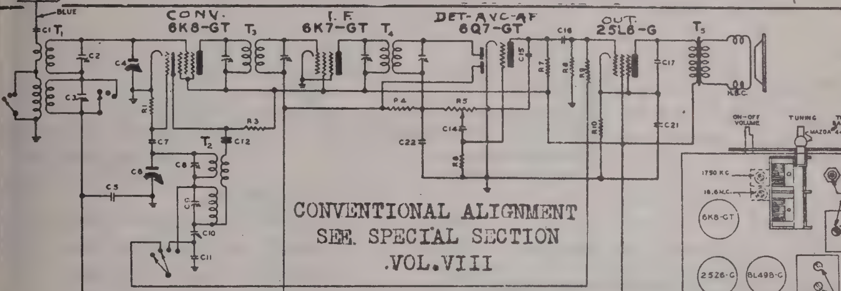


IF PEAK 455 KC

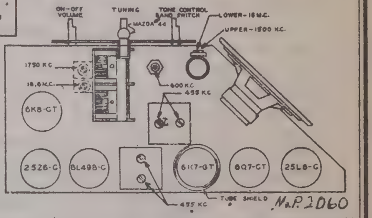
Location	Part No.	Description
R1	R-15531	Carbon res. 10K ohm ¼W20%
R2	R-15515	Carbon res. 100K ohm ¼W20%
R3	R-15511	Carbon res. 50K ohm ¼W20%
R4	R-53	Carbon res. 15K ohm ¼W20%
R5	R-15500	Carbon res. .2 meg. ¼W20%
R6	Y-VC-30	Volume Control
R7	R-79	Carbon res. 15 meg. ¼W20%
R8,R9	R-15520	Carbon res. 500K ohm ¼W20%
R10	R-80	Carbon res. 110 ohm ½W20%
C4	CM-29	Mica cond. 50 mmf 30%
C10, C12	CM-30	Mica cond. 250 mmf 30%
C1,C13,C20	C-15574	Tubular cond. .01 mfd. 400V
C11	C-15774	Tubular cond. .002 mfd. 400V
C2, C14	C-15760	Tubular cond. .02 mfd. 400V
C5, C15	C-15752	Tubular cond. .05 mfd. 200V
C19	C-15756	Tubular cond. .05 mfd. 400V
C17, C18	Y-CE-50	Electrolytic Condenser

1-6A7 CONVERTER
1-6D6 I.F.AMP.
1-75 DET.AVC.AF.
1-25L6G OUTPUT
1-25Z5 RECTIFIER
1-L49B BALLAST

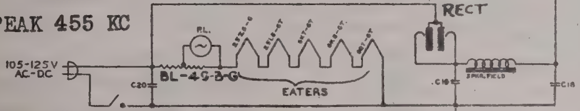
MODEL 2D60 5CAA



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL.VIII



IF PEAK 455 KC

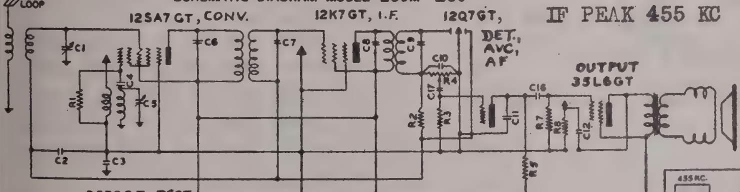


R1	R-15511	Carbon res. 50K ohm ¼W20%
R3	R-15531	Carbon res. 10K ohm ¼W20%
R4	R-15500	Carbon resistor 2meg ¼W20%
R5	Y-VC-21	Volume Control and Switch
R6,R8	R-50	Carbon resistor 5meg ¼W20%
R7	R-15504	Carbon res. 150K ohm ¼W20%
R9	R-15500	Carbon res. 20K ohm ¼W20%
R10	R-80	Carbon res. 110 ohm ½W20%

Location	Part No.	Description
C1,C12,C16, C17	C-15754	Tubular cond. .01 mfd. 400V
C4,C6	Y-CV-16A	Variable Condenser
C5	C-15752	Tubular cond. .05 mfd. 200V
C7	CM-31	Mica cond. 100 mmfd, 30%
C10	Y-CP-8	Padder Condenser
C11	CM-2	Mica cond. 4330 mmfd. 5%
C14	C-31	Tubular cond. .004 mfd. 400V
C15,C22	CM-30	Mica cond. 250 mmfd. 30%
C18,C19,C21	CE-46	Electrolytic Condenser
C20	C-15756	Tubular cond. .05 mfd. 400V
P.L.	LB-44	Mazda Bulb #44

T1	Y-ANA-10	Antenna Assembly
T2	Y-OSA-10	Oscillator Assembly
T3	Y-IFA-10	1st I. F. Transformer
T4	Y-IFA-11	2nd I. F. Transformer

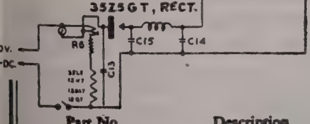
SCHEMATIC DIAGRAM MODEL-250M-250

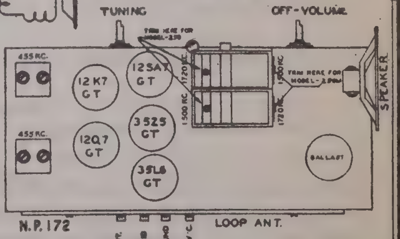


IF PEAK 455 KC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

Model 250



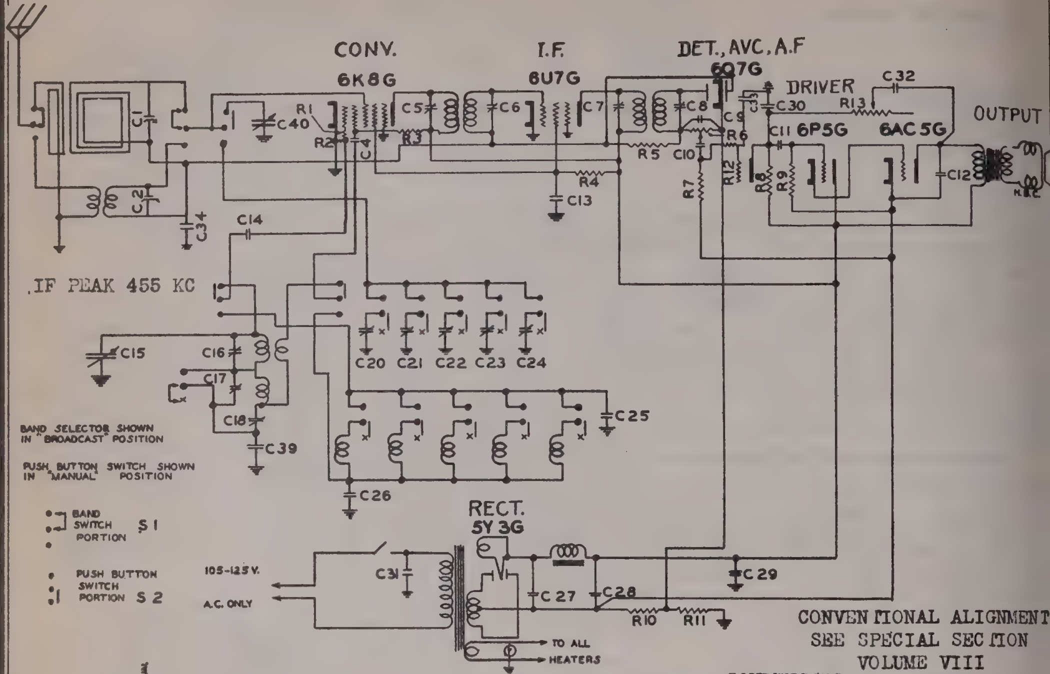


	Part No.	Description
C2	C-15752	Tubular cond. .05 mfd. 200V
C3	C-15751	Tubular cond. .25 mfd. 200V
C4	CM-29	Mica cond. 50 mmf. 30%
C10	CM-30	Mica cond. 250 mmf. 30%
C11	CM-31	Mica cond. 100 mmf. 30%
C12	C-15760	Tubular cond. .02 mfd. 400V
C13	C-15756	Tubular cond. .05 mfd. 400V
C14,C15	Y-CE-55	Electrolytic
C16	C-15754	Tubular cond. .01 mfd. 400V
C17	C-15753	Tubular cond. .002 mfd. 400V
R1	R-15510	Carbon res. 20K ohm ¼W20%
R2	R-15500	Carbon resistor 2meg ¼W20%
R3	R-79	Carbon resistor 15meg ¼W20%
R4	Y-VC-21	Volume Control
R5	R-15512	Carbon res. 250K ohm ¼W20%
R6	TU-83	Ballast
R7	R-15520	Carbon res. 500K ohm ¼W20%
R8	R-59	Carbon res. 110 ohm ½W10%

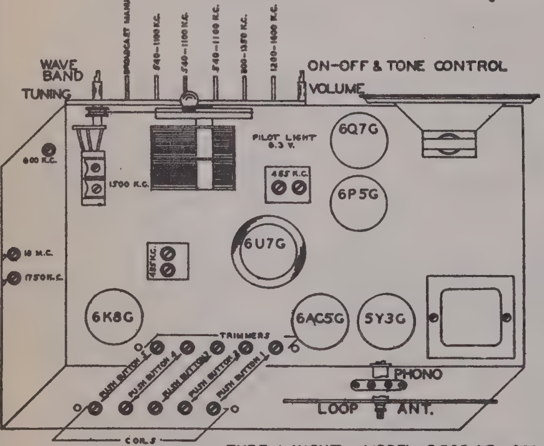
©John F. Rider, Publisher

MODELS 2C60AP
260

MAJESTIC RADIO & TELEV. CO. CORP.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



TUBE LAYOUT— MODEL 2C60 AP-260

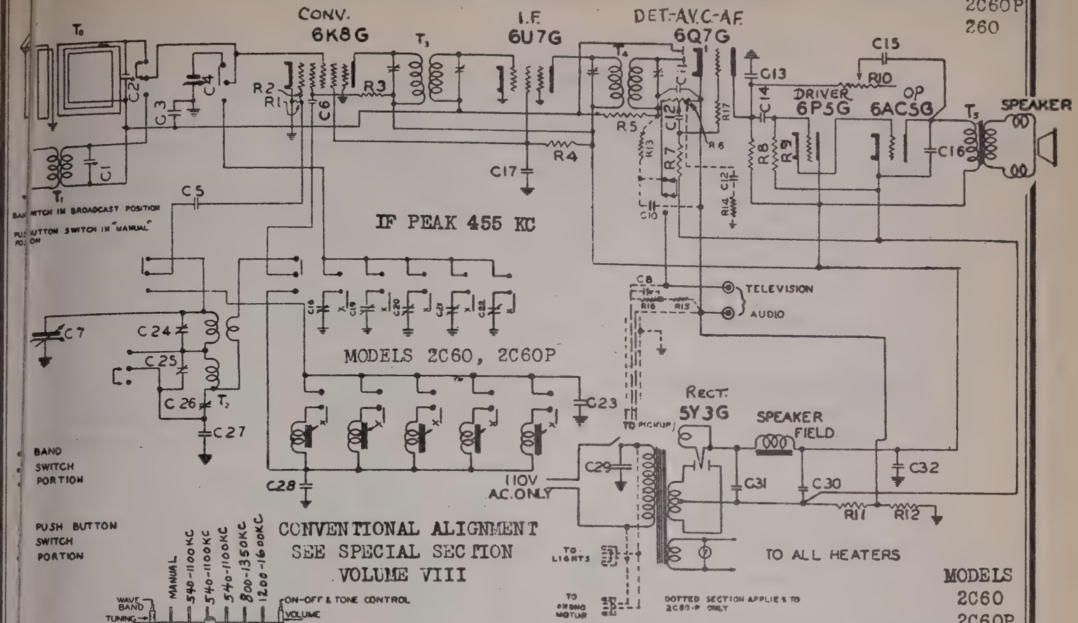
FOR SETTING PUSH BUTTONS SEE INDEX.

REPLACEMENT PARTS LIST

Schematic Location	*Part Number*	*Condensers*
C1, C2—C16, C17	Y-CT-24	Trimmer
C40, C15	Y-CV-33	Variable
C4, C11, C12	C-15754	.01 mfd. 400 V. Tubular
C10	C-49	.005 mfd. 400 V. Tubular
C13, C29	C-15756	.05 mfd. 400 V. Tubular
		CONDENSERS
C34	C-15752	.05 mfd. 200 V. Tubular
C9, C30	CM-31	100 mmfd. 30% Mica
C14	CM-29	50 mmfd. 30% Mica
C18	Y-CT-27	Padder Condenser
C20, C21, C22, C23, C24	Y-CT-31	Trimmer Strip
C25	CM-34	150 mmfd. 5% Silvered Mica
C26	CM-33	250 mmfd. 5% Silvered Mica
C27, C28	Y-CE-43	Electrolytic Condenser
C31	C-18	.01 mfd. 400 V. Tubular
C32, C33	CM-30	250 mmfd. 30% Mica
C39	CM-9	5500 mmfd. 5% Mica
		RESISTORS
R1	R-15601	100 ohm ¼ W 20% Carbon
R2	R-54	50K ohm ¼ W 20% Carbon
R3	R-15541	5K ohm ½ W 20% Carbon
R4	R-15544	15K ohm 1 W 20% Carbon
R5	R-15500	2 megohm ¼ W 20% Carbon
R6	Y-VC-33	Volume Control
R7, R9	R-15517	1 megohm ¼ W 20% Carbon
R8, R12	R-15512	250K ohm ¼ W 20% Carbon
R10, R11	R-87	70 ohm ¼ W 20% Carbon
		CONTROLS
R13	Y-VC-33	Tone Control
S1	Y-SW-25	2 pos. band switch
S2	Y-SW-19	6 button Switch

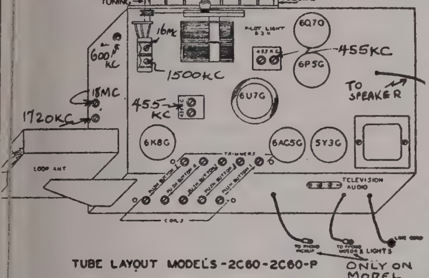
MAJESTIC RADIO & TELEV. CO. CORP.

MODELS 2C60
2C60P
260



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

MODELS
2C60
2C60P
260



TUBE LAYOUT MODELS-2C60-2C60-P

PRE-SETTING OF PUSH BUTTONS

The push-buttons may be easily set to receive any five stations desired provided that three of them lie between 540 and 1100 KC, one of them between 800 and 1350 KC, and one of them between 1200 and 1600 KC. Note on the diagram that push button number 1 covers the range 1200-1600 KC. If the station selected lies between those frequencies then push the button in as far as possible and with a small screwdriver adjust the screw from the back of the receiver that corresponds to that button until the station desired can be heard as loudly as possible. Complete the adjustment by adjusting the corresponding trimmer from the top of the chassis until maximum volume again results. In making these adjustments, it is desirable to keep the volume control turned down to low volume. By pressing button number 2, the corresponding coil adjusting screw and trimmer condenser may be adjusted to the next station and the same process repeated for the balance of the buttons.

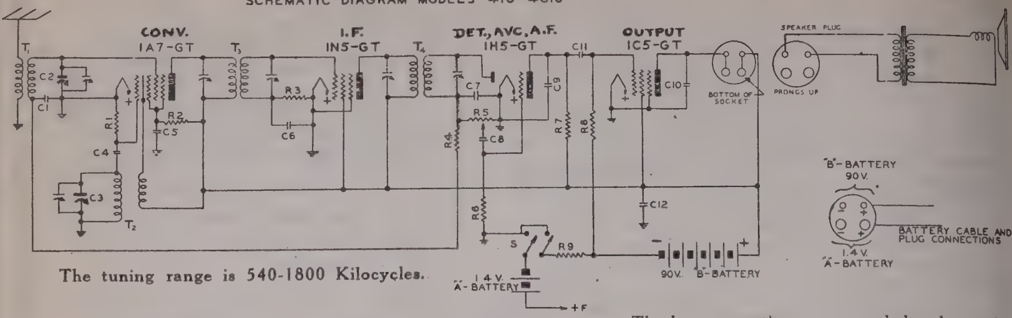
chematic ocation	Part No.	Condensers
1, C2,-C24 25	Y-CT-24	Trimmer
7, C4	Y-CV-33	Variable Condenser
18, C19, C20, 21, C22	Y-CT-31	Trimmer strip
C26	Y-CT-27	Padder Condenser
C3	C-15761	.1—200 V Tubular
C6, C10, C12, C14	C-15754	.01—400 V Tubular
C16	C-15769	.01—600 V Tubular
C17, C32	C-15756	.05—400 V Tubular
C29	C-18	.01—400 V Molded
C30, C31	Y-CE-43	Electrolytic Condenser (Model 2C60 only)
C30, C31	Y-CE-60	Electrolytic Condenser (Model 2C60-P only)
C5	CM-29	50 mmfd. 30% Mica
C11, C13	CM-31	100 mmfd. 30% Mica
C8, C15	CM-30	250 mmfd. 30% Mica
C23	CM-34	150 mmfd. 5% Mica
C27	CM-9	5500 mmfd. 5% Mica
C28	CM-33	250 mmfd. 5% Mica

		Resistor
R2	R-15601	100 ohm ¼ W 20% Carbon
R1, R13, R14	R-54	50K ohm ¼ W 20% Carbon
R3	R-15541	5K ohm ½ W 20% Carbon
R4	R-15544	15K ohm 1 W 20% Carbon
R5, R16	R-15500	2 megohm ¼ W 20% Carbon
R6, R10	Y-VC-33	Volume and Tone Controls (Model 2C60 only)
R6, R10	Y-VC-42	Volume and Tone Controls (Model 2C60-P only)
R7, R9	R-15517	1 megohm ¼ W 20% Carbon
R8, R15, R17	R-15512	250K ohm ¼ W 20% Carbon
R11, R12	R-87	70 ohm ¼ W 20% Crabon
		Description
To	Y-CS-100	Loop Antenna
T1	Y-CS-96	Short Wave Antenna Coil
T2	Y-CS-71	Oscillator Coil
T3	Y-CI-43	1st I.F. Transformer
T4	Y-CI-44	2nd I.F. Transformer
T5		Speaker Output Transformer
	LB-G-11W	Lights for Phono Compartment

MODELS 4C10,410
MODEL 5ADA

MAJESTIC RADIO & TELEV. CO. CORP.

SCHEMATIC DIAGRAM MODELS-410-4C10



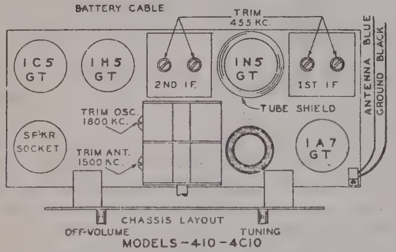
The tuning range is 540-1800 Kilocycles.

The battery packs recommended to be used:

Burgess No. 17GD60 or equivalent
Eveready No. 748 or equivalent
Ray-O-Vac No. AB-82 or equivalent

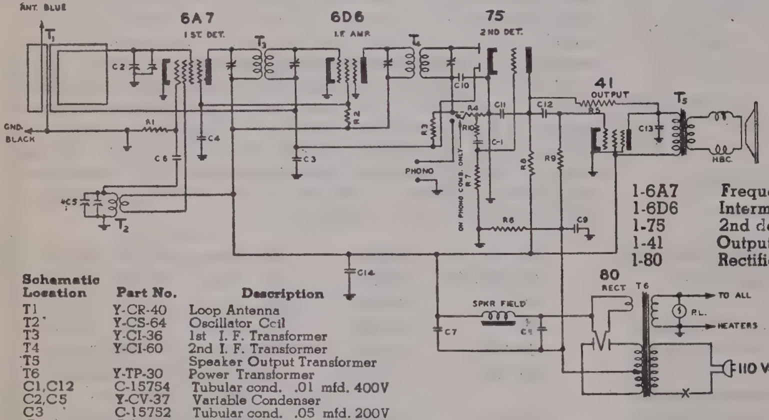
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

IF PEAK 455 KC



Schematic Location	Part No.	Description
C2,C3	Y-CV-26	Variable Condenser
C1,C5	C-15752	Tubular cond. .05 mfd 200V
C6,C8,C11	C-15763	Tubular cond. .01 mfd 200V
C10	C-15774	Tubular cond. .002 mfd. 400V
C12	CE-35	8 mfd. 150V Electrolytic cond.
C4,C7,C9	CM-31	Mica cond. 100 mmfd. 30%
T1	Y-CS 62	Antenna Coil
T2	Y-OSA-11	Oscillator Assembly
T3	Y-CI-29	1st I. F. Assembly
T4	Y-CI-30	2nd I. F. Assembly
R1	R-15523	Carbon res. 200Kohm ¼W20%
R2	R-44	Carbon res. 70K ohm ¼W10%
R3,R4	R-15500	Carbon resistor 2meg ¼W20%
R6	R-15559	Carbon resistor 3meg ¼W20%
R7	R-15520	Carbon res. 500Kohm ¼W20%
R8	R-15517	Carbon resistor 1meg ¼W20%
R9	R-72	Carbon res. 600 ohm ¼W20%
R5	Y-VC-43	Volume Control

MODEL 5ADA



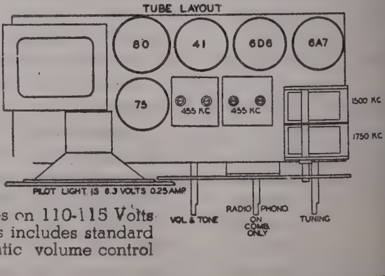
The tubes used are:

1-6A7	Frequency converter
1-6D6	Intermediate frequency amplifier
1-75	2nd detector, AVC and audio driver
1-41	Output
1-80	Rectifier

IF PEAK 455 KC

Schematic Location	Part No.	Description
T1	Y-CR-40	Loop Antenna
T2	Y-CS-64	Oscillator Ccil
T3	Y-CI-36	1st I. F. Transformer
T4	Y-CI-60	2nd I. F. Transformer
T5		Speaker Output Transformer
T6	Y-TP-30	Power Transformer
C1,C12	C-15754	Tubular cond. .01 mfd. 400V
C2,C5	Y-CV-37	Variable Condenser
C3	C-15752	Tubular cond. .05 mfd. 200V
C4	C-15756	Tubular cond. .05 mfd. 400V
C6	CM-29	Mica cond. 50 mmfd. 30%
C10,C11	CM-30	Mica cond. 250 mmfd. 30%
C7,C8,C9	Y-CE-43	Elecrolyic Condenser
C13	C-25	Tubular cond. .006 mfd. 400V
C14	C-15757	Tubular cond. .1 mfd. 400V
R1	R-15511	Carbon res. 50K ohm ¼W20%
R2	R-83	Carbon res. 35K ohm 1W20%
R3	R-15500	Carbon resistor 2meg ¼W20%
R4	Y-VC-30	Volume Control
R5	R-15559	Carbon resistor 3meg ¼W20%
R6	R-117	Carbon res 275 ohm ½W20%
R7	R-109	Carbon resistor 5meg ¼W20%
R8,R9	R-15520	Carbon res. 500Kohm ¼W20%
R10	R-15515	Carbon res. 100Kohm ¼W20%
P.L.	LB-44	Pilot Light Mazda #44

CONVENTIONAL
ALIGNMENT
SEE SPECIAL
SECTION
VOLUME VIII.

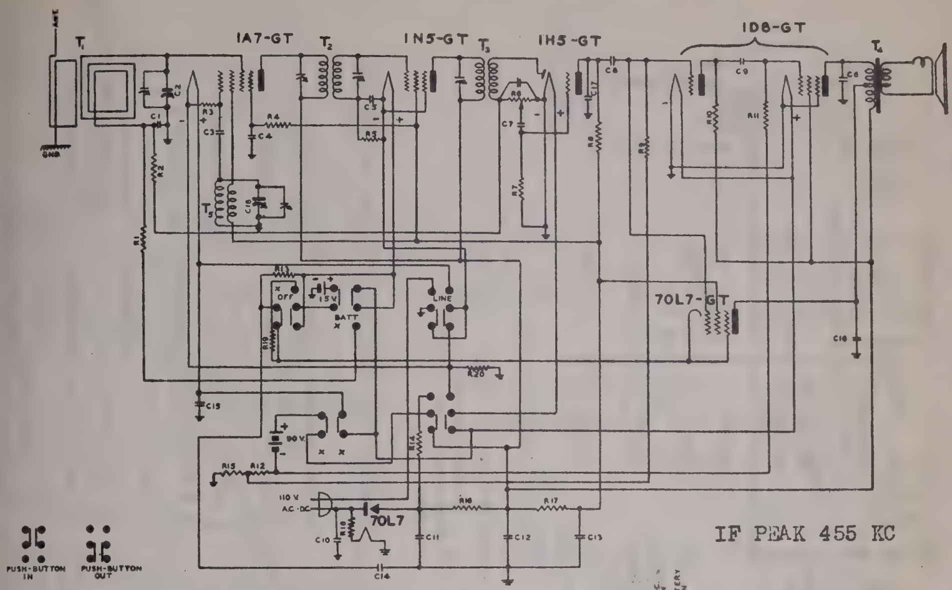


This is a five (5) tube Alternating Current (AC) receiver. This set operates on 110-115 Volts 60 Cycles current. The tuning range is from 540 to 1750 kilocycles. This includes standard broadcast and most city police stations. This set is equipped with automatic volume control and a Majestic Hi-Q Loop Antenna shielded ay a Faraday screen.

MAJESTIC RADIO & TELEV. CO. CORP.

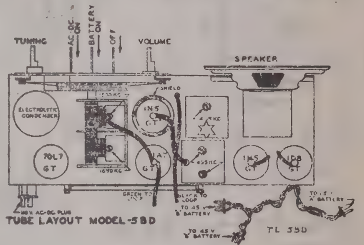
MODELS 5BD, 5BDR, 5ULBD

SCHEMATIC DIAGRAM MODEL -5BD



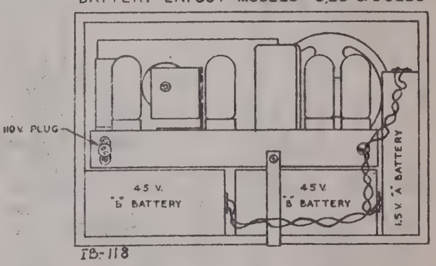
IF PEAK 455 KC

DIAGRAM SHOWN WITH BATTERY PUSH-BUTTON IN



TUBE LAYOUT MODEL-5BD

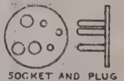
BATTERY LAYOUT MODELS - 5BD & 5ULBD



TB-118

Schematic Location	Part No.	Description
C1	C-15752	Tubular cond. .05 mfd. 200V
C2,C18	Y-CV-46B	Variable Condenser
C3	CM-29	Mica cond. 50 mmfd.
C4,C5,C8		
C9,C16	C-15754	Tubular cond. .01 mfd. 400V
C6,C7	C-15753	Tubular cond. .002 mfd. 600V
C10	C-15756	Tubular cond. .05 mfd. 400V
C11	CE-62	Electr. cond. 15 mfd. 150V
C12	CE-62	Electr. cond. 40 mfd. .150V
C13	CE-62	Electr cond. 10 mfd. 150V
C14	CE-62	Electr. cond. 100 mfd. 25V
C15	C-15761	Tubular cond. .1 mfd. 200V
C17	CM-30	Mica cond. 250 mmfd.
R1	R-63	Carbon resistor 10meg ¼W20%
R2,R5	R-15500	Carbon resistor 2meg ¼W20%
R3	R-15523	Carbon res. 200K ohm ¼W20%
R4	R-15511	Carbon res. 50K ohm ¼W20%
R7	R-109	Carbon resistor 5meg ¼W20%
R8,R10,R11	R-15517	Carbon resistor 1meg ¼W20%
R9	R-15512	Carbon res. 250K ohm ¼W20%
R-15,R-19	R-15601	Carbon res. 100 ohm ¼W20%
R-13	R-28	Carbon res. 10 ohm ¼W20%
R-14	R-15542	Carbon res. 1000ohm ¼W20%
R-17	R-15570	Carbon res. 2000ohm ¼W20%
R12	R-72	Carbon res. 600ohm ¼W20%
R16	R-121	Carbon res 300ohm 1W20%
R20	R-15600	Carbon rss. 200ohm ¼W20%
R6	Y-VC-38A	Volume Control
T1	Y-LOA-11	Loop Antenna
T2	Y-IFA-17	1st I. F. Assembly
T3	Y-IFA-16	2nd I. F. Assembly
T4	Y-SPA-71	Output Transformer
T5	Y OSC-11	Oscillator Coil
T6	SW-43	Push-Button Switch

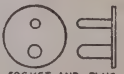
The frequency coverage is from 540 to 1650 kilocycles, i.e. from 555 to 182 meters. This includes the standard broadcast band and some police calls.



SOCKET AND PLUG DETAIL OF THE B BATTERIES

The tubes used are:

1—1A7GT	Converter.
1—1N5GT	I. F. Amplifier.
1—1H5GT	2nd Detector, AVC, and A. F. Amplifier.
1—1D8GT	2nd A. F. Amplifier and Output Tube Used on Battery Operation only.
1—7OL7GT	Output and Rectifier Tubes Used on Line Operation Only.

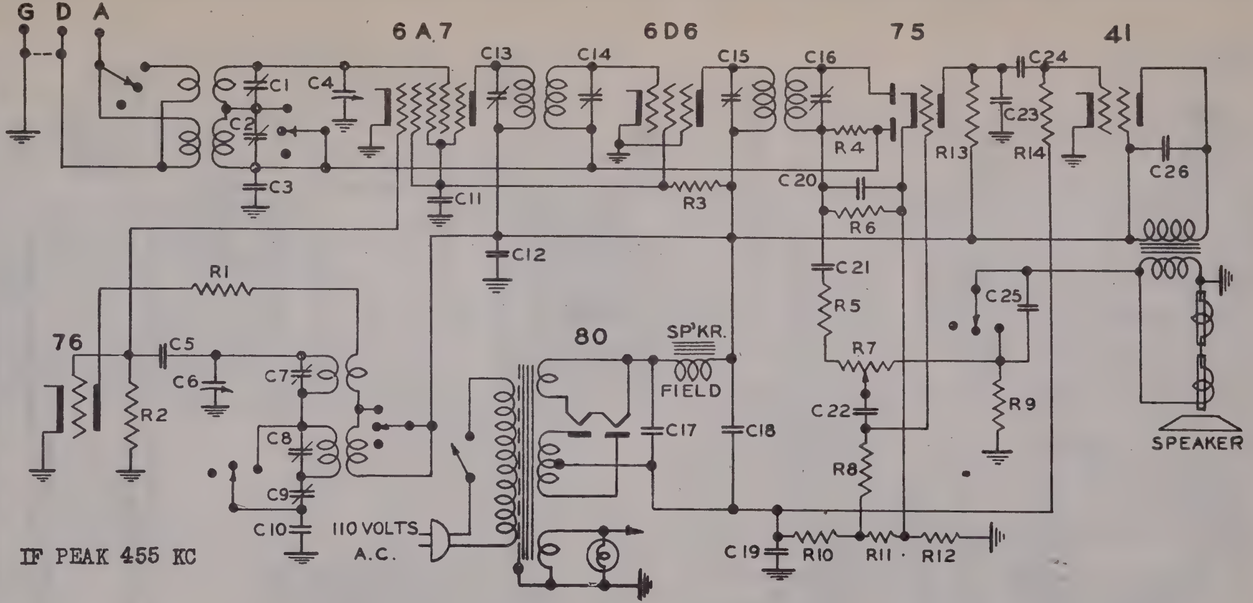


SOCKET AND PLUG DETAIL OF THE A BATTERY

The receiver is equipped with three push buttons. The first from the right is for line operation. The middle push button is for battery operation. The left hand push button is to turn the set off.

MODEL 62A,Series C

MAJESTIC RADIO & TELEV. CO. CORP.



IF PEAK 455 KC

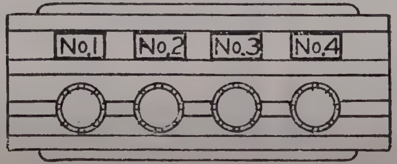
Schematic Location	Part No.	Description
C3	C-15752	Tubular cond. .05 mfd. 200 V
C11,C12	C-15756	Tubular cond. .05 mfd 400 V
C21,C22, C24,C26	C-15754	Tubular cond. .01 mfd. 400 V
C25	C-15772	Tubular cond. .02 mfd 200 V
C5	CM-15929	Mica cond. 50 mmf. Type"O"
C20	CM-15928	Mica cond. 250 mmf. Type"O"
C23	CM-15918	Mica cond. 100 mmf. Type"O"
C10	CM-17	Pre set mica cond. 4330 mmf. 3% 12 mfd. 300 V
C17,C18,C19	Y-CE-43	Elect. cond. 8 mfd. 300 V, 20 mfd, 25V.
C4,C6	Y-CV-19-A	Variable condenser (2 gang)
R2	R-15511	Carbon resistor 50K ¼W 20%
R3	R-69	Carbon resistor 7.5K 2 W 20%
R5,R13	R-15512	Carbon resistor 250K ¼W20%
R6,R14	R-15520	Carbon resistor 500K ¼W20%
R4,R8	R-15500	Carbon resistor 2 Meg¼W20%
R1	R-15601	Carbon resistor 100 ohms ¼W 20%
R9	R-65	Carbon resistor 10K ¼W 20%
R10,R11 R12	RC-6	Candohm resistor
R7	Y-VC-24	Volume control
C1,C2,C7,C8	Y-CP-2	Trimmer cond.
C9	Y-CP-16472	Padder cond.
C13,C14	Y-CT-1	Trimmer cond. 1st I. F.
C15,C16	Y-CT-1	Trimmer cond. 2nd I. F.

The tubes used are:

1-6A7	First detector
1-76	Oscillator
1-6D6	I. F. Amplifier
1-75	Second detector, automatic volume control and first audio amplifier
1-41	Output
1-80	Rectifier

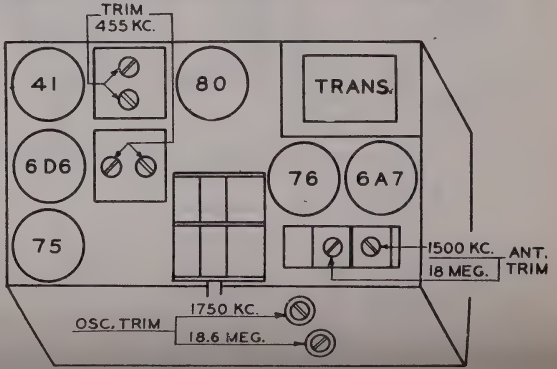
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

STATION INDICATORS



STATION SELECTORS

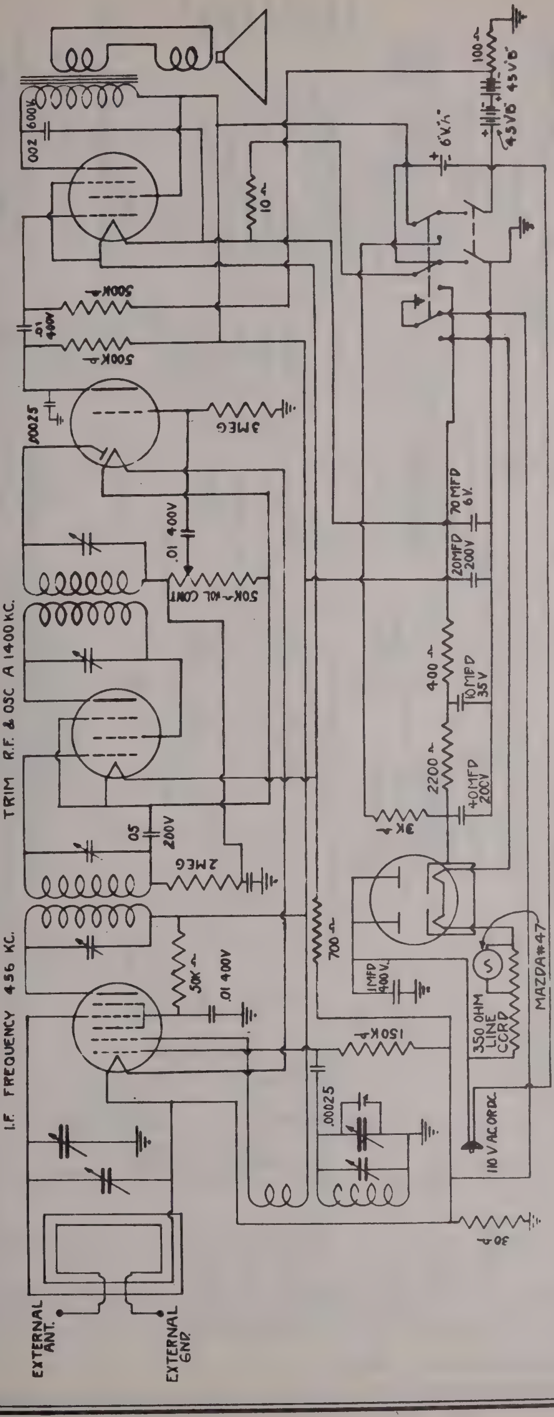
Setting Up Of Buttons see Index

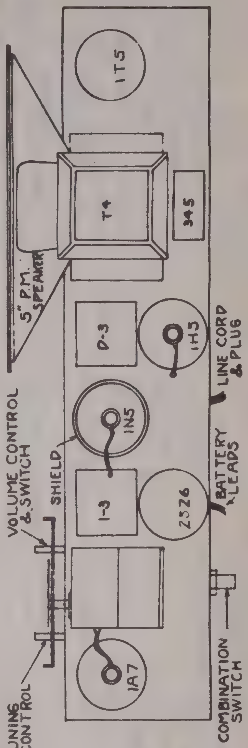


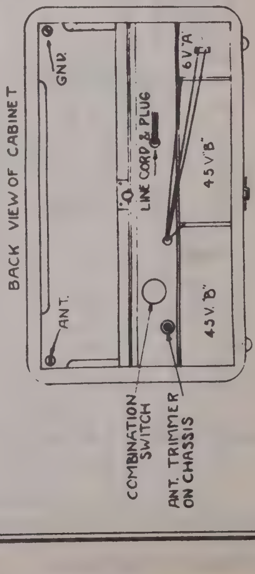
CHASSIS LAYOUT

MIDWEST RADIO CORP.

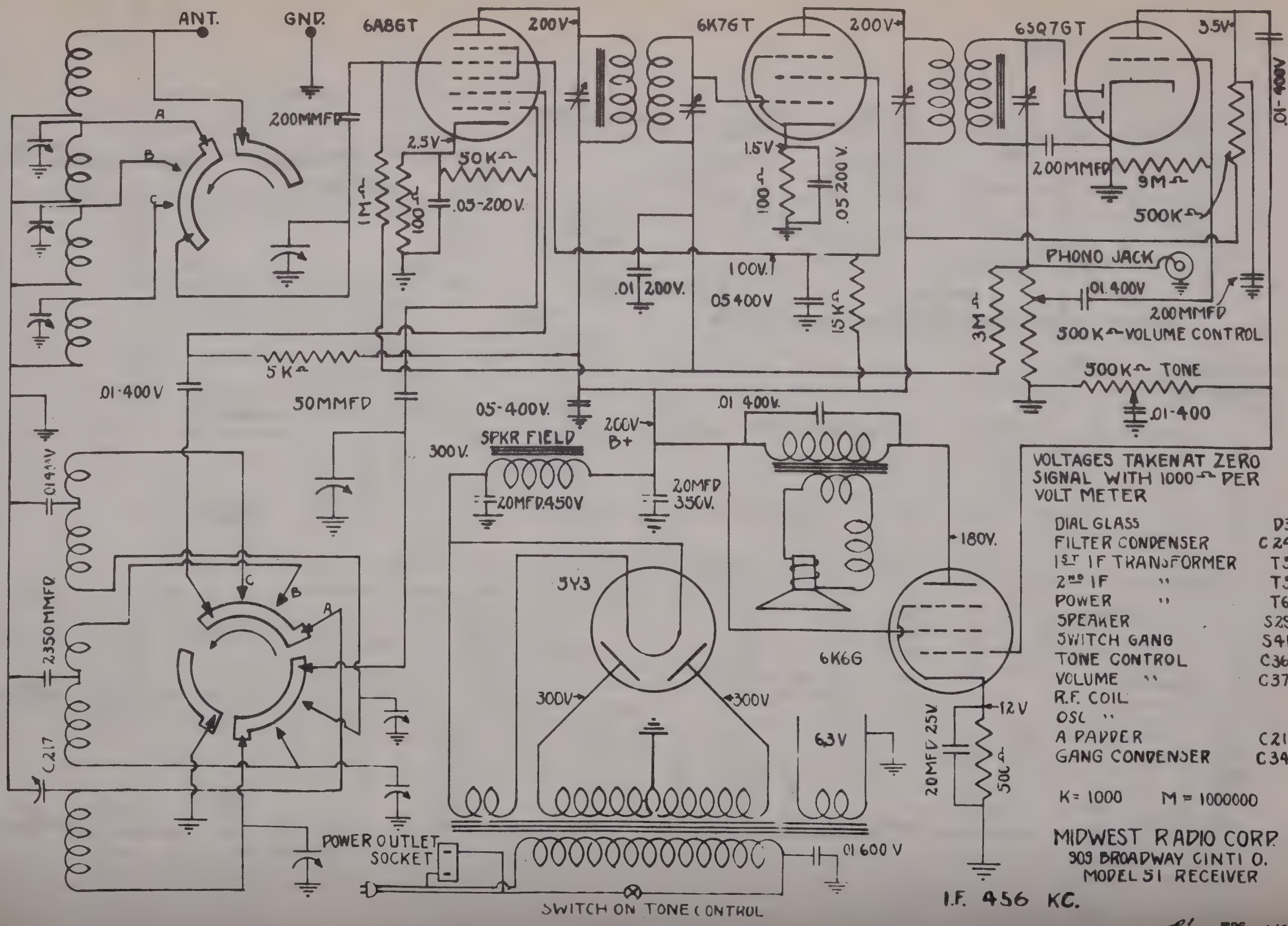
MODEL 1940
Portable







MIDWEST RADIO CORP.



VOLTAGES TAKEN AT ZERO SIGNAL WITH 1000Ω PER VOLT METER

DIAL GLASS	D34
FILTER CONDENSER	C248
1ST IF TRANSFORMER	T50
2ND IF "	T51
POWER "	T66
SPEAKER	S296
SWITCH GANG	S410
TONE CONTROL	C363
VOLUME "	C374
R.F. COIL	
OSC "	
A PADDER	C217
GANG CONDENSER	C345

K = 1000   M = 1000000

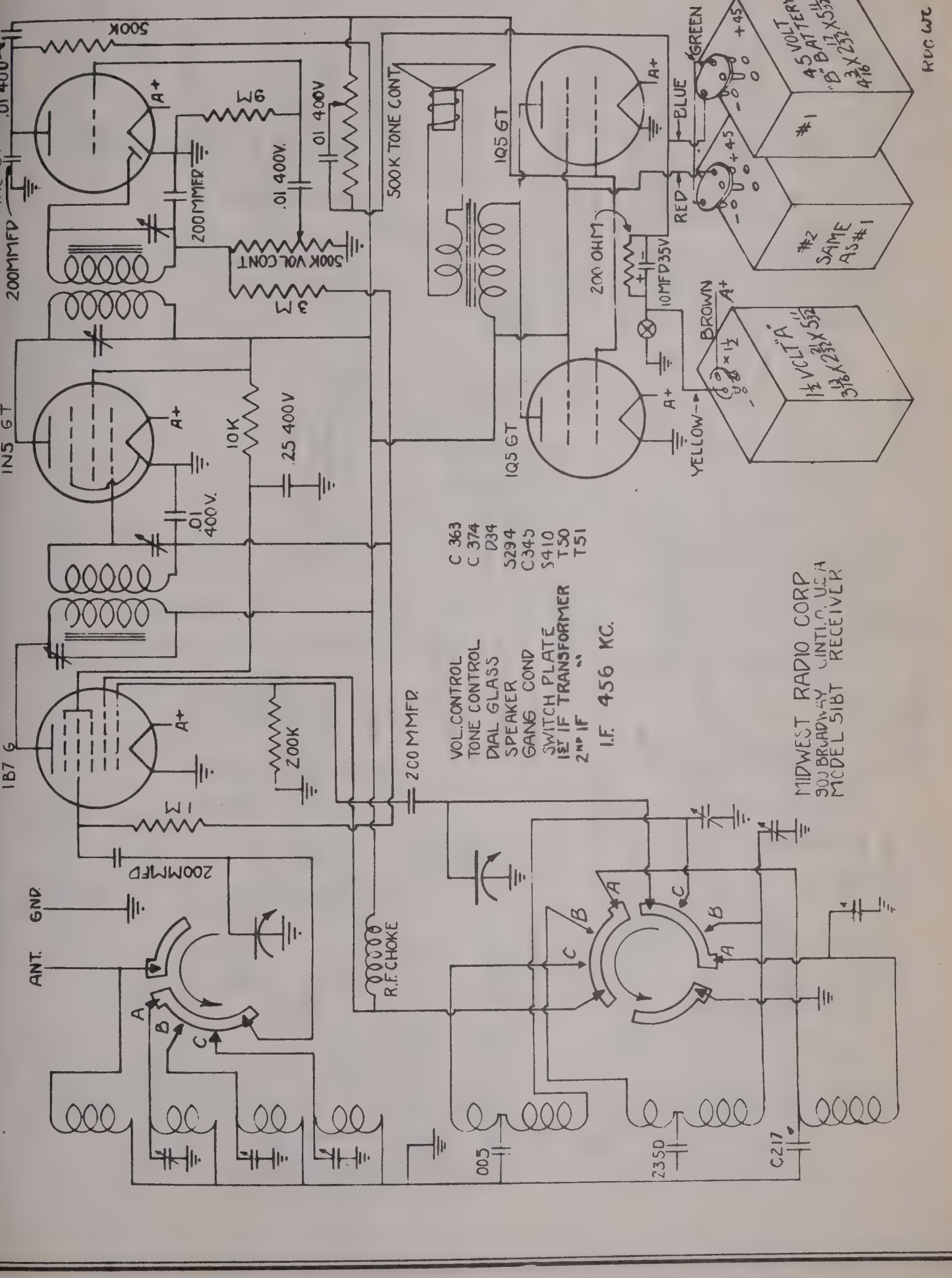
MIDWEST RADIO CORP.
909 BROADWAY CINTI O.
MODEL 51 RECEIVER

I.F. 456 KC.

EL RDG W.O.C.

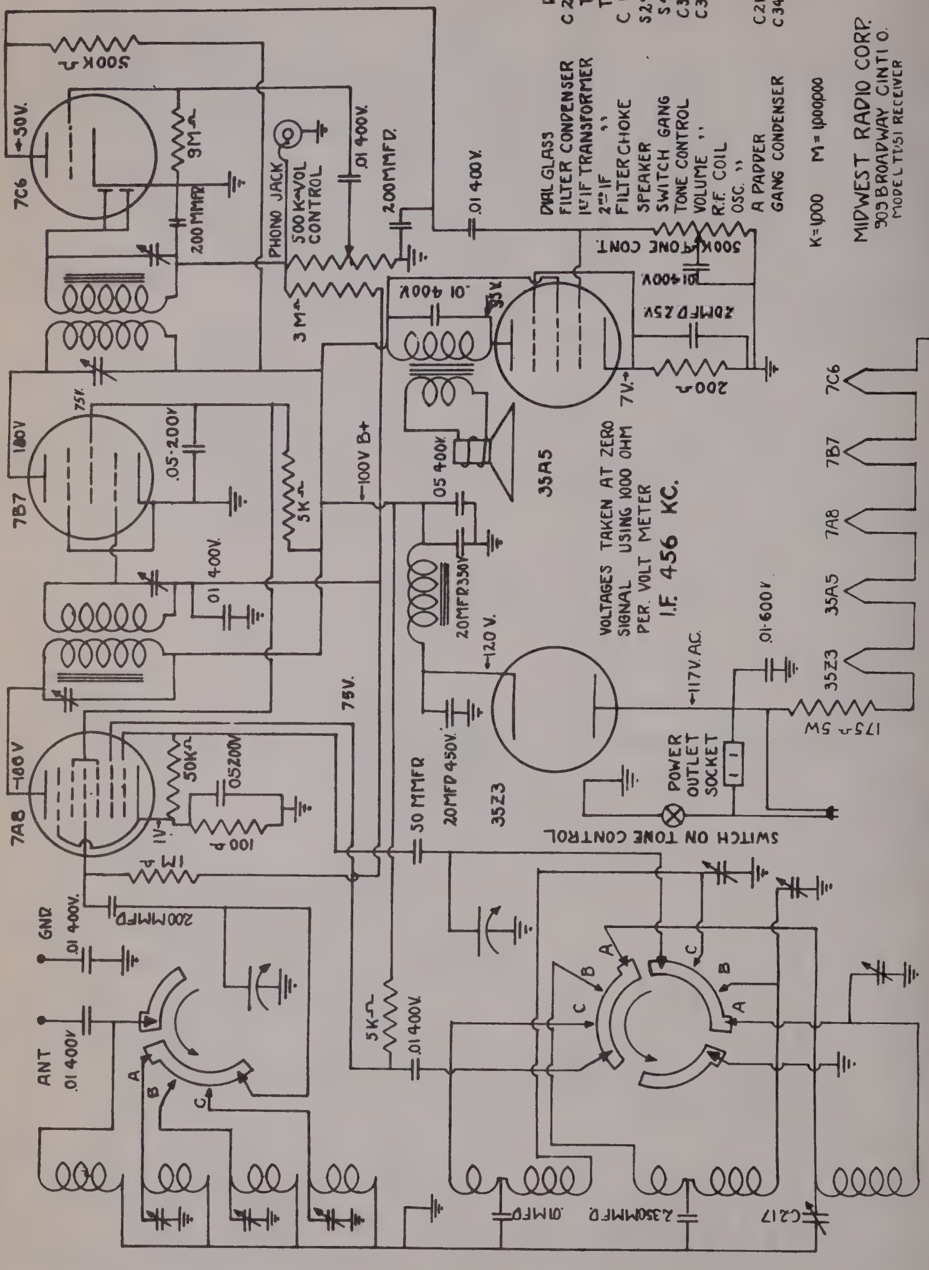
MIDWEST RADIO CORP.

MODEL 51BT



MODEL TD51

MIDWEST RADIO CORP.



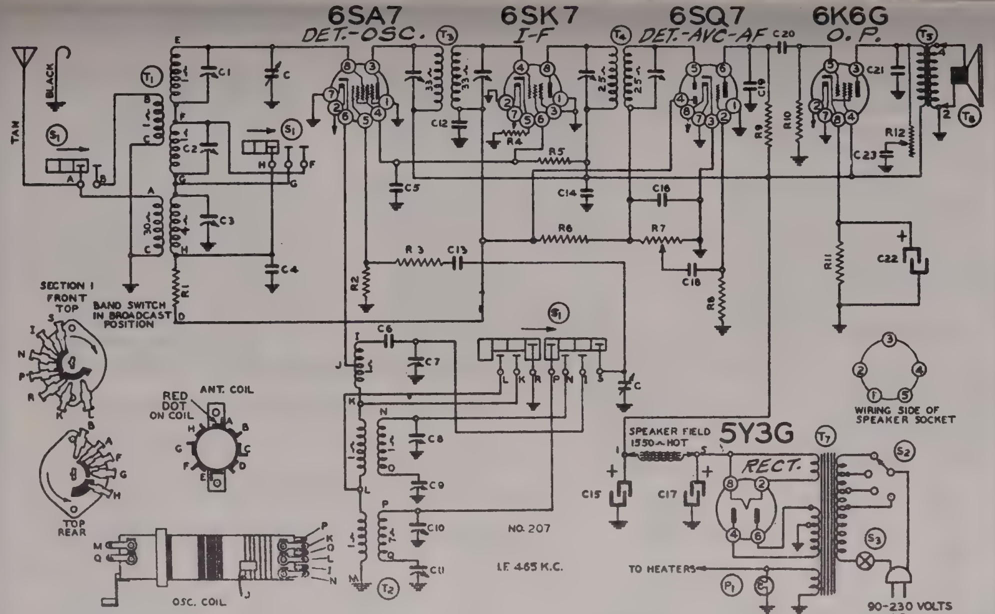
DIAL GLASS	P34
FILTER CONDENSER	C 248
1ST IF TRANSFORMER	T50
2ND IF "	T51
FILTER CHOKE	C 111
SPEAKER	S293
SWITCH GANG	S410
TONE CONTROL	C363
VOLUME "	C374
R.F. COIL	
OSC. "	
A PADDER	C217
GANG CONDENSER	C345

K=1000 M=1000000

MIDWEST RADIO CORP.
909 BROADWAY CINTI O.
MODEL TD51 RECEIVER

MONTGOMERY WARD & CO.

MODEL 04BR-389T



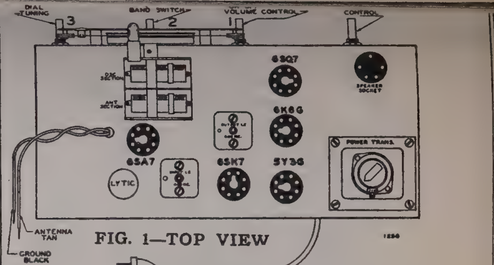


FIG. 1—TOP VIEW

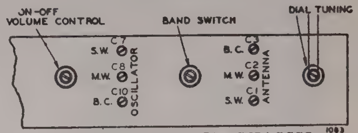


FIG. 3—FRONT OF CHASSIS

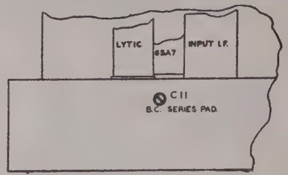
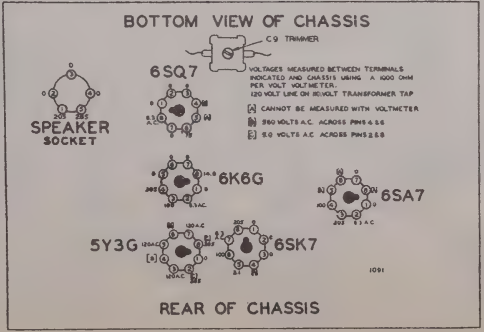


FIG. 4—REAR OF CHASSIS



VOLTAGES MEASURED BETWEEN TERMINALS INDICATED AND CHASSIS USING A 1000 OHM PER VOLT VOLTMETER.
120 VOLT LINE ON 110 VOLT TRANSFORMER TAP

[A] CANNOT BE MEASURED WITH VOLTMETER

[B] 560 VOLTS A.C. ACROSS PINS 4 & 6

[C] 5.0 VOLTS A.C. ACROSS PINS 2 & 8

FIG. 5

Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE13011	250M ohm—⅓ w.
R2	BE130194	35M ohm—⅓ w.
R3	BE130299	10 ohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130242	12M ohm—1 watt
R6	BE1304	3 megohm—⅓ w.
R7	BE101208	1 megohm volume control
R8	BE130223	10 megohm—⅓ w.
R9	BE13011	250M ohm—⅓ w.
R10	BE13019	1 megohm—⅓ w.
R11	BE13070	500 ohm—⅓ w.
R12	BE101237	150 ohm—Tone control
		CONDENSERS
C	BE102124	Two Gang Variable Condenser
C1	BE124124	S. W. Antenna Trimmer
C2	BE124124	M. W. Antenna Trimmer
C3	BE124124	B. C. Antenna Trimmer
C4	BE1009	.05 x 200 v.
C5	BE1001	.1 x 400 v.
C6	BE129153	.006—S. W. Padder (Set at Factory)
C7	BE124123	S. W. Oscillator Trimmer
C8	BE124123	M. W. Oscillator Trimmer
C9	BE129154	.0025 M. W. Padder
C10	BE124123	B. C. Oscillator Trimmer
C11	BE129155	B. C. Padder

Schematic Ref. No.	Part No.	Description
C12	BE10026	.02 x 400 v.
C13	BE1295	.0001 Mica
C14	BE1001	.1 x 400 v.
C15	BE119103	40 mfd. lytic
C16	BE1295	.0001 Mica
C17	BE119103	10 mfd. lytic
C18	BE10025	.002 x 600 v.
C19	BE1292	.0005 Mica
C20	BE10026	.02 x 400 v.
C21	BE910071	.004 x 600 v.
C22	BE119103	20 mfd. lytic x 25 w. v. C15, C17 and C22 in same unit
C23	BE10026	.02 x 400 v.
		PARTS
T1	BE111169	Antenna Coil
T2	BE110143	Oscillator Coil
T3	BE108169B	Input I. F.
T4	BE108170	Output I. F.
T5	BE10575	Output Transformer
T6	BE114176	6" Dynamic Speaker (1550 ohm field)
T7	BE104193	Power Transformer 40-60 cycles 90-230 volts
S1	BE125105	Band Switch
S2		Voltage Switch on Power Transformer
S3		Volume Control—On-Off switch
P1	BE10794	Pilot Light Bulb T-44

SEPT. 1940

©John F. Rider, Publisher

MODEL 04BR-389T

MODELS 04WG-728
04WG-732

MONTGOMERY WARD & CO.

ALIGNMENT PROCEDURE MODEL 04BR-389T

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mf., 200 Mmf., 400 Ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SA7	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C7) (See Fig. 3)	Short wave oscillator	See Note "A" Adjust to maximum output
	21 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 21 MC	Trimmer (C1) (See Fig. 3)	Short wave antenna	Adjust to maximum output
MEDIUM WAVE BAND	6 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6 MC	Trimmers (C8, C2) (See Fig. 3)	Medium wave oscillator and antenna	Adjust to maximum output
	2.3 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 2.3 MC	Trimmer (C9) (See Fig. 5)	Medium wave osc. series pad	Adjust to maximum rock dial. (See note "B")
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Trimmer (C10) (See Fig. 3)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C3) (See Fig. 3)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C11) (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "B")

NOTE "A"—It is extremely necessary when making this adjustment that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental.

NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

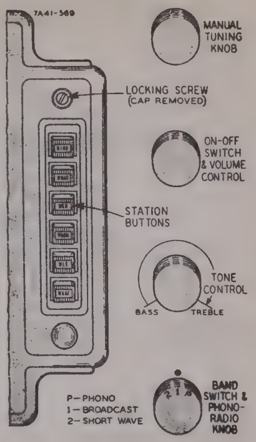
After each range is completed, repeat the procedure as a final check.

Test Frequencies Used	Kilocycles	Meters
I. F.	465	645.1
Short Wave	21000	14.2
Medium Wave	6000	50
Medium Wave	2300	130
Broadcast	1730	173.4
Broadcast	1500	200
Broadcast	600	500

BAND	FREQUENCY RANGE
Broadcast	540—1730 Kc. (555—173.4 Meters)
Medium	2.2—7.0 Mc. (136.3—42.8 Meters)
Short Wave	6.6—23.0 Mc. (45.4—13 Meters)

Power Consumption .... 55 Watts at 117 Volts

Power Output .... 1.5 Watts Undistorted, 3 Watts Maximum



Setting the Station Buttons MODELS 04WG-728, 04WG-732

Setting a Station Button

Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached.

At the top of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon —See illustration. Pry up this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handled screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by rotating the manual tuning knob until the signal is clearest and strongest.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in.* It is better to start with the top button.

Hold *this* button all the way *in.* With the other hand, see whether or not this station is still accurately tuned in by turning the tuning knob a slight amount back and forth. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached. Then, with a SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

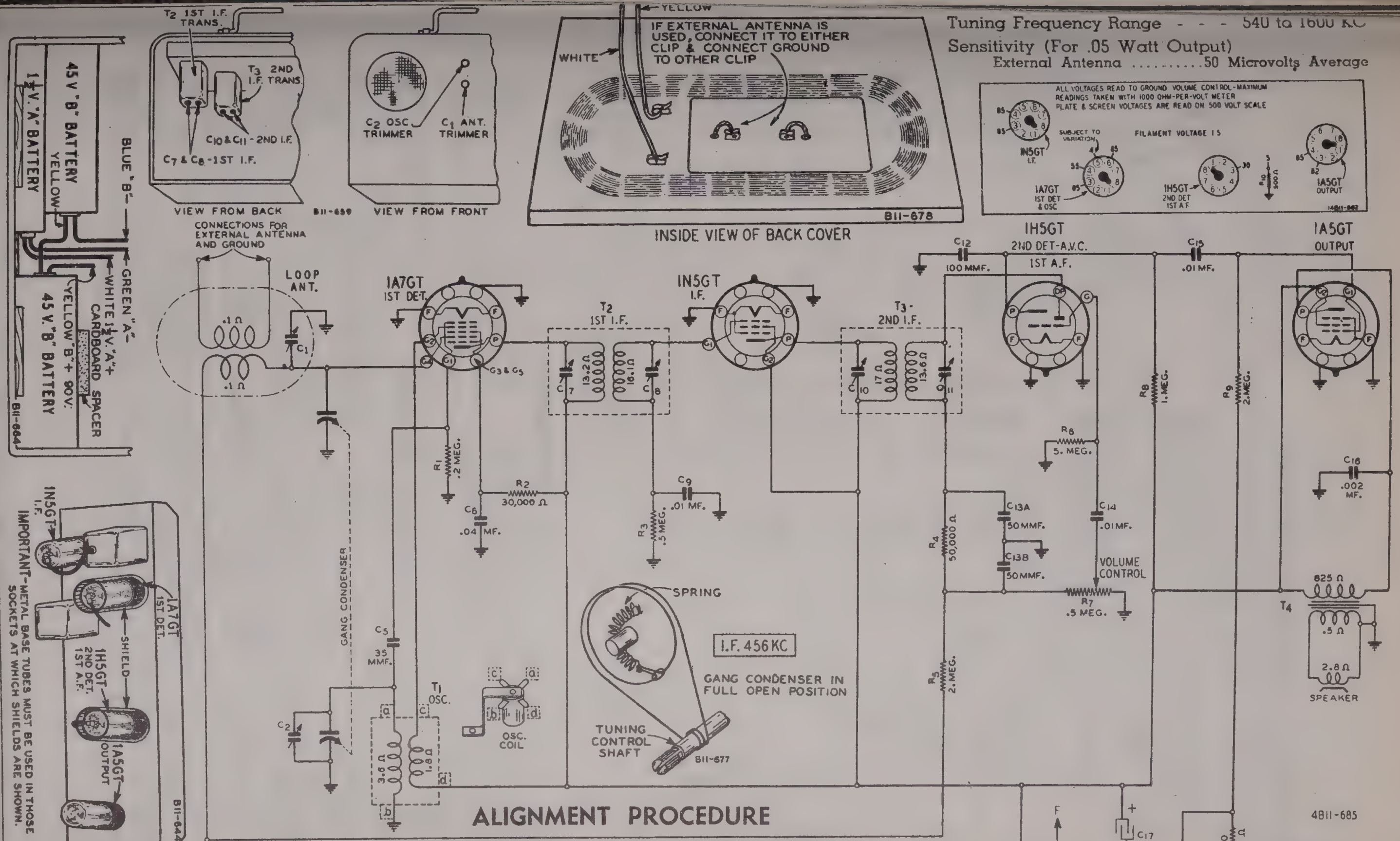
If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

MONTGOMERY WARD & CO.

MODEL 04WG-464

Tuning Frequency Range - - - 540 to 1600 KC

Sensitivity (For .05 Watt Output)
External Antenna ....50 Microvolts Average



IMPORTANT-METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR				
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration page 3
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn rotor to full open	1st I.F. (C7) & (C8) 2nd I.F. (C10) & (C11)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1500 KC	None—See Note A		Turn rotor to max. output	Antenna (C1)

Power Output

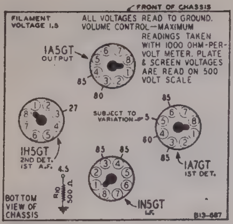
70 Milliwatts Undistorted
160 Milliwatts Maximum

Selectivity - -
50 KC Broad at
1000 Times Signal

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, pull pointer off shaft, set pointer at the 800 KC mark and push back on shaft.

MODEL 04WG-468

MONTGOMERY WARD & CO.

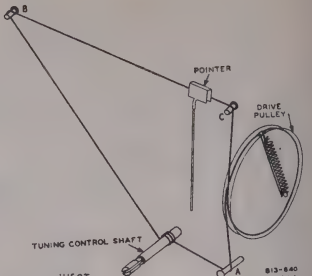


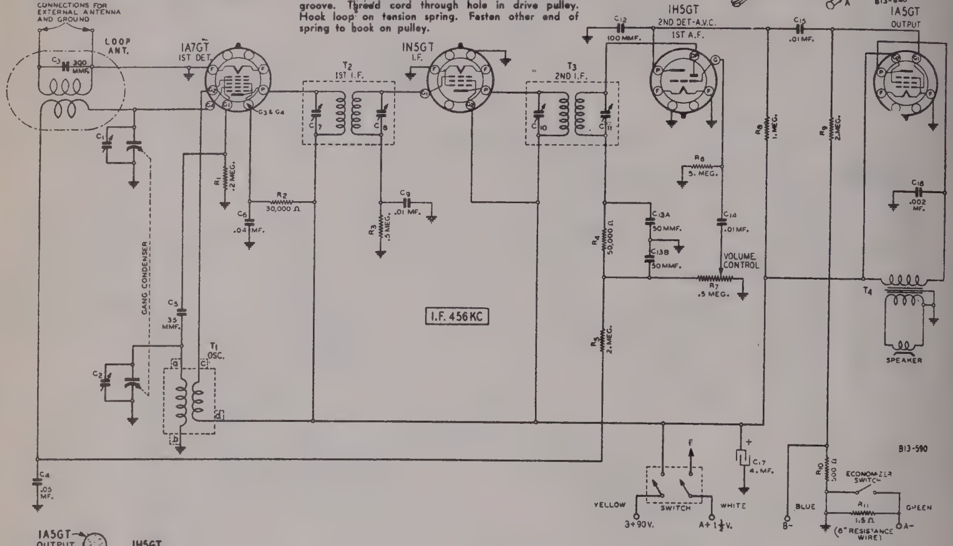
DRIVE CORD REPLACEMENT

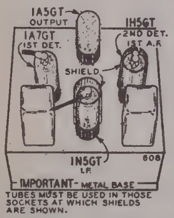
Tie a knot with a small loop at each end of new drive cord. The distance between knots should be 36¼ inches. Turn gang condenser to full open position—See illustration.

Thread one end of drive cord down through hole in groove of drive pulley. Place loop on hook on pulley. Wind other end of cord ¼ turn counter-clockwise (from pulley side of chassis) around drive pulley. Pass cord under idler stud A. Wind 3 turns clockwise (from front of chassis) around tuning control shaft. Turns should progress away from chassis.

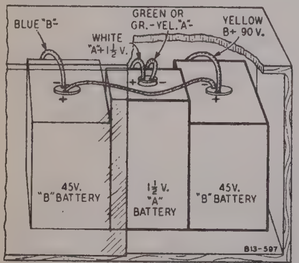
Continue cord over idler studs B and C as shown. Then wind cord ¾ turn counter-clockwise (from drive pulley side of chassis) around drive pulley. This turn should be on left side (from rear of chassis) of pulley groove. Thread cord through hole in drive pulley. Hook loop on tension spring. Fasten other end of spring to hook on pulley.







TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.



SPECIFICATIONS

Input Voltages and Currents
"A" Battery................1.5 Volts—.20 Amperes
"B" Batteries........................90 Volts—9 Ma.
Power Output.................. 70 Milliwatts Undistorted
160 Milliwatts Maximum
Selectivity......... .40 KC Broad at 1000 Times Signal

Intermediate Frequency ....456 KC
Speaker....................................5" P.M. Dynamic
Tuning Frequency Range................528 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna...........40 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

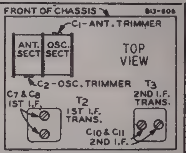
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. & 100 mmf.



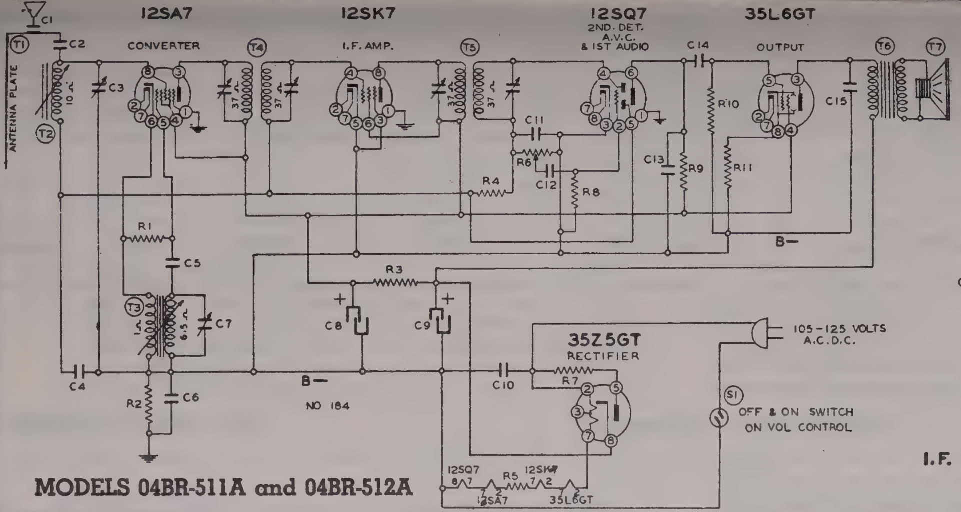
SIGNAL GENERATOR				
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Signal Grid of 1st Det (Top Cap)	.1 mf.	Turn rotor to full open	1st I.F. (C7) & (C8) 2nd I.F. (C10) & (C11)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1400 KC	External Antenna Clip On Loop —See Note A	100 mmf.	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna (C1)

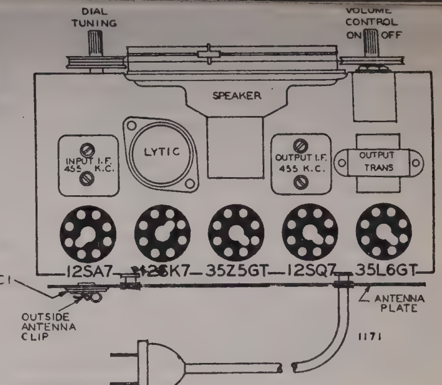
NOTE A—Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop.

NOTE B—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

MONTGOMERY WARD & CO.

MODELS 04BR-511A,
04BR-512A
above ser.#0E428700





I.F. 455 K.C.

MODELS 04BR-511A and 04BR-512A

SERIES A (SERIAL No. OE428700 and UP)

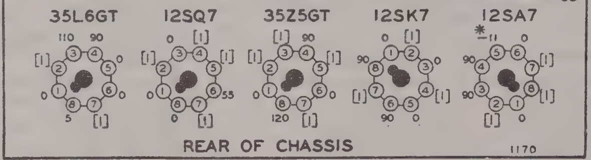
Selectivity - 85 KC Broad at 1000 Times Signal at 1000 KC	
Tuning Frequency Range - - - - - -	**535 to 1720 KC**
Intermediate Frequency - - - - - - - - -	**455 KC**
Speaker - - - - - - - - - - -	**4 in. P. M. Dynamic**
Power Consumption - - - - - - - - - -	**35 Watts**
Power Output - - - - - -	**800 Milliwatts Undistorted**
Sensitivity (for .05 Watts Output) -	**30 Microvolts Average**

BOTTOM VIEW OF CHASSIS

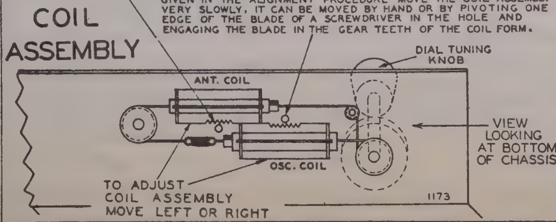
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B—

[1] CANNOT BE MEASURED WITH D.C. VOLTMETER.

* OSCILLATOR VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.



NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.



Aligning Instructions

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.

Service Notes

All voltages as indicated on the voltage chart are measured with 117 volt A.C. or D.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE130176	20M ohm—⅓ w.
R2	BE130100	150M ohm—⅓ w.
R3	BE130279	1M ohm—1 watt
R4	BE1304	3 megohm—⅓ w.
R5	BE130288	50 ohm—1.5 watt
R6	BE101220	500M ohm volume control and Switch
R7	BE130240	30 ohm—⅓ w.
R8	BE130257	5 megohm—⅓ w.
R9	BE130100	150M ohm—⅓ w.
R10	BE13011	250M ohm—⅓ w.
R11	BE130166	150 ohm—⅓ w.
		CONDENSERS
C1	BE131262	.00001 washer condenser (antenna clip on back plate,
C2	BE129114	.0003 mica
C3	BE124137	Trimmer on antenna coil
C4	BE1009	.05 x 200 v.
C5	BE12939	.00005 mica
C6	BE10091	.15 x 400 v.
C7	BE124137	Trimmer on Oscillator coil
C8	BE11992	20 mfd. lytic x 150 w. v.
C9	BE11992	40 mfd. lytic x 150 w. v.
C10	BE10013	.05 x 400 v.
C11	BE12912	.00025 mica
C12	BE10025	.002 x 600 v.
C13	BE1292	.0005 mica
C14	BE10011	.01 x 400 v.
C15	BE10011	.01 x 400 v.
		C3 and C7 in same unit
		C8 and C9 in same unit
		PARTS
T1	BE115597-18	Antenna plate—walnut
		or
	BE115597-9	Antenna plate—ivory
T2	BE111181	Antenna permeability coil
T3	BE110153	Oscillator permeability coil
T4	BE108157-H	Input I.F. Coil—455 kc.
T5	BE108157-I	Output I.F. Coil—455 kc.
T6	BE105110	Output Transformer
T7	BE114199	4" P.M. Speaker
S1		Switch on volume control

Models No. 04BR-511A and 04BR-512A ALIGNMENT PROCEDURE

IMPORTANT: See Aligning Instructions

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Metal Antenna Backplate	Iron Cores All the way out	Trimmer (C7) (See bottom of chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Trimmer (C3) (See bottom of chassis view)	Antenna	Adjust to maximum output (See Note "A")
	1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See bottom of chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

Model No. 04BR-570A ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

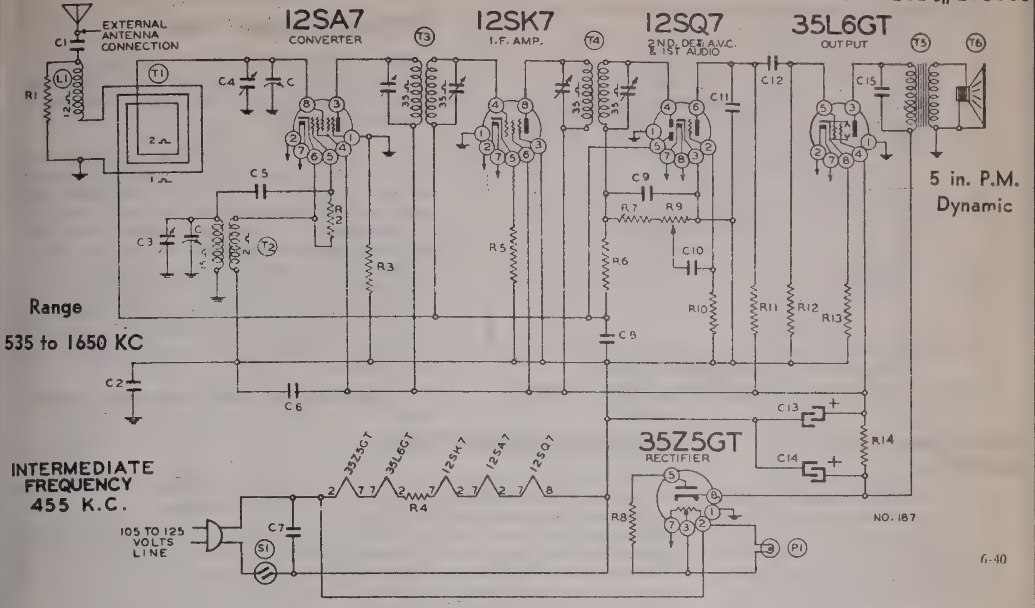
BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6S7G I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6D8G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 6D8G	Rotor full open (Plates out of mesh)	Trimmer—Top of gang (See Top View)	Oscillator	Adjust to maximum output
	1400 Kc.		(See Note "A")	Set dial at 1400 Kc.	Trimmer—Top of gang (See Top View)	Antenna	Adjust to maximum output

NOTE "A"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

Loop aerial should be connected when aligning receiver and should be the same distance from the chassis as when mounted in the cabinet

MONTGOMERY WARD & CO.

MODELS 04BR-513A, 04BR-514A above ser.#428000



5 in. P.M. Dynamic

Range

535 to 1650 KC

INTERMEDIATE FREQUENCY 455 K.C.

Power Consumption - - - - - 35 watts

Power Output - - 800 Milliwatts Undistorted

Sensitivity for 50 Milliwatt Output:

20 Microvolts Average

Selectivity - 65 KC Broad at 1000 Times Signal at 1000 KC

Loop aerial should be connected when aligning receiver.

NOTE "A"—Mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

NOTE "B"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

RESISTORS

Diagram Ref. No.	Part No.	
R1	BE130314	2200 ohm—⅓ w.
R2	BE13094	50M ohm—⅓ w.
R3	BE1309	200M ohm—⅓ w.
R4	BE130315	75 ohm—1½ w.
R5	BE130203	40 ohm—⅓ w.
R6	BE1304	3 megohm—⅓ w.
R7	BE1301	25M ohm—⅓ w.
R8	BE130215	25 ohm—⅓ w.
R9	BE101198	1 megohm volume contr
R10	BE130257	5 megohm—⅓ w.
R11	BE1303	500M ohm—⅓ w.
R12	BE1303	500M ohm—⅓ w.
R13	BE130166	150 ohm—⅓ w.
R14	BE130287	1200 ohm—1 w.

CONDENSERS

C	BE102132	2 gang variable condenser
C1	BE10011	.01 x 400 v.
C2	BE10091	.15 x 400 v.
C3		Oscillator trimmer on gang
C4		Antenna trimmer on gang
C5	BE12921	.0002 mfd. mica
C6	BE1009	.05 x 200 v.
C7	BE1001	.1 x 400 v.
C8	BE1009	.05 x 200 v.
C9	BE1295	.0001 mfd. mica
C10	BE10025	.002 x 600 v.
C11	BE12912	.00025 mfd. mica
C12	BE100106	.004 x 600 v.
C13	BE11992	20 mfd. lytic x 150 w. v.
C14	BE11992	40 mfd. lytic x 150 w. v.
C15	BE10026	.02 x 400 v.

C13 and C14 are in same unit

PARTS

T1	BE111182	Loop antenna—complete assembly
T2	BE110145	Oscillator coil
T3	BE108140I	Input I. F.—455 kc.
T4	BE108141D	Output I. F.—455 kc.
T5	BE105104	Output Transformer
T6	BE114201	5" P. M. Speaker
L1	BE12311	Loading coil
S1		On-off switch on volume control
P1	BE107249	Pilot light bulb T47

BOTTOM VIEW OF CHASSIS

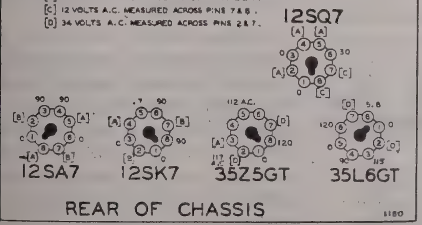
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B— WITH A LINE VOLTAGE OF 117 V. VOLUME CONTROL AT MINIMUM.

[A] CANNOT BE MEASURED WITH VOLTMETER.

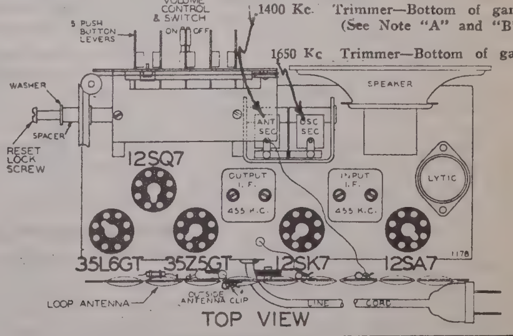
[B] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.

[C] 12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.

[D] 34 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.


12SQ7
[A] [A] 0 30 [A] [C] 0 [C]
90 90 [B] [A] C 0 [A] [B]
12SA7
.7 90 [A] [B] C 90 [B] 0
12SK7
112 A.C. [D] [A] 120 117 A.C. [D] 0
35Z5GT
[D] 5.8 120 0 0 [D] 90 115
35L6GT
1180

REAR OF CHASSIS



1400 Kc. Trimmer—Bottom of gang (See Note "A" and "B")

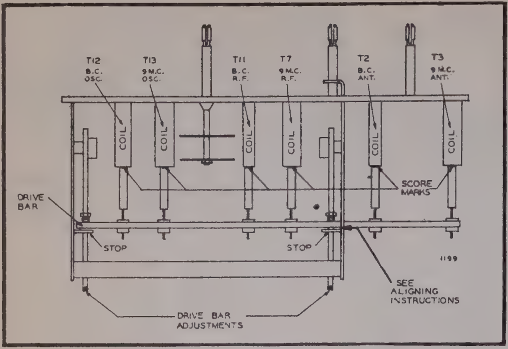
1650 Kc Trimmer—Bottom of gang

TOP VIEW

SEE MODEL NUMBERS BELOW

MONTGOMERY WARD & CO.

MODELS 675A, 676A, 903A,
907A, 904A, 906A



IRON CORE ADJUSTMENT VIEW
MODELS 903A, 907A, 904A, 906A, 1105A, 1106A

SETTING PUSHBUTTONS

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place. (push directly on front of button) Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock in place when setting up the station.

To change stations simply repeat the procedure above.

REPLACING PUSH-BUTTONS

Should is ever be necessary to replace a broken or lost pushbutton you will notice they are made in two parts, a clear front and a brown body. To separate the two portions first take off the escutcheon. Push the button in—Next push the brown body of the button back until it snaps free from the clear front. You can now lift the clear portion off and take out the brown body. To replace the pushbutton, reverse the procedure.

HOW TO REMOVE CHASSIS

Should it ever be necessary to take the chassis out of the cabinet be sure to pull the plug from the light socket. Next pull the control knobs off the shafts and take the escutcheon off.

Turn the spring clips clear of the back and take the back off—be sure to disconnect the loop aerial and the speaker plug, also the plugs from the phono unit. Remove the chassis mounting screws and lift the chassis out.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control at minimum, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet. Although the short wave bands on this radio are of the band spread type the Alignment Procedure is not difficult. However because each short wave scale covers only a small portion of the short wave spectrum you must do the work carefully and your oscillator must be accurate.

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

First refer to the "Iron Core Adjustment View" now turn the tuning knob until the drive bar comes within 1/64 to 1/32 from the stops. (A piece of blotting paper is about the right thickness and will serve as a gauge). The clearance of the bar must be the same at both stops. If far off you can raise one drive screw gently and equalize them. Minor adjustments may be made with the drive bar adjustments.

Next rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.

MODELS 903A, 907A, 1105A, 1106A

PHONOGRAPH-TELEVISION AND FM. JACK

Should you wish to use an external phonograph it should be plugged into the phono jack shown in the top view—The on-off radio-phono knob on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phono or a television or FM converter.

MODELS 513A, 514A

SETTING THE AUTOMATIC PUSHBUTTONS

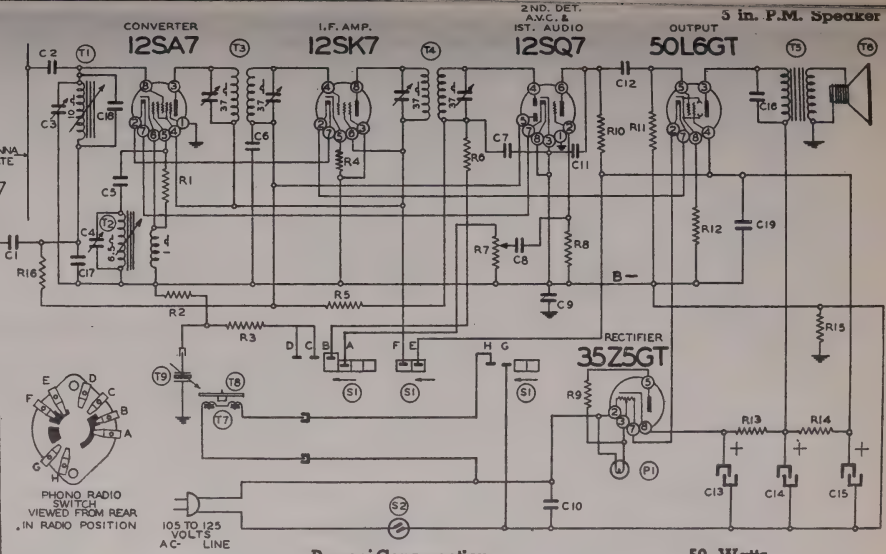
Make a list of your 5 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the front of each pushbutton.

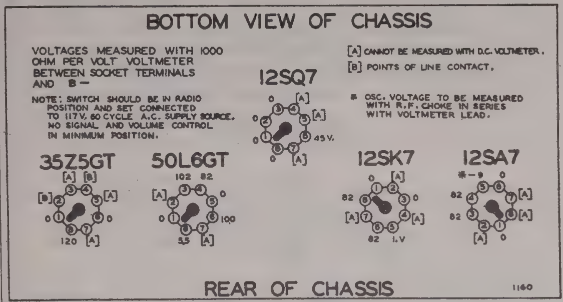
Press one of the buttons all the way down and hold it FIRMLY. Now tune in the station you want with the tuning knob. Tune back and forth until the station is clear, then release the button. NOTE: *If the tuning knob turns quite hard when the button is held down firmly (loosen the reset lock screw several turns with a screwdriver or coin (quarter).*

Continue, setting each of the remaining pushbuttons in the same way. Now turn the tuning knob all the way to the right and tighten the reset lock screw. This screw prevents the pushbuttons from slipping off the stations you have set. To change stations loosen lock screw and proceed as above.

MONTGOMERY WARD & CO. MODEL 04BR-515, A & B above ser.#0E507100

Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	BE130176	20M ohm—⅓ w.
R2	BE130118	600M ohm—⅓ w.
R3	BE130118	600M ohm—⅓ w.
R4	BE13056	100 ohm—⅓ w.
R5	BE130170	3 megohm—⅓ w.
R6	BE13012	50M ohm—⅓ w.
R7	BE101217	½ megohm—vol contr
R8	BE130257	5 megohm—⅓ w.
R9	BE130215	25 ohm—½ w.
R10	BE1309	200M ohm—⅓ w.
R11	BE13037	750M ohm—⅓ w.
R12	BE130166	150 ohm—⅓ w.
R13	BE13097	200 ohm—⅓ w.
R14	BE130287	1200 ohm—1 watt
R15	BE1309	200M ohm—⅓ w.
R16	BE1309	200M—⅓ w.
		CONDENSERS
C1	BE1295	.0001 Mica Condenser
C2	BE129114	.0003 mfd. mica
C3	BE124136	Antenna Trimmer
C4	BE124136	Oscillator Trimmer
C5	BE1295	.0001 mica
C6	BE1009	.05 x 200 v.
C7	BE1295	.0001 mica
C8	BE10025	.002 x 600 v.
C9	BE100119	.1 x 400 v.
C10	BE1001	.1 x 400 v.
C11	BE12912	.00025 mica
C12	BE10019	.006 x 600 v.
C13	BE11994	40 mfd. lytic—150 w. v.
C14	BE11994	20 mfd. lytic—150 w. v.
C15	BE11994	20 mfd. lytic—150 w. v.
C16	BE10011	.01 x 400 v.
C17	BE129162	.0008 Mica Condenser
C18	BE129163	.000025 Ceramicon Condenser
C19	BE10013	.05 x 400 v. cond.
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
T1	BE112767	Antenna Coil—Permeability tuning assembly complete
T2	BE112767	Oscillator Coil
T3	BE108140F	Input I. F. Coil—465 kc.
T4	BE108145D	Output I. F. Coil—465 kc.
T5	BE105108	Output Transformer
T6	BE114198	5" P.M. Speaker
T7	BE104206	Phono Motor
T8	BE12228	Turntable
T9	BE114194	Phono pick up arm
S1	BE125113	Phono Switch
S2		Switch on volume control
P1	BE107249	Pilot light T47
		T1 and T2 in same unit





BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117V. 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.

[B] POINTS OF LINE CONTACT.

* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

REAR OF CHASSIS

Power Consumption - - - - - - - - 50 Watts

Power Output - - - - 900 Milliwatts Undistorted

NO. 185

I.F. 465 KC

Sensitivity (for .5 Watts Output)
Broadcast Band—40 Microvolts Average

Selectivity - 65 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range - - - - - - 535 to 1690 KC

Aligning Instructions

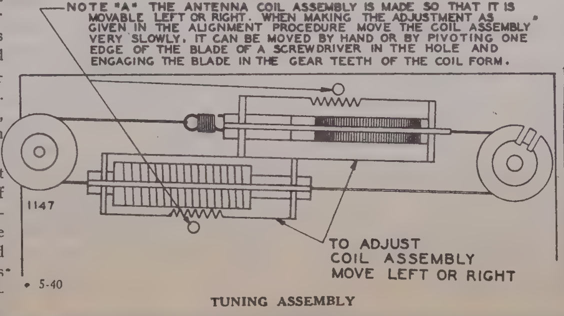
CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.

To remove chassis from the cabinet pull tuning knob and volume knob off their shafts. Remove the four mounting screws that hold the chassis to the cabinet. Move the chassis toward back of cabinet so that control shafts and dial assembly clear holes in cabinet, then chassis can be slipped out.

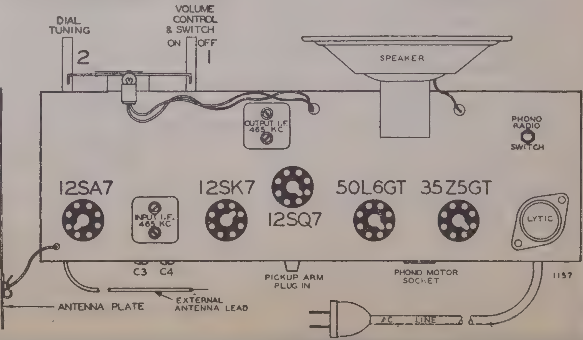
• 5-40

MODEL 04BR-515A (SERIAL No. OE507100 and UP)

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.



TUNING ASSEMBLY



MODEL 04BR-515, A & B
above ser.#0E507100
MODEL 04BR-679A

MONTGOMERY WARD & CO.

Model No. 04BR-515A

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Antenna Plate See Trimmer View	Iron Cores All the way out	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Antenna Plate See Trimmer View	Iron Cores All the way out	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Antenna Plate See Trimmer View	Iron Cores All the way out	Trimmer (C4) (See Trimmer View)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna Lead See Trimmer View	Iron Cores All the way out	Trimmer (C3) (See Trimmer View)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Antenna Lead See Trimmer View	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left.	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna Lead See Trimmer View	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Trimmer View)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

Model Nos. 04BR-679A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 175 mmf.

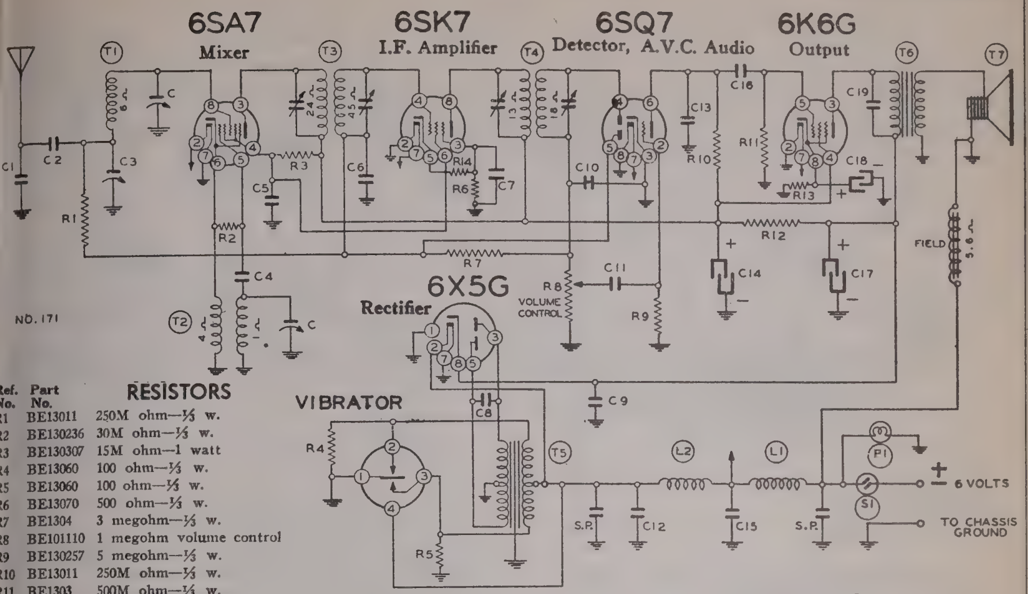
BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.5 MFD.	Grid of 6K7G I.F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	455 Kc.	.5 MFD.	Grid of 6A8G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1550 Kc.	175 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of Middle section of gang (See Fig. 2)	Oscillator	Adjust to maximum output
	1400 Kc.	175 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmers—Top of front and rear section of gang (See Fig. 2)	Antenna and R. F.	Adjust to maximum output
	600 Kc.	175 mmf.	Antenna lead	Set dial at 600 Kc.	B.C. Series Pad (See Fig. 2)	Oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Trimmer is located on top of chassis along side of gang. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check. Do not bend plates of variable condenser to correct tracking.

MONTGOMERY WARD & CO.

MODEL 04BR-567A
above ser.#225040



Ref. No.	Part No.	RESISTORS
R1	BE13011	250M ohm—⅓ w.
R2	BE130236	30M ohm—⅓ w.
R3	BE130307	15M ohm—1 watt
R4	BE13060	100 ohm—⅓ w.
R5	BE13060	100 ohm—⅓ w.
R6	BE13070	500 ohm—⅓ w.
R7	BE1304	3 megohm—⅓ w.
R8	BE101110	1 megohm volume control
R9	BE130257	5 megohm—⅓ w.
R10	BE13011	250M ohm—⅓ w.
R11	BE1303	500M ohm—⅓ w.
R12	BE130199	1500 ohm—1 watt
R13	BE130308	750 ohm—1 watt
R14	BE130174	50 ohm—⅓ w.

CONDENSERS

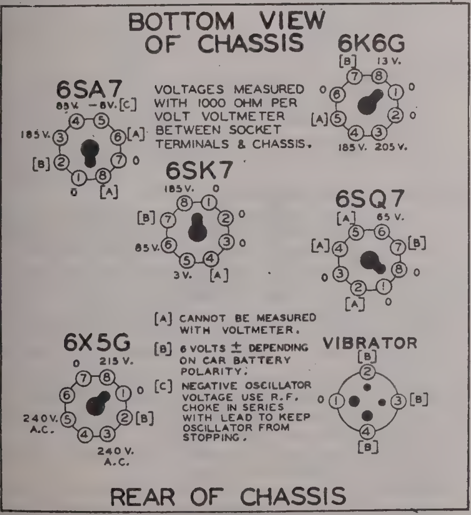
C	BE10269	2 gang variable condenser
C1	BE1293	.00002 mica
C2	BE10055	.01 x 400 volts
C3	BE12434	Adj. Antenna Trimmer
C4	BE12921	.0002 mica
C5	BE100115	.05 x 400 v.
C6	BE1009	.05 x 200 v.
C7	BE10020	.1 x 200 v.
C8	BE10034	.005 x 1200 v.
C9	BE12912	.00025 mica
C10	BE1295	.0001 mica
C11	BE10025	.002 x 600 v.
C12	BE10031	.5 x 120 v.
C13	BE1292	.0005 mica
C14	BE119105	15 mfd. lytic x 350 w. v.
C15	BE10031	.5 x 120 v.
C16	BE10078	.01 x 200 v.
C17	BE119105	15 mfd. lytic x 350 w. v.
C18	BE119105	20 mfd. lytic x 25 w. v.
C19	BE10087	.01 x 600 v.

C14, C17 and C18 in same unit

PARTS

T1	BE11195B	Antenna Coil
T2	BE110146	Oscillator Coil
T3	BE108139	Input I.F. Coil—465 kc.
T4	BE108121B	Output I. F. Coil—465 kc.
T5	BE104131	Power Transformer
T6	BE10567	Output Transformer
T7	BE114114R	5" Dynamic Speaker (5.6 ohm field)
L1	BE10568	"A" Choke
L2	BE10566	"A" Choke
S1		Switch on volume control
P1	BE10797	Pilot light (T51) 6-8 volts
S.P.	BE11749	(2) Spark Plates

I.F. 465 K.C.



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

[A] CANNOT BE MEASURED WITH VOLTMETER.

[B] 6 VOLTS ± DEPENDING ON CAR BATTERY POLARITY.

[C] NEGATIVE OSCILLATOR VOLTAGE USE R.F. CHOKE IN SERIES WITH LEAD TO KEEP OSCILLATOR FROM STOPPING.

FIG. 4

7-40

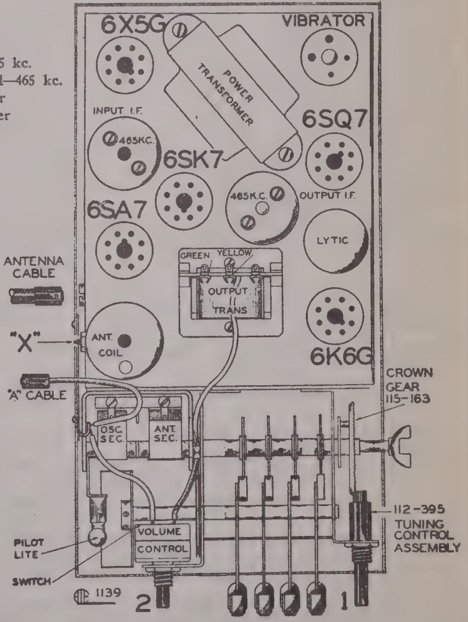


FIG. 3—TOP VIEW

MODEL 04BR-567A
above ser.#225040

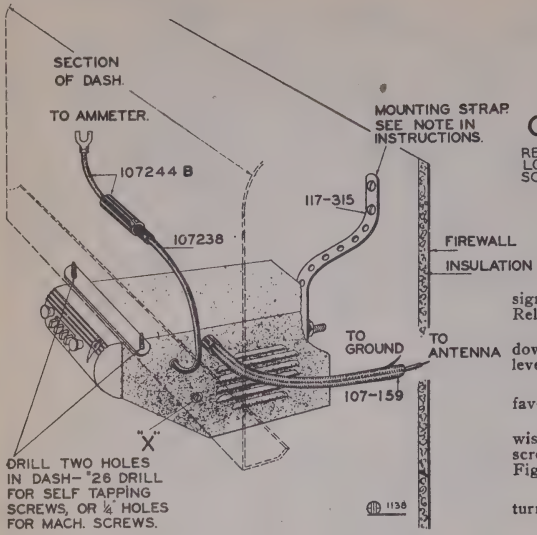

SECTION OF DASH.
TO AMMETER.
107244 B
107238
MOUNTING STRAP SEE NOTE IN INSTRUCTIONS.
117-315
FIREWALL
INSULATION
TO GROUND
TO ANTENNA
107-159
"X"
DRILL TWO HOLES IN DASH- "26 DRILL FOR SELF TAPPING SCREWS, OR ¼" HOLES FOR MACH. SCREWS.
1138

FIG. 1—GENERAL INSTALLATION VIEW

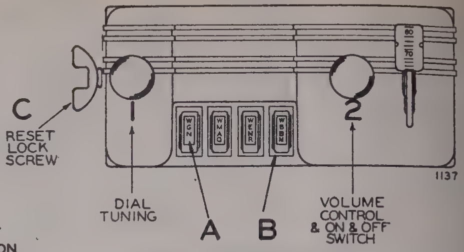


FIG. 2—FRONT VIEW

RADIO LOCATION

Determine the most desirable mounting location, (See Fig. 1—General Installation View, page 2).

In the majority of installations it will be found that the radio can be mounted under the dash panel directly to the left of the steering column.

BONDING

Cars with floating power must have the motor bonded to the bulkhead and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. 5/8" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires. etc., which pick up motor noise and reradiate it into the car. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car. In extreme cases it has been found necessary to ground the steering column.

GENERATOR INTERFERENCE

Remove the generator cutout mounting screw and fasten the condenser (100-81) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely.

Connect the condenser lead to the battery terminal of the cutout. The generator condenser is absolutely necessary as it is used to eliminate a high pitched whining noise which would otherwise be heard as the motor is accelerated.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings of each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 1) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 1) to the right (clockwise) as far as it will turn, and tighten the special locking screw ("C") located on left side of tuner dial assembly (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" one or two turns, select the new station as explained. **Be sure to retighten the locking screw**, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press **down on the lever and your favorite station is selected.**

ADJUST ANTENNA TRIMMER

Tune in a weak signal at approximately 600 K.C. with volume control about three-fourths on. Adjust trimmer screw "X" until maximum output is obtained. (See Fig. 1, Adjustment "X" on right side of radio).

I.F. ALIGNMENT: (465 K.C.)

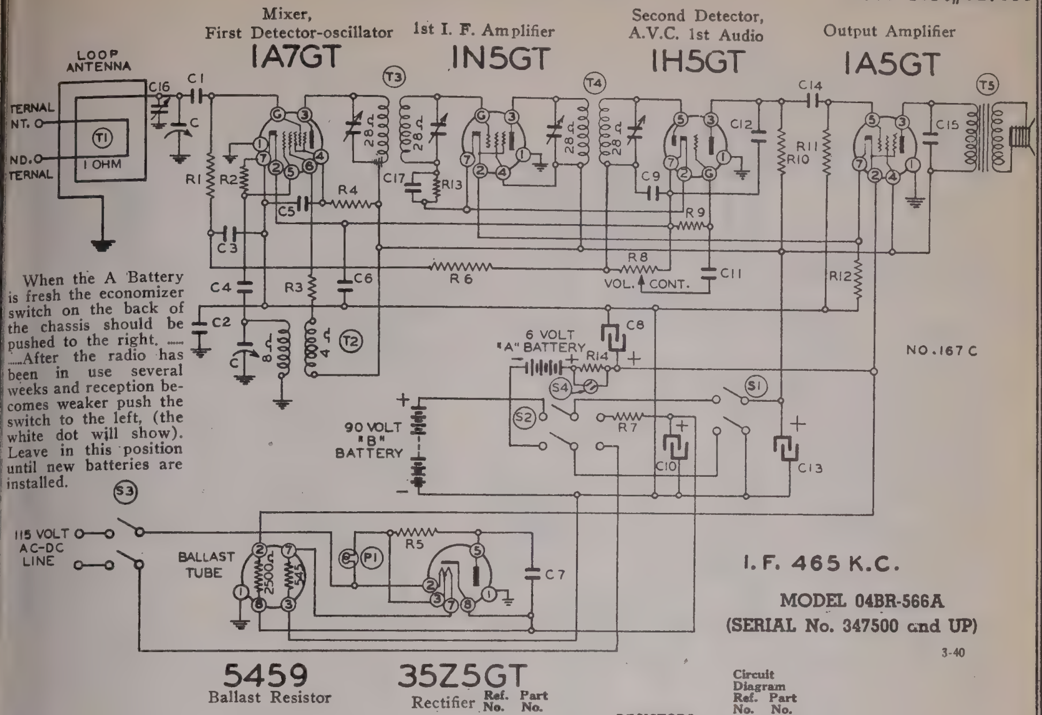
1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6SK7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108121 to resonance with oscillator.
3. Move test oscillator connection to grid of 6SA7 tube and adjust trimmer condensers of input I.F. transformer No. 108139 to resonance with oscillator. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver. (See Fig. 3—top view, page 3.)

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is the rear section of the two-gang condenser—see top view, Fig. 3).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust antenna trimmer (front section of gang condenser) to resonance (see top view, Fig. 3).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad in the antenna circuit for maximum gain. This pad is mounted on the side of the antenna can, adjustment "X."
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

MONTGOMERY WARD & CO.

MODEL 04BR-566A
above ser.#347500

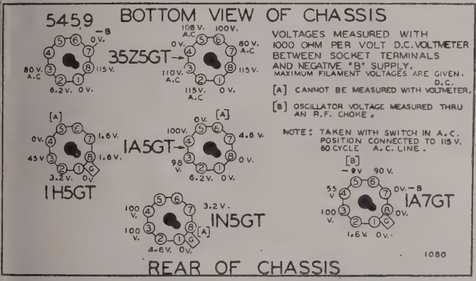


When the A Battery is fresh the economizer switch on the back of the chassis should be pushed to the right. ……After the radio has been in use several weeks and reception becomes weaker push the switch to the left, (the white dot will show). Leave in this position until new batteries are installed.

I. F. 465 K.C.

MODEL 04BR-566A
(SERIAL No. 347500 and UP)

3-40



VOLTAGES MEASURED WITH 1000 OHM PER VOLT D.C. VOLTMETER BETWEEN SOCKET TERMINALS AND NEGATIVE "B" SUPPLY. MAXIMUM FILAMENT VOLTAGES ARE GIVEN.

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.

[B] OSCILLATOR VOLTAGE MEASURED THRU AN R.F. CHOKE.

NOTE: TAKEN WITH SWITCH IN A.C. POSITION CONNECTED TO 115 V. 60 CYCLE A.C. LINE.

RESISTORS

Ref. No.	Part No.	
R1	BE13038	.2 megohm—⅓ w.
R2	BE130266	200M ohm—⅓ w.
R3	BE13018	4M ohm—⅓ w.
R4	BE130208	40M ohm—⅓ w.
R5	BE130215	25 ohm—½ w.
R6	BE130170	3 megohm—⅓ w.
R7	BE130129	2500 ohm—⅓ w.
R8	BE101210	1 megohm volcontrol
R9	BE130257	5 megohm—⅓ w.
R10	BE1303	500M ohm—⅓ w.
R11	BE13038	2 megohm—⅓ w.
R12	BE13092	1M ohm—⅓ w.
R13	BE130100	150M ohm—⅓ w.
R14	BE130197	20 ohm—⅓ w.

CONDENSERS

Circuit Diagram Ref. No.	Part No.	
C	BE102125	2 gang variable cond
C1	BE12912	.00025
C2	BE100110	.2 mfd. x 400 v.
C3	BE1009	.05 x 200 v.
C4	BE12912	.00025
C5	BE1009	.05 x 200 v.
C6	BE10020	.1 x 200 v.
C7	BE10011	.01 x 400 v.
C8	BE119104	Lytic 200 mfd. x 6 w. v.
C9	BE1295	.0001 mfd.
C10	BE119104	Lytic 40 mfd. x 150 w. v.
C11	BE10025	.002 x 600 v.
C12	BE1292	.0005 mfd.
C13	BE119104	Lytic 20 mfd. x 150 w. v.
C14	BE10011	.01 x 400 v.
C15	BE10025	.002 x 600 v.
C16	BE124116	Adjustable antenna trimmer
C17	BE10026	.02 x 400 v.

C8, C10 and C13 in same unit

PARTS

Ref. No.	Part No.	
T1	BE111171	Loop Antenna
T2	BE110144	Oscillator Coil
T3	BE108171B	Input I. F. Coil—465 kc.
T4	BE108172	Output I. F. Coil—465 kc.
T5	BE114189	Speaker with output transf
S1	BE101210	Switch on volume control
S2	BE125106	Power Switch
S3	BE125107	Cut-off switch in line cord
S4	BE12588B	Battery economizer switch
P1	BE107249	Pilot light T47

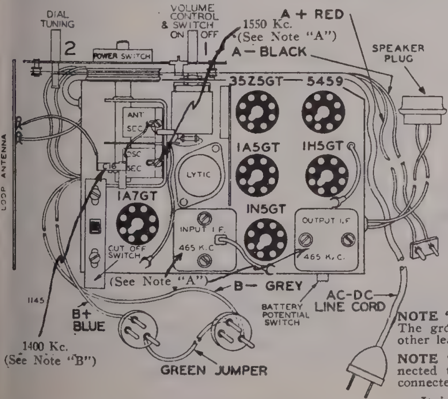


FIG. 2—TOP VIEW

Specifications

Power Consumption	"A" Battery 50 MA; "B" Battery 8 MA. (On A.C. or D.C. 35 Watts)
Power Output	100 Milliwatts, Undistorted 200 Milliwatts, Maximum
Sensitivity (for .05 Watts)	50 Microvolts Average
Selectivity	52 Kc. Broad at 1000 Times Signal at 1000 Kc.
Tuning Range	540 to 1550 Kc.
Intermediate Frequency	465 Kc.
Speaker	5 in. P. M. Dynamic

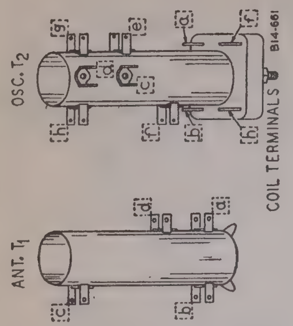
CONVENTIONAL ALIGNMENT

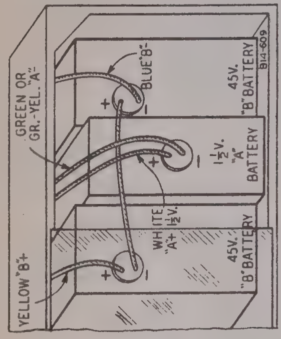
NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments. The ground of the signal generator is connected to the negative "B" wire of the radio and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

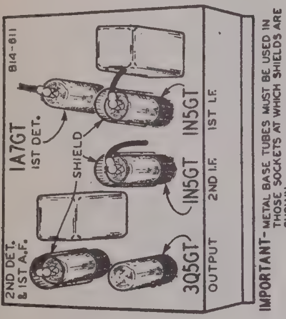
NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the ground terminal of the loop assembly. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the antenna terminal of the loop assembly.

It is important when making this adjustment that the same distance between the loop antenna and the chassis be maintained as when the chassis and loop are installed in the cabinet.

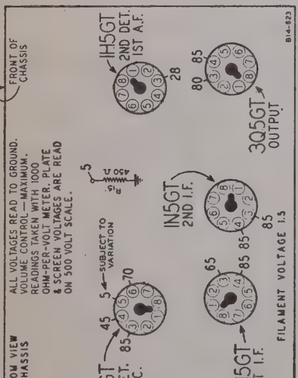
MONTGOMERY WARD & CO.





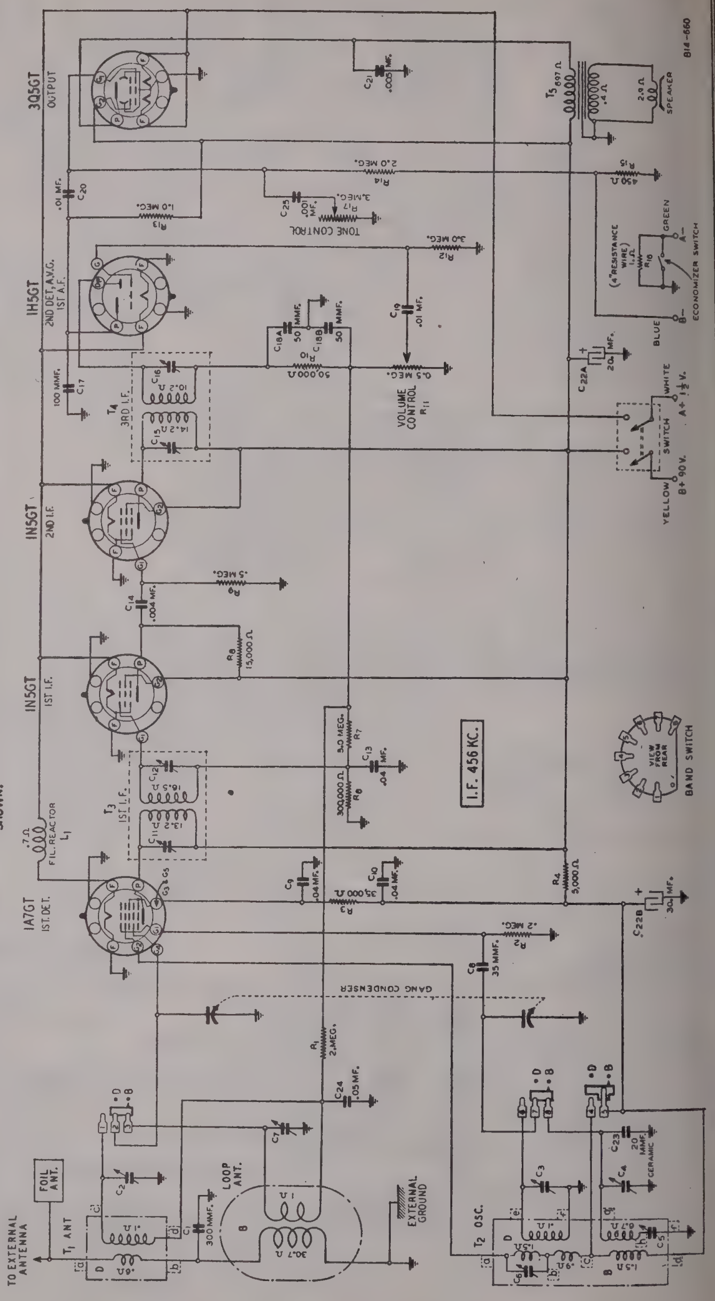


IMPORTANT- METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.



ALL VOLTAGES READ TO GROUND. VOLUME CONTROL—MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

FILAMENT VOLTAGE 1.5



MONTGOMERY WARD & CO.

MODEL 04WG-569
MODEL 04WG-568

MODEL 04WG-568

Input Voltages and Currents
"A" Battery....................1.5 Volts—.30 Amperes
"B" Battery..........................90 Volts—12 Ma.
Power Output..............125 Milliwatts Undistorted / 200 Milliwatts Maximum
Selectivity.....38 KC Broad at 1000 Times Signal
Intermediate Frequency..................456 KC

Speaker............................6" P.M. Dynamic
Tuning Frequency Range
B Range.............................528 to 1600 KC
D Range..........................5750 to 18300 KC
Sensitivity—External Antenna—(For .05 Watt output)
B Range............................6 Microvolts Average
D Range............................10 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	3rd I.F. (C15) & (C16) 1st I.F. (C11) & (C12)
RANGE B 1600 KC	External Antenna Clip	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC	External Antenna Clip	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C7)
600 KC	External Antenna Clip—See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note C
RANGE D 18,300 KC	External Antenna Clip	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
16,000 KC	External Antenna Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note C
6000 KC	External Antenna Clip	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C6) Rock Rotor—See Note C
LOOP RANGE B 1400 KC	External Antenna Clip—See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C7)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

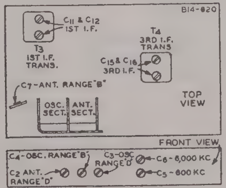
NOTE A—If the pointer is not at 1400 KC on the dial, tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale.

NOTE B—By means of wooden blocks, stand the loop aerial asssembly upright exactly 3 inches from the back of the chassis.

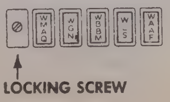
NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop antenna.

CAUTION—When aligning the short wave hands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



SETTING A STATION BUTTON



Grasp the top and bottom of the button at the left and pull it off the shaft. When this is done, the locking screw shaft will be exposed.

Insert a screwdriver in the slot of the locking screw and depress it by pressing in with the screwdriver. Loosen the locking screw by turning 3 or 4 turns in a counter-clockwise direction. Continue to press in firmly on the screwdriver, thus holding the locking screw shaft depressed. Select the first station from the list you have prepared and *carefully* tune in this station by means of the manual tuning knob until the station is clearest and strongest.

Continue to press in firmly on the screwdriver and lock the mechanism by turning the locking screw in a clockwise direction. Tighten firmly but not excessively. The station is now set on this button.

Proceed in the same manner to set stations on any of the remaining buttons.

MODEL 04WG-569

Input Voltages and Currents—Battery Operation
"A" Battery..........................6 Volts—50 Ma.
"B" Batteries......................90 Volts—9.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output
Battery Operation - - - - - 70 Mw. Undistorted / 160 Mw. Maximum
AC Operation - - - - - - 70 Mw. Undistorted / 160 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - 5" P.M. Dynamic
Tuning Frequency Range - - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - - - - 50 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

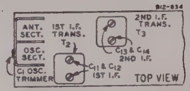
Output Indicating Meter—Non-Metallic Screwdriver.

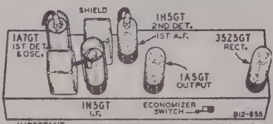
Dummy Antenna—.1 mf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below and Illustration of Back—Page 2)
456 KC	Signal Grid of 1st Det. (Top Cap)	Point "X" Prong No. 7 1H5GT—2nd Det.	.1 mf.	Turn Rotor to full open	1st I.F. (C11) & (C12) 2nd I.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	Same as Above	.1 mf.	Turn Rotor to full open	Oscillator (C1)
1400 KC	None—See Note A			Turn Rotor to max. output	Antenna (C2)

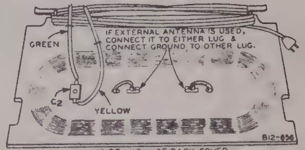
NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—Tune in an 800 KC signal. If the pointer is not at 800 KC on the dial, set pointer at the 800 KC mark on the dial scale.





IMPORTANT- METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.


GREEN
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
C2
YELLOW
B12-856

INSIDE VIEW OF BACK COVER

DRIVE CORD REPLACEMENT

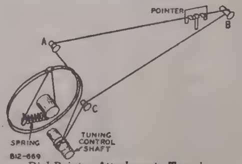
Tie a knot with a small loop at each end of new drive cord. The distance between knots should be 29¼ inches.

Thread one end of drive cord down through hole in groove of drive pulley. Place loop on hook on pulley. Turn gang condenser to completely closed position—See illustration.

Wind cord one complete turn counter-clockwise (from back of chassis) around drive pulley. Then pass cord over idler studs A, B, & C as shown.

Wind 3½ turns clockwise (from back of chassis) around tuning control shaft. These turns should progress toward chassis.

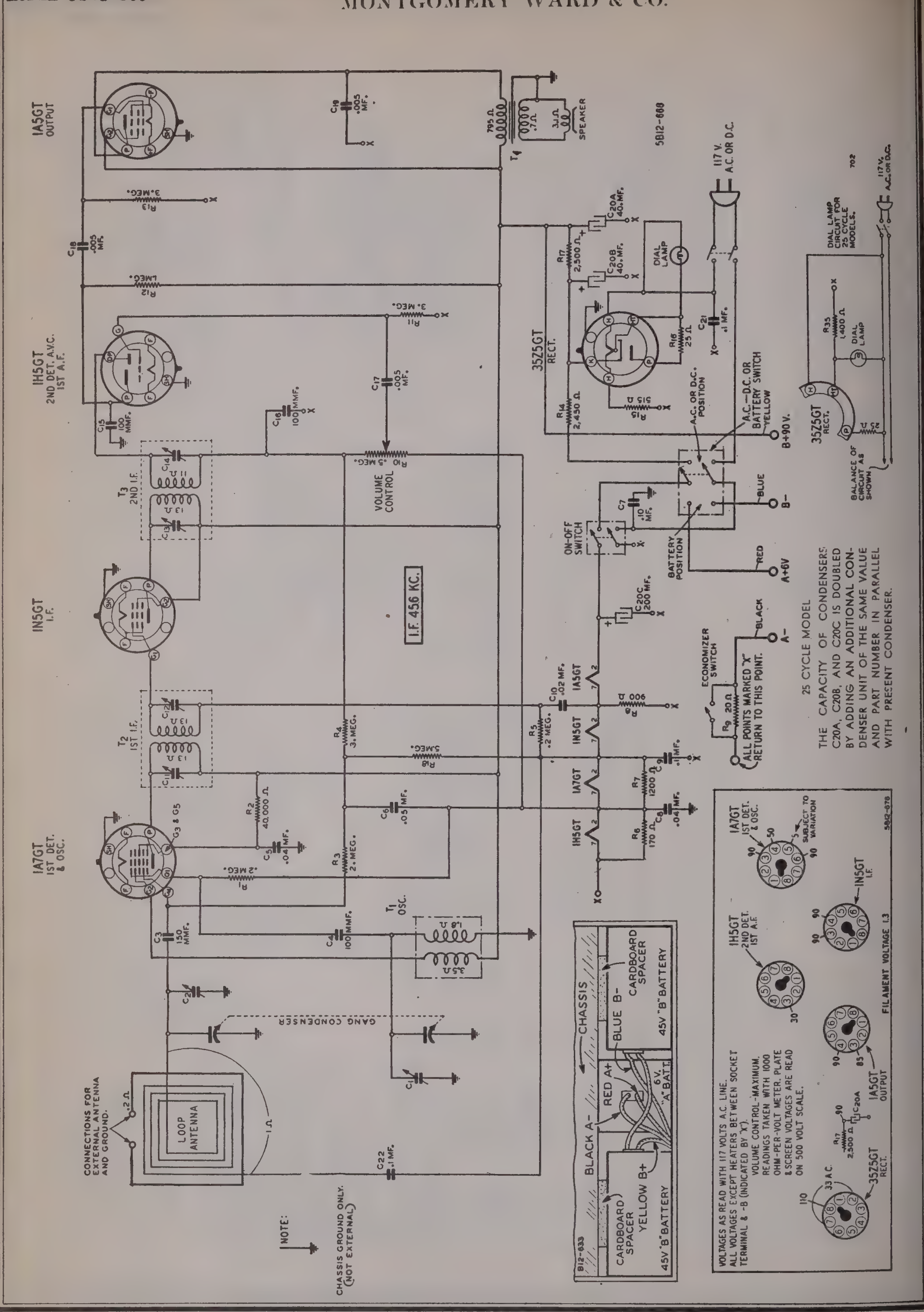
Wind 1¼ turns counter-clockwise (from back of chassis) around drive pulley. These turns should be on right side (from gang condenser side of chassis) of pulley groove and should progress toward dial mounting plate. Thread cord through hole in groove of drive pulley. Hook loop on tension spring. Wind cord around drive pulley shaft—See illustration. Fasten free end of spring to hook on pulley.



Dial Pointer Attachment—Tune in a signal of known frequency. Set pointer at this frequency mark on the dial scale. Fasten pointer to drive cord—See illustration.

MODEL 04WG-569

MONTGOMERY WARD & CO.



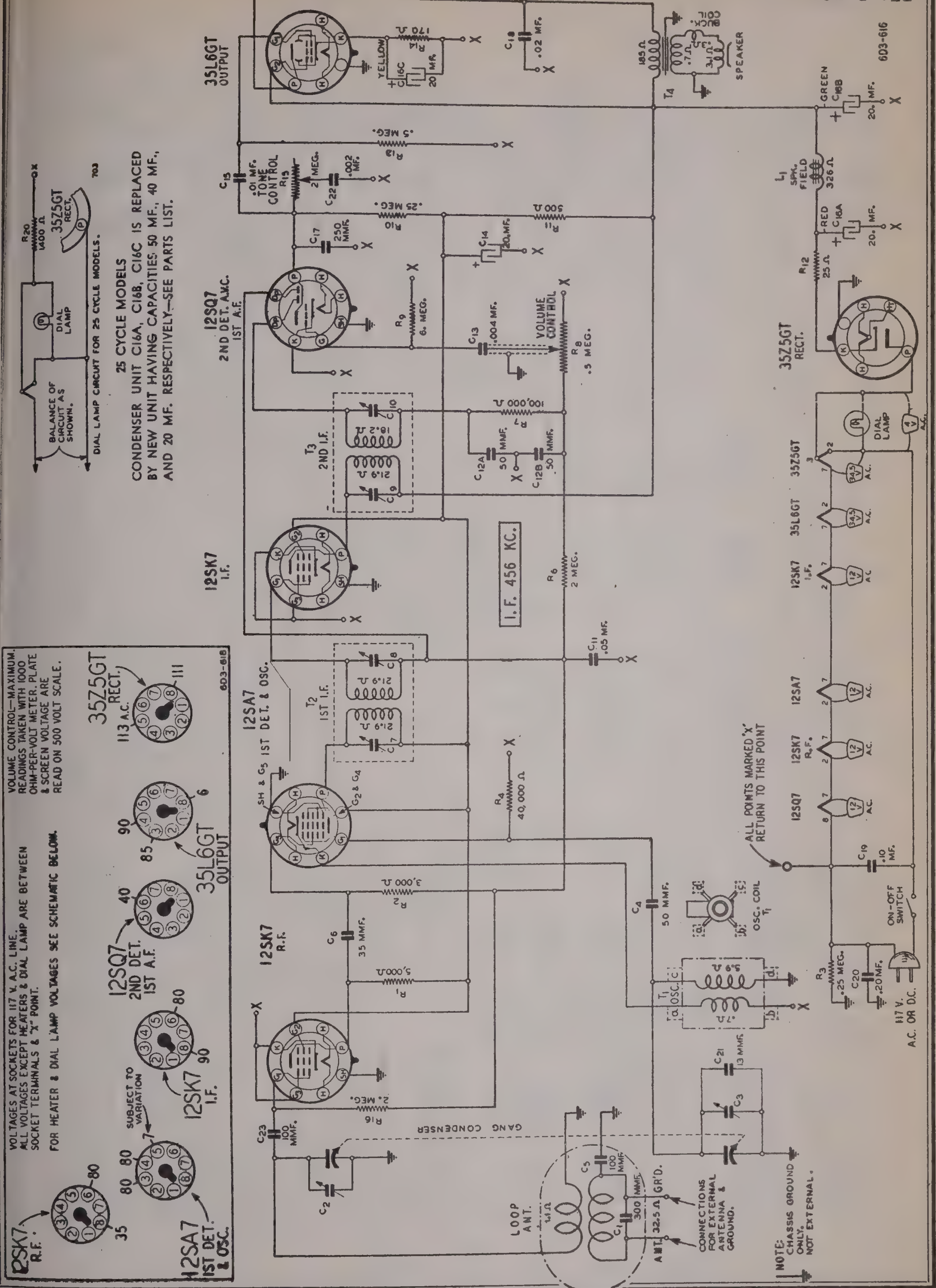
25 CYCLE MODEL

THE CAPACITY OF CONDENSERS C20A, C20B, AND C20C IS DOUBLED BY ADDING AN ADDITIONAL CONDENSER UNIT OF THE SAME VALUE AND PART NUMBER IN PARALLEL WITH PRESENT CONDENSER.

VOLTAGES AS READ WITH 117 VOLTS A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS BETWEEN SOCKET TERMINAL & -B (INDICATED BY "X").
VOLUME CONTROL-MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

MONTGOMERY WARD & CO.

MODEL 04WG-610,
04WG-611



VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "X" POINT.

FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW.

VOLUME CONTROL—MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGE ARE READ ON 500 VOLT SCALE.

25 CYCLE MODELS

CONDENSER UNIT C16A, C16B, C16C IS REPLACED BY NEW UNIT HAVING CAPACITIES 50 MF., 40 MF., AND 20 MF. RESPECTIVELY.—SEE PARTS LIST.

DIAL LAMP CIRCUIT FOR 25 CYCLE MODELS.

ALL POINTS MARKED 'X' RETURN TO THIS POINT

NOTE: CHASSIS GROUND ONLY. NOT EXTERNAL.

CONNECTIONS FOR EXTERNAL ANTENNA & GROUND.

©John F. Rider, Publisher

MODELS 04WG-610, 04WG-611
04WG-612, 04WG-614

MONTGOMERY WARD & CO.

MODEL 04WG-610 MODEL 04WG-611

Power Consumption - 28 Watts (At 117 volts AC Supply)
Power Output - - - - - - .8 Watt Undistorted
Selectivity - - 50 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - 5" Electro Dynamic
Tuning Frequency Range - - - 528 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - - - 10 Microvolts Average

CAUTION

The metal chassis is connected to one side of the line through a .2 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

ALIGNMENT PROCEDURE

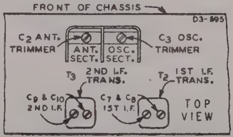
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	SIGNAL GENERATOR GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Control Grid 12SK7—I.F.	Point "X" (12SK7—R.F. Prong No. 3)	.1 mf.	Turn Rotor to full open	2nd I.F. (C9) & (C10)
456 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8)
1600 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	External Antenna Clip On Loop —See Note A	External Ground Clip On Loop	100 mmf.	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Antenna (C2)

NOTE A—By means of wooden blocks, stand the loop aerial assembly upright exactly 1¼ inches from the back of the chassis.

NOTE B—If the pointer is not at 1500 KC on the dial, tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale.



SPECIFICATIONS — MODEL 04WG-612

Power Consumption. . 28 Watts (At 117 volts AC Supply)
Power Output. . . . . .8 Watt Undistorted
1.25 Watts Maximum
Selectivity. . . . . 39 KC Broad at 1000 times Signal
Intermediate Frequency. . . . . 456 KC
Speaker . . . . 5" Electro-Dynamic

Tuning Frequency Range
B Range. . . . . 528 to 1600 KC
C Range. . . . . 2300 to 6500 KC

Sensitivity (For .05 watt output)
B Range. . . . . 8 Microvolts Average
C Range. . . . . 10 Microvolts Average

CAUTION

The metal chassis is connected to one side of the line through a .2 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

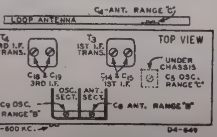
After each range is completed, repeat the procedure as a final check.

NOTE A—By means of wooden blocks, stand the loop aerial assembly upright exactly one inch from the back of the chassis.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CALIBRATION—Tune in an 800 KC signal. If pointer is not at the 800 KC mark on the dial scale, set pointer at 800 KC mark.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.



ALIGNMENT PROCEDURE MODEL 04WG-612

Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohm.

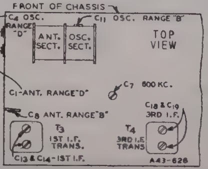
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	SIGNAL GENERATOR GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
I. F.						
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	Point "X" {12SQ7—1st A.F. Prong No. 3}	.1 mf.	B Range	Turn Rotor to full open	1st I.F. (C14) & (C15) 3rd I.F. (C18) & (C19)
RANGE B						
1600 KC	Signal Grid of 1st Det.	Point "X"	.1 mf.	B Range	Turn Rotor to full open	Oscillator Range B (C9)
1400 KC	External Antenna Clip on Loop —See Note A	External Ground Clip On Loop	100 mmf.	B Range	Turn Rotor to max. output	Antenna Range B (C8)
600 KC	External Antenna Clip —See Note A	External Ground Clip	100 mmf.	B Range	Turn Rotor to max. output	600 KC (C3) Rock Rotor—See Note B
RANGE C						
6500 KC	External Antenna Clip	External Ground Clip	400 Ohm	C Range	Turn Rotor to full open	Oscillator Range C (C5)
6000 KC	External Antenna Clip	External Ground Clip	400 Ohm	C Range	Turn Rotor to max. output	Ant. Range C (C4) Rock Rotor—See Note B

ALIGNMENT PROCEDURE MODEL 04WG-614

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 3rd I.F. (C18) & (C19)
RANGE B					
1600 KC	External Antenna Clip	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1400 KC	External Antenna Clip	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C8)
600 KC	External Antenna Clip See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C7) Rock Rotor—See Note C
RANGE D					
18 300 KC	External Antenna Clip	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17 000 KC	External Antenna Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C8)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

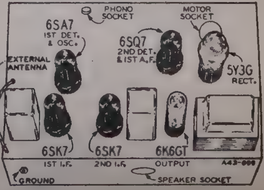
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—By means of wooden blocks, stand the loop aerial assembly upright exactly 4 inches from the back of the chassis.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

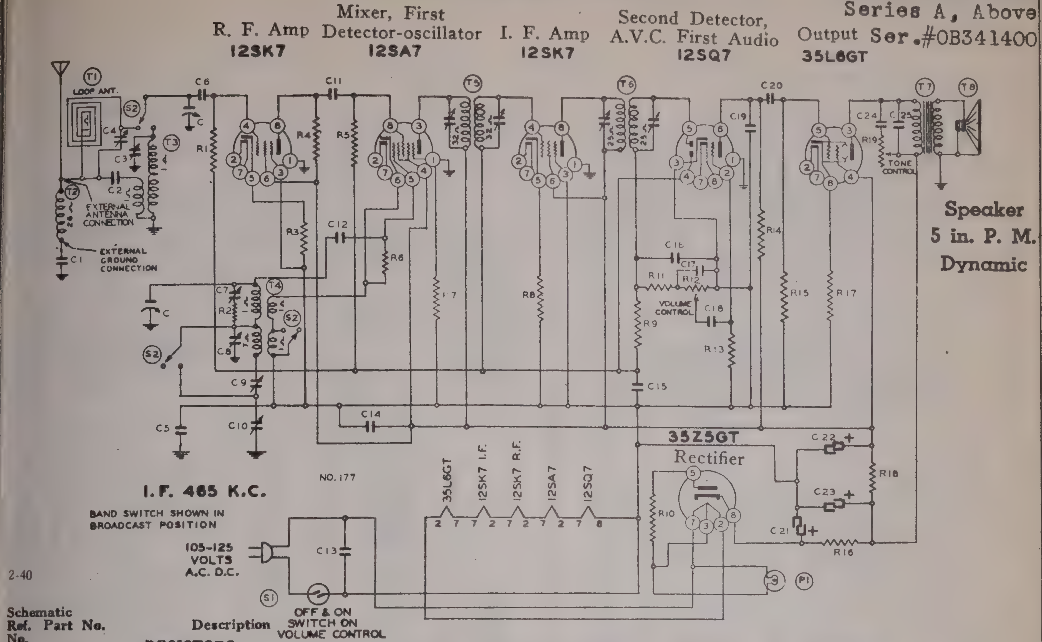
NOTE D—Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop antenna.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



MONTGOMERY WARD & CO.

MODEL 04BR-609A
Series A, Above
Ser.#OB341400



I.F. 465 K.C.

BAND SWITCH SHOWN IN BROADCAST POSITION

Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE13019	1 megohm—⅓ w.
R2	BE130166	150 ohm—⅓ w.
R3	BE130248	40 ohm—⅓ w.
R4	BE130218	5M ohm—⅓ w.
R5	BE13020	100M ohm—⅓ w.
R6	BE13012	50M ohm—⅓ w.
R7	BE1309	200M ohm—⅓ w.
R8	BE130248	40 ohm—⅓ w.
R9	BE1304	3 megohm—⅓ w.
R10	BE130215	25 ohm—½ w.
R11	BE1301	25M ohm—⅓ w.
R12	BE101195	1 megohm volume control
R13	BE130257	5 megohm—⅓ w.
R14	BE1303	500M ohm—⅓ w.
R15	BE1303	500M ohm—⅓ w.
R16	BE130296	200 ohm—1 watt
R17	BE130166	150 ohm—⅓ w.
R18	BE130287	1200 ohm—1 watt
R19	BE101194	200M ohm tone control
		CONDENSERS
C	BE102127	2 gang variable condenser
C1	BE10013	.05 x 400 v.
C2	BE12954	.003 Mica
C3	BE124127	Short Wave Band Antenna Trimmer
C4	BE124127	B.C. Antenna Trimmer
C5	BE10024	.25 x 400 v.
C6	BE1292	.0005 mica
C7	BE124125	Short Wave Band Oscillator Trimmer
C8	BE124125	B.C. Oscillator Trimmer
C9	BE124126	B.C. Oscillator Pad
C10	BE124126	Short Wave Band Oscillator Pad
C11	BE1295	.0001 Mica
C12	BE12912	.00025 mica
C13	BE1001	.1 x 400 v.
C14	BE1009	.05 x 200 v.
C15	BE1009	.05 x 200 v.
C16	BE1295	.0001 Mica
C17	BE12938	.00005 mica
C18	BE10071	.004 x 600 v.
C19	BE12912	.00025 mica
C20	BE10078	.01 x 200 v.
C21	BE11994	40 mfd.—150 w.v.
C22	BE11994	20 mfd.—150 w.v.
C23	BE11994	20 mfd.—150 w.v.
C24	BE1009	.05 x 200 v.
C25	BE10026	.02 x 400 v.

C3 and C4 in one unit   C7 and C8 in one unit
C9 and C10 in one unit   C21, C22 and C23 in same unit

Schematic Ref. No.	Part No.	Description
		PARTS
T1	BE111144	Loop Antenna Assembly
T2	BE10535	R.F. Choke
T3	BE111172	Antenna Coil
T4	BE110147	B.C. S.W. Oscillator Coil
T5	BE108140G	Input I.F. Coil—465 kc.
T6	BE108145	Output I.F. Coil—465 kc.
T7	BE10589B	Output Transformer
T8	BE114177	5 in. P.M. Speaker
S1	BE101195	Volume Control and Switch
S2	BE125108	Wave Band Change Switch
P1	BE107249	6.3 volt T47 pilot light

MODEL 04BR-609A SERIES A (SERIAL No. OB341400 and UP)

Power Consumption - - - - - - - - - 35 Watts

Power Output - - - - - - - 1 Watt Undistorted

Sensitivity (for .5 Watts Output) - -

Broadcast Band —35 Microvolts Average

Shortwave Band—50 Microvolts Average

Selectivity - 48 KC Broad at 1000 Times Signal at 1000 KC

**Tuning Frequency Range - - - - - - 540 to 1550 KC
1.95 to 7 MC**

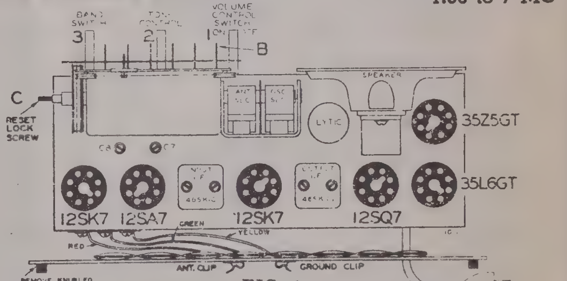
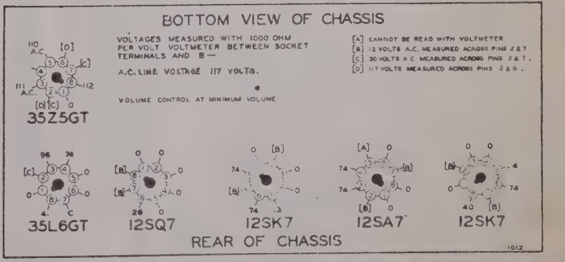


FIG. 1



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

A.C. LINE VOLTAGE 117 VOLTS.

VOLUME CONTROL AT MINIMUM VOLUME

[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7
[C] 30 VOLTS A C MEASURED ACROSS PINS 2 & 7.
[D] 117 VOLTS MEASURED ACROSS PINS 2 & 8.

FIG. 4—BOTTOM VIEW

MODEL 04BR-609A
above ser.#0B341400

MONTGOMERY WARD & CO.

- Loop antenna connected to radio.
- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 12SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	7000 Kc.	200 mmf.	Antenna Clip	Short Wave	Rotor full open (Plates out of mesh)	Trimmer C7 (See Fig. 3)	Short Wave oscillator	Adjust to maximum output
	6000 Kc.	200 mmf.	Antenna Clip	Short Wave	Set Dial at 6 Mc.	Trimmer C3 (See Fig. 3)	Short Wave antenna	Adjust to maximum output
	2200 Kc.	200 mmf.	Antenna Clip	Short Wave	Set Dial 2.2 Mc.	Trimmer C10 (See Fig. 3)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROAD-CAST BAND	1550 Kc.	200 mmf.	Antenna Clip	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C8 (See Fig. 3)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna Clip	Broadcast	Set Dial at 1400 Kc.	Trimmer C4 (See Fig. 3)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna Clip	Broadcast	Set Dial at 600 Kc.	Trimmer C9 (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "B")

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Procedure for Setting the Automatic Pushbuttons

There are six pushbuttons on the front of the radio by means of which six stations may be selected (see "B," Fig. 2).

1. Make a list of local stations you tune in regularly; any number up to and including six.

2. Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

3. On the front of each automatic tuner button an opening is provided for inserting the call letter tabs. (See "A," Fig. 2.)

4. Insert the call letter tabs in the rectangular openings in each of the automatic tuner pushbuttons. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

5. Press in ALL THE WAY any one of the automatic tuner pushbuttons. Holding it in FIRMLY, tune in by means of the tuning knob (No. 4) the station you have assigned to this pushbutton. Turn the tuning knob very slowly back and forth (while still holding button in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the pushbutton.

6. Press in another automatic tuner pushbutton. Holding it in FIRMLY, carefully tune in the station assigned to this pushbutton. Release this pushbutton.

7. Follow this procedure until you have selected all of your favorite stations.

8. Now rotate the tuning kob to the right (clockwise) as far as it will turn, and with a coin (quarter), tighten the special locking screw ("C") in the center of the tuning knob, (see Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the pushbuttons. (Note: **Reset Lock Screw "C" is loose when radio is shipped from factory.**

If you should desire to change any station you selected to another, loosen the reset locking screw two or three complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner pushbuttons, it is due to the locking screw being too tight. Loosen the reset locking screw until the dial mechanism works freely with the tuner pushbutton pressed in.)

BE SURE TO RETIGHTEN THE RESET LOCK SCREW, otherwise the stations will not stay adjusted to the pushbuttons.

The automatic dial is now set up for quick tuning.

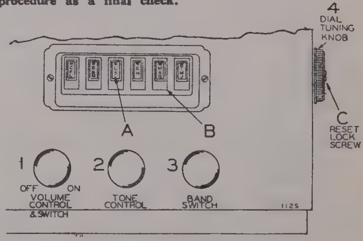


FIG. 2

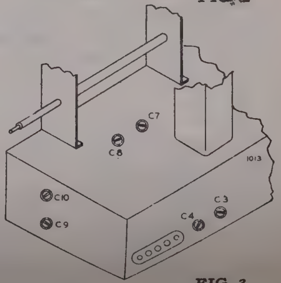


FIG. 3

Schematic Diagram Ref. No.	Part No.	Description

RESISTORS

R1	BE13022	5M ohm—⅓ watt
R2	BE130166	150 ohm—⅓ watt
R3	BE13012	50M ohm—⅓ watt
R4	BE13026	1000 ohm—⅓ watt
R5	BE130157	12M ohm—⅓ watt
R6	BE1304	3 megohm—⅓ watt
R7	BE130168	100 ohm—⅓ watt
R8	BE130168	100 ohm—⅓ watt
R9	BE101225	1 megohm volume control
R10	BE130233	60 ohm—⅓ watt
R11	BE130233	60 ohm—⅓ watt
R12	BE130223	10 megohm—⅓ watt
R13	BE13037	750M ohm—⅓ watt
R14	BE13011	250M ohm—⅓ watt
R15	BE13079	400 ohm—⅓ watt
R16	BE130222	350 ohm—⅓ watt
R17	BE130235	1500 ohm—⅓ watt

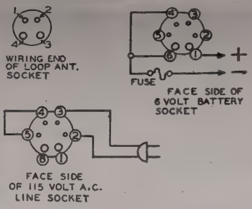
CONDENSERS

C	BE102134	2 gang variable condenser
C1	BE1009	.05 x 200 volts
C2		Antenna trimmer on gang
C3		Oscillator trimmer on gang
C4	BE10020	.1 x 200 v.
C5	BE1295	.0001 mica
C6	BE10020	.1 x 200 v.
C7	BE10013	.05 x 400 v.
C8	BE10031	.5 x 120 v.
C9	BE10031	.5 x 120 v.
C10	BE10073	.008 x 1200 v.
C11	BE12951	.000125 mica
C12	BE10012	.003 x 600 v.
C13	BE12960	.00015 mica
C14	BE10011	.01 x 400 v.
C15	BE10020	.1 x 200 v.
C16	BE119111	20 mfd. lytic—25 w. v.
C17	BE119111	40 mfd. lytic—200 w. v.
C18	BE119111	20 mfd. lytic—200 w. v.
C19	BE119111	20 mfd. lytic—200 w. v.
C20	BE10019	.006 x 600 v.
C21	BE10020	.1 x 200 v.

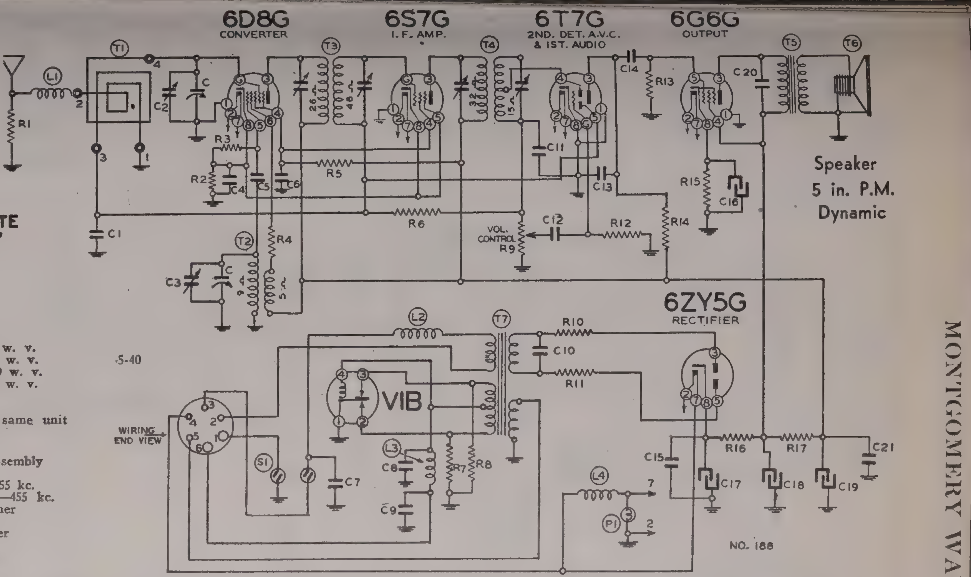
C16, C17, C18, C19 are in same unit

PARTS

T1	BE111187	Loop Antenna Assembly
T2	BE110155	Oscillator Coil
T3	BE108129C	Input I.F. Coil—455 kc.
T4	BE108130D	Output I.F. Coil—455 kc.
T5	BE105113	Output Transformer
T6	BE114205	5" P.M. Speaker
T7	BE104216	Power Transformer
L1	BE12312	R.F. Choke
L2	BE10566	R.F. "A" Choke
L3	BE10568	R.F. Choke
L4	BE10566	R.F. "A" Choke
		On-Off Switch on Volume Control
P1	BE12626	Plug-in Vibrator Unit


WIRING END OF LOOP ANT. SOCKET
FUSE
FACE SIDE OF 6 VOLT BATTERY SOCKET
FACE SIDE OF 115 VOLT A.C. LINE SOCKET

INTERMEDIATE FREQUENCY 455 K.C.



MODEL 04BR-570A (SERIAL No. OE528700 and UP)

Power Consumption - - - - 30 Watts
Battery Drain - - - - - 2½ Amps
Power Output - - 700 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output: 15 Microvolts Average

Selectivity - 50 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - 535 to 1650 KC

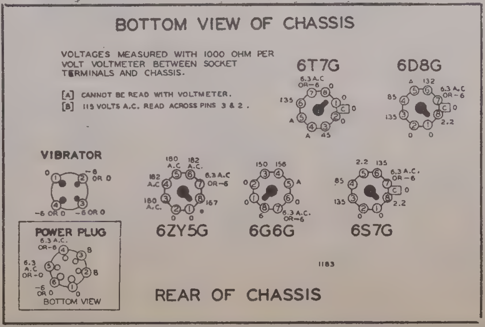
SETTING THE AUTOMATIC PUSHBUTTONS

Pry out the metal button in cabinet opposite pushbutton locking screw.

Press one of the buttons all the way down and hold it FIRMLY. Now tune in the station you want with the tuning knob. Tune back and forth until the station is clear, then release the button. NOTE: *If the tuning knob turns quite hard when the button is held down firmly, loosen the pushbutton locking screw several turns with a screwdriver.*

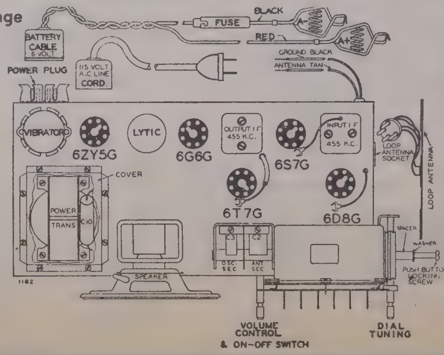
Continue, setting each of the remaining pushbuttons in the same way. Now turn the tuning knob all the way to the right and tighten the pushbutton locking screw. This screw prevents the pushbuttons from slipping off the stations you have set. To change stations loosen locking screw and proceed as above.

BOTTOM VIEW OF CHASSIS



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

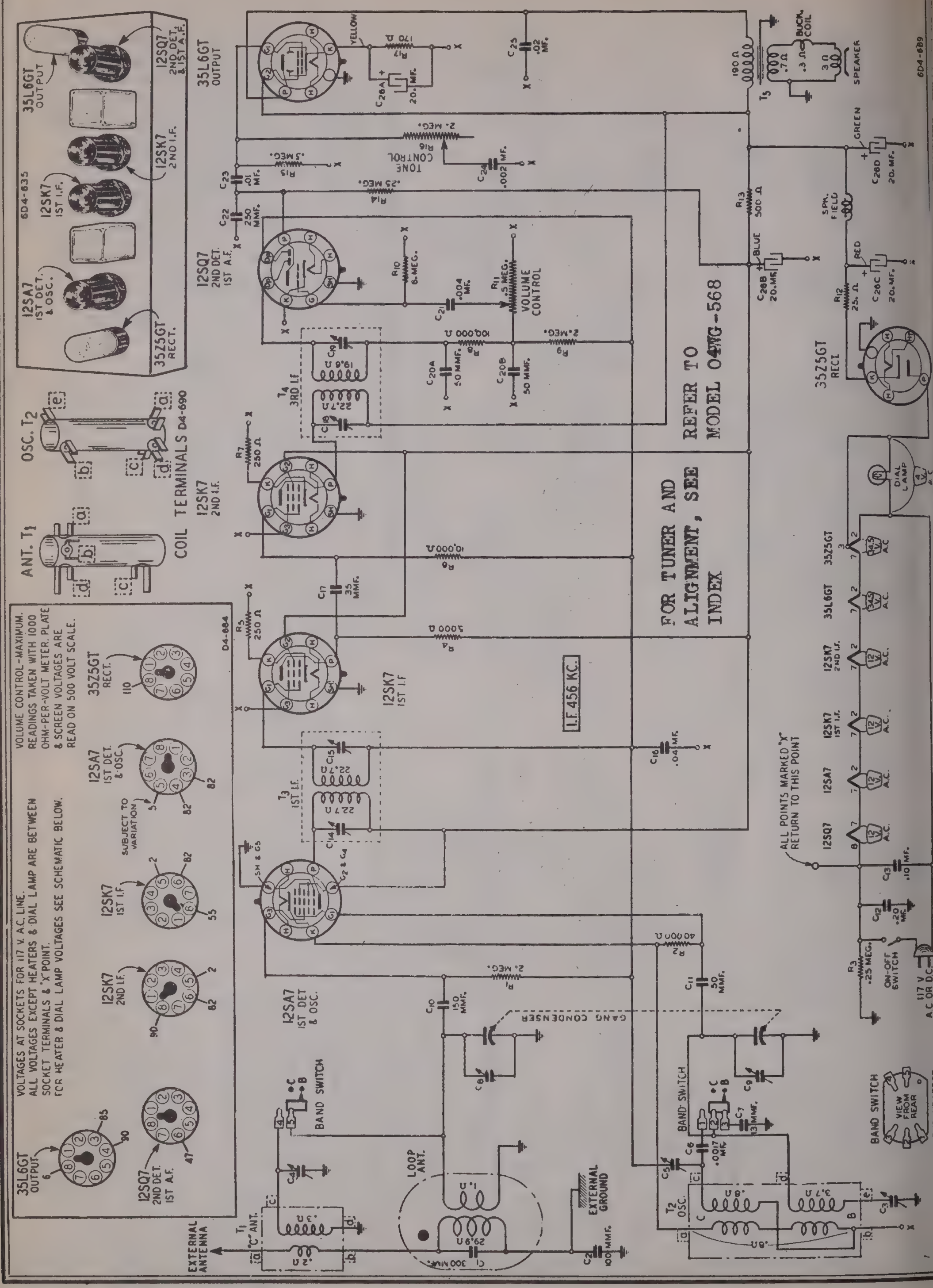
[A] CANNOT BE READ WITH VOLTMETER.
[B] 115 VOLTS A.C. READ ACROSS PINS 3 & 2.



To remove the chassis pull the loop antenna plug from the chassis. Pull the pushbuttons, the tuning and volume knobs off their shafts. Take out the 4 screws in bottom of cabinet and lift chassis out.

MODEL 04WG-612

MONTGOMERY WARD & CO.



VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "X" POINT. FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW.

VOLUME CONTROL-MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

FOR TUNER AND ALIGNMENT, SEE INDEX

REFER TO MODEL 04WG-568

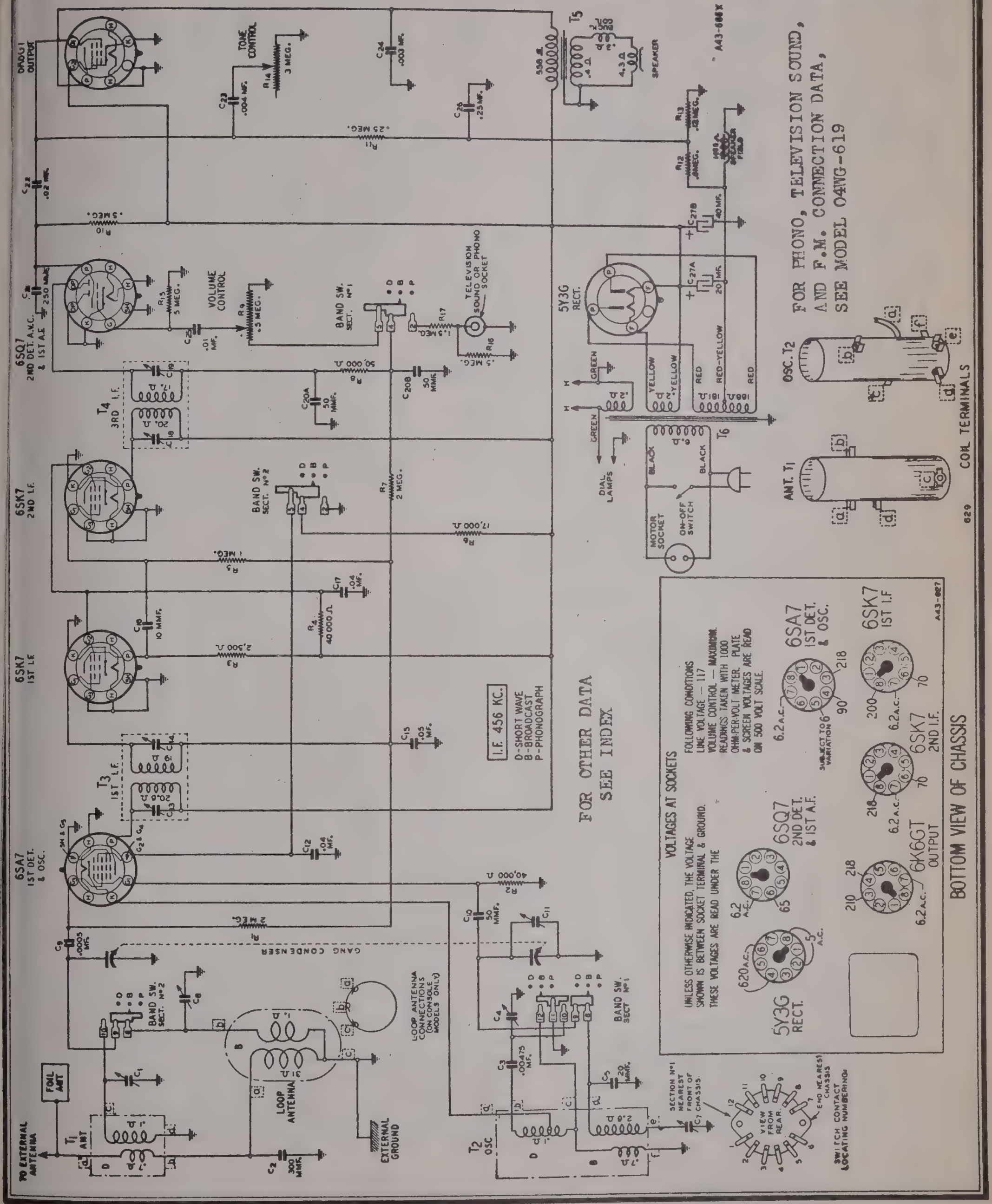
MONTGOMERY WARD & CO

MODEL 04WG-614

Power Consumption 57 Watts (At 117 volts 60 cycles)
73 Watts (Phonograph Operating)
Power Output.................. 1.7 Watts Undistorted
2.5 Watts Maximum
Selectivity.....40 KC Broad at 1000 times Signal
Intermediate Frequency..................456 KC
Speaker..............6" or 8" Electro-Dynamic

Tuning Frequency Range
B Range.............................. 528 to 1800 KC
D Range.............................5750 to 18300 KC

Sensitivity —External Antenna—(For 0.5 Watt output)
B Range..................... 7 Microvolts Average
D Range....................15 Microvolts Average



FOR PHONO, TELEVISION SOUND, AND F.M. CONNECTION DATA, SEE MODEL 04WG-619

FOR OTHER DATA SEE INDEX

VOLTAGES AT SOCKETS

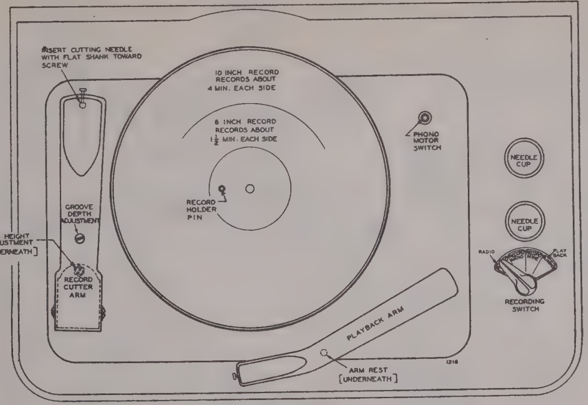
UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND. THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS LINE VOLTAGE — 117 VOLUME CONTROL — MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

BOTTOM VIEW OF CHASSIS

MODEL 04BR-615A
above ser.#565300
MODELS 04BR-904A,04BR-906A,
04BR-1106A

MONTGOMERY WARD & CO.

MODEL 04BR-615A (SERIAL No. 565300 and UP)
OPERATING THE PHONOGRAPH AND RECORDER


INSERT CUTTING NEEDLE WITH FLAT SHANK TOWARD SCREW
10 INCH RECORD RECORDS ABOUT 4 MIN. EACH SIDE
6 INCH RECORD RECORDS ABOUT 1½ MIN. EACH SIDE
PHONO MOTOR SWITCH
NEEDLE CUP
NEEDLE CUP
RECORD HOLDER PIN
GROOVE DEPTH ADJUSTMENT
ARM HEIGHT ADJUSTMENT [UNDERNEATH]
RECORD CUTTER ARM
RADIO
PLAY BACK
RECORDING SWITCH
PLAYBACK ARM
ARM REST [UNDERNEATH]
1218

RECORDER VIEW

OPERATING THE PHONOGRAPH

Turn radio on. Turn recording switch to Playback position.

Put your record on turntable and start motor. Place playback arm on record and control tone and volume with the radio volume and tone control knobs.

RECORDING RADIO PROGRAMS

Turn the radio on and tune in the program you wish to record. Put recording switch in "Record-Radio" position. The volume will drop. Start motor and then gently lower cutting needle onto blank record, about ¼" from outer edge.

RECORDING VOICE

Turn the radio volume control nearly full on. Recording switch should be in Record "Mike" position. Start motor, and set cutting needle gently on start of record. Turn mike switch on and talk.

NOTE: The cutting arm must be raised about three inches to move it freely across the record.

HOW TO MAKE PERFECT RECORDINGS

Unpack the microphone and check to see that it is plugged into the chassis. **The microphone must be connected to the chassis at all times.**

Insert a playback needle in the playback arm.

Insert a special cutting stylus (needle) in the cutter arm. Handle this needle with care.

Be sure the needle is tight after each recording. Should it loosen during the recording, it will chatter and ruin your record.

CUTTING NEEDLE

The cutting stylus is razor sharp and must not be dropped on the record or allowed to rest on the turntable.

For best operation, the instrument **should be** level in all directions. To **check this, place** a small level, if you **have one, on** the turntable. If you do **not have** a level, a marble will do. If the marble rolls off the turntable, it is low in the direction in which it rolls. Place something under the cabinet until the machine is reasonably level.

SHAVINGS

The cutting stylus cuts out a fine shaving that is just a little thicker than a human hair. These shavings should not be allowed to gather under the cutting stylus.

While cutting, gently brush the shavings from the left side of the record in, toward the center pin, allowing them to collect there until the recording is completed.

DO NOT USE TOO MUCH VOLUME

The most frequent cause of poor recordings is too much volume or overloading. If some passages of your recording are smooth and clear while others are raspy, rough and distorted, you are probably using too much volume. Overloading occurs most often on strong passages. The remedy is to reduce the volume slightly and study the different effects of microphone technique.

Too little volume will show up when you play the record back. The volume control on playbacks will have to be turned up quite high and needle scratch will be excessive.

CUTTING ARM ADJUSTMENTS

The cutting arm is adjusted at the factory for proper operation, however, with various types of blanks this adjustment may sometimes have to be altered. **With a blank record on the table,** the height adjustment under the cutter arm should be adjusted so that the bottom of the cutting arm is ¼" from the top of the record blank. Make this measurement carefully at the front end beside the stylus screw.

The screw adjustment can be turned to raise or lower the arm.

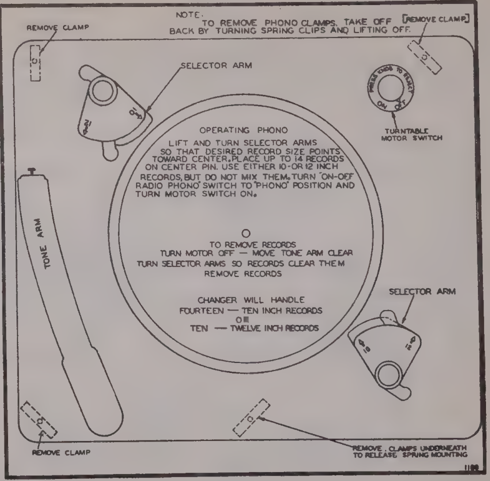
Several blank grooves should now be cut to see if the groove is the proper depth. The depth adjustment screw on the cutter arm will increase the depth of the groove if turned to the right and will decrease the groove if turned to the left.

If the groove is too shallow, the playback needle will not stay in the groove. If it is too deep, not enough wall will be left between grooves and the playback needle will break through from one track to the next after a few playings.

The proper depth of groove will leave about the same space between the groove as the groove is wide. Hold a finished record toward the light and you can usually see if the grooves are spaced correctly.

A **properly** cut groove will leave a shaving just a little heavier than a human hair.

MODEL 04BR-904A MODEL 04BR-906A MODEL 04BR-1106A
AUTOMATIC RECORD CHANGER—Operating Instructions


NOTE.
TO REMOVE PHONO CLAMPS, TAKE OFF BACK BY TURNING SPRING CLIPS AND LIFTING OFF.
REMOVE CLAMP
[REMOVE CLAMP]
SELECTOR ARM
TURNTABLE MOTOR SWITCH
ON
OFF
OPERATING PHONO
LIFT AND TURN SELECTOR ARMS SO THAT DESIRED RECORD SIZE POINTS TOWARD CENTER. PLACE UP TO 14 RECORDS ON CENTER PIN. USE EITHER 10-OR 12 INCH RECORDS, BUT DO NOT MIX THEM. TURN "ON-OFF RADIO PHONO" SWITCH TO "PHONO" POSITION AND TURN MOTOR SWITCH ON.
TONE ARM
TO REMOVE RECORDS
TURN MOTOR OFF — MOVE TONE ARM CLEAR
TURN SELECTOR ARMS SO RECORDS CLEAR THEM
REMOVE RECORDS
CHANGER WILL HANDLE
FOURTEEN — TEN INCH RECORDS
OR
TEN — TWELVE INCH RECORDS
SELECTOR ARM
10
12
REMOVE CLAMP
REMOVE CLAMPS UNDERNEATH TO RELEASE SPRING MOUNTING
1199

SETTING FOR SIZE OF RECORD

The Changer plays up to fourteen 10" or ten 12" records at one loading. **All records must be the same size for each loading.**

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

LOADING

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

STARTING THE CHANGER

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph-radio knob, to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

HOW TO REJECT A RECORD

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

PLAYING INDIVIDUAL RECORDS

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading", and set the machine in operation by means of the switch knob described under "Starting the Changer." In other words, play an individual record in the same manner as you would play a stack of that size.

UNLOADING

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

TURNING OFF CHANGER

Throw Changer switch knob to "OFF" position.

Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

IF CHANGER IS LEFT RUNNING

No damage will be done if you forget to turn off Changer after it **has played** its entire load of records. It **will simply** repeat the last record until **stopped or** reloaded.

MONTGOMERY WARD & CO.

MODEL 04BR-615A
above ser.#565300

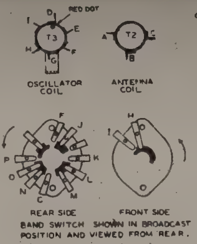
Diagram Ref. No.	Part No.	Description
RESISTORS		
R1	BE130321	3500 ohms—⅓ w.
R2	BE130197	20 ohms—⅓ w.
R3	BE1304	3 megohm—⅓ w.
R4	BE13076	30M ohms—⅓ w.
R5	BE13097	200 ohms—⅓ w.
R6	BE130165	15M ohms—1 w.
R7	BE13022	5M ohms—⅓ w.
R8	BE13019	1 megohm—⅓ w.
R9	BE13012	50M ohms—⅓ w.
R10	BE130192	2M ohms—⅓ w.
R11	BE1302	75M ohms—⅓ w.
R12	BE1301	25M ohms—⅓ w.
R13	BE1304	3 megohm—⅓ w.
R14	BE13012	50M ohms—⅓ w.
R15	BE101142	1 megohm volume control
R16	BE13028	750M ohm—⅓ w.
R17	BE130257	5 megohm—⅓ w.
R18	BE101143	Tone control
R19	BE13019	1 megohm—⅓ w.
R20	BE13011	250M ohm—⅓ w.
R21	BE1303	500M ohm—⅓ w.
R22	BE130322	10 ohm—1 w.
R23	BE130227	250 ohm—1 w.
R24	BE130203	40 ohm—⅓ w.
CONDENSERS		
C	BE102135	2 gang variable condenser
C1	BE124127	B.C. Antenna Trimmer
C2	BE124127	S.W. Antenna Trimmer
C3	BE1292	.0005 mica
C4	BE12960	.00015 mica
C5	BE124112	S.W. Oscillator trimmer
C6	BE124112	B.C. Oscillator trimmer
C7	BE124146	B.C. Oscillator series padder
C8	BE124146	S.W. Oscillator series padder
C9	BE10013	.05 x 400 v. condenser
C10	BE1009	.05 x 200 v. condenser
C11	BE12921	.0002 mica
C12	BE119114	15 mfd. x 400 v. lytic
C13	BE119114	15 mfd. x 400 v. lytic
C14	BE119114	20 mfd. x 25 v. lytic
C15	BE119114	10 mfd. x 300 v. lytic
C16	BE1292	.0005 mica
C17	BE11967	8 mfd. x 450 v. lytic
C18	BE1001	.1 x 400 v. condenser
C19	BE10011	.01 x 400 v. condenser
C20	BE129161	.0001 mica
C21	BE129161	.0001 mica
C22	BE10012	.003 x 600 v. condenser
C23	BE1292	.0005 mica
C24	BE10089	.008 x 800 v.
C25	BE1292	.0005 mica
C26	BE10026	.02 x 400 v.
C27	BE10011	.01 x 400 v.

C1 and C2 in one unit C5 and C6 in one unit
C7 and C8 in one unit C12, C13, C14 and C15 in one unit C20 and C21 in one unit

PARTS

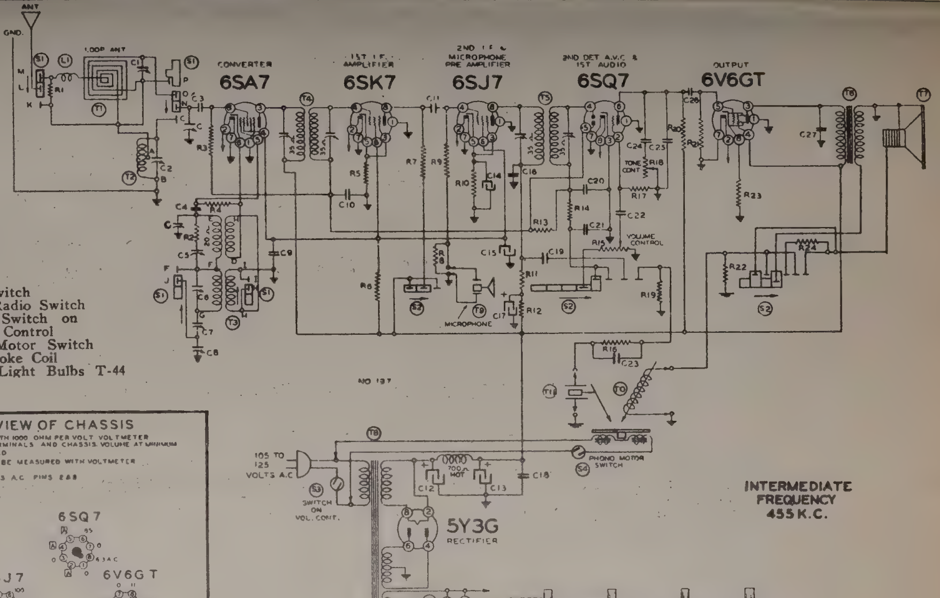
Diagram Ref. No.	Part No.	Description
T1	BE111204	Loop Antenna Assembly
T2	BE111184	S.W. Antenna Coil
T3	BE110163	B.C. S.W. Oscillator Coil
T4	BE108169D	Input I.F. Coil Complete
T5	BE108106T	Output I.F. Coil Complete
T6	BE105118	Output Transformer
T7	BE114212	6" Dynamic Speaker
T8	BE104225	Power Transformer
T9	BE114214	Microphone and Cable
T10	BE104230	Recording and playback unit complete 60 cycle
T11		Phono Pickup arm

7-40

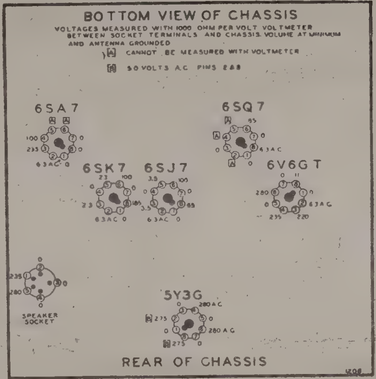


BAND SWITCH SHOWN IN BROADCAST POSITION AND VIEWED FROM REAR.

S1	BE125126	Band Switch
S2	BE125127	Phono Radio Switch
S3		On-off Switch on Volume Control
S4	BE12577	Phono Motor Switch
L1	BE12312	R.F. Choke Coil
P1	BE10794	2-Pilot Light Bulbs T-44



INTERMEDIATE FREQUENCY 455 K.C.

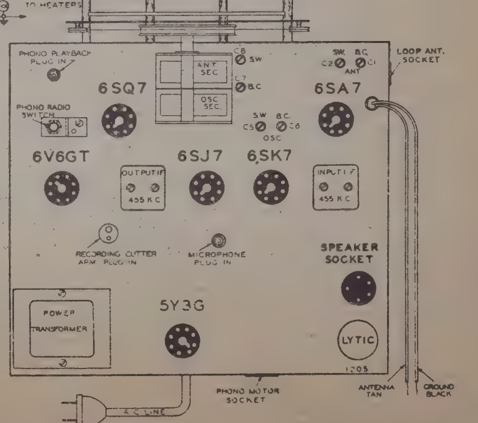


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. VOLUME AT MINIMUM AND ANTENNA GROUNDED

[A] CANNOT BE MEASURED WITH VOLTMETER

[B] 50 VOLTS A.C. PINS 2&8



Power Consumption	Radio Only	70 Watts
	Motor Only	40 Watts
Power Output		2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output:		15 Microvolts Average
Selectivity		51 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range	Broadcast Band	535 to 1600 KC
	Shortwave Band	5.46 to 18.3 MC
Intermediate Frequency		455 KC
Speaker		6 in. Electro Dynamic

ALIGNMENT PROCEDURE

Model No. 04BR-615A

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SJ7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C5	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C2	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C8	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C6	Broadcast oscillator	Adjust to maximum output
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C7	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C1 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C7 (See Top View)	Broadcast osc. Series Pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." leads when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 535 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." terminals.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

MODEL 04BR-675A and 04BR-676A

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6S7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to signal
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROADCAST BAND	1600 Kc.	.1 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to signal
	535 Kc.	.1 mmf.	Grid of 6SA7	Broadcast	Set Dial at 535 K. C.	Trimmer C6	Broadcast oscillator series pad	Adjust to signal
LOOP ALIGNMENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 K. C.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 K. C.	Trimmer T3 (See Top View)	Iron Core Tracking Coil	Adjust to maximum output

The loop antenna should be connected to the radio when making all adjustments.—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected.

NOTE "A"— Turn the dial back and forth slightly, (rock) and adjust trimmer until the peak of greatest intensity is obtained.

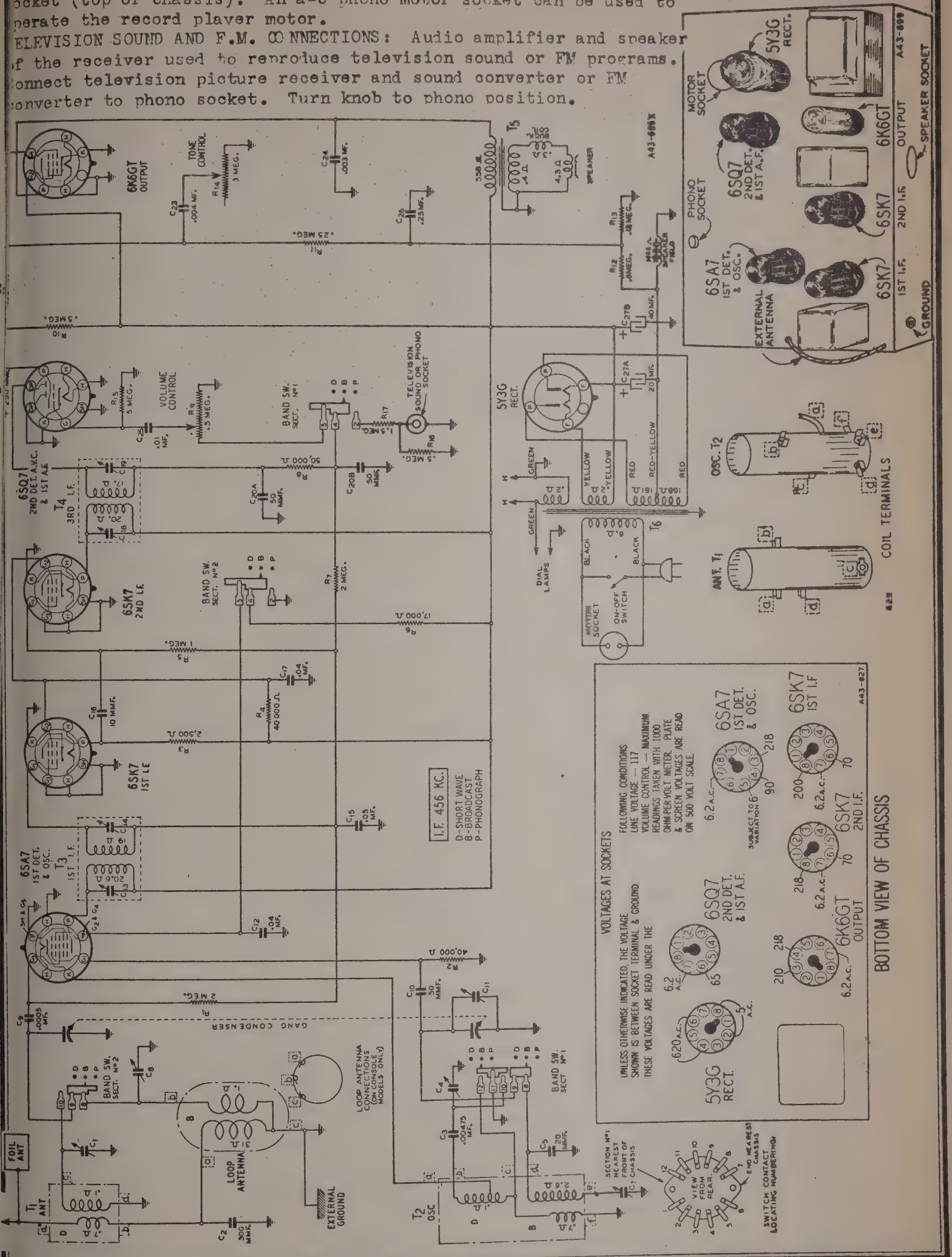
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

MONTGOMERY WARD & CO. MODELS 04WG-619, 04WG-621,04WG-621NI

HONOGRAPH CONNECTIONS: Insert phono pickup cable into phono ocket (top of chassis). An a-c phono motor socket can be used to perate the record player motor.

ELEVISION SOUND AND F.M. CONNECTIONS: Audio amplifier and speaker f the receiver used to reproduce television sound or FM programs. onnect television picture receiver and sound converter or FM onverter to phono socket. Turn knob to phono position.



VOLTAGES AT SOCKETS

UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND. THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS LINE VOLTAGE — 117 VOLUME CONTROL — MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE

SUBJECT TO VARIATION

BOTTOM VIEW OF CHASSIS

©John F. Rider, Publisher

SPECIFICATIONS—Model No. 04BR-620A

Power Consumption Radio Only - - - - - - 70 Watts
Radio and Motor - - - - 90 Watts
Power Output - - - - - - - - 2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 15 Microvolts Average
Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC
Intermediate Frequency - - - - - - - - 455 KC
Speaker - - - - - - - - - - 8 in. Electro Dynamic

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Chassis View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Chassis View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Chassis View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 530 K.C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." leads.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

SPECIFICATIONS

Power Consumption 57 Watts (At 117 volts 60 cycles)
Power Output................ 1.7 Watts Undistorted
2.5 Watts Maximum
Selectivity.....40 KC Broad at 1000 times Signal
Intermediate Frequency..................456 KC
Speaker..............6" or 8" Electro-Dynamic

Tuning Frequency Range
B Range............................ 528 to 1600 KC
D Range............................5750 to 18300 KC
Sensitivity—External Antenna—(For 0.5 Watt output)
B Range.................. 7 Microvolts Average
D Range.....................15 Microvolts Average

MODEL 04WG-619
" 04WG-621
" 04WG-621NI

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

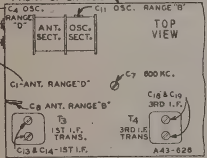
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Console Model—It is not necessary to remove chassis from cabinet. Merely remove chassis mounting screws so that chassis may be turned to reach oscillator trimmer on gang condenser.					
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 3rd I.F. (C18) & (C19)
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C8)
600 KC	External Antenna Clip or Lead See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C7) Rock Rotor—See Note C
RANGE D					
18.300 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17 000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip or Lead See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C8)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—(Table Model) By means of wooden blocks, stand the loop aerial assembly upright exactly 4 inches from the back of the chassis.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—(Table Model) Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop antenna (Table Model) or ground screw on chassis (Console Model).

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15 000 KC. The signal will then be heard at 15.000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15.000 less 912 KC, or 14.088 KC on the dial. It may be necessary to increase the input signal to hear the image.

ANTENNA

Two built-in Air Wave Aerials are used with this radio.

One of these aerials is a loop type and is used for broadcast band reception. The other is a counterpoise foil aerial and is used for reception on the short wave band. For the reception of local or nearby stations, an outside antenna and ground are usually not required.

For best reception of short wave stations, an outside antenna is recommended.

For best results, an outside antenna 50 to 60 feet long, including the lead-in, should be used.

DRIVE CORD REPLACEMENT

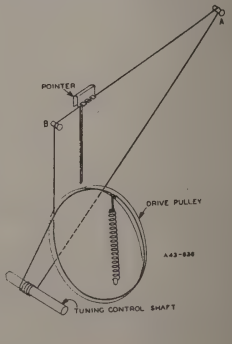
Turn gang condenser to full open position—See illustration. Use a new drive cord 42 inches in length.

Tie one end of cord to tension spring. Pass other end of cord up through hole in groove of drive pulley. Pull cord through hole until spring is flush against inside of pulley rim.

Wind cord 1/4 turn counter-clockwise (from pulley side of chassis) around drive pulley. Then wind 4 1/2 turns clockwise (from front of chassis) around tuning control shaft. These turns should progress toward chassis. Pass cord over idler studs A and B as shown, then wind cord 3/4 turn counter-clockwise (from pulley side of chassis) around drive pulley. This turn should be on left side (from front of chassis) of pulley groove.

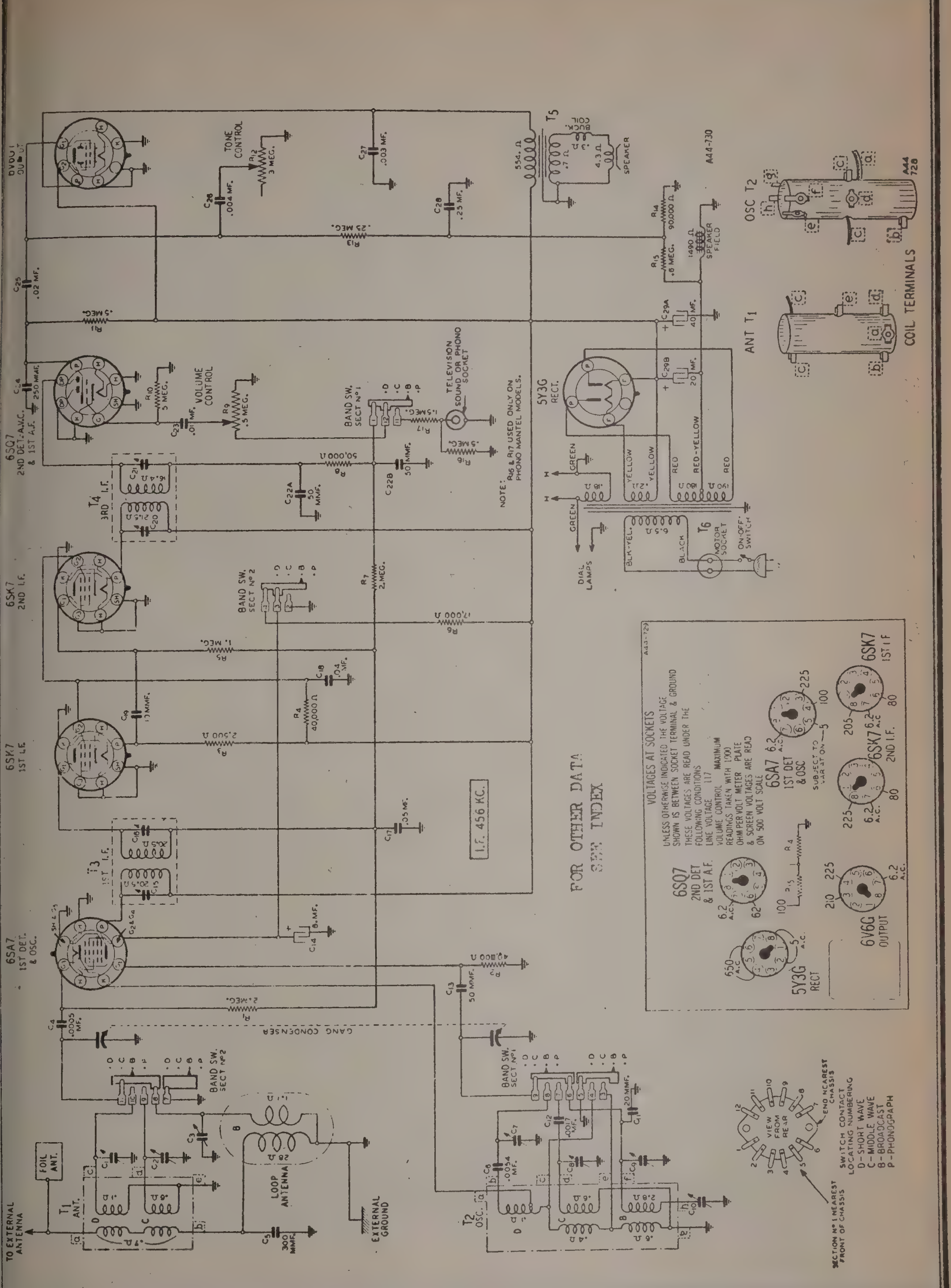
Pass cord through hole in groove of drive pulley. Tie cord to tension spring. Fasten other end of spring to hook on drive pulley.

DIAL POINTER ATTACHMENT—Tune in a signal of known frequency. Set pointer at this frequency mark on dial scale. Fasten pointer to drive cord—See illustration.



MONTGOMERY WARD & CO.

MODELS 04WG-622A, 04WG-623A



VOLTAGES AT SOCKETS

UNLESS OTHERWISE INDICATED THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND

THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS

LINE VOLTAGE 117

VOLUME CONTROL MAXIMUM

READINGS TAKEN WITH 1000 OHM PER VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE

SUBJECT TO VARIATION

FOR OTHER DATA SEE INDEX

©John F. Rider, Publisher

MODELS 04WG-622A,04WG-623A MONTGOMERY WARD & CO.
MODEL 04WG-731

SPECIFICATIONS MODEL 04WG-731

Power Consumption. .28 Watts (At 117 volts AC Supply)
Power Output. . . . . .9 Watt Undistorted
1.3 Watts Maximum
Selectivity. . . . . . . .39 KC Broad at 1000 times Signal
Intermediate Frequency. . . . . .456 KC
Speaker . . . . .6" P.M. Dynamic

Tuning Frequency Range
B Range . . . . 528 to 1600 KC
D Range . . . . .9000 to 12,200 KC

Sensitivity (For .05 watt output)
B Range . . . . 8 Microvolts Average
D Range . . . . .10 Microvolts Average

CAUTION

The metal chassis is connected to one side of the line through a .2 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohm.

SIGNAL GENERATOR						
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
I. F.						
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	Point "X" { 12SQ7—1st A.F. Prong No. 3 }	.1 mf.	B Range	Turn Rotor to full open	1st I.F. (C15) & (C16) 3rd I.F. (C19) & (C20)
RANGE B						
1600 KC	Signal Grid of 1st Det.	Point "X"	.1 mf.	B Range	Turn Rotor to full open	Oscillator Range B (C10)
1400 KC	External Antenna Clip on Loop —See Note A	External Ground Clip On Loop	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna Range B (C8)
RANGE D						
10,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Tuning Knob until Indicator is at 10.5 MC on Scale	Oscillator Range D (C7)
10,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Leave Setting as above	Ant. Range D (C4)

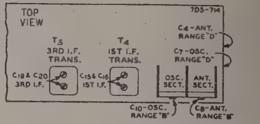
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

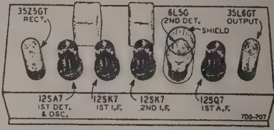
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—By means of wooden blocks, stand the loop aerial assembly upright exactly one inch from the back of the chassis.

NOTE B—If the pointer is not at 1400 KC on the dial, set pointer at this mark on the dial scale.





SPECIFICATIONS MODELS 04WG-622A, 04WG-623A

Power Consumption 60 Watts (At 117 volts 60 cycles)
Power Output. . . . . 2.5 Watts Undistorted
3.5 Watts Maximum
Selectivity. . . . .40 KC Broad at 1000 times Signal
Intermediate Frequency. . . . . .456 KC
Speaker . . . . .6" Electro-Dynamic

Tuning Frequency Range
B Range . . . . 528 to 1600 KC
C Range . . . . .2200 to 7000 KC
D Range . . . . .7000 to 22000 KC

Sensitivity—External Antenna—(For 0.5 Watt output)
B Range . . . . 7 Microvolts Average
C Range . . . . 7 Microvolts Average
D Range . . . . .15 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 3rd I.F. (C20) & (C21)
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C3)
600 KC	External Antenna Clip or Lead See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C10) Rock Rotor—See Note C
RANGE C					
7000 KC	External Antenna Clip or Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C8)
6000 KC	External Antenna Clip or Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C2)
RANGE D					
22,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
21,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip or Lead See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C3)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—(Table Model) By means of wooden blocks, stand the loop aerial assembly the same distance from the back of the chassis that it is normally when the chassis is assembled in the cabinet.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

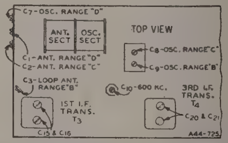
NOTE D—Re-assemble chassis in cabinet. Replace back on cabinet (Table Model). Connect ground post of signal generator to external ground clip on loop antenna (Table Model) or ground screw on chassis (Console Model).

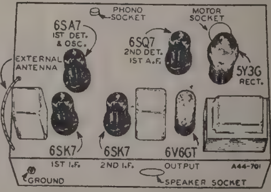
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

MODEL 04WG-622A
" 04WG-623A

PHONOGRAPH CONNECTIONS: Insert phono pickup cable into phono socket (top of chassis). An a-c phono motor socket can be used to operate the record player motor.

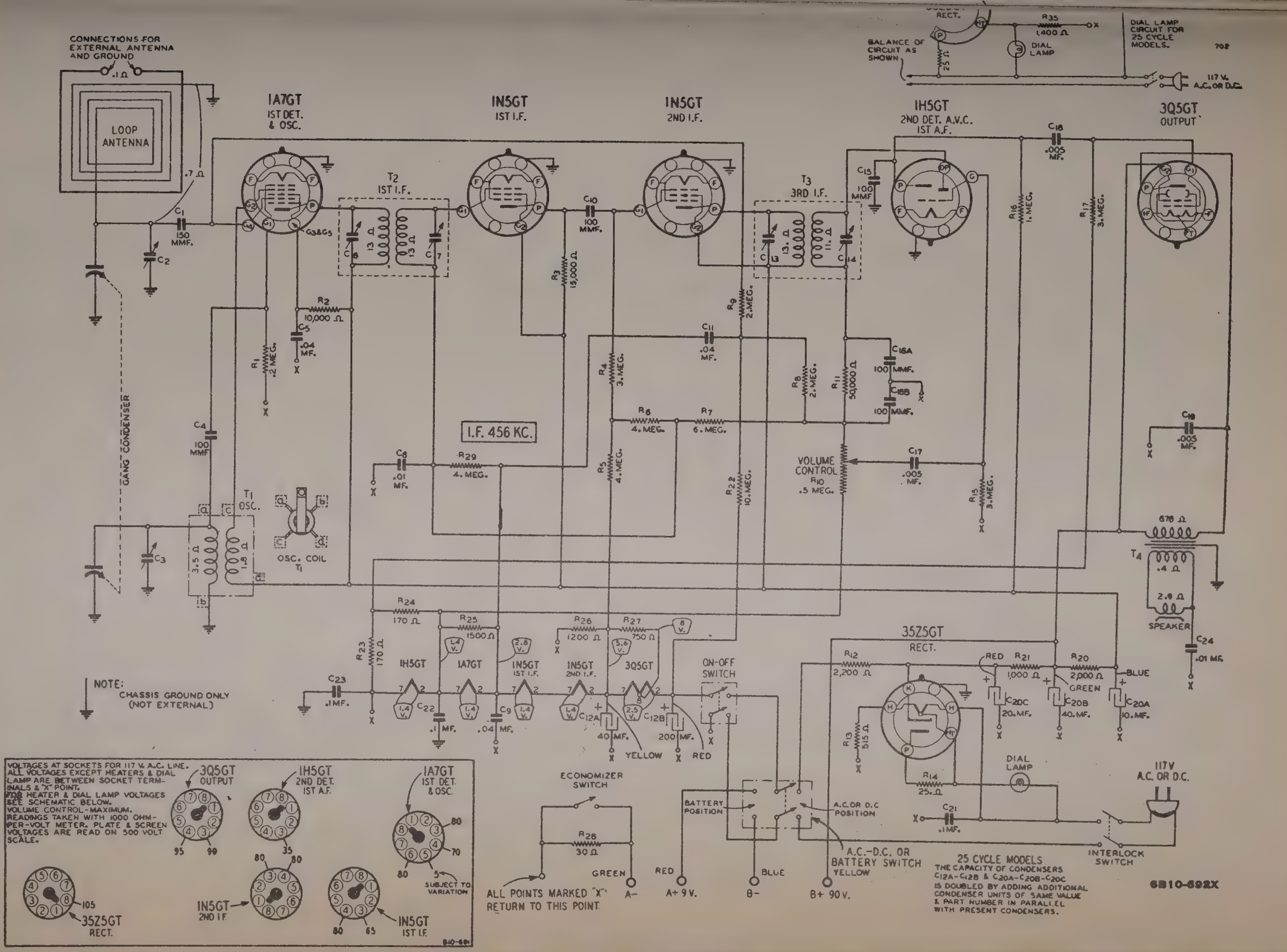
TELEVISION SOUND AND F.M. CONNECTIONS: Audio amplifier and speaker of the receiver used to reproduce television sound or FM programs. Connect television picture receiver and sound converter or FM converter to phono socket. Turn knob to phono position.





MONTGOMERY WARD & CO.

MODEL 04WG-672



VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "X" POINT. FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW. VOLUME CONTROL-MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

25 CYCLE MODELS

THE CAPACITY OF CONDENSERS C_{12A}-C_{12B} & C_{20A}-C_{20B}-C_{20C} IS DOUBLED BY ADDING ADDITIONAL CONDENSER UNITS OF SAME VALUE & PART NUMBER IN PARALLEL WITH PRESENT CONDENSERS.

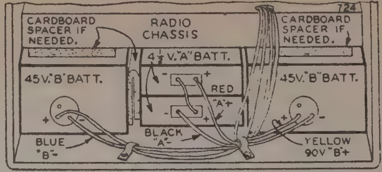
MODEL 04WG-672

SPECIFICATIONS

Input Voltages and Currents—Battery Operation
"A" Batteries.................. 9 Volts—50 Ma.
"B" Batteries..................90 Volts—11.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output

Battery Operation - - - -	150 Mw. Undistorted 350 Mw. Maximum
AC Operation - - - - -	200 Mw. Undistorted 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - 456 KC
Speaker - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

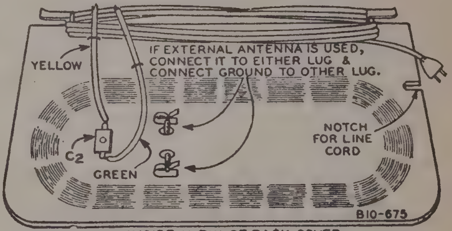
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf.

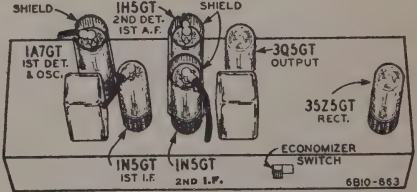
SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below)
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	200 mmf.	Turn Rotor to max. output	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet. Close back on cabinet.

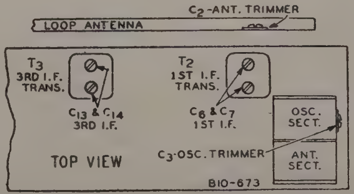
CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, set the pointer at the 800 KC mark.


YELLOW
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
C2
GREEN
NOTCH FOR LINE CORD
B10-675

INSIDE VIEW OF BACK COVER



IMPORTANT - METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.



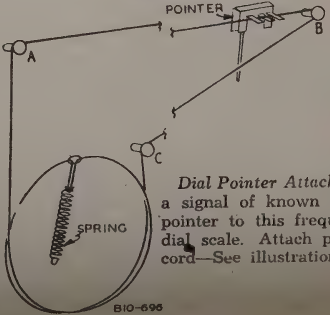
DRIVE CORD REPLACEMENT

Use a new drive cord 28 inches in length; tie one end to tension spring. Thread other end through hole in groove of drive pulley and pull spring flush against inside of pulley rim. Turn gang condenser to full open position—See illustration.

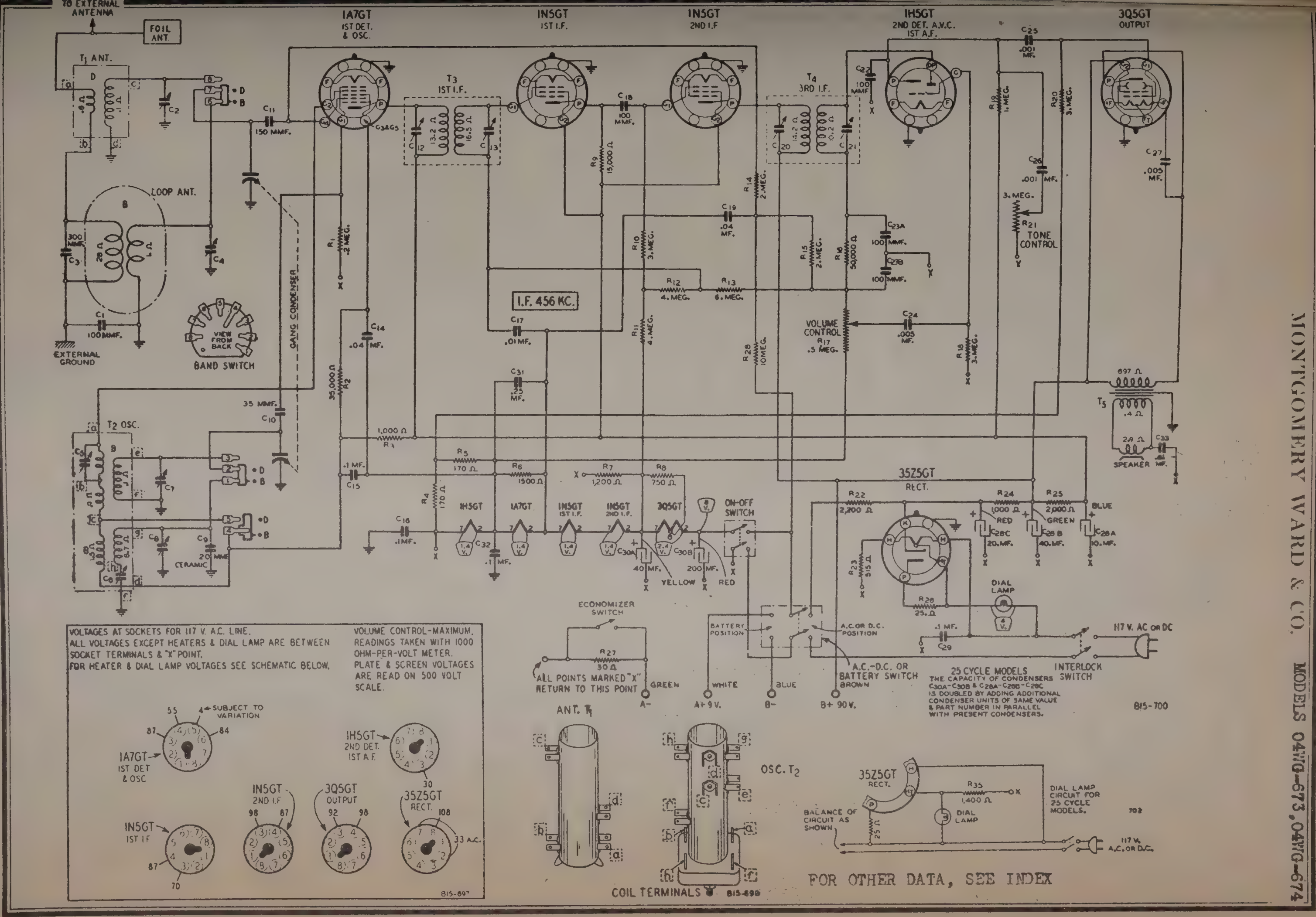
Wind cord ¾ turn clockwise (from back of chassis) around drive pulley. Pass cord over idler studs A, B, & C, as shown. Then wind cord ¾ turn clockwise (from back of chassis) around drive pulley. This turn should be on left side (from gang condenser side of chassis) of pulley groove.

Thread cord through hole in pulley groove and tie to tension spring.

Attach other end of spring to hook on drive pulley.



Dial Pointer Attachment—Tune in a signal of known frequency. Set pointer to this frequency mark on dial scale. Attach pointer to drive cord—See illustration.



VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "X" POINT.
FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW.

VOLUME CONTROL-MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER.
PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

ALL POINTS MARKED "X" RETURN TO THIS POINT

25 CYCLE MODELS
THE CAPACITY OF CONDENSERS C30A-C30B & C28A-C28B-C28C IS DOUBLED BY ADDING ADDITIONAL CONDENSER UNITS OF SAME VALUE & PART NUMBER IN PARALLEL WITH PRESENT CONDENSERS.

FOR OTHER DATA, SEE INDEX

SPECIFICATIONS

Input Voltages and Currents—Battery Operation
"A" Battery .... 9 Volts—50 Ma.
"B" Batteries .... 90 Volts—11.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output
Battery Operation - - - - - - 150 Mw. Undistorted
350 Mw. Maximum
AC Operation - - - - - - - 200 Mw. Undistorted
400 Mw. Maximum
Selectivity - - - - 38 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - 6" or 8" P.M. Dynamic
Tuning Frequency Range
B Range .... 528 to 1600 KC
D Range ....5750 to 18300 KC
Sensitivity—External Antenna—(For .05 Watt output)
B Range ....12 Microvolts Average
D Range......................20 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The equipment in column at right is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
Loop Aerial must be connected to chassis during all adjustments. Mantel Model—Take out hinge screws from cabinet back as well as other screws and remove chassis and back intact from cabinet.						
I. F. 456 KC	External Antenna Wire	Point "X" 1H5GT—2nd Det. Prong No. 7	.1 mf.	B Range	Turn Rotor to Full Open	3rd I.F. (C20) & (C21) 1st I.F. (C12) & (C13)
RANGE B 1600 KC	External Antenna Wire	External Ground Wire	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1400 KC	External Antenna Wire—See Note B	External Ground Wire	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C4)
600 KC	External Antenna Wire—See Note B	External Ground Wire	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C6) Rock Rotor—See Note C
RANGE D 18,300 KC	External Antenna Wire	External Ground Wire	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
16,000 KC	External Antenna Wire	External Ground Wire	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note C
6000 KC	External Antenna Wire	External Ground Wire	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C5) Rock Rotor—See Note C
LOOP RANGE B 1400 KC	External Antenna Wire—See Note D	External Ground Wire	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C4)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

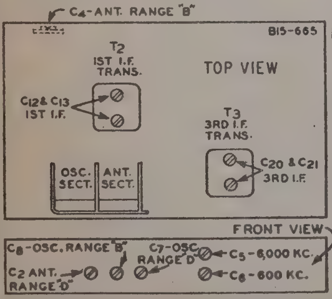
After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale.

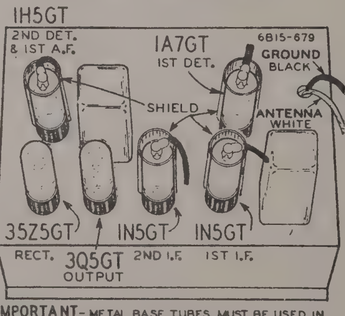
NOTE B (Mantel Model Only)—By means of wooden blocks, stand the loop aerial assembly upright exactly 1¾ inches from the back of the chassis.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-assemble chassis in cabinet. Mantel Model—Replace back on cabinet. Antenna Range B trimmer may be reached through narrow slot in cabinet back.



CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



IMPORTANT-METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.

DRIVE CORD REPLACEMENT

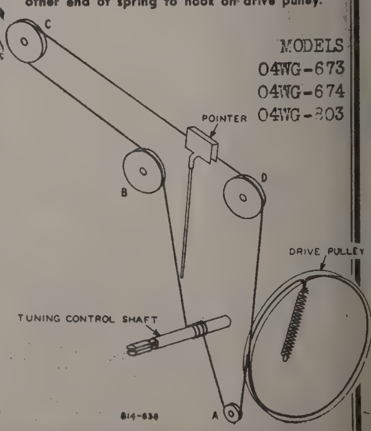
Turn gang condenser to full open position—See illustration. Use a new drive cord 42 inches in length.

Tie one end of cord to tension spring. Pass other end of cord up through hole in groove of drive pulley. Pull cord through hole until spring is flush against inside of pulley rim.

Pass cord under small pulley A—See illustration. Then wind 4 turns counter-clockwise (from back of chassis) around tuning control shaft. These turns should progress toward dial mounting plate. Pass cord over pulleys B, C, and D as shown. Then wind cord ¾ turn counter-clockwise (from drive pulley side of chassis) around drive pulley. This turn should be on left side (from back of chassis) of pulley groove.

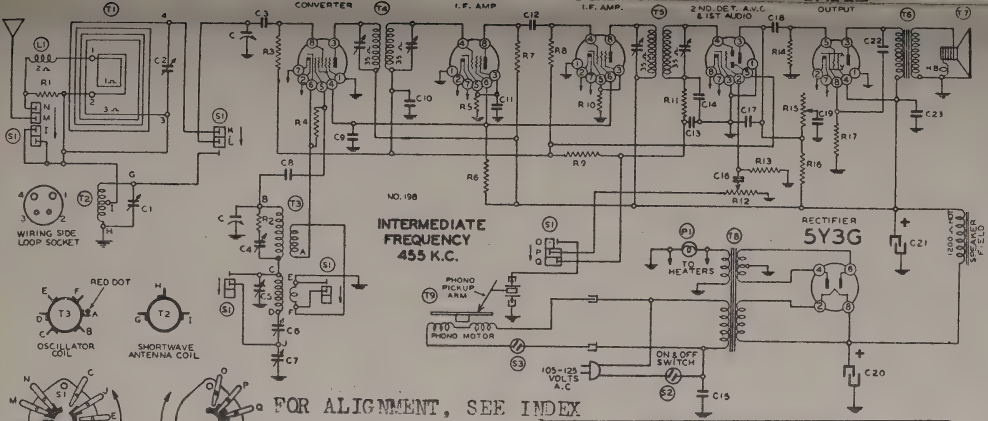
Pass cord through hole in groove of drive pulley. Tie cord to tension spring. Fasten other end of spring to hook on drive pulley.

MODELS
04WG-673
04WG-674
04WG-303



MONTGOMERY WARD & CO.

MODEL 04BR-620A



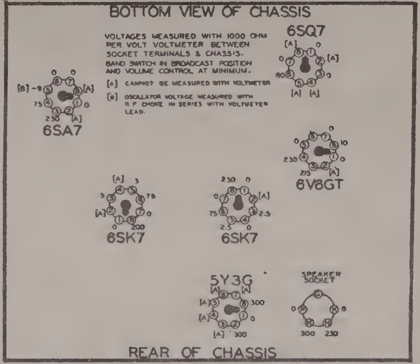
FOR ALIGNMENT, SEE INDEX

BRC—Series A—Form 6263—5250—8-40
Pro. 209

VIEWED FROM REAR

VIEWED FROM FRONT

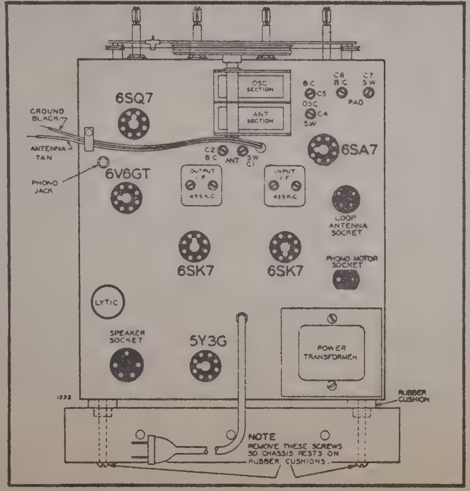
WAVE BAND SWITCH SHOWN IN BROADCAST POSITION



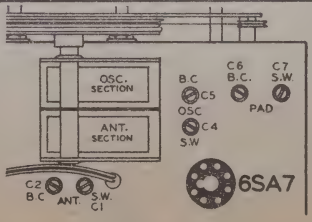
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS. BAND SWITCH IN BROADCAST POSITION AND VOLUME CONTROL AT MINIMUM.

[A] CANNOT BE MEASURED WITH VOLTMETER

[B] OSCILLATOR VOLTAGE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.



CHASSIS VIEW



TRIMMER VIEW

RESISTORS

No.	No.	
R1	BE13071	4000 Ohm—⅓ w.
R2	BE130128	20 Ohm—⅓ w.
R3	BE13019	1 Megohm—⅓ w.
R4	BE130236	30M Ohm—⅓ w.
R5	BE130283	750 Ohm—⅓ w.
R6	BE130324	18M Ohm—1 watt
R7	BE130218	5M Ohm—⅓ w.
R8	BE13020	100M Ohm—⅓ w.
R9	BE130170	3 Megohm—⅓ w.
R10	BE130222	350 Ohm—⅓ w.
R11	BE13012	50M Ohm—⅓ w.
R12	BE101232	1 Megohm Volume Control
R13	BE130223	10 Megohm—⅓ w.
R14	BE1303	500M Ohm—⅓ w.
R15	BE101231	1 Megohm Tone Control
R16	BE130172	250M Ohm—⅓ w.
R17	BE130323	270 Ohm—1 watt

CONDENSERS

C	BE102137	Two Gang Variable Condenser
C1	BE124149	S.W. Antenna Trimmer
C2	BE124149	B.C. Antenna Trimmer
C3	BE1292	.0005 Mica
C4	BE124142	S.W. Oscillator Trimmer
C5	BE124142	B.C. Oscillator Trimmer
C6	BE124146	B.C. Padding Condenser
C7	BE124146	S.W. Padding Condenser
C8	BE12960	150 mmfd. Mica
C9	BE10013	.05 x 400 v.
C10	BE10022	.05 x 200 v.
C11	BE1009	.05 x 200 v.
C12	BE1292	.0005 Mica
C13	BE129161	.0001 Mica
C14	BE129161	.0001 Mica
C15	BE10061	.02 x 600 v.
C16	BE10025	.002 x 600 v.
C17	BE12912	.00025 Mica
C18	BE10026	.02 x 400 v.
C19	BE10071	.004 x 600 v.
C20	BE119115	16 mfd. x 400 w. v. lytic
C21	BE119115	16 mfd. x 400 w. v. lytic
C22	BE10019	.006 x 600 v.
C23	BE1001	.1 x 400 v.

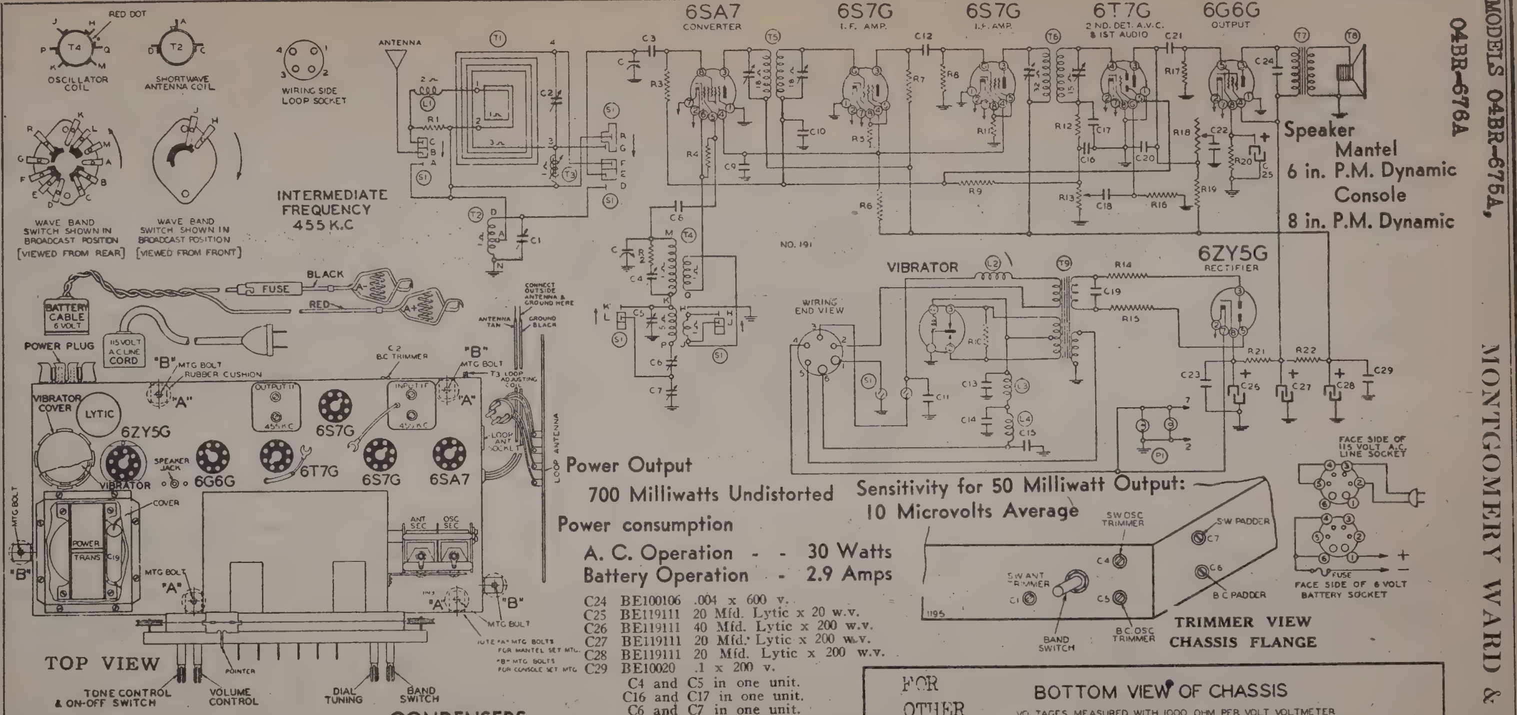
C1 and C2 are in same unit C4 and C5 in same unit
C6 and C7 are in same unit C13 and C14 in same unit
C20 and C21 are in same unit

PARTS

T1	BE111208	Loop Antenna Assembly
T2	BE111184	S.W. Antenna Coil
T3	BE110154	B.C. and S.W. Oscillator Coil
T4	BE108169E	Input I.F. Coil—455 kc.
T5	BE108106U	Output I.F. Coil—455 kc.
T6	BE105118	Output Transformer
T7	BE114216	8" Electro Dynamic Speaker
T8	BE104225B	60 Cycle Power Transformer
and	BE104238B	25 Cycle Power Transformer
T9	BE104228	60 Cycle Seeburg Record Changer and Phono Assembly
and	BE104229	25 Cycle Seeburg Record Changer and Phono Assembly
S1	BE125132	Phono-band Switch
S2		Switch on Volume Control
S3		Switch on Record Changer
L1	BE12312	R.F. Choke Coil
P1	BE10794	Pilot Light Bulb No. T-44

MODELS 04BR-675A, 04BR-676A

MONTGOMERY WARD & CO.



Speaker
Mantel 6 in. P.M. Dynamic
Console 8 in. P.M. Dynamic

Power Output

700 Milliwatts Undistorted

Power consumption

A. C. Operation - - 30 Watts
Battery Operation - 2.9 Amps

Sensitivity for 50 Milliwatt Output:
10 Microvolts Average

Range 535 to 1600 KC
5.6 to 18.3 MC

RESISTORS

Diagram Ref. No.	Part No.	
R1	BE130193	3M ohm—⅓ w.
R2	BE130276	10 ohm—⅓ w.
R3	BE13019	1 megohm—⅓ w.
R4	BE130236	30M ohm—⅓ w.
R5	BE13070	500 ohm—⅓ w.
R6	BE13067	9M ohm—⅓ w.
R7	BE130157	12M ohm—⅓ w.
R8	BE13019	1 megohm—⅓ w.
R9	BE130170	3 megohm—⅓ w.
R10	BE13084	200 ohm—⅓ w.
R11	BE130192	2M ohm—⅓ w.
R12	BE13020	100M ohm—⅓ w.
R13	BE101227	Volume Control
R14	BE130233	60 ohm—⅓ w.
R15	BE130233	60 ohm—⅓ w.
R16	BE130223	10 megohm—⅓ w.
R17	BE1303	500M ohm—⅓ w.
R18	BE101228	2 megohm (Tone)
R19	BE130266	200M ohm—⅓ w.
R20	BE13079	400 ohm—⅓ w.
R21	BE130222	350 ohm—⅓ w.
R22	BE130235	1500 ohm—⅓ w.

CONDENSERS

C	BE102133	2 Gang Variable Condenser
C1	BE124116	S.W. Antenna Trimmer
C2	BE124141	B.C. Antenna Trimmer
C3	BE12921	.0002 mica
C4	BE124142	S.W. Oscillator Trimmer
C5	BE124142	B.C. Oscillator Trimmer
C6	BE124140	B.C. Pad Trimmer
C7	BE124140	S.W. Pad Trimmer
C8	BE12938	.00005 mica
C9	BE10048	.25 x 200 v.
C10	BE1009	.05 x 200 v.
C11	BE10013	.05 x 400 v.
C12	BE1292	.0005 mica
C13	BE10031	.5 x 120 v.
C14	BE10031	.5 x 120 v.
C15	BE10031	.5 x 120 v.
C16	BE129161	.0001 mica
C17	BE129161	.0001 mica
C18	BE10025	.002 x 600 v.
C19	BE10073	.008 x 1200 v.
C20	BE1292	.0005 mica
C21	BE10026	.02 x 400 v.
C22	BE100106	.004 x 600 v.
C23	BE10020	.1 x 200 v.
C24	BE100106	.004 x 600 v.
C25	BE119111	20 Mfd. Lytic x 20 w.v.
C26	BE119111	40 Mfd. Lytic x 200 w.v.
C27	BE119111	20 Mfd. Lytic x 200 w.v.
C28	BE119111	20 Mfd. Lytic x 200 w.v.
C29	BE10020	.1 x 200 v.

C4 and C5 in one unit.
C16 and C17 in one unit.
C6 and C7 in one unit.
C25, C26, C27 and C28 in one unit

PARTS

T1	BE111194	Loop Ant. Assembly (Mantel)
	BE111196	Loop Ant. Assembly (Console)
T2	BE111193	S.W. Ant. Coil
T3	BE111183	Loop Adj. Coil
T4	BE110160	B.C. S.W. Oscillator Coil
T5	BE108183	Input I.F. Coil—455 kc.
T6	BE108180	Output I.F. Coil—455 k.c.
T7	BE105114	Output Transformer
T8	BE114210	6" Speaker P.M. (Mantel)
	BE114211	8" P.M. Speaker (Console)
T9	BE104216	Power Transformer
S1	BE125119	Wave Band Switch
L1	BE12312	R.F. Choke Coil
L2	BE105102	"A" Choke
L3	BE10568	"A" Choke Coil
L4	BE105102	"A" Choke
P1	BE107259	(2) T47 Pilot Light Bulbs

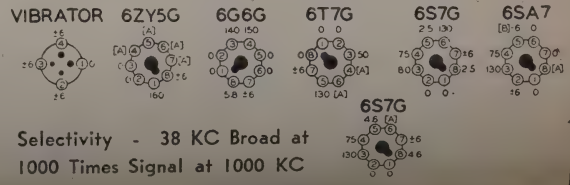
6-40

FOR OTHER DATA SEE INDEX

BOTTOM VIEW OF CHASSIS

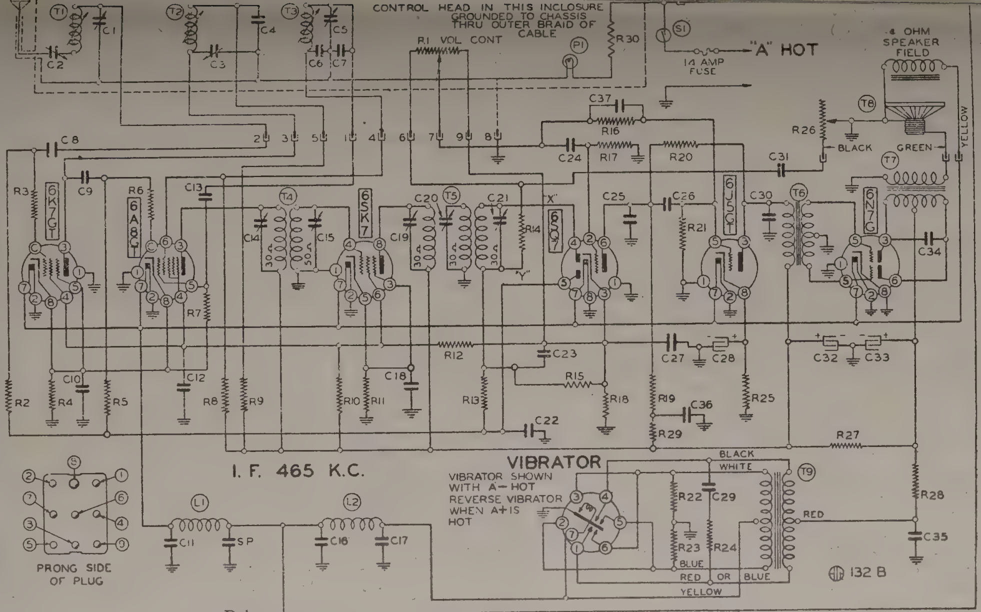
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS LOOP PLUGGED INTO CHASSIS AND SET TUNED OFF SIGNAL SET OPERATING ON 6.3 VOLT STORAGE BATTERY

[A] CANNOT BE MEASURED WITH VOLTMETER
[B] OSCILLATOR VOLTAGE MEASURED WITH R.F CHOKE IN SERIES WITH VOLTMETER LEAD



Selectivity - 38 KC Broad at
1000 Times Signal at 1000 KC

REAR OF CHASSIS



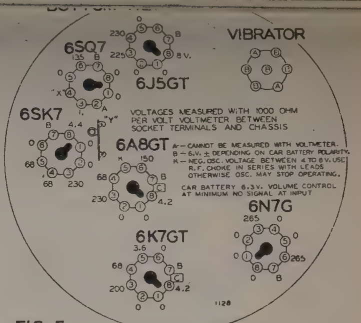

VIBRATOR
6SQ7
6J5GT
6SK7
6A8GT
6K7GT
6N7G
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
A — CANNOT BE MEASURED WITH VOLTMETER.
B — 6.V. ± DEPENDING ON CAR BATTERY POLARITY.
K — NEG. OSC. VOLTAGE BETWEEN 4 TO 8 V. USE R.F. CHOKE IN SERIES WITH LEADS OTHERWISE OSC. MAY STOP OPERATING.
CAR BATTERY 6.3V. VOLUME CONTROL AT MINIMUM NO SIGNAL AT INPUT
1128

FIG. 5

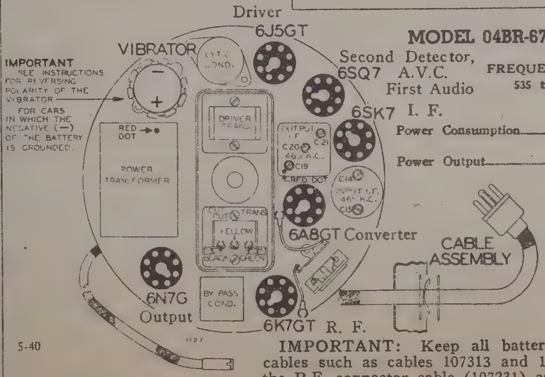


Fig. 3—Top View of Chassis

MODEL 04BR-678C (SERIAL No. 15927 and UP)

FREQUENCY RANGE
535 to 1565 Kc.

Power Consumption..........7.7 Amperes at 6.3 Volts

Power Output..........7 Watts Undistorted.
9 Watts Maximum

IMPORTANT: Keep all battery connecting wires and cables such as cables 107313 and 107315 as far away from the R.F. connector cable (107231) as possible. This will reduce any interference which may be present in these battery wires from being radiated back into the R.F. connector cable 107231.

RESISTORS

R1	BE101161	1.2 megohm volume control
R2	BE13019	1 megohm— ⅓ w.
R3	BE130275	500 ohm—⅓ w.
R4	BE13079	400 ohm—⅓ w.
R5	BE13019	1 megohm—⅓ w.
R6	BE130275	500 ohm—⅓ w.
R7	BE13012	50M ohm—⅓ w.
R8	BE13012	50M ohm—⅓ w.
R9	BE13021	20M ohm—⅓ w.
R10	BE130196	30M ohm—1 watt
R11	BE130235	1500 ohm—⅓ w.
R12	BE1307	40M ohm—⅓ w.
R13	BE13019	1 megohm—⅓ w.
R14	BE13020	100M ohm—⅓ w.
R15	BE130118	600M ohm—⅓ w.
R16	BE130257	5 megohm—⅓ w.
R17	BE13019	1 megohm—⅓ w.
R18	BE130101	600 ohm—⅓ w.
R19	BE13011	250M ohm—⅓ w.
R20	BE13038	2 megohm—⅓ w.
R21	BE1303	500M ohm—⅓ w.
R22	BE130269	100 ohm—⅓ w.
R23	BE130269	100 ohm—⅓ w.
R24	BE13071	4M ohm—⅓ w.
R25	BE13092	1M ohm—⅓ w.
R26	BE101162	1 megohm tone control
R27	BE130199	1500 ohm Resistor—1 watt
R28	BE130231	75 ohm—⅓ w.
R29	BE13020	100M ohm—⅓ w.
R30	BE130299	10 ohm—⅓ w.

CONDENSERS

C1	BE12483	Antenna Shunt Trimmer
C2	BE12481	Antenna Series Trimmer
C3	BE12480	R. F. Shunt Trimmer
C4	BE100102	.15 x 400 v.
C5	BE12480	Oscillator Shunt Trimmer
C6	BE129137	.0005 Mica
C7	BE129136	.00017 Mica
C8	BE12997	.00005 Ceramicon—5%
C9	BE1292	.0005 Mica
C10	BE11625	.05 x 200 v.
C11	BE1296	.002 Mica
C12	BE11625	.25 x 400 v.
C13	BE12912	.00025 Mica
C14		Plate Trimmer on Input I.F. Trans.
C15		Grid Trimmer on Input I.F. Trans.
C16	BE10031	.5 x 120 v.
C17	BE10031	.5 x 120 v.
C18	BE1009	.05 x 200 v.
C19		Plate Trimmer on Output I.F. Trans.
C20		Tertiary Trimmer on Output I.F. Trans.
C21		Grid Trimmer on Output I.F. Trans.
C22	BE11625	.05 x 200 v.
C23	BE1295	.0001 Mica
C24	BE10011	.01 x 400 v.
C25	BE1295	.0001 Mica
C26	BE10011	.01 x 400 v.
C27	BE10026	.02 x 400 v.
C28	BE11988	20 mfd.—25 w. v. lytic
C29	BE100101	.0055 x 1600
C30	BE129114	.0003 Mica
C31	BE10047	.002 x 600 v.
C32	BE11988	15 mfd.—450 w. v. lytic
C33	BE11988	15 mfd.—450 w. v. lytic
C34	BE100103	.004 x 800 v.
C35	BE1001	.1 x 400 volt
C36	BE10013	.05 x 400 v.
C37	BE12967	.00004 Mica

PARTS

T1	BE111118	P.B. Antenna Coil Assembly Complete
T2	BE10949	P.B.R.F. Coil Assembly Complete
T3	BE110109	P.B. Oscillator Coil
T4	BE108120B	Input I.F. Coil—465 kc.
T5	BE108115B	Output I.F. Coil—465 kc.
T6	BE10584	Audio Driver Transformer
T7	BE10583	Output Transformer
T8	BE114155	8" Dynamic Speaker
T9	BE104158	Power Transformer
L1	BE10566	"A" Choke
L2	BE10519	"A" Choke
P1	BE10797	6-8 v. Pilot Light T51
S1		Off-on Switch on volume control
	BE1269	Vibrator (130 cycle synchronous).

MODEL 04BR-678C
above ser.#15927

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 125 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	Trimmers C19, C20 (See Fig. 3)	Output I. F.	See note "A" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SK7	Set dial at 1400 Kc.	Trimmer C21 (See Fig. 3)	Output I. F.	See note "B" Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6A8GT	Set dial at 1400 Kc.	Trimmers C14, C15 (See Fig. 3)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1565 Kc.	125 mmf.	Antenna lead	Set dial at 1565 Kc.	Trimmer C5 (See Fig. 4)	Oscillator	Adjust to maximum output
	1400 Kc.	125 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmers C1, C3 (See Fig. 4)	Antenna and R. F.	Adjust to maximum output
	600 Kc.	125 mmf.	Antenna lead	Set dial at 600 Kc.	Trimmer C2 (See Fig. 4)	Antenna series adj.	See note "C"

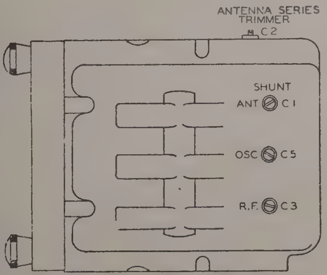


Fig. 4.—Bottom View of Remote Tuner

NOTE "A" IMPORTANT: To align the output I. F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the diode tuned circuit. Connect the resistor as indicated by points "X" and "Y" on the circuit diagram and the bottom view of the radio chassis Fig. 5. A red dot on top of output I. F. can designates location of trimmer "C19."

NOTE "B" Before adjusting trimmer C21 disconnect the 10M ohm resistor. Under no circumstances re-adjust trimmers C19 or C20 after the 10M ohm resistor has been removed.

For alignment of the output I. F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used.

NOTE "C" Maximum gain for this adjustment depends on the capacity of the antenna system of the car in which the radio is installed. For the proper alignment of this adjustment see "Adjusting Antenna Trimmer,"

ALIGNMENT OF THE IRON CORES

The iron cores for the antenna, R. F. and oscillator permeability coils have been very carefully adjusted at the factory and require no further adjustment, unless it becomes necessary to replace a coil, or if the adjustments have been tampered with.

The procedure for aligning the iron cores will be supplied with replacement coils when ordered.

IMPORTANT—ADJUSTING ANTENNA TRIMMER:

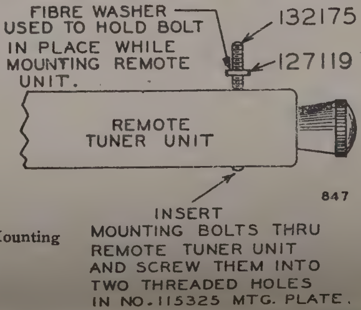
Tune in any weak station between 600 and 800 kc.

Make sure that the antenna shunt trimmer on the Bottom of the Remote Tuner is turned all the way out (counter clockwise), (see adjustment "C1," Fig. 4)

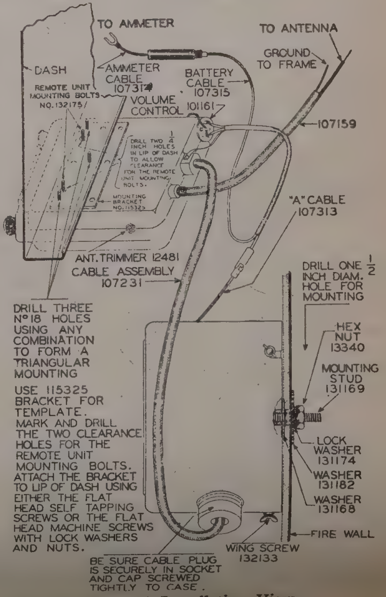
Adjust antenna series trimmer on the side of the remote **Tuner Unit.** For maximum output. (See adjustment "C2," Fig. 4)

NOTE: If resonance (maximum output) cannot be obtained within the range of the antenna series trimmer "C2," turn the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer "C1" on the **bottom of the remote tuner unit for a peak of maximum output.**

The above arrangement will cover any antenna capacity that is now in use.


FIBRE WASHER USED TO HOLD BOLT IN PLACE WHILE MOUNTING REMOTE UNIT.
132175
127119
REMOTE TUNER UNIT
847
INSERT MOUNTING BOLTS THRU REMOTE TUNER UNIT AND SCREW THEM INTO TWO THREADED HOLES IN NO.115325 MTG. PLATE.

Remote Mounting


TO AMMETER
TO ANTENNA
GROUND TO FRAME
DASH
AMMETER CABLE 107314
BATTERY CABLE 107315
REMOTE UNIT MOUNTING BOLTS NO.132175
VOLUME CONTROL 101161
107159
DRILL TWO 1/4 INCH HOLES IN LIP OF DASH TO ALLOW CLEARANCE FOR THE REMOTE UNIT MOUNTING BOLTS.
MOUNTING BRACKET NO.115325
"A" CABLE 107313
ANT. TRIMMER 12481
CABLE ASSEMBLY 107231
DRILL ONE 1/2 INCH DIAM. HOLE FOR MOUNTING
DRILL THREE Nº18 HOLES USING ANY COMBINATION TO FORM A TRIANGULAR MOUNTING
USE 115325 BRACKET FOR TEMPLATE. MARK AND DRILL THE TWO CLEARANCE HOLES FOR THE REMOTE UNIT MOUNTING BOLTS. ATTACH THE BRACKET TO LIP OF DASH USING EITHER THE FLAT HEAD SELF TAPPING SCREWS OR THE FLAT HEAD MACHINE SCREWS WITH LOCK WASHERS AND NUTS.
HEX NUT 13340
MOUNTING STUD 131169
LOCK WASHER 131174
WASHER 131182
WASHER 131168
FIRE WALL
WING SCREW 132133
BE SURE CABLE PLUG IS SECURELY IN SOCKET AND CAP SCREWED TIGHTLY TO CASE.

General Installation View

©John F. Rider, Publisher

MONTGOMERY WARD & CO.

MODEL 04BR-678C
Above Ser.#15927

PROCEDURE FOR SETTING THE AUTOMATIC PUSHBUTTONS:

There are six pushbuttons on the Remote Tuner Unit by means of which six stations may be set up for automatic tuning (see B, Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the top of each pushbutton a slot is provided for inserting the call letter tabs, (see A, Fig. 2).

Insert the call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. **Push the dial tuning knob in hard enough to make it latch in.**
2. **Rotate the dial tuning knob to the left** (counter-clockwise), until the knob can not be turned any further **without forcing.**

   You will note that as the knob is rotated it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required to actually **start unlocking** the tuner mechanism. Beyond this point the knob will turn quite easily again until the tuner mechanism is **completely unlocked.** At this point do not force the knob any further. The tuner mechanism is now **unlocked.**

   (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)
3. Push in **all the way** any one of the pushbuttons and at the same time hold in **firmly** the dial tuning knob. **Both the dial tuning knob** and the **pushbutton** should **be pushed hard** enough to make them **stay latched in.** The reason for holding the dial tuning knob **in firmly** when the **pushbutton** is **pressed** in is due to the latching mechanism in the Remote Tuner unit which is so constructed to release the dial tuning knob entirely when a pushbutton is pressed in. When setting up stations for automatic tuning, however, it is necessary that both the **dial tuning knob** and the **pushbutton** be latched in together.
4. **Press in on the pushbutton which is latched in.** Holding it in **firmly,** tune in by means of the dial tuning knob the station indicated on the station call letter tab on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing in firmly on the pushbutton), until the station is clearest. The station will then be accurately tuned in.

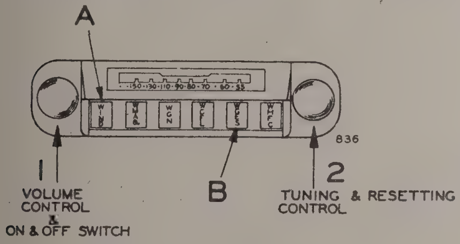


Fig. 2—Front View of Remote Tuner Unit

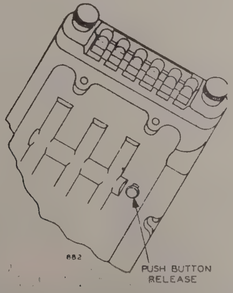


Fig. 2A—

Bottom View of Remote Tuner Unit Showing Push Button Release Pin.

5. Push in **all the way** another pushbutton, at the same time holding the dial tuning knob in so that **both** the **pushbutton** and the **dial tuning knob are latched in together.** Holding the pushbutton in **firmly,** tune in the **station indicated on the call letter tab on this pushbutton.**
6. Follow this procedure until you have tuned in all of your favorite stations.
7. When the last pushbutton has been properly set up, it is necessary to **release** it from the latched-in position before the tuner mechanism can be locked. To release this pushbutton, press the **pushbutton release** pin on the bottom of the tuner unit. This will trip the latching mechanism and all the **pushbuttons** will be released to **out** position, (See Fig. 2A).
8. Now, Press on the dial tuning knob hard enough to make it latch in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it.

   This will **lock the tuner mechanism** and all the stations that have been set up on the pushbuttons **will be locked** in place for automatic tuning.
9. Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

The **important** steps to remember when setting up stations on the pushbuttons for automatic tuning are:

1. **To unlock** the tuner mechanism **press on the dial tuning** knob hard enough to make it stay **latched in.** Rotate the dial tuning knob to the left (counterclockwise) until the knob cannot be turned any further without forcing it.
2. **To set a pushbutton,** Push in **all the way** and hold in **firmly** both the **pushbutton** and the **dial tuning knob** so that **both latch in.** Hold in **firmly** the **pushbutton and** tune in the station by means of the dial tuning knob. Set all the pushbuttons in the same manner.
3. **To release** the last **pushbutton press** the **pushbutton release pin on the bottom of the tuner unit.**
4. **To lock the tuner mechanism push on the dial tuning** knob hard enough to make it stay latched in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it. (NOTE: All the pushbuttons must be in **out position** when locking the tuner mechanism.)

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the voltage chart.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

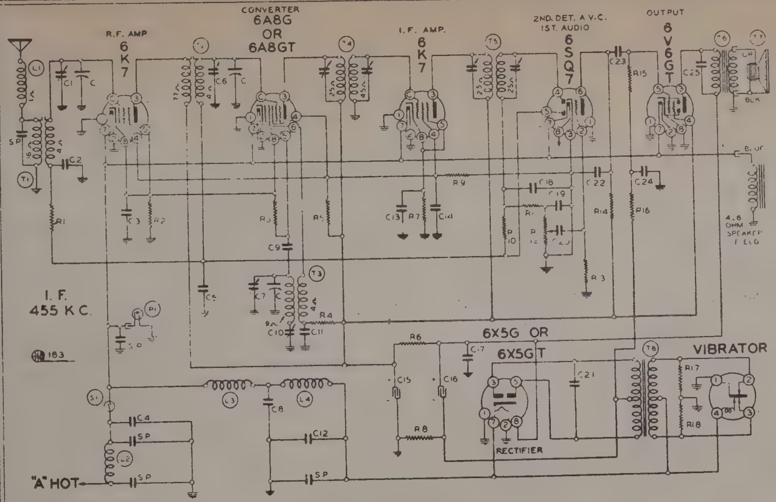
To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS:

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

MODEL 04BR-679A
above ser.#5000



Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE13020	100M ohm—⅓ w.
R2	BE13054	500 ohm—⅓ w.
R3	BE13012	50M ohm—⅓ w.
R4	BE130208	40M ohm—⅓ w.
R5	BE130196	30M ohm—1 watt
R6	BE130279	1M ohm—1 watt
R7	BE130153	700 ohm—⅓ w.
R8	BE130220	300 ohm—1 w.
R9	BE130208	40M ohm—⅓ w.
R10	BE13038	2 megohm—⅓ w.
R11	BE13012	50M ohm—⅓ w.
R12	BE10141	500M ohm volume control
R13	BE130223	10 megohm—⅓ w.
R14	BE1309	200M ohm—⅓ w.
R15	BE1305	300M ohm—⅓ w.
R16	BE130141	250M ohm—⅓ w.
R17	BE13060	100 ohm—⅕ w.
R18	BE13060	100 ohm—⅓ w.
		CONDENSERS
C	BE102100	3 gang variable condenser
C1		Antenna Trimmer on gang condenser
C2	BE10063	.05 x 200 v.
C3	BE10063	.1 x 200 v.
C4	BE10031	.5 x 120 v.
C5	BE10022	.05 x 200 v.
C6		R.F. Trimmer on gang condenser
C7		Oscillator Trimmer on gang condenser
C8	BE10031	.5 x 120 v.
C9	BE12912	.00025 mica
C10	BE12437	350 mmfd. W.C. Series Pad
C11	BE10020	.1 x 200 v.
C12	BE10031	.5 x 120 v.
C13	BE10020	.1 x 200 v.
C14	BE10053	.25 x 400 v.
C15	BE11965C	16 mfd. lytic x 350 w. v.
C16	BE11965C	16 mfd. lytic x 350 w. v.
C17	BE10011	.01 x 400 v.
C18	BE1295	.0001 mica
C19	BE1295	.0001 mica
C20	BE10025	.002 x 600 v.
C21	BE100100	.008 x 1600 v.
C22	BE12912	.00025 mica
C23	BE10019	.006 x 600 v.
C24	BE10020	.1 x 200 v.
C25	BE10019	.006 x 600 v.

C2 and C3 are in same unit
C15 and C16 in same unit

Schematic Ref. No.	Part No.	Description
		PARTS
T1	BE11171	Antenna Coil
T2	BE10935	R.F. Coil
T3	BE11057	Oscillator Coil
T4	BE10896B	Input I.F.—455 kc.
T5	BE10898	Output I.F.—455 kc.
T6	BE10561B	Output Transformer
T7	BE11459	5" Dynamic Speaker
T8	BE104159B	Power Transformer
L1	BE11176	Antenna Filter Choke
L2	BE10526	"A" Choke
L3	BE10524	"A" Choke
L4	BE10519	"A" Choke
S1		On-off switch on volume control
P1	BE10797	6-8 volt pilot light

Power Consumption	6.4 Amps AT-6.3 Volts
Power Output	2.5 Watts Undistorted
Sensitivity (for 1 Watt)	5 Microvolts Average
Selectivity - 48 Kc. Broad at 1000 Times Signal at 1000 Kc.	
Tuning Range	Broadcast 540—1550 Kc.
Intermediate Frequency	455 Kc.
Speaker	5 in. Dynamic

MODEL 04BR-679A SERIES A (SERIAL No. 5000 and UP)

FOR ALIGNMENT
SEE INDEX

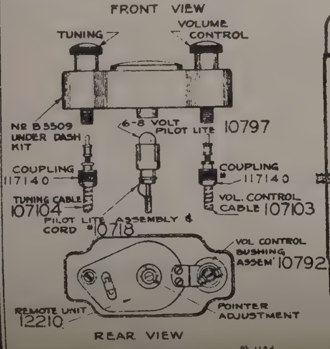


FIG. 4

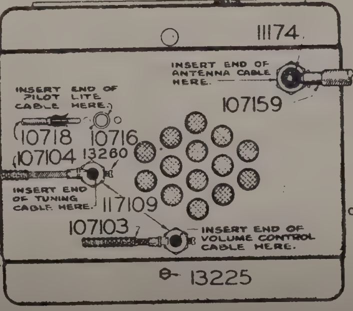

11174
INSERT END OF ANTENNA CABLE HERE.
107159
INSERT END OF PILOT LITE CABLE HERE.
10718
10716
107104
13260
INSERT END OF TUNING CABLE HERE.
117109
107103
INSERT END OF VOLUME CONTROL CABLE HERE.
13225

FIG. 1—SIDE VIEW

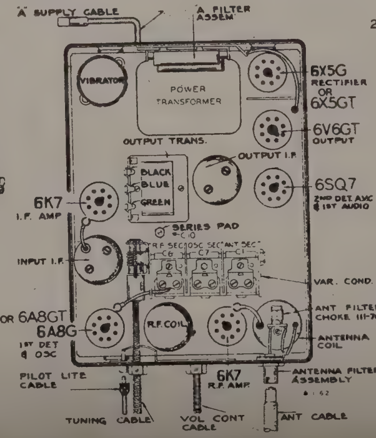
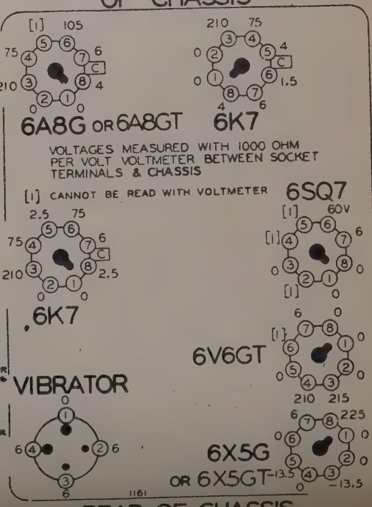


FIG. 2—TOP VIEW

BOTTOM VIEW OF CHASSIS



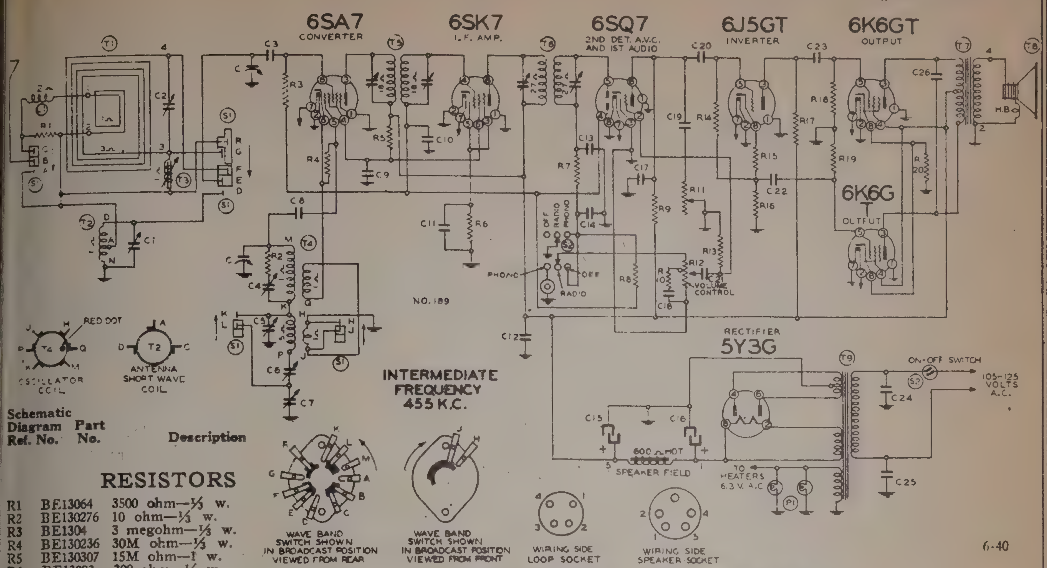
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS

[1] CANNOT BE READ WITH VOLTMETER

4-40

MONTGOMERY WARD & CO.

MODELS 04BR-729A, 04BR-730A
Above Ser.#0E509600



6-40

Schematic Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	BE13064	3500 ohm—⅓ w.
R2	BE130276	10 ohm—⅓ w.
R3	BE1304	3 megohm—⅓ w.
R4	BE130236	30M ohm—⅓ w.
R5	BE130307	15M ohm—1 w.
R6	BE13083	300 ohm—⅓ w.
R7	BE13012	50M ohm—⅓ w.
R8	BE13038	2 megohm—⅓ w.
R9	BE13011	250M ohm—⅓ w.
R10	BE130149	15M ohm—⅓ w.
R11	BE101223	Tone Control—1 megohm
R12	BE101224	Volume control—½ megohm
R13	BE130257	5 megohm—⅓ w.
R14	BE1303	500M ohm—⅓ w.
R15	BE130218	5M ohm—⅓ w.
R16	BE130103	100M ohm—⅓ w.
R17	BE130103	100M ohm—⅓ w.
R18	BE1303	500M ohm—⅓ w.
R19	BE1303	500M ohm—⅓ w.
R20	BE130320	320 ohm—1 w.
		CONDENSERS
C	BE102133	2 gang variable condenser
C1	BE124116	Short wave antenna trimmer
C2	BE124141	B.C. Antenna Trimmer
C3	BE1292	.0005 mica
C4	BE124142	Dual Adj. Trimmer—S.W. Osc. Trimmer
C5	BE124142	Dual Adj. Trim.—B.C. Osc. Trimmer
C6	BE124140	Dual Adj. Cond.—B.C. Pad
C7	BE124140	Dual Adj. Cond.—S.W. Pad
C8	BE12960	.00015 mica
C9	BE10013	.05 x 400 v.
C10	BE1009	.05 x 200 v.
C11	BE1009	.05 x 200 v.
C12	BE1001	.1 x 400 v.
C13	BE129161	Dual—.0001 Mica
C14	BE129161	Dual—.0001 Mica
C15	BE119108	16 mfd. x 450 w.v. lytic cond.
C16	BE119108	16 mfd. x 450 w.v. lytic cond.
C17	BE1295	.0001 mica
C18	BE100120	.035 x 200 v.
C19	BE10019	.006 x 600 v.
C20	BE10026	.02 x 400 v.
C21	BE10019	.006 x 600 v.
C22	BE10013	.05 x 400 v.
C23	BE10013	.05 x 400 v.
C24	BE10061	.02 x 600 v.
C25	BE10061	.02 x 600 v.
C26	BE10019	.006 x 600 v.

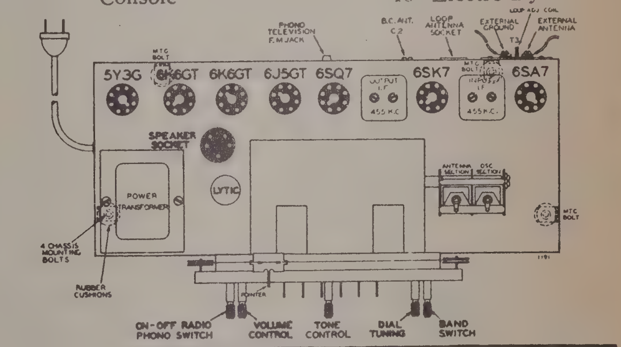
C4 and C5, C6 and C7, and C13 and C14 are in same unit.

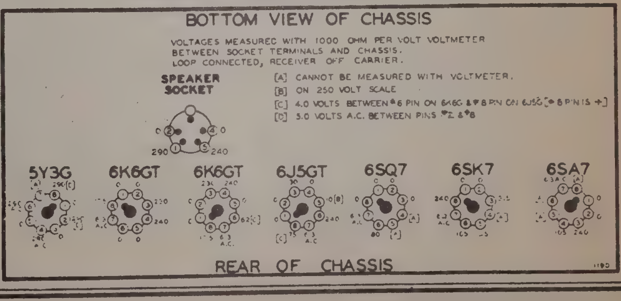
PARTS

T1	BE111185	Loop Antenna Assembly
	BE111186	Round loop antenna assembly
T2	BE111184	Short Wave Antenna Coil
T3	BE111183	Loop Adj. Coil
T4	BE110154	B.C.—S.W. Oscillator coil
T5	BE108178	Input I.F. Coil—455 kc.
T6	BE108179	Output I.F. Coil—455 kc.
T7	BE105112	Output Transformer
T8	BE114203	6″ Dynamic Speaker
	BE114204	10″ Dynamic Speaker
T9	BE104212	Power Transformer
L1	BE12312	R.F. Choke Coil
S1	BE125119	Wave Band Switch
S2	BE125120	Radio-Phono On-off switch
P1	BE10794	(2) Pilot light bulbs T-44

MODEL 04BR-729A and 04BR-730A
(SERIAL NO. 0E509600 AND UP)

Power consumption		75 Watts
Power Output		3 Watts Undistorted
Sensitivity for 500 Milliwatt Output:		20 Microvolts Average
Selectivity		45 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range	Broadcast	535 to 1600 KC
	Shortwave	5.4 to 18.4 MC
Speaker	Mantel	6″ Electro Dynamic
	Console	10″ Electro Dynamic




BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
LOOP CONNECTED, RECEIVER OFF CARRIER.

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] ON 250 VOLT SCALE
[C] 4.0 VOLTS BETWEEN #6 PIN ON 6K6G & #8 PIN ON 6J5G [#8 PIN IS +]
[D] 5.0 VOLTS A.C. BETWEEN PINS #2 & #8

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 532 K.C.	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T3 (See Top View)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 535 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND.". terminals.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

HOW TO REMOVE CHASSIS

Should it ever be necessary to take the chassis out of the cabinet be sure to first pull the plug from the light socket. Next pull off all control knobs and take off the escutcheon. Pull out the loop aerial and speaker plugs, then remove the 4 chassis mounting screws and lift the chassis out.

NOTE—On the Mantel Model it is necessary to remove the screws and take the back off.

PHONOGRAPH-TELEVISION OR FM. JACK

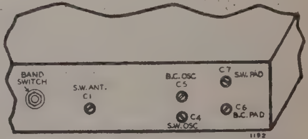
Should you wish to use an external phonograph it should be plugged into the phono jack shown in the top view—The on-off radio-phono knob on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accomodate either the Phono or a television or FM converter.

PUSHBUTTON TUNING

Pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place. (push directly on front of button) Continue setting each pushbutton in the same way.

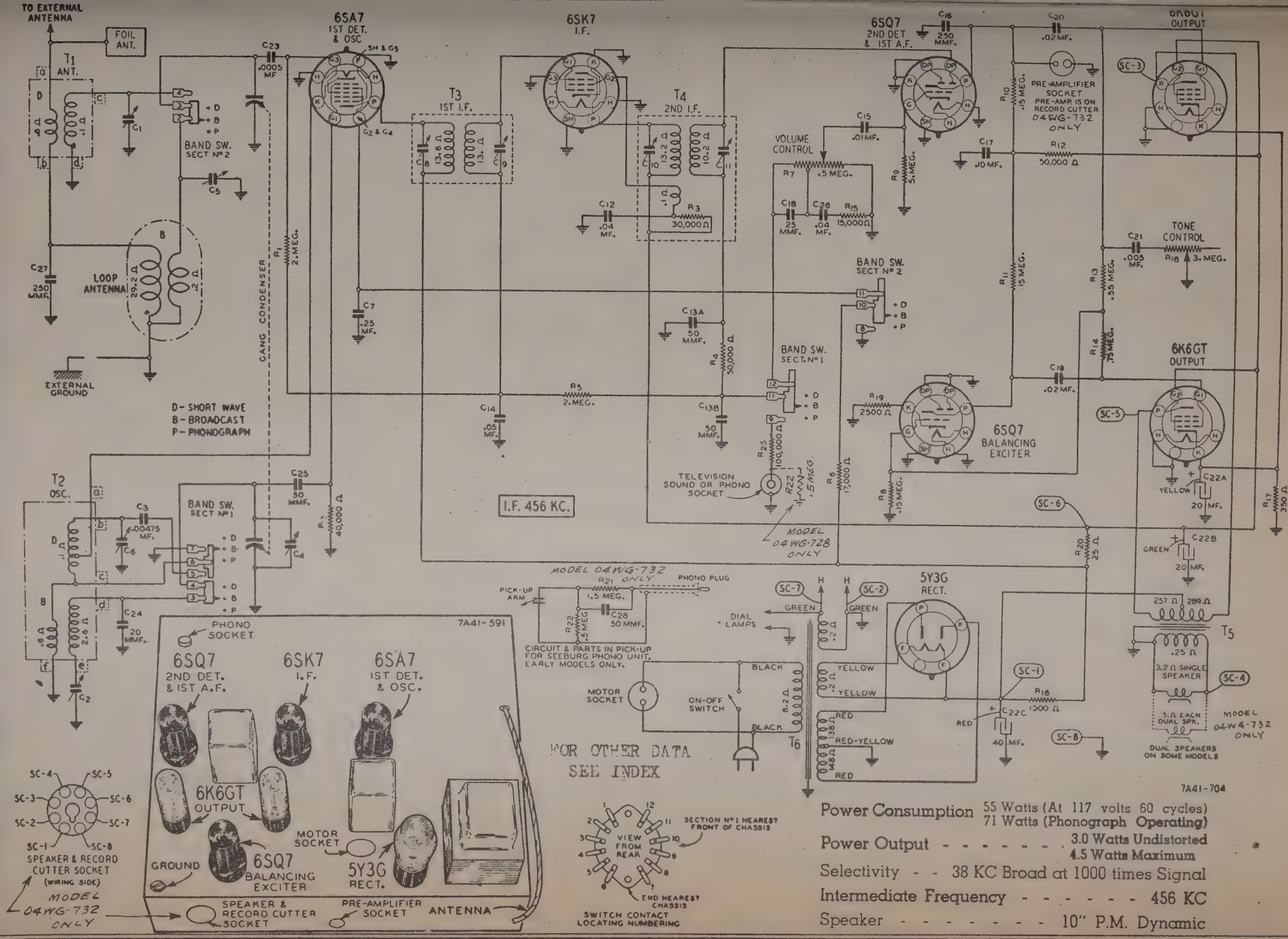


TRIMMER VIEW FRONT CHASSIS FLANGE

Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

MONTGOMERY WARD & CO. MODELS 04WG-728,04WG-732



FOR OTHER DATA SEE INDEX

Power Consumption	55 Watts (At 117 volts 60 cycles) 71 Watts (Phonograph Operating)
Power Output - - - - - - -	3.0 Watts Undistorted 4.5 Watts Maximum
Selectivity - -	38 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - -	456 KC
Speaker - - - - - - - -	10" P.M. Dynamic

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis and top plate from cabinet as explained in the article on this subject. Remove top plate from chassis. Then place chassis on a stand in such a way that the loop connection plugs can be reinserted in the loop sockets on the chassis.					
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C8) & (C9) 2nd I.F. (C10) & (C11)
RANGE B					
1600 KC 1550 KC (MODEL 04WG-728) RANGE B	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C2) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
LOOP RANGE B					
1400 KC See Note C	None See Note C		B Range	Turn Rotor to Max. Output	Ant. Range B (C5)

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

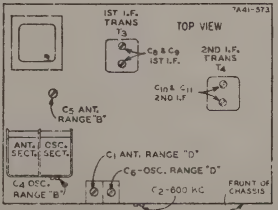
Tuning Frequency Range

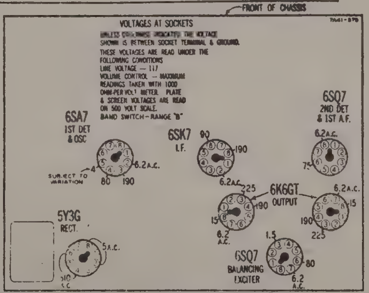
B Range.... 528 to 1600 KC
D Range.... 5750 to 18300 KC

Sensitivity—External Antenna—

(For 0.5 Watt Output)

B Range ... .15 Microvolts Average
D Range ... .45 Microvolts Average





Operating the Automatic Phonograph

The operation of the phonograph is simple but the phonograph instruction folder packed with this instruction book should be carefully read and understood before an attempt is made to place the record changer in operation.

The record changer is entirely automatic in its action after it has started operating. Any number up to fourteen 10 inch or ten 12 inch records may be played consecutively without need of attention by the listener. Standard 10 inch or 12 inch records may be used but *only one size may be played at a time.* Each record must have a run-off groove so that the record changer will operate properly. This groove is the one which carries the tone arm toward the center of the record after the record has stopped playing.

The volume and tone controls are used in the same manner for phonograph reproduction as they are for radio reception—See article "Operating the Radio."

To Turn the Phonograph On

Turn the on-off switch knob to the right.

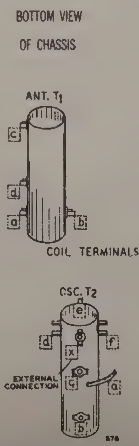
A click will be heard and the dial will light. Wait 30 seconds for the tubes to heat.

Turn the Phonograph-Radio knob, to the phonograph (P) position—See illustration.

For detailed instructions regarding the operation of the automatic record changer, see the phonograph instruction folder.

To Turn the Phonograph Off

The instructions for turning off the automatic record changer are given in the article "Turning Off Changer" in the phonograph instruction folder. Be sure to turn the radio on-off switch knob to the left. A click will be heard and the dial lamps will be off.



Drive Cord Replacement

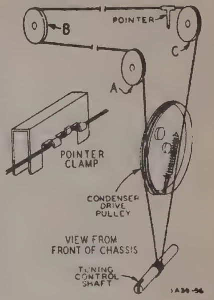
Use a drive cord approximately 70 inches in length. Tie a large knot with a small loop at one end of the new drive cord. Thread other end of cord up through hole in rim of condenser drive pulley. Pull cord through hole until large knot is flush against pulley rim.

Turn gang condenser to completely closed position.

Wind ¼ turn in a clockwise direction (from right side of chassis) around condenser drive pulley. Wind cord over pulleys A and B as shown in illustration. Pass cord between dial lamp brackets and mounting plate and then over pulley C. Wind 4½ turns in a clockwise direction (from front of chassis) around tuning control shaft. Turns should progress toward the chassis.

Turn gang condenser to full open position. Wind 1¼ turns in a clockwise direction (from right side of chassis) around condenser drive pulley. This turn should be at left side (from front of chassis) of pulley groove. Pass cord through hole in pulley rim. Secure tension spring to cord loop. Knot other end of cord to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.



Home Recorder - Television - Frequency Modulation

Home Recorder

This radio is designed so that you may take advantage of a *new* and extremely interesting form of entertainment. By replacing the record changer unit in this radio with a unit which includes a record cutter and a record changer, the new world of making your own records is opened to you.

Your favorite radio programs, comedy, dance or symphony may be permanently recorded. By means of a microphone attachment, voice or music of your own production may be recorded.

For detailed information regarding this record cutter unit, get in touch with your local Montgomery Ward store or the nearest Mail Order House.

Television Sound Connections

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the top of the chassis base is a socket to which is connected the phono cable shielded pin tip. Upon removal of this pin tip, the connector on the cable from a television receiver can be inserted in the socket. (The cable connector must be a single shielded pin tip type, Part No. 6A224.)

When Television sound reproduction is desired, the Phonograph-Radio knob should be turned to the Phonograph (P) position. For radio reception, the knob should be in one of the two Radio positions.

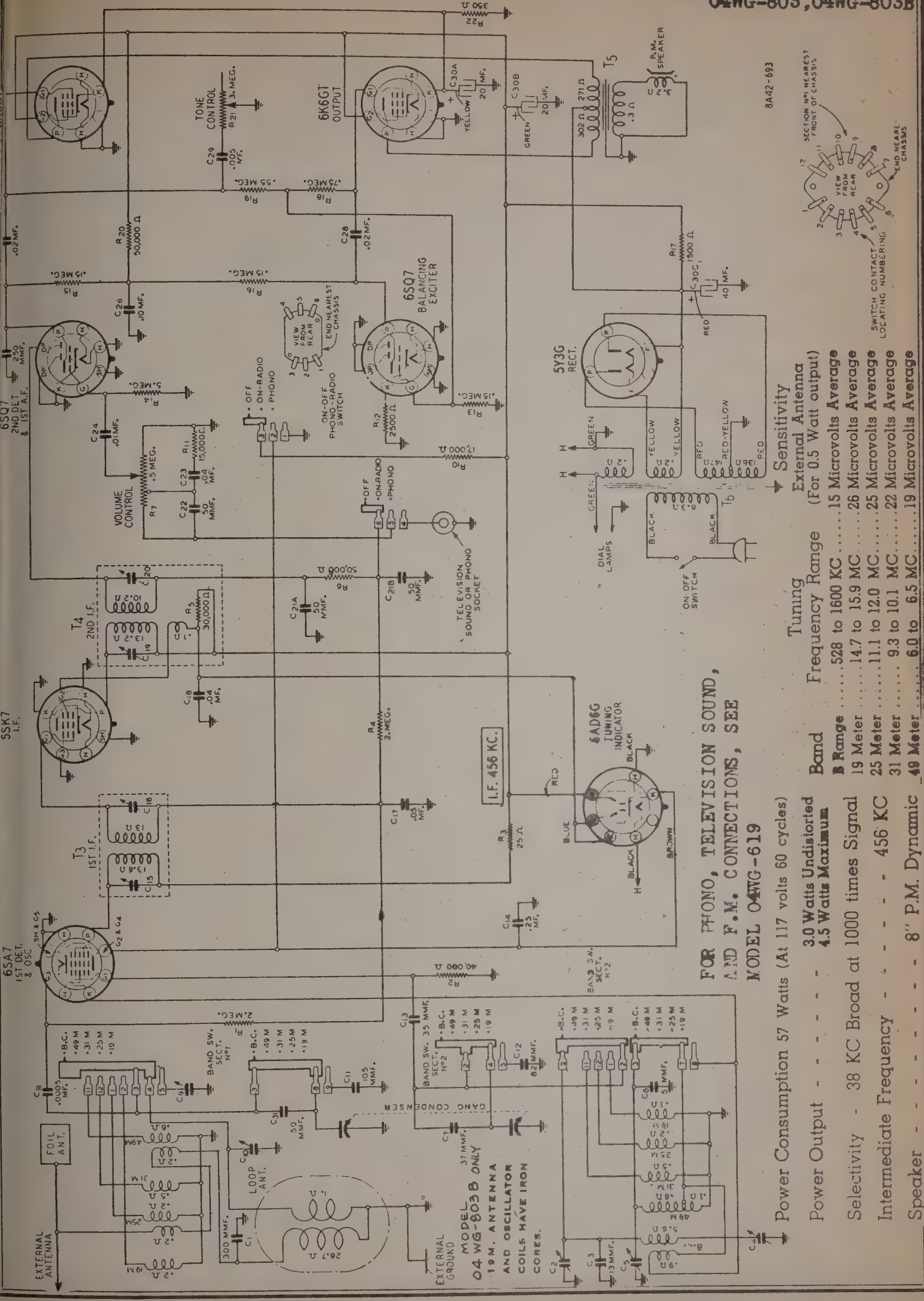
Frequency Modulation Connections

If Frequency Modulated programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce these programs in conjunction with any Frequency Modulation Converter.

The connection to the chassis is exactly the same as explained in the preceding article "Television Sound Connections."

When Frequency Modulated programs are desired, the Phonograph-Radio knob should be turned to the Phonograph (P) position. For radio reception, the knob should be in one of the two Radio positions

MONTGOMERY WARD & CO. MODELS 04WG-803, 04WG-803B



FOR PHONO, TELEVISION SOUND, AND F.M. CONNECTIONS, SEE MODEL 04WG-619

Power Consumption 57 Watts (At 117 volts 60 cycles)

Power Output - - - - - - **3.0 Watts Undistorted**
4.5 Watts Maximum

Selectivity - 38 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - 8" P.M. Dynamic

Band	Tuning Frequency Range	Sensitivity External Antenna (For 0.5 Watt output)
B Range	528 to 1600 KC	**15 Microvolts Average**
19 Meter	14.7 to 15.9 MC	**26 Microvolts Average**
25 Meter	11.1 to 12.0 MC	**25 Microvolts Average**
31 Meter	9.3 to 10.1 MC	**22 Microvolts Average**
49 Meter	6.0 to 6.5 MC	**19 Microvolts Average**

MODELS 04WG-803,04WG-803B

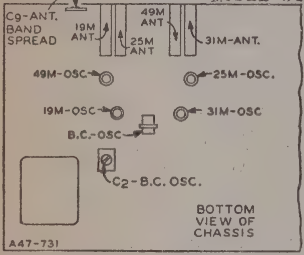
MONTGOMERY WARD & CO.

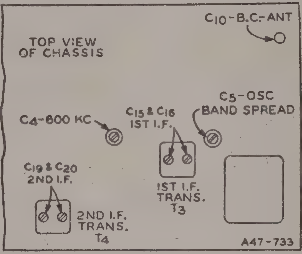
Volume Control—Maximum All adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

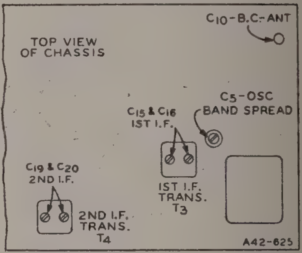
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet but do not disconnect leads to loop aerial.					
I. F.					
456 KC	Grid of Ist Det.	.I mf.	B Range	Turn Rotor to Full Open	Ist I.F. (C15) & (C16) 2nd I.F. (C19) & (C20)
RANGE B					
1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C2)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C10)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C4) Rock Rotor—See Note B
SHORT WAVE BANDS					
6300 KC	Antenna Lead	400 Ohm	49 Meter	Turn Tuning Knob until Pointer is at 6.3 MC	Oscillator Band Spread (C5)
6300 KC	Antenna Lead	400 Ohm	49 Meter	Leave Setting as above	Antenna Band Spread (C9)
LOOP RANGE B					
1400 KC	Antenna Lead See Note C	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C10)

MODEL 04WG-803B





MODEL 04WG-803



CAUTION—Two of the coils in the band spread coil assembly, the 19 Meter Antenna and Oscillator coils, have adjustable iron cores in the "B" and later issues of this model. One of the adjusting screws extends out from the front panel of the chassis base at the left of the band switch. The other adjusting screw extends up from the chassis base in back of the tuning condenser.

DO NOT CHANGE THE POSITION OF THESE ADJUSTING SCREWS as they have been properly set at the factory and cannot be satisfactorily re-adjusted in the field.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

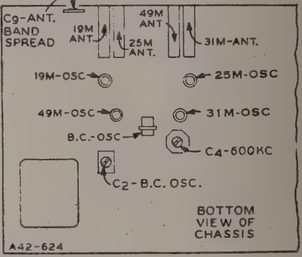
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

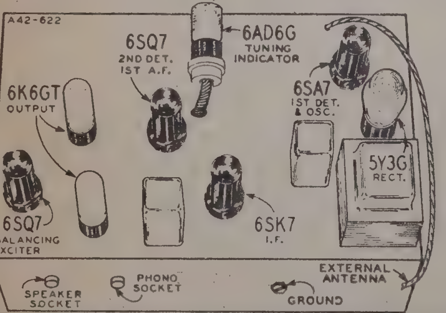
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

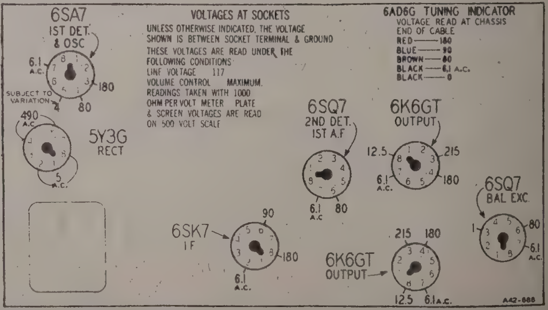
NOTE C—Re-assemble chassis in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

MODEL 04WG-803







VOLTAGES AT SOCKETS

UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND

THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS
LINE VOLTAGE 117
VOLUME CONTROL MAXIMUM.
READINGS TAKEN WITH 1000 OHM PER VOLT METER PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE

6AD6G TUNING INDICATOR
VOLTAGE READ AT CHASSIS END OF CABLE
RED——180
BLUE——90
BROWN——80
BLACK——6.1 A.C.
BLACK——0

MONTGOMERY WARD & CO. MODELS
04BR-903A, 04BR-907A
above ser. #519000

RESISTORS

Diagram Ref. No.	Part No.	
R1	BE1301	25M ohm—⅓ w.
R2	BE1301	25M ohm—⅓ w.
R3	BE13019	1 megohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130218	5M ohm—⅓ w.
R6		1 megohm—in tuning indicator cable
R7	BE10662	12,500 ohm—3 w.
R8	BE13019	1 megohm—⅓ w.
R9	BE130232	25M ohm—⅓ w.
R10	BE130220	300 ohm—1 w.
R11	BE1303	500M ohm—⅓ w.
R12	BE1303	500M ohm—⅓ w.
R13	BE130103	100M ohm—⅓ w.
R14	BE130218	5M ohm—⅓ w.
R15	BE130103	100M ohm—⅓ w.
R16	BE13019	1 megohm—⅓ w.
R17	BE13070	500 ohm—⅓ w.
R18	BE13011	250M ohm—⅓ w.
R19	BE130149	15M ohm—⅓ w.
R20	BE13011	250M ohm—⅓ w.
R21	BE1303	500M ohm—⅓ w.
R22	BE101221	½ megohm (volume
R23	BE101226	1 megohm (tone)
R24	BE13012	50M ohm—⅓ w.
R25	BE1304	3 megohm—⅓ w.
R26	BE130257	5 megohm—⅓ w.

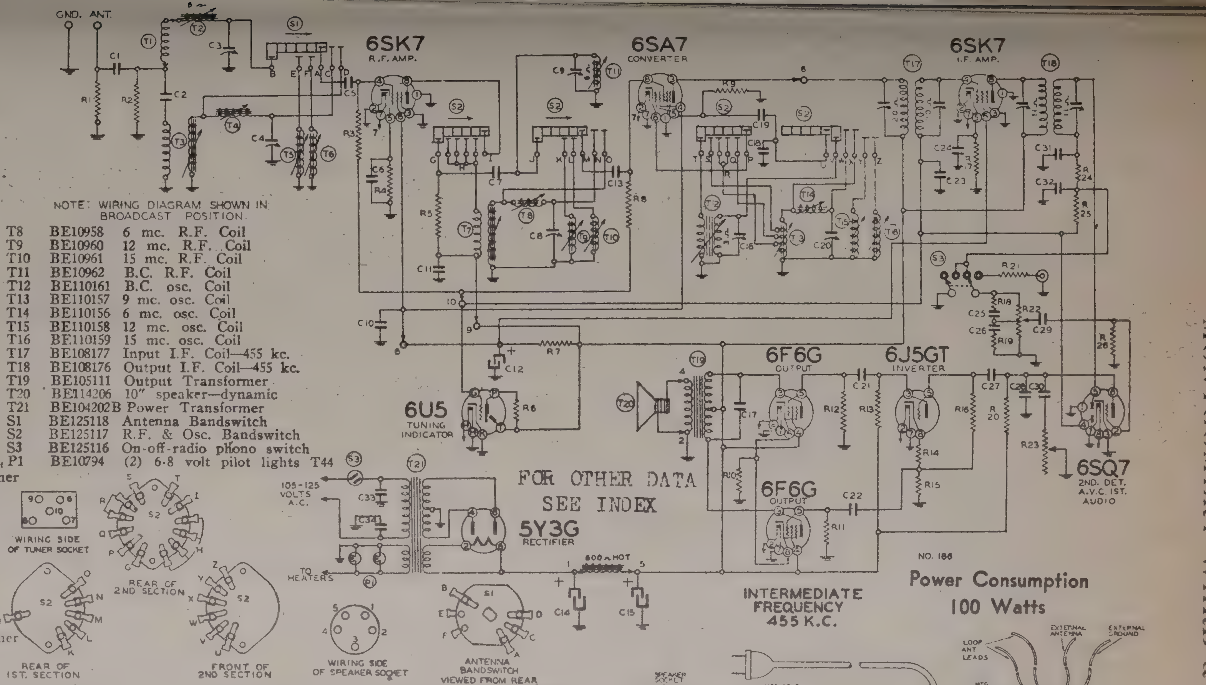
CONDENSERS

C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.—10%
C3	BE124143	B.C. Antenna Trimm
C4	BE124143	9 mc. Antenna Trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular
C7	BE129168	.00001 mica
C8	BE124138	9 mc. R.F. Trimmer
C9	BE124139	B.C. R.F. Trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE119109	10.0 x 350 w.v.
C13	BE1292	.0005 mica
C14	BE119109	15.0 x 450 w.v.
C15	BE119109	15.0 x 450 w.v.
C16	BE124144	B.C. Oscillator trimmer
C17	BE10071	.004 x 600 v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. osc. trimmer
C21	BE10013	.05 x 400 v.
C22	BE1009	.05 x 200 v.
C23	BE10026	.02 x 400 v.
C24	BE10020	.1 x 200 v.
C25	BE129114	.0003 mica
C26	BE100122	.03 x 200 v.
C27	BE10026	.02 x 400 v.
C28	BE12921	.0002 mica
C29	BE10019	.006 x 600 v.
C30	BE10019	.006 x 600 v.
C31	BE129165	.00005 mica
C32	BE129165	.00005 mica
C33	BE10061	.02 x 600 v. Bakelite
C34	BE10061	.02 x 600 v. Bakelite

PARTS

T1	BE111188	Loop Antenna Assembly for 62903
	BE111201	Loop Antenna Assembly for 62907
T2	BE111195	B.C. Antenna Coil
T3	BE111190	9 mc. Antenna Coil
T4	BE111189	6 mc. Antenna Coil
T5	BE111191	12 mc. Antenna Coil
T6	BE111192	15 mc. Antenna Coil
T7	BE10959	9 mc. R.F. Coil
T8	BE10958	6 mc. R.F. Coil
T9	BE10960	12 mc. R.F. Coil
T10	BE10961	15 mc. R.F. Coil
T11	BE10962	B.C. R.F. Coil
T12	BE110161	B.C. osc. Coil
T13	BE110157	9 mc. osc. Coil
T14	BE110156	6 mc. osc. Coil
T15	BE110158	12 mc. osc. Coil
T16	BE110159	15 mc. osc. Coil
T17	BE108177	Input I.F. Coil—455 kc.
T18	BE108176	Output I.F. Coil—455 kc.
T19	BE105111	Output Transformer
T20	BE114206	10" speaker—dynamic
T21	BE104202B	Power Transformer
S1	BE125118	Antenna Bandswitch
S2	BE125117	R.F. & Osc. Bandswitch
S3	BE125116	On-off-radio phono switch
P1	BE10794	(2) 6-8 volt pilot lights T44

7-40



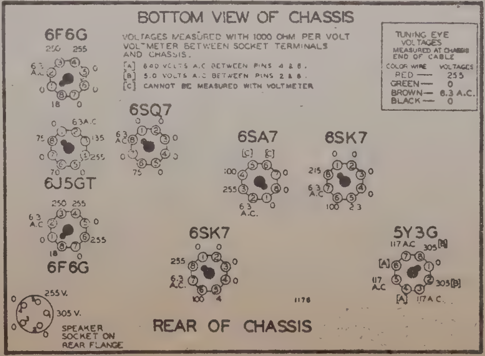
NOTE: WIRING DIAGRAM SHOWN IN BROADCAST POSITION.

FOR OTHER DATA SEE INDEX

INTERMEDIATE FREQUENCY 455 K.C.

NO. 186

Power Consumption 100 Watts



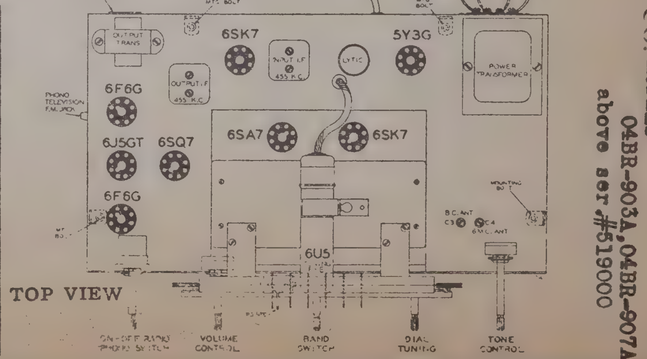
BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[A] 6.0 VOLTS A.C. BETWEEN PINS 4 & 8.
[B] 5.0 VOLTS A.C. BETWEEN PINS 2 & 8.
[C] CANNOT BE MEASURED WITH VOLTMETER.

TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE

COLOR WIRE	VOLTAGES
RED	255
GREEN	0
BROWN	6.3 A.C.
BLACK	0

REAR OF CHASSIS



TOP VIEW

MODELS 04BR-903A,04BR-907A
above ser.#519000
MODELS 04BR-904A,04BR-906A,
04BR-1105A,04BR-1106A

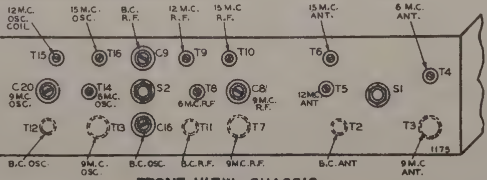
ALIGNMENT PROCEDURE Model No. 04BR-903A and 04BR-907A , 04BR-904A and 04BR-906A , 04BR-1105A , 04BR-1106A .

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metalic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted In Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (2nd I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to maximum output
04BR-1106A 04BR-1105A ONLY	455 Kc.	.1 MFD.	Grid of 6SK7 (1st I.F.)	Broadcast	Set Dial at 1600 Kc.	Three Trimmers on Top	Interstage I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output



FRONT VIEW CHASSIS

TRIMMER VIEW

SPECIFICATIONS

Model No. 04BR-903A and 04BR-907A
Model No. 04BR-904A and 04BR-906A

Power Output		5 Watts Undistorted
Sensitivity for 500 Milliwatt Output:		10 Microvolts Average
Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC		
Tuning Frequency Range	Broadcast Band	540 to 1600 KC
	49M Band	5.9 to 6.1 MC
	31M Band	9.1 to 10 MC
	25M Band	11.4 to 12.1 MC
	19M Band	14.9 to 15.4 MC
Intermediate Frequency		455 KC
Speaker		10 in. Electro Dynamic

Model No. 04BR-904A and 04BR-906A

HOME RECORDING

This radio is designed so you can replace the present record changer unit with one that also includes a recording arm.

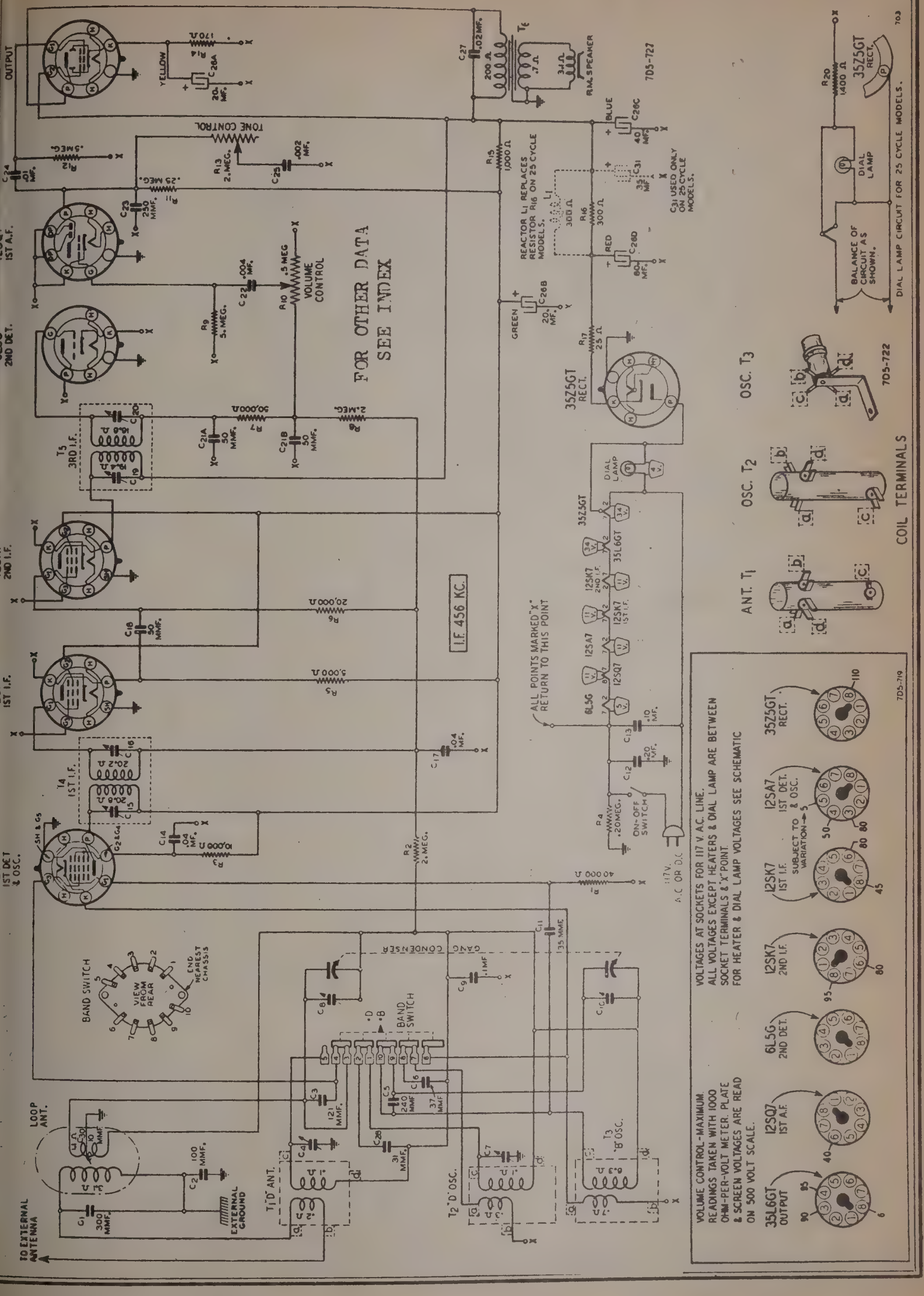
SPECIFICATIONS

Model No. 04BR-1105A
Model No. 04BR-1106A

Power Consumption		120 Watts
Power Output		10 Watts Undistorted
Sensitivity for 500 Milliwatt Output:		10 Microvolts Average
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC		
Tuning Frequency Range	Broadcast Band	540 to 1600 KC
	49M Band	5.9 to 6.1 MC
	31M Band	9.1 to 10 MC
	25M Band	11.4 to 12.1 MC
	19M Band	14.9 to 15.4 MC
Intermediate Frequency		455 KC
Speaker		12 in. Electro Dynamic

MONTGOMERY WARD & CO.

MODEL 04WG-731



VOLUME CONTROL-MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & 'X' POINT.
FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC

MODELS 04BR-904A, 04BR-906A

MONTGOMERY WARD & CO.

RESISTORS

Diagram Ref. No.	Part No.	Description
R1	BE1301	25M ohm—⅓ w.
R2	BE1301	25M ohm—⅓ w.
R3	BE13019	1 megohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130218	5M ohm—⅓ w.
R6		1 megohm—in tuning indicator cable
R7	BE10662	12,500 ohm—3 watts
R8	BE13019	1 megohm—⅓ w.
R9	BE130232	25M ohm—⅓ w.
R10	BE130220	300 ohm—1 watt
R11	BE1303	500M ohm—⅓ w.
R12	BE1303	500M ohm—⅓ w.
R13	BE130103	100M ohm—⅓ w.
R14	BE130218	5M ohm—⅓ w.
R15	BE130103	100M ohm—⅓ w.
R16	BE13019	1 megohm—⅓ w.
R17	BE13070	500 ohm—⅓ w.
R18	BE13011	250M ohm—⅓ w.
R19	BE130149	15M ohm—⅓ w.
R20	BE13011	250M ohm—⅓ w.
R21	BE101221	½ megohm volume control
R22	BE101226	1 megohm tone control
R23	BE13012	50M ohm—⅓ w.
R24	BE1304	3 megohm—⅓ w.
R25	BE130257	5 megohm—⅓ w.

CONDENSERS

Diagram Ref. No.	Part No.	Description
C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.—10%
C3	BE124143	B.C. Antenna Trimmer
C4	BE124143	9 mc. antenna trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular
C7	BE129168	.00001 Mica
C8	BE124138	9 mc. R.F. Trimmer
C9	BE124139	B.C. R.F. Trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE119109	10.0 x 350 w. v.
C13	BE1292	.0005 mica
C14	BE119109	15.0 x 450 w. v.
C15	BE119109	15.0 x 450 w. v.
C16	BE124144	B.C. Oscillator trimmer
C17	BE10071	.004 x 600 v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. osc. trimmer
C21	BE10013	.05 x 400 v.
C22	BE1009	.05 x 200 v.
C23	BE10026	.02 x 400 v.
C24	BE10020	.1 x 200 v.
C25	BE129114	.0003 mica
C26	BE100122	.03 x 200 v.
C27	BE10026	.02 x 400 v.
C28	BE12921	.0002 mica
C29	BE10019	.006 x 600 v.
C30	BE10019	.006 x 600 v.
C31	BE129165	.00005 mica
C32	BE129165	.00005 mica
C33	BE10061	.02 x 600 v. bakelite
C34	BE10061	.02 x 600 v. bakelite

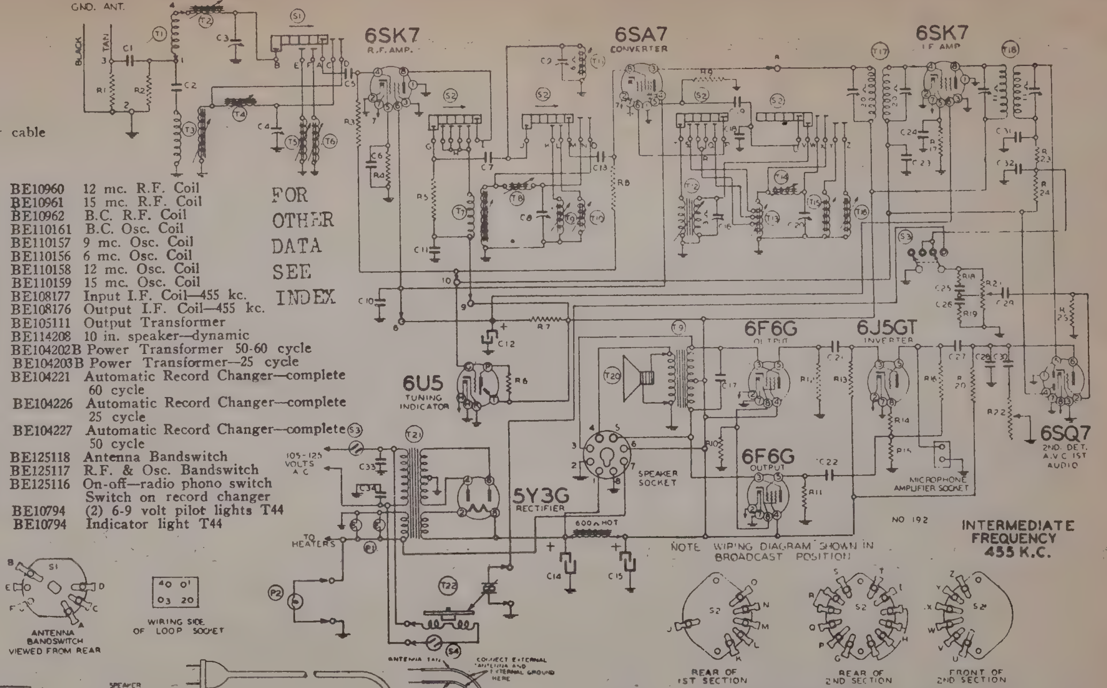
C12, C14 and C15 in same unit
C31 and C32 in same unit

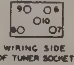
PARTS

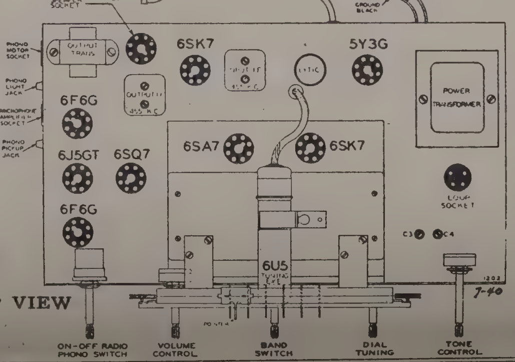
Diagram Ref. No.	Part No.	Description
T1	BE111198	Loop antenna assembly for Model 62904
	BE111199	Loop antenna assembly for Model 62906
T2	BE111195	B.C. Antenna Coil
T3	BE111190	9 mc. Antenna Coil
T4	BE111189	6 mc. Antenna Coil
T5	BE111191	12 mc. Antenna Coil
T6	BE111192	15 mc. Antenna Coil
T7	BE10959	9 mc. R.F. Coil
T8	BE10958	6 mc. R.F. Coil
T9	BE10960	12 mc. R.F. Coil
T10	BE10961	15 mc. R.F. Coil
T11	BE10962	B.C. R.F. Coil
T12	BE110161	B.C. Osc. Coil
T13	BE110157	9 mc. Osc. Coil
T14	BE110156	6 mc. Osc. Coil
T15	BE110158	12 mc. Osc. Coil
T16	BE110159	15 mc. Osc. Coil
T17	BE108177	Input I.F. Coil—455 kc.
T18	BE108176	Output I.F. Coil—455 kc.
T19	BE105111	Output Transformer
T20	BE114208	10 in. speaker—dynamic
T21	BE104202B	Power Transformer 50-60 cycle
	BE104203B	Power Transformer—25 cycle
T22	BE104221	Automatic Record Changer—complete 60 cycle
	BE104226	Automatic Record Changer—complete 25 cycle
	BE104227	Automatic Record Changer—complete 50 cycle
S1	BE125118	Antenna Bandswitch
S2	BE125117	R.F. & Osc. Bandswitch
S3	BE125116	On-off—radio phono switch
S4		Switch on record changer
P1	BE10794	(2) 6-9 volt pilot lights T44
P2	BE10794	Indicator light T44

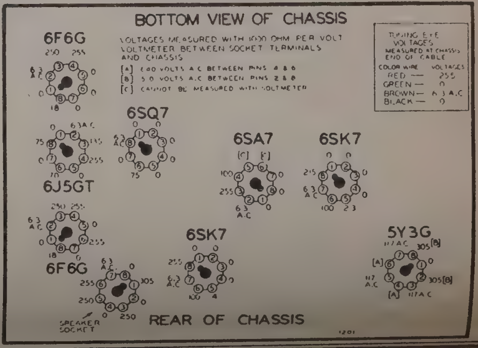
FOR OTHER DATA SEE INDEX

Power Consumption
Radio Only 100 W
Motor Only 20 W







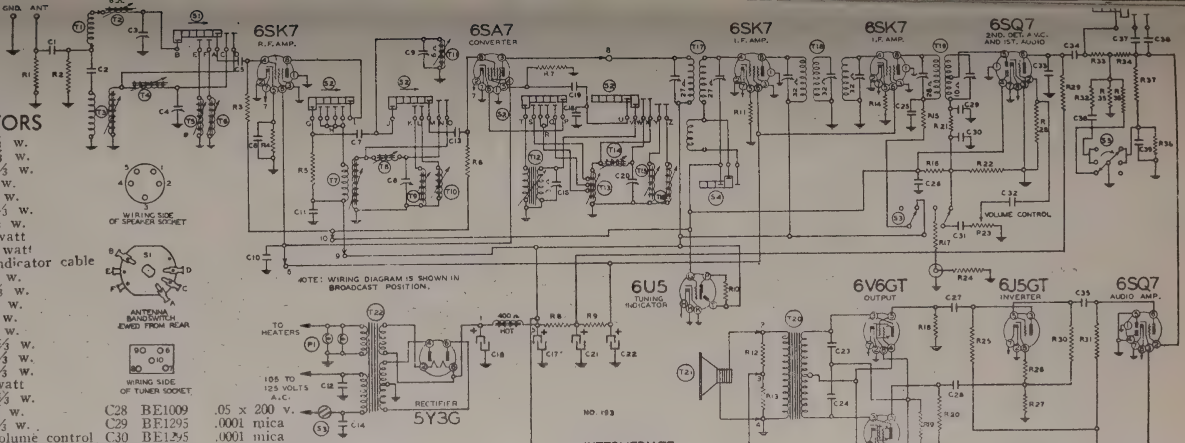

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
[A] 6.0 VOLTS A.C. BETWEEN PINS 4 & 6
[B] 5.0 VOLTS A.C. BETWEEN PINS 2 & 8
[C] CANNOT BE MEASURED WITH VOLTMETER
TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE
COLOR WIRE VOLTAGES
RED — 255
GREEN — 0
BROWN — 6.3 A.C.
BLACK — 0
6F6G
6SQ7
6SA7
6SK7
6J5GT
6SK7
5Y3G
6F6G
SPEAKER SOCKET
REAR OF CHASSIS

MONTGOMERY WARD & CO.

MODEL 04BR-1105A

above ser.#532000

FOR OTHER DATA
SEE INDEX


GND.
ANT
6SK7
R.F. AMP.
6SA7
CONVERTER
6SK7
I.F. AMP.
6SK7
I.F. AMP.
6SQ7
2ND. DET. A.V.C. AND 1ST. AUDIO
WIRING SIDE OF SPEAKER SOCKET
ANTENNA BANDSWITCH VIEWED FROM REAR
WIRING SIDE OF TUNER SOCKET
NOTE: WIRING DIAGRAM IS SHOWN IN BROADCAST POSITION.
VOLUME CONTROL
TO HEATERS
105 TO 125 VOLTS A.C.
RECTIFIER
5Y3G
6U5
TUNING INDICATOR
6V6GT
OUTPUT
6J5GT
INVERTER
6SQ7
AUDIO AMP.
HOT
NO. 193
INTERMEDIATE FREQUENCY 455 K.C.
OUTPUT
6V6GT

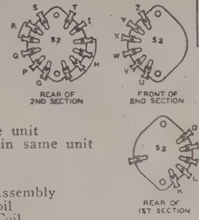
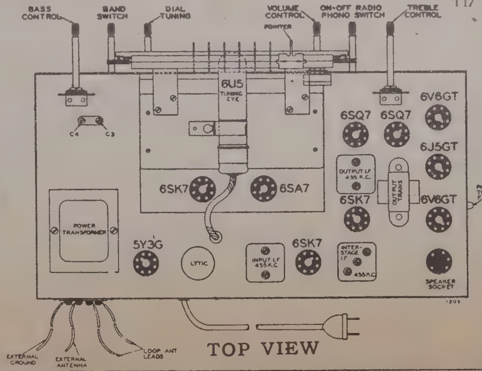


Diagram Ref. No.	Part No.	
RESISTORS		
R1	BE130232	25M ohm—⅓ w.
R2	BE130232	25M ohm—⅓ w.
R3	BE13019	1 megohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130218	5M ohm—⅓ w.
R6	BE13019	1 megohm—⅓ w.
R7	BE130232	25M ohm—⅓ w.
R8	BE130318	6M ohm—2 watt
R9	BE130319	10M ohm—2 watt
R10		1 megohm in tuning indicator cable
R11	BE13013	1100 ohm—⅓ w.
R12	BE13082	10M ohm—⅓ w.
R13	BE130235	1500 ohm—⅓ w.
R14	BE130192	2M ohm—⅓ w.
R15	BE130192	2M ohm—⅓ w.
R16	BE13019	1 megohm—⅓ w.
R17	BE1303	500M ohm—⅓ w.
R18	BE1303	500M ohm—⅓ w.
R19	BE130317	250 ohm—2 watt
R20	BE1303	500M ohm—⅓ w.
R21	BE13094	50M ohm—⅓ w.
R22	BE130316	120M ohm—⅓ w.
R23	BE101229	500M ohm volume control
R24	BE1303	500M ohm—⅓ w.
R25	BE13094	50M ohm—⅓ w.
R26	BE130218	5M ohm—⅓ w.
R27	BE13094	50M ohm—⅓ w.
R28	BE130257	5 megohm—⅓ w.
R29	BE130172	250M ohm—⅓ w.
R30	BE1303	500M ohm—⅓ w.
R31	BE130172	250M ohm—⅓ w.
R32	BE130232	25M ohm—⅓ w.
R33	BE13080	150M ohm—⅓ w.
R34	BE130309	350M ohm—⅓ w.
R35	BE130172	250M ohm—⅓ w.
R36	BE13066	75M ohm—⅓ w.
R37	BE13080	150M ohm—⅓ w.
R38	BE130146	2 megohm—⅓ w.
CONDENSERS		
C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.
C3	BE124143	B.C. Antenna Trimmer
C4	BE124143	9 mc. Antenna Trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular
C7	BE129168	.00001 mica
C8	BE124138	9 mc. R.F. Trimmer
C9	BE124139	B.C. R.F. Trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE10061	.02 x 600 v.
C13	BE1292	.0005 mica
C14	BE10061	.02 x 600 v.
C15	BE119112	30.0 mfd. lytic
C16	BE124144	B.C. Oscillator Trimmer
C17	BE119112	30.0 mfd. lytic x 450 w.v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. oscillator trimmer
C21	BE119112	10.0 mfd. lytic
C22	BE11969	16 mfd. x 350 w.v.
C23	BE10065	.015 x 600 v.
C24	BE10065	.015 x 600 v.
C25	BE1001	.1 x 400 v.
C26	BE10020	.1 x 200 v.
C27	BE10013	.05 x 400 v.
C28	BE1009	.05 x 200 v.
C29	BE1295	.0001 mica
C30	BE1295	.0001 mica
C31	BE10020	.1 x 200 v.
C32	BE10019	.006 x 600 v.
C33	BE12912	.00025 mica
C34	BE1001	.1 x 400 v.
C35	BE10013	.05 x 400 v.
C36	BE100118	.008 x 600 v.
C37	BE12938	.00005 mica
C38	BE129166	.000125 mica
C39	BE10037	.003 x 600 v.

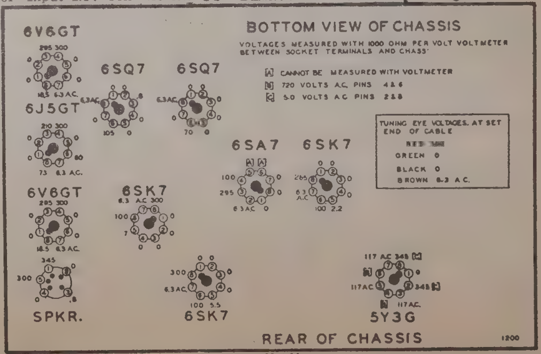
C3, C4 in same unit
C15, C17 and C21 are in same unit

PARTS

T1	BE111200	Loop Antenna Assembly
T2	BE111195	B.C. Antenna Coil
T3	BE111190	9 mc. Antenna Coil
T4	BE111189	6 mc. Antenna Coil
T5	BE111191	12 mc. Antenna Coil
T6	BE111192	15 mc. Antenna Coil
T7	BE10959	9 mc. R.F. Coil
T8	BE10958	6 mc. R.F. Coil
T9	BE10960	12 mc. R.F. Coil
T10	BE10961	15 mc. R.F. Coil
T11	BE10962	B.C. R.F. Coil
T12	BE110161	B.C. Oscillator Coil
T13	BE110157	9 mc. Oscillator Coil
T14	BE110156	6 mc. Oscillator Coil
T15	BE110158	12 mc. Oscillator Coil
T16	BE110159	15 mc. Oscillator Coil
T17	BE108181	Input I.F. Coil—455 kc.
T18	BE108155B	Interstage I.F. Coil
T19	BE108182	Output I.F. Coil—455 kc.
T20	BE105115	Output Transformer
T21	BE114207	12 in. Dynamic Speaker
T22	BE104217	Power Transformer—50-60 cycles
	BE104218	Power Transformer—25 cycle
S1	BE125121	Antenna Bandswitch
S2	BE125122	R.F. Oscillator Bandswitch
S3	BE125125	On-off Radio Phono Switch
S4	BE125124	Treble Switch
S5	BE125123	Bass Switch
P1	BE10794	2 6-8 volts pilot light T44



TOP VIEW

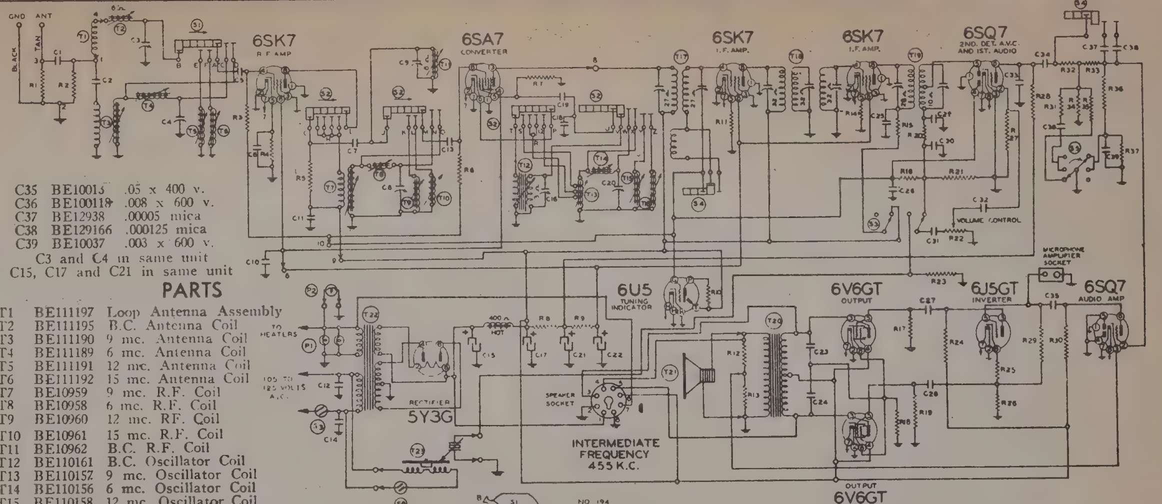

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 720 VOLTS A.C. PINS 4 & 6
[C] 50 VOLTS A.C. PINS 2 & 8
TUNING EYE VOLTAGES AT SET END OF CABLE
GREEN 0
BLACK 0
BROWN 6.3 A.C.
6V6GT
6SQ7
6SQ7
6J5GT
6SA7
6SK7
6V6GT
6SK7
SPKR.
6SK7
5Y3G

REAR OF CHASSIS

9-40

MODEL 04BR-1106A
above ser.#535050

MONTGOMERY WARD & CO.



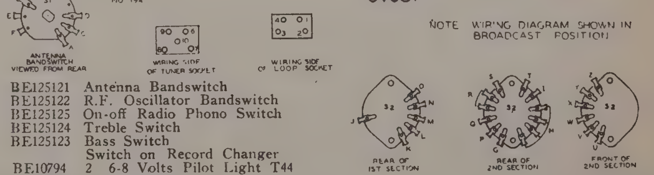

NO 194
ANTENNA BANDSWITCH VIEWED FROM REAR
WIRING SIDE OF TUNER SOCKET
WIRING SIDE OF LOOP SOCKET
NOTE WIRING DIAGRAM SHOWN IN BROADCAST POSITION
REAR OF 1ST SECTION
REAR OF 2ND SECTION
FRONT OF 2ND SECTION

Diagram Ref. No.	Part No.	
		RESISTORS
R1	BE130232	25M ohm—⅓ w.
R2	BE130232	25M ohm—⅓ w.
R3	BE13019	1 megohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130218	5M ohm—⅓ w.
R6	BE13019	1 megohm—⅓ w.
R7	BE130232	25M ohm—⅓ w.
R8	BE130318	6M ohm—2 watt
R9	BE130319	10M ohm—2 watt
R10		1 megohm in tuning indicator cable
R11	BE13013	1100 ohm -⅓ w.
R12	BE13082	10M ohm—⅓ w.
R13	BE130235	1500 ohm—⅓ w.
R14	BE130192	2M ohm—⅓ w.
R15	BE130192	2M ohm—⅓ w.
R16	BE13019	1 megohm—⅓ w.
R17	BE1303	500M ohm—⅓ w.
R18	BE130317	250 ohm—2 watt
R19	BE1303	500M ohm—⅓ w.
R20	BE13094	50M ohm—⅓ w.
R21	BE130316	120M ohm—⅓ w.
R22	BE101229	500M ohm
R23	BE1303	500M ohm--⅓ w.
R24	BE13094	50M ohm—⅓ w.
R25	BE130218	5M ohm—⅓ w.
R26	BE13094	50M ohm—⅓ w.
R27	BE130257	5 megohm—⅓ w.
R28	BE130172	250M ohm—⅓ w.
R29	BE1303	500M ohm—⅓ w.
R30	BE130172	250M ohm—⅓ w.
R31	BE130232	25M ohm—⅓ w.
R32	BE13080	150M ohm—⅓ w.
R33	BE130309	350M ohm—⅓ w.
R34	BE130172	250M ohm—⅓ w.
R35	BE13066	75M ohm—⅓ w.
R36	BE13080	150M ohm—⅓ w.
R37	BE130146	2 megohm—⅓ w.
		CONDENSERS
C1	BE1292	.0005 mica
C2	BE10047	.002 x 600 v.
C3	BE124143	B.C. Antenna Trimmer
C4	BE124143	9 mc. Antenna Trimmer
C5	BE1292	.0005 mica
C6	BE10020	.1 x 200 v. tubular
C7	BE129168	.00001 mica
C8	BE124138	9 mc. R.F. Trimmer
C9	BE124139	B.C. R.F. Trimmer
C10	BE10074	.1 x 400 v.
C11	BE10074	.1 x 400 v.
C12	BE10061	.02 x 600 v.
C13	BE1292	.0005 mica
C14	BE10061	.02 x 600 v.
C15	BE119112	30.0 mfd. lytic
C16	BE124144	B.C. Oscillator Trimmer
C17	BE119112	30.0 mfd. lytic x 450 w. v.
C18	BE129167	.0002 silver mica
C19	BE129165	.00005 mica
C20	BE124145	9 mc. oscillator trimmer
C21	BE119112	10.0 mfd. lytic
C22	BE11969	16 mfd. x 350 w. v.
C23	BE10065	.015 x 600 v.
C24	BE10065	.015 x 600 v.
C25	BE1001	.1 x 400 v.
C26	BE10020	.1 x 200 v.
C27	BE10013	.05 x 400 v.
C28	BE1009	.05 x 200 v.
C29	BE1295	.0001 mica
C30	BE1295	.0001 mica
C31	BE10020	.1 x 200 v.
C32	BE10019	.006 x 600 v.
C33	BE12912	.00025 mica
C34	BE1001	.1 x 400 v.
C35	BE10013	.05 x 400 v.
C36	BE100118	.008 x 600 v.
C37	BE12938	.00005 mica
C38	BE129166	.000125 mica
C39	BE10037	.003 x 600 v.

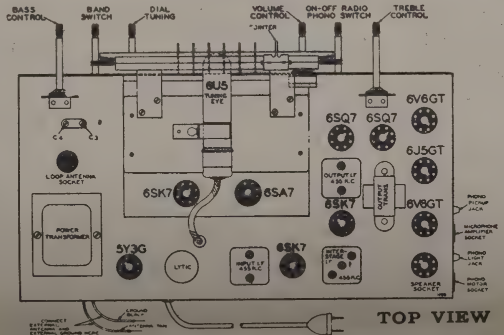
C3 and C4 in same unit
C15, C17 and C21 in same unit

6-40

PARTS

T1	BE111197	Loop Antenna Assembly
T2	BE111195	B.C. Antenna Coil
T3	BE111190	9 mc. Antenna Coil
T4	BE111189	6 mc. Antenna Coil
T5	BE111191	12 mc. Antenna Coil
T6	BE111192	15 mc. Antenna Coil
T7	BE10959	9 mc. R.F. Coil
T8	BE10958	6 mc. R.F. Coil
T9	BE10960	12 mc. RF. Coil
T10	BE10961	15 mc. R.F. Coil
T11	BE10962	B.C. R.F. Coil
T12	BE110161	B.C. Oscillator Coil
T13	BE110157	9 mc. Oscillator Coil
T14	BE110156	6 mc. Oscillator Coil
T15	BE110158	12 mc. Oscillator Coil
T16	BE110159	15 mc. Oscillator Coil
T17	BE108181	Input I.F. Coil—455 kc.
T18	BE108155B	Interstage I.F. Coil
T19	BE108182	Output I.F. Coil—455 kc.
T20	BE105115	Output Transformer
T21	BE114209	12 in. Dynamic Speaker
T22	BE104217	Power Transformer—50/60 Cycles
	BE104218	Power Transformer—25 Cycle
T23	BE104227	Automatic Record Changer, Roberts 50 Cycle Complete with Turntable
	BE104226	Automatic Record Changer, Roberts 25 Cycle, Complete with Turntable
	BE104221	Automatic Record Changer, Roberts 60 Cycle, Complete with Turntable
S1	BE125121	Antenna Bandswitch
S2	BE125122	R.F. Oscillator Bandswitch
S3	BE125125	On-off Radio Phono Switch
S4	BE125124	Treble Switch
S5	BE125123	Bass Switch
S6		Switch on Record Changer
P1	BE10794	2 6-8 Volts Pilot Light T44
P2	BE10794	Indicator Light T44

FOR OTHER DATA
SEE INDEX



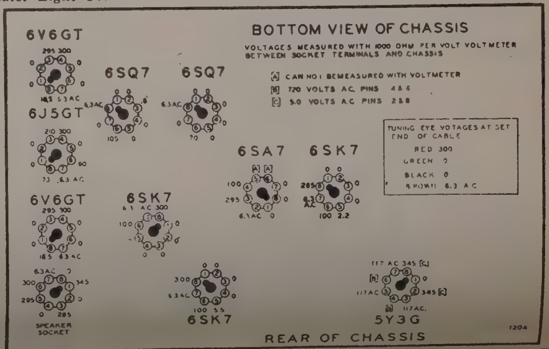
TOP VIEW

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS

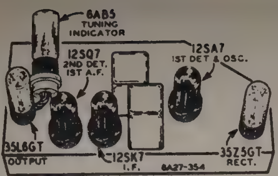
[A] CAN NOT BE MEASURED WITH VOLTMETER
[B] 120 VOLTS AC PINS 4 & 6
[C] 5.0 VOLTS AC PINS 2 & 8

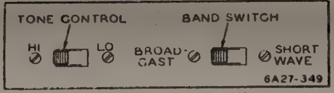
TUNING EYE VOLTAGES AT SET END OF CABLE
RED 300
GREEN 0
BLACK 0
BROWN 6.3 AC



REAR OF CHASSIS

©John F. Rider, Publisher



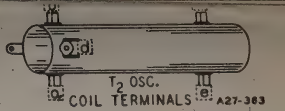


BACK PANEL OF CHASSIS

Power Consumption - - 28 Watts (At 117 volts AC Supply)

Power Output - - - - - - .8 Watt Undistorted 1.25 Watts Maximum

Selectivity - - 50 KC Broad at 1000 times Signal



MODEL 93WG-604
" 93WG-605

TO REDUCE MODULATION HUM:

Insulate dial-lamp clip from mounting bracket.
Return condenser C2 to B- (point X on schematic) instead of to chassis ground.
Dress lead from condenser C16 to volume control as far as possible from heater leads.

Tuning Frequency Range

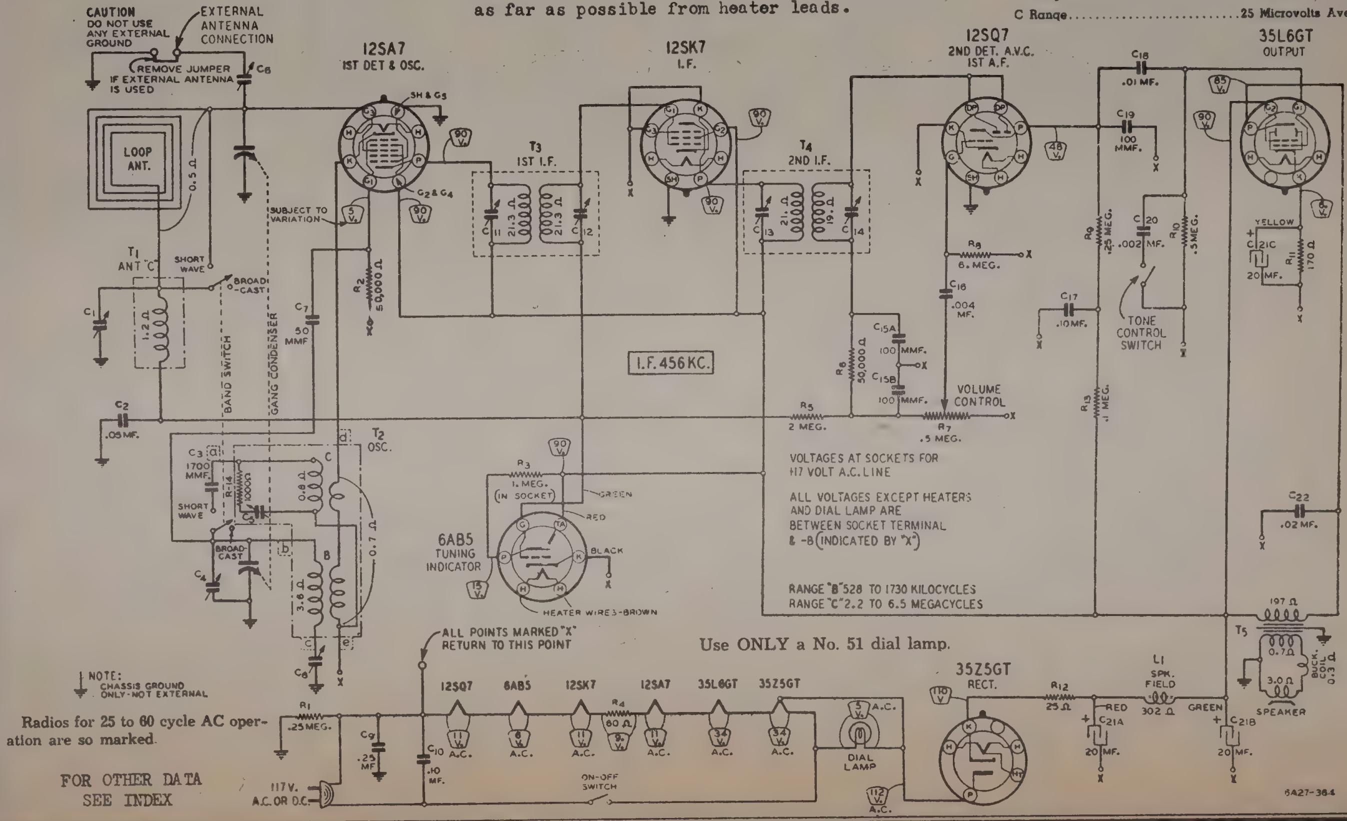
B Range........... 528 to 1730 KC

C Range.... ......2200 to 6500 KC

Sensitivity (For .05 watt output)

B Range..............................35 Microvolts Average

C Range..............................25 Microvolts Average



ALL POINTS MARKED "X" RETURN TO THIS POINT

VOLTAGES AT SOCKETS FOR 117 VOLT A.C. LINE

ALL VOLTAGES EXCEPT HEATERS AND DIAL LAMP ARE BETWEEN SOCKET TERMINAL & -B (INDICATED BY "X")

RANGE "B" 528 TO 1730 KILOCYCLES
RANGE "C" 2.2 TO 6.5 MEGACYCLES

Use ONLY a No. 51 dial lamp.

NOTE: CHASSIS GROUND ONLY-NOT EXTERNAL

Radios for 25 to 60 cycle AC operation are so marked.

FOR OTHER DATA
SEE INDEX

Setting a Station Button

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

At the right side of the cabinet (from the front) will be seen a cap which covers a hole in the cabinet—See illustration. Pry off this cap, being careful not to scratch the cabinet. Removal of the cap will expose a large locking screw. Using a screwdriver, loosen the mechanism by turning this screw in a counter-clockwise direction. The screw will turn easily until the dial stops rotating. Then exert a slight amount of additional pressure and continue to turn the screw about one and one-half complete turns.

With one hand, hold the manual tuning control to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way down*. It will go down easily at first and then a firm gentle pressure must be applied to push it down the rest of the way. It is better to start with the left hand button.

Hold *this* button all the way down. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning control a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way down.*

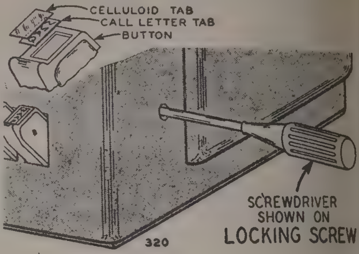
Release the button after the station is tuned in.

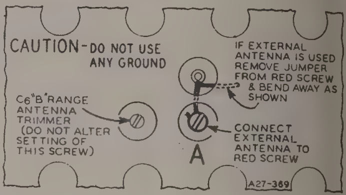
Carefully tune in the second station on your list. Then hold the tuning control and push the second button slowly and firmly all the way down. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Do this by turning the locking screw in a clockwise direction until it is tight. It will turn easily until the dial stops rotating—then additional pressure must be exerted. Tighten firmly but not excessively. Replace the cap over the hole.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.




CAUTION-DO NOT USE ANY GROUND
IF EXTERNAL ANTENNA IS USED REMOVE JUMPER FROM RED SCREW & BEND AWAY AS SHOWN
C6"B"RANGE ANTENNA TRIMMER (DO NOT ALTER SETTING OF THIS SCREW)
CONNECT EXTERNAL ANTENNA TO RED SCREW
A
A27-369

ALIGNMENT PROCEDURE

Remove Jumper on Loop Antenna for All Adjustments.

Volume Control—Maximum All Adjustments.

Connect Ground Post of Signal Generator to B—(12SK7—Prong No. 3) in Chassis.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

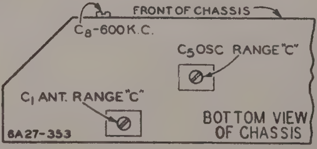
SIGNAL GENERATOR			BAND		ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	SWITCH SETTING	CONDENSER SETTING	(See Trimmer Illustrations)
I. F.					
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	.1 mf.	B Range	Turn Rotor to full open	1st I.F. (C11) & (C12) 2nd I.F. (C13) & (C14)
RANGE B					
1730 KC	Signal Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to full open	Oscillator Range B (C4)
1500 KC	Red Antenna Screw at Back of Loop	.1 mf.	B Range	Turn Rotor to max. output	Antenna Range B (C6)—See Illustration Page 1
600 KC	Same as Above	.1 mf.	B Range	Turn Rotor to max. output	600 KC (C8) Rock Rotor—See Note A
RANGE C					
6500 KC	Same as Above	.1 mf.	C Range	Turn Rotor to full open	Oscillator Range C (C5)
6000 KC	Same as Above	.1 mf.	C Range	Turn Rotor to max. output	Ant. Range C (C1) Rock Rotor—See Note A

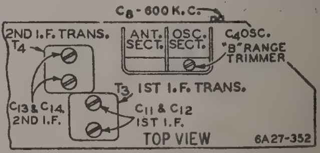
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

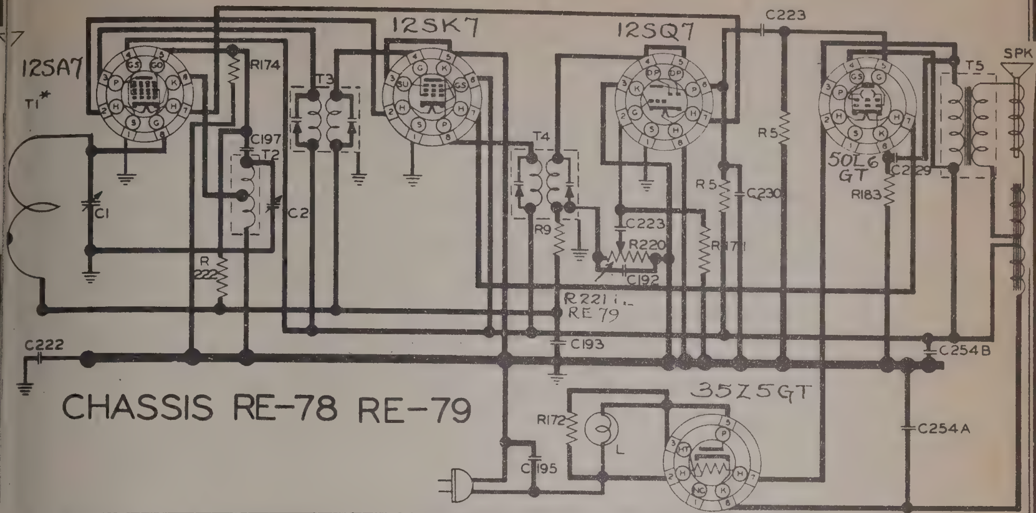
CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.





NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 622,622A.Ch.RE-78
632, Ch.RE-79
Chassis RE-91



CHASSIS RE-78 RE-79

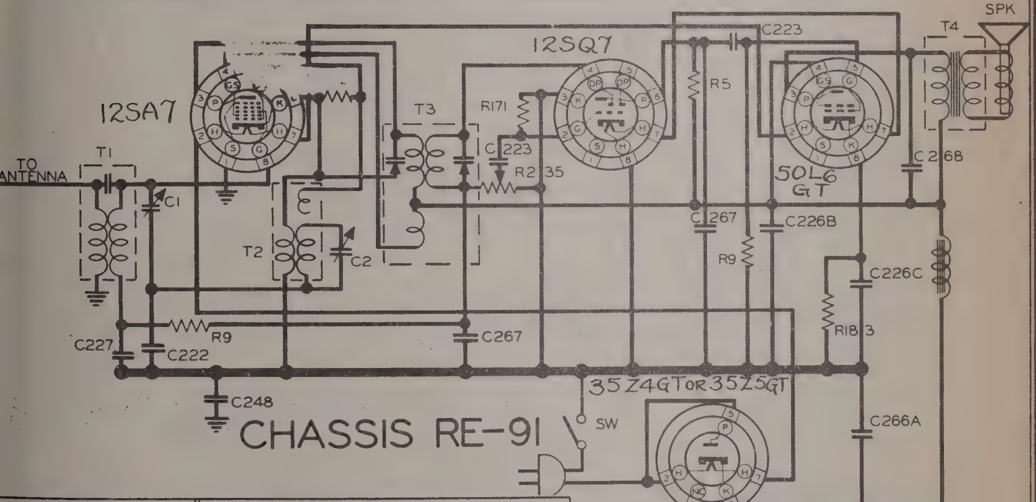
RESISTORS			
R	OHM	W	PART NO
220	1 M	V.C.	17-16876
5	500K	1/4	17-2070
183	150	1/4	17-14316
174	20 K	1/4	17-14291
172	100	1/4	17-14289
222	10 M	1/4	17-14377
9	1M	1/4	17-2080
	In Chassis RE-		*79*
221	1 M	V.C.	17-16899

CONDENSERS			
C	CAPACITY	VOLT	PART NO
1	TWO GANG		17-16841
2	VARIABLE		
254A	20 MFD.	150	17-14376
254B	10 MFD.	150	
192	.00025	600	17-14273
195	.05	400	17-14276
222	.2	400	17-14317
229	.02	400	17-14327
223	.002	400	17-14318
193	.05	200	17-14274
197	.0001	600	17-14278
230	.000	400	17-14328

TRANSFORMERS		
T	TYPE	PART NO
1	ANTENNA LOOP	00-16882
2	OSCILLATOR COIL	00-16891
3	FIRST I.F. COIL	00-16885
4	SECOND I.F. COIL	00-16886
5	OUTPUT TRANSF.	00-16883
**In*	*Chassis RE79*	***
1	*ANT. LOOP*	*00-16900*

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
L	DIAL LIGHT BULB MAZDA #47	17-16378
P	LINE CORD & PLUG ASSY	17-16874
SPK	SPEAKER ASSY.	17-16867

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA



CHASSIS RE-91

CONDENSERS			
C	CAPACITY	VOLT	PART NO.
222	.2	400	17-14317
227	.05	200	17-14323
248	.05	400	17-14366
223	.002	400	17-14318
268	.03	400	17-14392
1	TWO GANG		17-17115
2	VARIABLE		
266A	20 MFD.	150	17-14390
266B	10 MFD.	150	
266C	20 MFD.	25	
267	.0005	400	17-14391
	.0005	400	

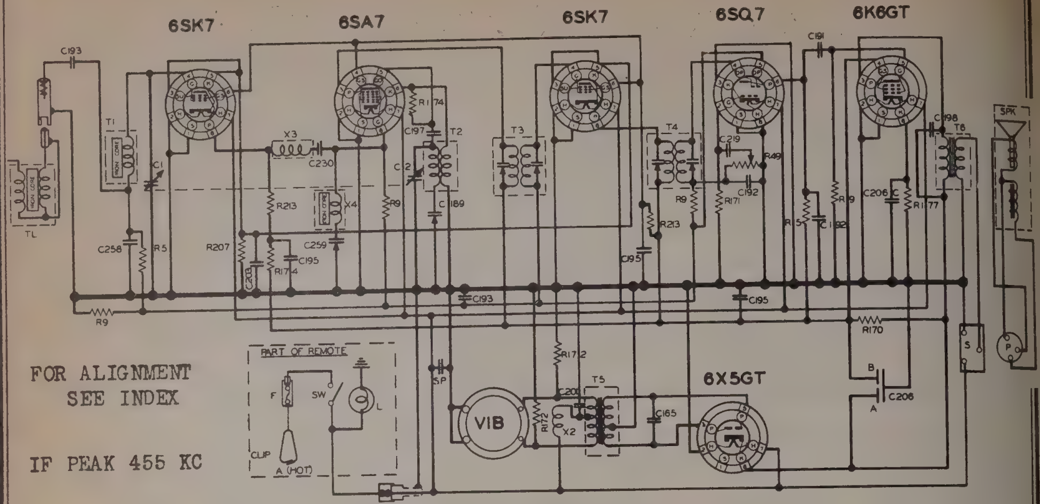
MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
T1	ANTENNA COIL	00-17130
T2	OSCILLATOR COIL	00-17119
T3	I.F COIL	00-17120
T4	OUTPUT TRANSFORMER	00-17131
SPK.	SPEAKER	17-17132

FREQUENCY RANGE
1750 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

RESISTORS			
R	OHM	W	PART NO.
174	20 K.	1/4	17-14291
9	1 M	1/4	17-2080
171	15 M	1/4	17-14288
5	500K.	1/4	17-2070
183	150	1/4	17-14318
235	2 M	V.C	17-17117

MODEL 720 Ch.RE-86

NOBLITT-SPARKS INDUSTRIES, INC.



FOR ALIGNMENT SEE INDEX

IF PEAK 455 KC

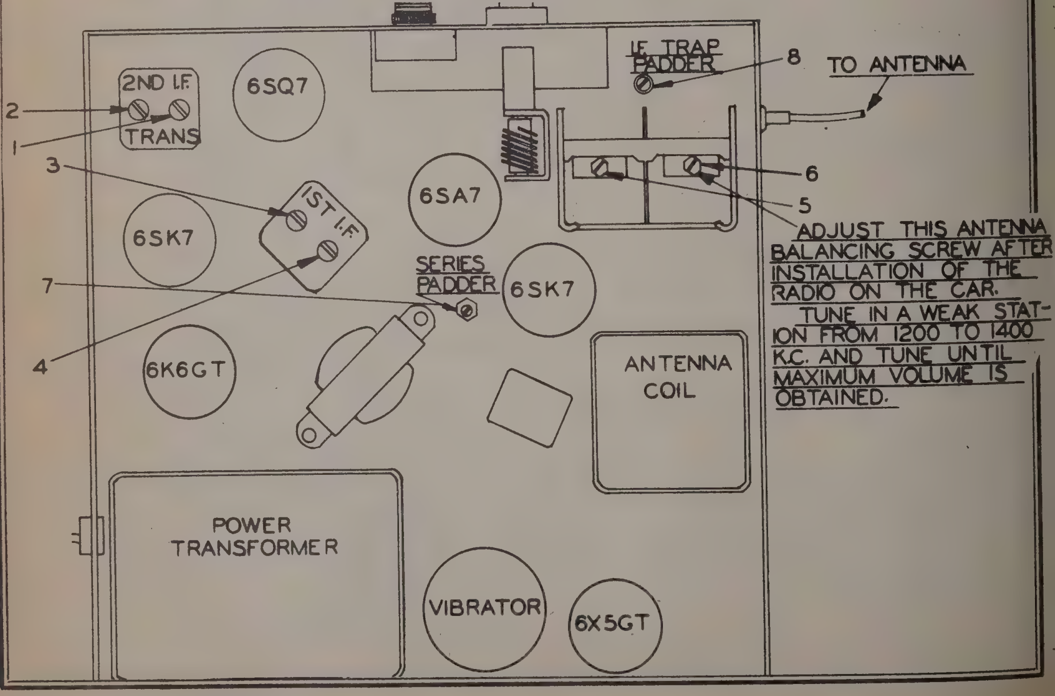
RESISTORS			
R	OHMS	W	PART NO
5	500K	1/4	17-2070
9	M	1/4	7 2080
49	500K	VC	17-14534
170	800		17-14287
171	1.5M	1/4	17-14288
172	100	1/4	17-14289
174	20K	1/4	17-14291
177	650	1/4	17-14296
213	10K	1/4	17-14308
207	500	1/4	17-14381

CONDENSERS			
C	CAPACITY	VOLT	PART NO
1	TWO-GANG		17-18254
2	VARIABLE		
165	005	1200	17-14230
189	400-800 MMFD	PAD	17-14286
191	01	400	17-14272
192	00025	600	17-14273
193	05	200	17-14274
195	05	400	17-14276
219	003	200	17-14312
203	.2	200	17-18242
206A	10 MFD.	300	17-14297
206B	0 MFD	300	
206C	40 MFD	15	
230	0005	400	17-14328
258	004	600	17-14381
20	.5	150	17-14285
259	4 40 MMFD.	PAD	17-14383
197	.0001	600	17-14278
198	005	400	17-14279

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO
1	ANTENNA COIL	00-18219
2	OSCILLATOR	00-17000
3	FIRST IF COIL	00-17007
4	SECOND IF COIL	00-17008
5	POWER TRANSFORMER	00-18265
6	OUTPUT TRANSFORMER	00-18268
X	CHOKES	
2	SUPPRESSION CHOKE	29-13459
3	TRAP CHOKE	00-16982
4	TRAP CHOKE	00-16982

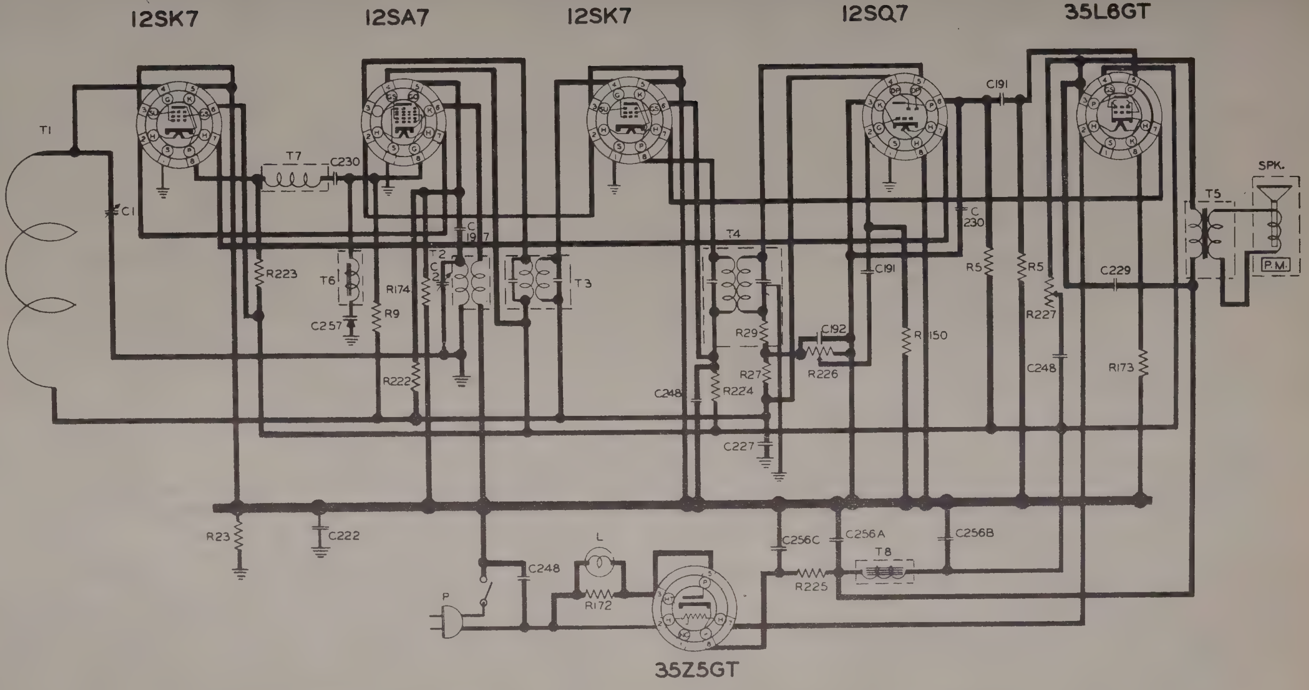
MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
F	FUSE - 20 AMPS	17-2228
L	DIAL LIGHT BULB - MAZDA NO. 51	17-13904
P	SPEAKER PLUG	17-4780
S	SPEAKER SOCKET	17-15831
SPK	SPEAKER ASSEMBLY	17-18517
SW	POWER SWITCH	—
TL	TRANSMISSION LINE	00-16969
SP	SPARK PLATE	
VIB	VIBRATOR	17-14747

I.F. PEAK 455 K.C.
FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA



ADJUST THIS ANTENNA BALANCING SCREW AFTER INSTALLATION OF THE RADIO ON THE CAR. TUNE IN A WEAK STATION FROM 1200 TO 1400 K.C. AND TUNE UNTIL MAXIMUM VOLUME IS OBTAINED.

ARVIN HOME RADIO CHASSIS RE-80



RESISTORS			
R	OHM	W	PART NO
223	4000	1/4	17-16967
23	250 K	1/4	17-3011
9	1 M	1/4	17-2080
222	10 M	1/4	17-16966
174	20 K	1/4	17-14291
172	100	1/4	17-14289
225	15	1/4	17-16969
224	15 K	1/4	17-16968
27	2 M	1/4	17-4788
29	50 K	1/4	17-2060
150	5 M	1/4	17-14242
5	500 K	1/4	17-2070
173	200	1/4	17-14290
226	250 K	V C	17-16950
227	100 K	T.C	17-16951

CONDENSERS			
C	CAPACITY	VOLT	PART NO
230	.0005	400	17-4328
222	2	400	17-14317
197	.0001	600	17-14278
248	.05	400	17-4366
227	.05	200	17-14323
192	.00025	600	17-14273
256 A	40 MFD.	150	17-6918
256 B	20 MFD	50	
256 C	10 MFD	150	
191	.01	400	17-4272
1	TWO GANG		17-16949
2	VARIABLE		
257	4-40 MMFD	PAD.	17-14378
229	.02	400	17-4327

TRANSFORMERS			
T	DESCRIPTION	PART NO.	
	ANTENNA LOOP	17-16974	
2	OSCILLATOR COIL	00-16912	
3	FIRST I.F. COIL	00-16913	
4	SECOND I.F. COIL	00-17005	
5	OUTPUT TRANSFORMER	00-16915	
6	TRAP CHOKE	00-6926	
7	SERIES CHOKE	00-16927	
8	IRON CORE "B" CHOKE	00-16954	

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
L	PILOT LIGHT MAZDA 47	17-16378
SPK	SPEAKER 6 PM	17-16892
R226	VOLUME CONTROL & SW	17-16950
R227	TONE CONTROL	17-16951
P	LINE CORD & PLUG ASSY	17-16844

IF PEAK 455 K.C.

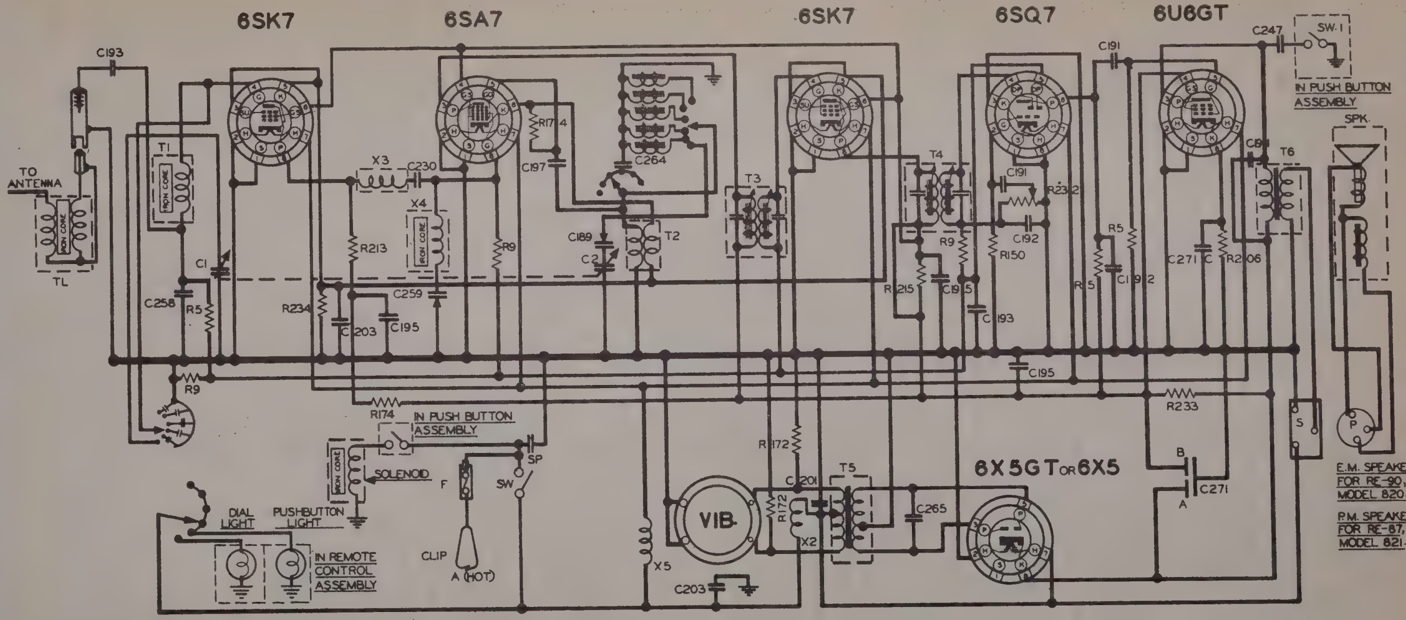
BALANCE 1400 K.C.-CHECK AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA

MODEL 820 Ch.RE-90
MODEL 821 Ch.RE-87

NOBLITT-SPARKS INDUSTRIES, INC.

ARVIN CAR RADIO — CHASSIS RE-90 & RE-87



RESISTORS				
R	OHMS	W	PART NO.	
5	500 K.	1/4	17-2070	
9	1 M.	1/4	17-2080	
232	250 K.	V.C	17-17038	
150	5 M	1/4	17-14242	
215	5000	1/4	17-14371	
172	100	1/4	17-14289	
174	20 K.	1/4	17-14291	
208	300	1/4	17-14380	
213	10 K.	1/4	17-14389	
234	180	1/4	17-14389	
233	3000	1	17-14388	

CONDENSERS				
C	CAPACITY	VOLT	PART NO.	
1	TWO-GANG		17-18254	
2	VARIABLE			
265	.01	1600	17-14387	
189	400-800 MMFD	PAD.	17-14268 A	
191	.01	400	17-14272	
192	.00025	600	17-14273	
193	.05	200	17-14274	
195	.05	400	17-14276	
258	.004	600	17-14381	
203	.2	200	17-18242	
271 A	20 MFD.	300	17-14396	
271 B	10 MFD.	300		
271 C	20 MFD.	25		
201	5	150	17-14285	
259	440 MMFD.	PAD.	17-14383	
197	.0001	600	17-14278	
247	.04	400	17-14383	
230	.0005	400	17-14328	
264	.00035	PAD.	17-14386	

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO.	
1	ANTENNA COIL	00-17072	
2	OSCILLATOR COIL	00-17133	
3	FIRST I.F. COIL	00-17074	
4	SECOND I.F. COIL	00-17075	
5	POWER TRANSF.	00-17073	
6	OUTPUT TRANSF.	00-17076	
X	CHOKES		
2	SUPPRESSION CHOKE	29-18308	
3	TRAP CHOKE	00-18862	
4	TRAP CHOKE	00-18862	
5	HASH CHOKE	29-17111	

MISCELLANEOUS UNITS			
SYMBOL	DESCRIPTION	PART NO	
F	FUSE - 20 AMPS	17-2225	
L	DIAL LIGHT BULB - MAZDA # 51	17-13904	
P	SPEAKER PLUG	17-4780	
S	SPEAKER SOCKET	17-13831	
SPK.	SPEAKER ASSEMBLY RE-90 MODEL 820	17-17114	
SW.	POWER SWITCH	—	
TL.	TRANSMISSION LINE	00-16988	
SP	SPARK PLATE	—	
VIB.	VIBRATOR	17-14747	
SW.1	TONE CONTROL SWITCH	—	
SPK.	SPEAKER ASSEMBLY RE-87 MODEL 821	17-17188	

I.F. PEAK 455 K.C.
FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA.

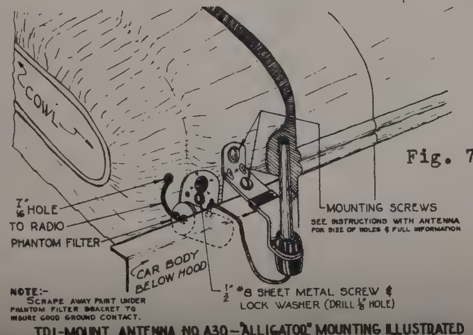

COWL
7/16" HOLE TO RADIO
PHANTOM FILTER
CAR BODY BELOW HOOD
MOUNTING SCREWS
SEE INSTRUCTIONS WITH ANTENNA FOR SIZE OF HOLES & FULL INFORMATION
1/2" #8 SHEET METAL SCREW & LOCK WASHER (DRILL 1/8" HOLE)

Fig. 7

NOTE:- SCRAPE AWAY PAINT UNDER PHANTOM FILTER BRACKET TO INSURE GOOD GROUND CONTACT.

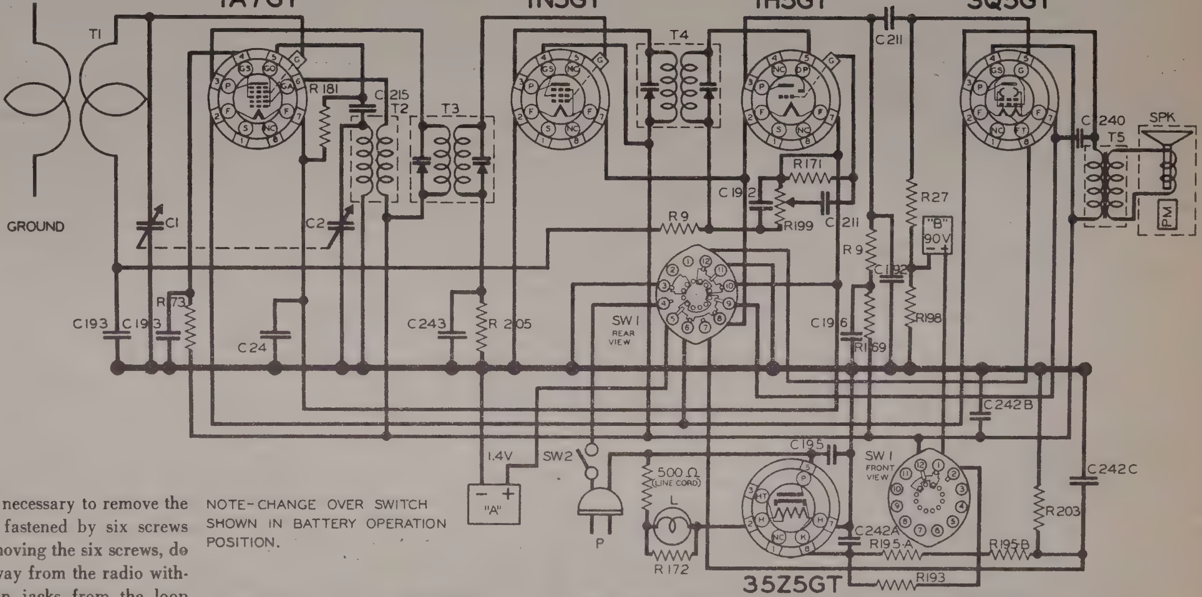
TRI-MOUNT ANTENNA NO. A30-"ALLIGATOR" MOUNTING ILLUSTRATED
MAY BE ALSO MOUNTED WITH SINGLE "UNDERHOOD" BRACKET OR "HINGE-PIN" BRACKET

NOBLITT-SPARKS INDUSTRIES, INC.

All sensitivities given for 50 milliwatts output = .4 volts across Voice Coil.

Operation No.	Connect Bal. Oscillator to	Balance Oscillator Frequency	Adjust	Dial Setting
1	1A7 Grid	455 kc	1st & 2nd I. F. Trimmers	550 kc
2	Ant Post Through 20 uuf	1400 kc	Osc. Trimmer	1400 kc
3	Ant Post Through 20 uuf	1400 kc	Ant Trimmer	1400 kc

RADIO CHASSIS RE-82



NOTE-CHANGE OVER SWITCH SHOWN IN BATTERY OPERATION POSITION.

RESISTORS			
R	OHM	W	PART NO.
9	1M	1/4	17-2080
27	2M	1/4	17-4788
73	30K	1/4	17-4276
169	150K	1/4	17-14282
171	15M	1/4	17-14288
172	100	1/4	17-14289
181	100K	1/4	17-14303
195A	460	2 3/4	17-14351
195B	1500	5 1/4	
198	400	1/4	17-14343
199	1M	V.C.	17-14350
203	450	1/4	17-14354
193	2K	1/4	17-14337
205	3M	1/4	17-14356

CONDENSERS			
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-18549
2	VARIABLE		
192	.00025	600	17-14273
193	.05	200	17-14274
195	.05	400	17-14276
198	.1	200	17-14277
211	.01	200	17-14306
215	.0001	600	17-14310
24	.5	200	17-14040A
240	.003	400	17-14348
242A	40	150	17-14353
242B	20	150	
242C	100	25	
243	.002	200	17-14357

TRANSFORMERS		
T	TYPE	PART NO.
1	ANTENNA LOOP	00-16973
2	OSCILLATOR COIL	00-16404
3	FIRST I.F	00-16578
4	SECOND I.F COIL	00-16579
5	OUTPUT TRANS.	00-16566

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
A	1.5 VOLT "A" BATTERY	17-16583
B	TWO 45 VOLT "B" BATTERIES	17-16562
L	DIAL LIGHT BULB - MAZDA 47	17-16378
P	LINE CORD & PLUG ASSEMBLY	17-16492
SPK	SPEAKER ASSEMBLY - 5" PERMANENT MAGNET	17-16613
SWI	AC DC - BATTERY SWITCH	17-16564
SW2	VOLUME CONTROL & LINE SWITCH	17-14350

I.F PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

Installation of Batteries:

To install batteries it will be necessary to remove the back of the cabinet which is fastened by six screws (three on each side). After removing the six screws, do not attempt to pull the back away from the radio without first disconnecting the pin jacks from the loop antenna.

When the back has been removed, turn the cabinet upside down (handle to the bottom).

Note the battery cable extending from the right side of the chassis. This cable terminates in one two-prong plug for the long "A" battery and two three-prong plugs for the smaller "B" batteries.

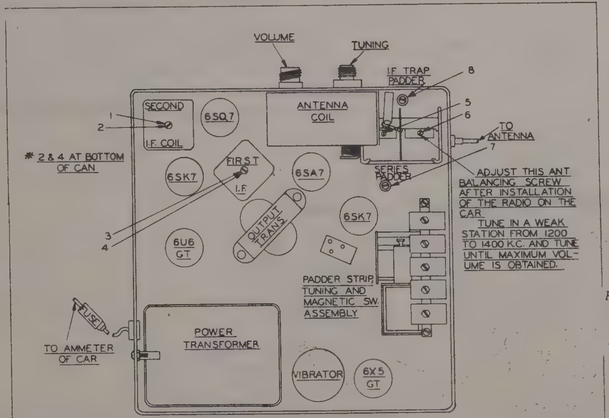
MODEL 720
MODEL 820
MODEL 821

NOBLITT-SPARKS INDUSTRIES, INC.

IMPORTANT: Before attempting to balance radio, be sure the Automatic Station Selector (push button control) is set to *"DIAL"* position.

All sensitivities given for 1 watt output equals 1.65 V. across voice coil.

Operation No.	*Connect Bal. Oscillator to*	*Bal. Oscillator Frequency*	*Adjust Padder No.*	*Dial Setting*	*Sensitivity*
1	6SA7 Grid	455 kc.	1,2,3 & 4	550 kc	50uv
2	Ant. Coupler Through 20 uuf	455 kc.	8	550 kc	min. sig
3	Through 20 uuf	1400 kc.	5, then 6	1400 kc	10 uv
4	Through 20 uuf	600 kc.	7	600 kc	10 uv


VOLUME
TUNING
I.F. TRAP PADDER
8
5
6
TO ANTENNA
7
SECOND I.F. COIL
1
2
6SQ7
ANTENNA COIL
* 2 & 4 AT BOTTOM OF CAN
6SK7
FIRST I.F.
6SA7
SERIES PADDER
ADJUST THIS ANT BALANCING SCREW AFTER INSTALLATION OF THE RADIO ON THE CAR
TUNE IN A WEAK STATION FROM 1200 TO 1400 K.C. AND TUNE UNTIL MAXIMUM VOLUME IS OBTAINED.
OUTPUT TRANS
6SK7
3
4
6U6 GT
PADDER STRIP TUNING AND MAGNETIC SW. ASSEMBLY
FUSE
TO AMMETER OF CAR
POWER TRANSFORMER
VIBRATOR
6X5 GT

Synchronizing Station Selector Controls

(1) Disconnect the push button control cable (cloth covered cable) by pulling out the plug from the radio case.

(2) Turn on the power switch and set the Automatic Station Selector Control to "Dial" position -- that is, to the position where the word "Dial" appears at the window of the control.

(3) Plug the cloth covered cable back into the radio.

The three preceding steps will have synchronized the Automatic Station Selector control system so that the numerals on the control dial correspond to the positions of the magnetic tuning switch in the radio.

The remote control Automatic Station Selector can be set to tune in five broadcast stations (preferably powerful local stations) of your choice. The dial of the control unit carries the numbers 1 to 5 to designate the stations.

To tune in stations with push buttons

(1) Set the Automatic Station Selector to position No. 1 (the numeral "1" appearing on the dial of the control unit). With the Selector in this position the set may be tuned to any station whose broadcast frequency lies between 900 and 1600 kilocycles.

(2) Remove the Slot Cover on the front of the set below the speaker grille for access to the Oscillator Adjustment Screws and Antenna Trimmers, by adjustment of which the tuning is accomplished. See *Fig.7.*

(3) Adjust (with screwdriver) Oscillator Adjustment Screw No. 1A *(see Fig. 7)* until the broadcast signal of the desired station is received. Turning the Oscillator Adjustment Screws in a clockwise direction lowers the frequency and turning in a counter clockwise direction increases the frequency.

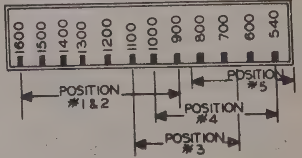
(4) Adjust Antenna Trimmer No. 1B to position where maximum volume is attained. The entire range of the Antenna Trimmers is covered within three counter clockwise turns of the screw from tight position. *Do not back screws out more than three turns.* Clockwise rotation lowers the frequency. Counter clockwise rotation increases the frequency.

The preceding instructions outline completly the steps for setting up station selector position No. 1. For positions No. 2, No.3, No.4 and No.5 the same general proceedure is to be used.

Below is a table showing five Station Selector positions, the kilocycle range covered by each position and the Oscillator screws and Antenna Trimmers by adjustment of which any desired station within the given range may be tuned in.

It will be noted that, even though the power switch is off and the radio not playing, when the control button is pushed there will be a clearly audible "click" in the radio. This sound is made by the magnetic switch which is always energized regardless of whether or not the radio is turned on. In other words, this sound denotes normal functioning of the automatic control system.

If at any time the Station Selector controls become non-synchronous due to improper operation of the push button or operation of the push button when the control cable is disconnected, synchronism may again be restored by repeating the 3 steps outlined under the heading *"Synchronizing the Station Selector Controls"* after making sure that the radio is turned on and the pilot light is lit in the manual tuning dial, indicating that the manual tuning switch control is "switched-in".



Position of Automatic Station Selector	*Broadcast Range In Kilocycles*	*Oscillator Screw To Select Station*	*Antenna Trimmer To Adjust for Maximum Volume*
1	900 to 1600	1A	1B
2	900 to 1600	2A	2B
3	650 to 1100	3A	3B
4	540 to 1000	4A	4B
5	535 to 850	5A	5B

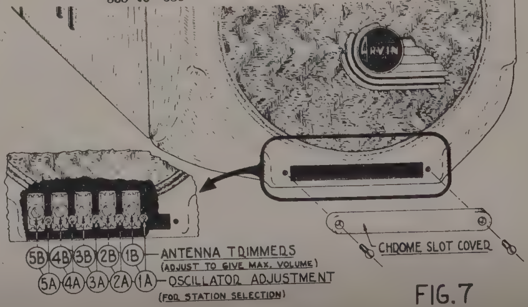
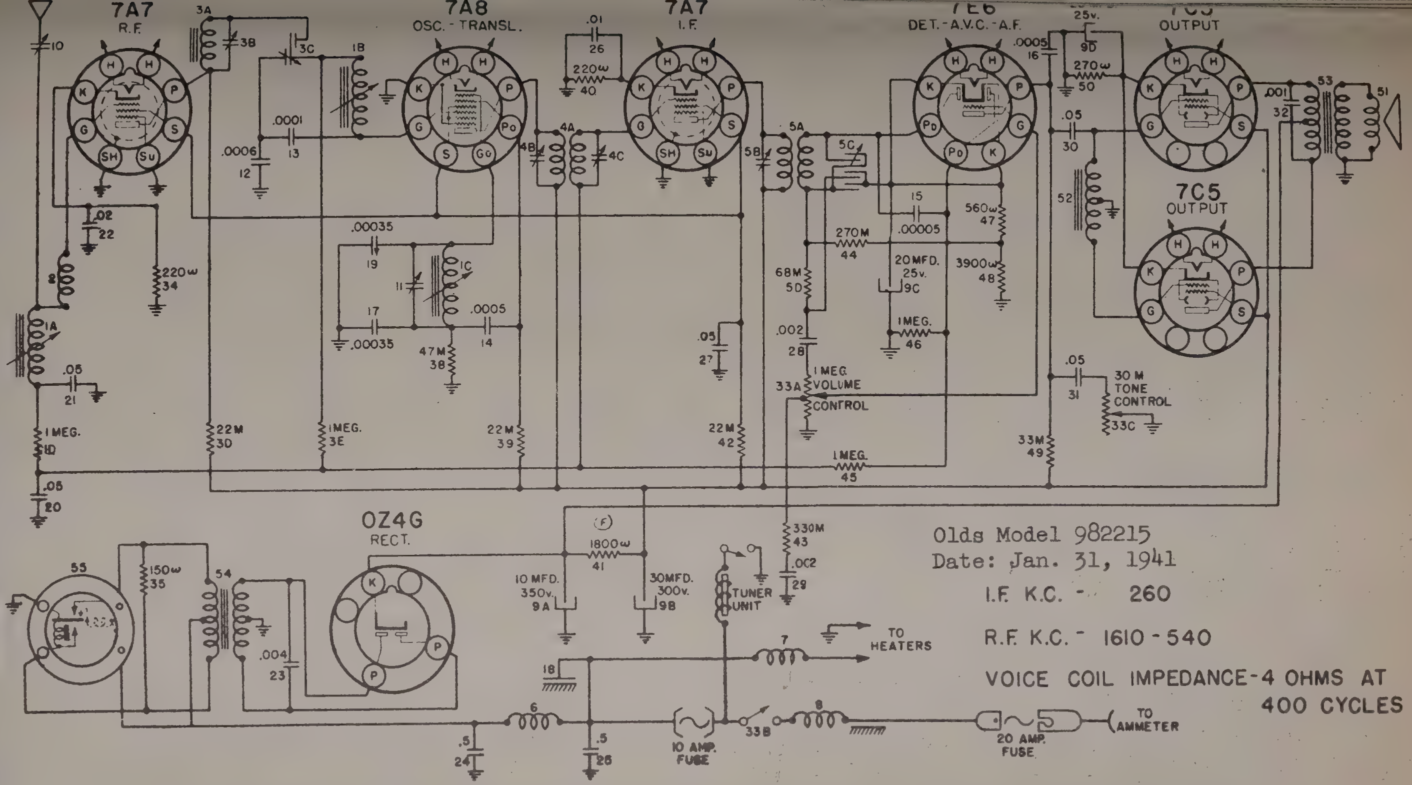


FIG.7

OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982215



Olds Model 982215
Date: Jan. 31, 1941
I.F. K.C. - 260
R.F. K.C. - 1610 - 540
VOICE COIL IMPEDANCE - 4 OHMS AT 400 CYCLES

The antenna circuit is directly coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 K.C.).

The Antenna System used with these receivers is of the extension rod type, mounting through the cowl of the body by the use of special insulators, conforming to the contour of the cowl. Raising and lowering of the rod is accomplished by means of a remote control on the instrument panel.

MODEL 982215

OLDSMOBILE DIV.—GEN. MOTORS

CIRCUIT ALIGNMENT

All of the adjustable condensers in this receiver are very accurately adjusted at the factory and will need no further adjustment (excepting antenna condenser "G") unless tampered with or a defective coil has been replaced. If realignment is found to be necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

DO NOT ATTEMPT TO PEAK THE I-F STAGES OF THIS RECEIVER WITHOUT CAREFULLY NOTING THE INSTRUCTIONS BELOW:

1. Aligning I-F Stages at 260 Kilocycles

(a) Turn volume control to the maximum position.

(b) Connect the signal lead of the test oscillator through a .1 mfd. condenser to terminal X, which is the grid prong of the 7A8 tube.

(c) Connect the ground lead of the test oscillator to the chassis frame.

(d) Connect the output meter across the speaker voice coil at the terminal board mounted on the speaker.

(e) Set the test oscillator to exactly 260 Kilocycles.

(f) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1610 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 7A8 tube and connect to the antenna terminal of the receiver THROUGH a .000075 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .000075 mfd. mica condenser be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)

(b) Loosen lock screw "E" and tune the receiver by means of the manual control to the extreme high frequency position, against the stop, and tighten screw "E".

(c) Set the test oscillator to 1610 Kilocycles.

(d) Adjust the condenser "F" for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial.)

(e) Adjust the antenna compensating condenser "G" for maximum output.

(f) Adjust the R.F. trimmer condenser "J" for maximum output.

3. Adjusting the I-F Wave Trap

(a) Leave the test oscillator lead the same as for aligning at 1610 K.C.

(b) Set the test oscillator to exactly 260 K.C.

(c) Adjust the trimmer "H" for minimum deflection on the output meter. (It may be necessary to increase the signal from the test oscillator when making this adjustment.)

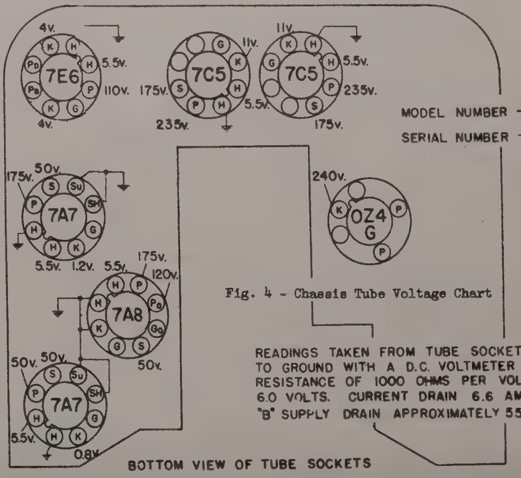
NOTE: With permeability tuning it is necessary to adjust the capacity at only one frequency. The coils are so wound that tracking is automatic and the usual low frequency adjustments are not necessary.

If the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

Lock screw "E" maintains the location of the mechanical stop at the high frequency end of the band.

New frequency assignments to 1600 K.C. make it desirable for the receiver to cover this range, but due to local ordinances it is not permissible in all locations. The high frequency stop is set at 1560 K.C. in production and after aligning the receiver, reset the stop to this frequency which is accomplished by loosening lock screw "E", tune in manually to 1560 K.C. and tighten screw.

Where ordinances permit, the high frequency stop may be set at any frequency up to 1600 K.C.



MODEL NUMBER - 982215

SERIAL NUMBER - 656C901 AND UP

Fig. 4 - Chassis Tube Voltage Chart

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.6 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 55 M.A.

BOTTOM VIEW OF TUBE SOCKETS

MODEL 982215

OLDSMOBILE DIV.—GEN. MOTORS

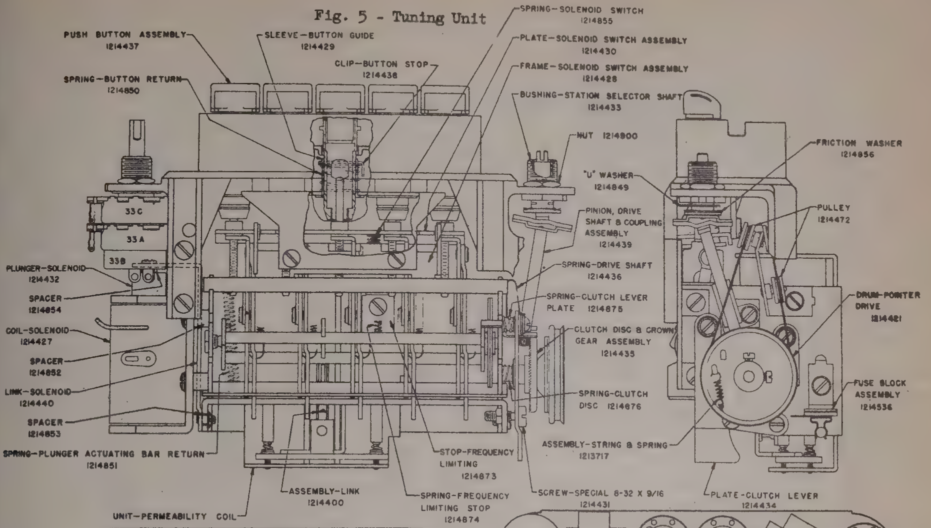

PUSH BUTTON ASSEMBLY 1214437
SPRING—BUTTON RETURN 1214850
SLEEVE—BUTTON GUIDE 1214429
CLIP—BUTTON STOP 1214436
SPRING—SOLENOID SWITCH 1214855
PLATE—SOLENOID SWITCH ASSEMBLY 1214430
FRAME—SOLENOID SWITCH ASSEMBLY 1214428
BUSHING—STATION SELECTOR SHAFT 1214433
NUT 1214900
"U" WASHER 1214849
PINION, DRIVE SHAFT & COUPLING ASSEMBLY 1214439
SPRING—DRIVE SHAFT 1214436
SPRING—CLUTCH LEVER PLATE 1214875
CLUTCH DISC & CROWN GEAR ASSEMBLY 1214435
SPRING—CLUTCH DISC 1214676
ASSEMBLY—STRING & SPRING 1213717
SCREW—SPECIAL 8-32 X 9/16 1214431
PLATE—CLUTCH LEVER 1214434
FRICTION WASHER 1214856
PULLEY 1214472
DRUM—POINTER DRIVE 1214421
FUSE BLOCK ASSEMBLY 1214536
33C
33A
33B
PLUNGER—SOLENOID 1214432
SPACER 1214854
COIL—SOLENOID 1214427
SPACER 1214852
LINK—SOLENOID 1214440
SPACER 1214853
SPRING—PLUNGER ACTUATING BAR RETURN 1214851
UNIT—PERMEABILITY COIL
ASSEMBLY—LINK 1214400
STOP—FREQUENCY LIMITING 1214873
SPRING—FREQUENCY LIMITING STOP 1214874

Fig. 5 - Tuning Unit

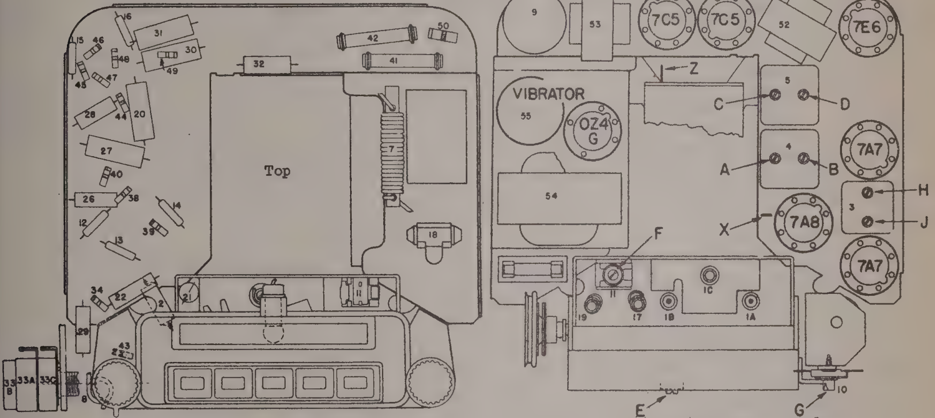


Fig. 1 - Chassis Parts Layout - 982215

Bottom

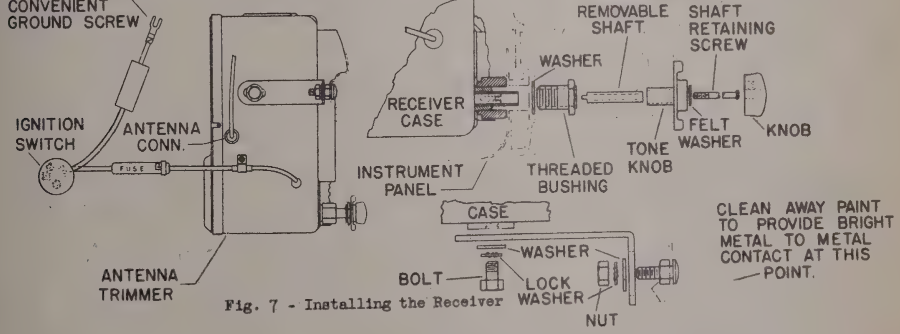
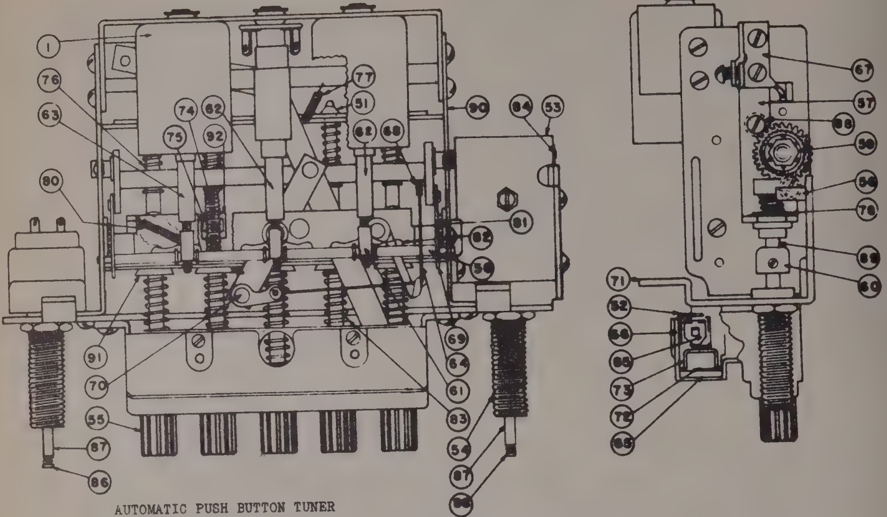


Fig. 7 - Installing the Receiver

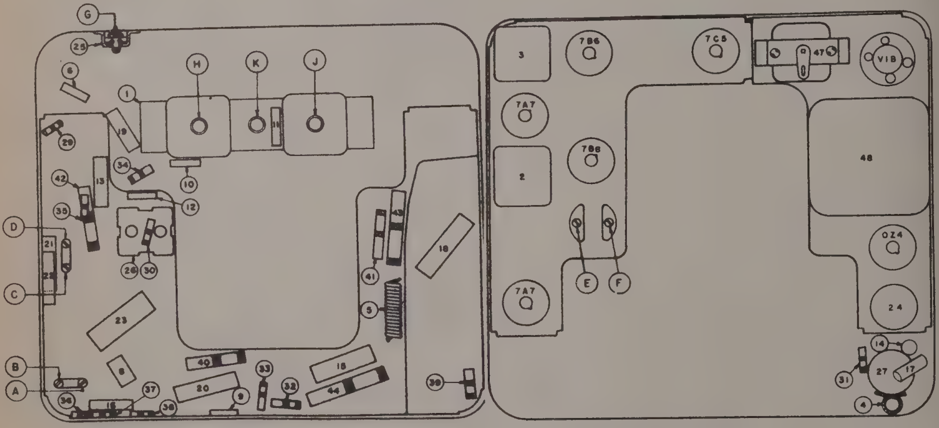
MODEL 982216

OLDSMOBILE DIV.—GEN. MOTORS



AUTOMATIC PUSH BUTTON TUNER

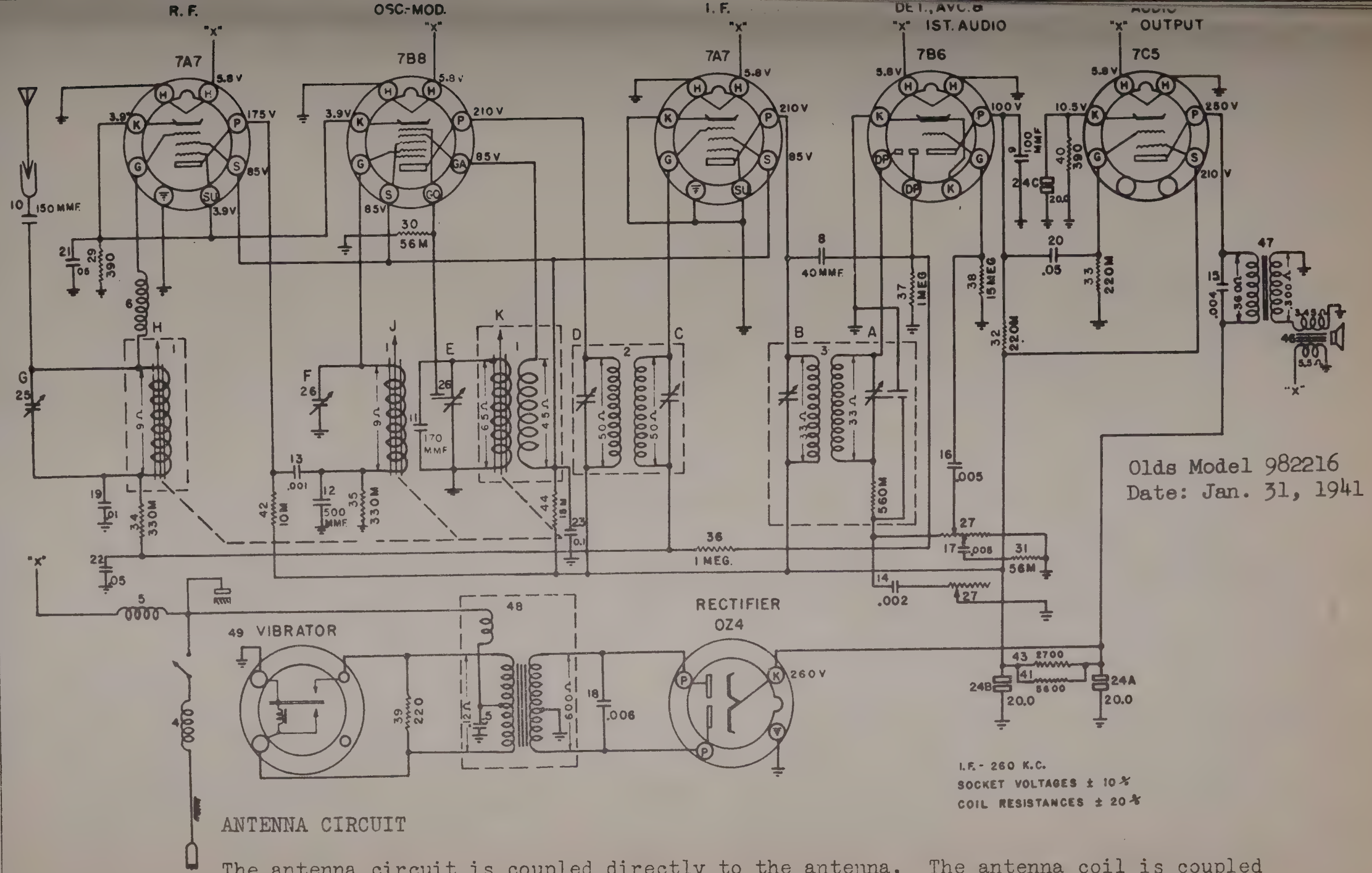
The iron cored automatic tuner consists of three coils with variable iron cores actuated by a rugged mechanical device for varying the position of the cores in the coils. Changing the position of the cores changes the inductance of the antenna, R.F. and oscillator coils, and provides a means of tuning the radio over the entire broadcast band. A special compensating condenser is employed in the oscillator circuit to prevent the set from drifting off station due to normal variations in car voltage and radio temperatures.



Bottom

Top

OLDSMOBILE DIV.—GEN. MOTORS



Olds Model 982216
Date: Jan. 31, 1941

ANTENNA CIRCUIT

The antenna circuit is coupled directly to the antenna. The antenna coil is coupled to the grid of the R.F. amplifier through a high frequency filter which minimizes ignition and other high frequency interferences. Due to the antenna circuit being directly coupled to the antenna, the antenna adjustment screw must be adjusted to give maximum volume when the receiver is tuned to a weak station which is received between 130 and 150 on the dial.

MODEL 982216

OLDSMOBILE DIV.—GEN. MOTORS

CIRCUIT ALIGNMENT

Alignment Procedure: The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a defective coil has been replaced. It is advisable not to attempt any adjustment unless it is definitely known that an adjustment is necessary.

An accurately calibrated test oscillator or signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments the front and back covers must be removed. All trimmers are readily accessible. The antenna trimmer is adjusted through a hole in the end of the case.

Due to the fact that the iron cores have been sealed in place at the factory only the trimmer adjustments as outlined under capacity alignment should be made unless the coils of the iron cored tuning unit are changed.

CAPACITY ALIGNMENT

1. I.F. Alignment at 260 K.C.

   (a) Connect an output meter across the speaker voice coil, leaving speaker connected.

   (b) Connect the ground lead of the signal generator to the chassis frame.

   (c) Connect the signal lead of the signal generator to the 7B8 tube grid side of the R.F. Trimmer Condenser F through a 0.1 mfd. condenser.

   (d) Turn set volume control on full and tone control to the extreme treble end. Set the signal generator at 260 K.C. Tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved in narrow limits no appreciable change in output may be noted.

   (e) Adjust the I.F. trimmers A, B, C, and D for maximum output.

2. Alignment at 1560 K.C.

   (a) Connect the signal lead of the signal generator to the receiver antenna connection through a 75 mmfd condenser.

   (b) Turn the manual tuning control of the receiver to the stop at the extreme high frequency end of the dial.

   (c) Set the signal generator to 1560 K.C.

   (d) Adjust the oscillator trimmer "E" for maximum output.

   (e) Adjust the R.F. trimmer "F" for maximum output.

   (f) Adjust the antenna trimmer "G" for maximum output.

3. Alignment at 1400 K.C.

   (a) Set the signal generator to 1400 K.C.

   (b) Turn the receiver to the signal and readjust the trimmers F and G for maximum output. Signal generator signal should be as low as possible and still give a satisfactory meter reading.

   This type of tuning circuit does not require alignment at 600 K.C.

4. Alignment with Car Antenna

   Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal near 1400 K.C. The antenna should be fully extended when making this adjustment.

CAPACITY AND INDUCTANCE ALIGNMENT

To be used only when there is definite evidence of iron cores being out of adjustment.

1. I.F. Alignment at 260 K.C.

   Follow the procedure as outlined under I.F. Alignment at 260 K.C. Capacity Alignment.

2. Alignment at 1560 K.C.

   (a) Connect the signal lead of the signal generator to the antenna connection of the set through a 70 mmfd condenser.

   (b) Set signal generator to 1560 Kilocycles.

   (c) Rotate the manual tuning mechanism until the high frequency stop is reached. Mechanically align the iron cores K, H, and J by setting each core so that its front edge sticks out 1-1/16" from the end of the coil form and the antenna and R.F. cores H and J stick out 1-13/32" from the end of the respective coil windings.

   (d) Adjust the oscillator trimmer E, R.F. trimmer F, and antenna trimmer G for maximum output.

3. Alignment at 1400 K.C.

   (a) Set signal generator to 1400 K.C. and tune set to this signal.

   (b) Adjust the R.F. core J for maximum output.

   (c) Adjust the antenna core H for maximum output.

4. Realignment at 1560 and 1400 K.C.

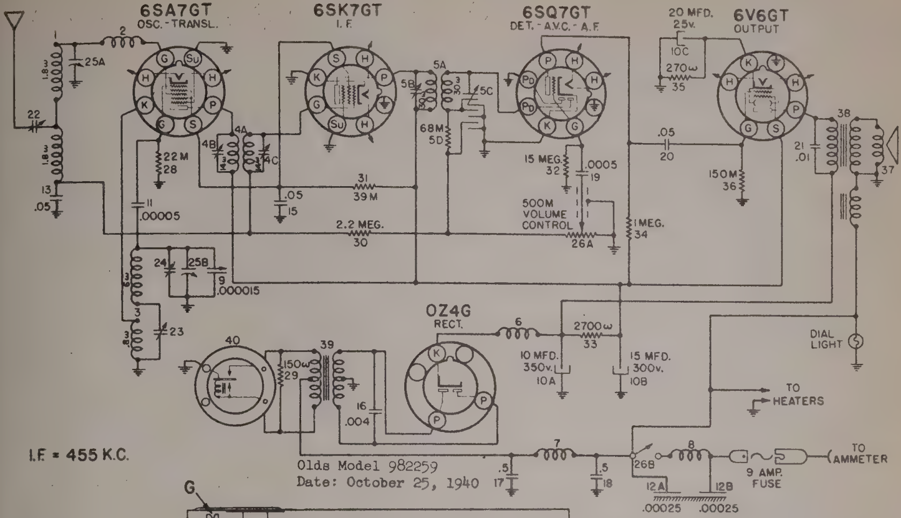
   (a) Repeat alignment of trimmer E and trimmers F and G at 1560 K.C.

   (b) Repeat alignment of cores H and J at 1400 K.C. Apply shellac to the core screws sealing the adjustment.

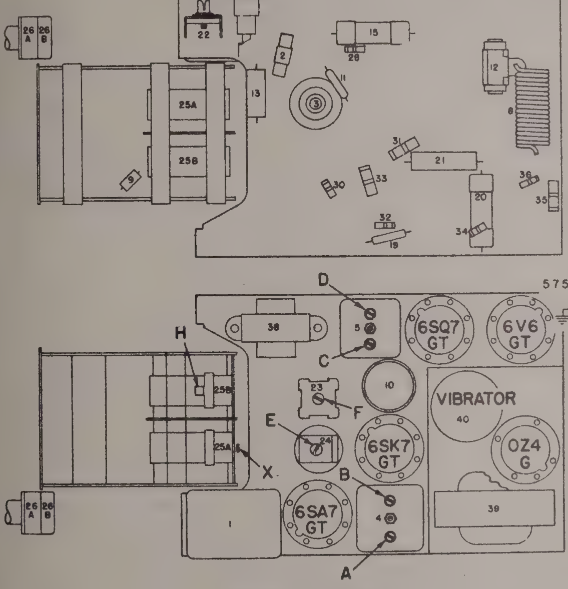
5. Alignment with Car Antenna

   Antenna trimmer G must be adjusted to match car antenna when receiver is installed; use a weak station signal near 1400 K.C. The antenna should be fully extended when making this adjustment.

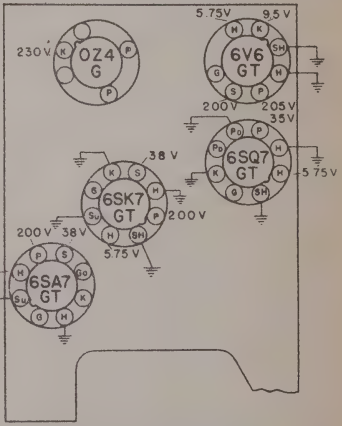
OLDSMOBILE DIV.—GEN. MOTORS



Olds Model 982259
Date: October 25, 1940



Chassis Parts Layout



BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. ALL VOLTAGES EXCEPT THE HEATER VOLTAGES MEASURED ON THE 0-250 VOLT SCALE

"A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.0 AMP

"B" SUPPLY DRAIN APPROXIMATELY 45 M.A.

MODEL NUMBER -- 982259
SERIAL NUMBER -- 687C101 & UP
TUBE COMPLEMENT — 6SA7GT, 6SK7GT, 6SQ7GT, 6V6GT, 0Z4G.
BATTERY CURRENT — 6.0 AMPERES

B+ VOLTS — 230 VOLTS
I.F. K.C. — 455
R.F. K.C. - 1560 TO 540
VIBRATOR TYPE - NON SYNCHRONOUS

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the signal lead of the test oscillator to terminal "X" on variable condenser 25-A (See Parts Layout), which is the grid lead of the 6SA7GT tube, through a .1 mfd. condenser.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect the output meter across the voice coil of the speaker.

(d) Set the test oscillator to exactly 455 K.C.

(e) Turn volume control to maximum.

(f) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. (See Parts Layout). These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F circuits.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop "H" (See Parts Layout).

(c) Set the test oscillator to 1560 Kilocycles.

(d) Adjust the condenser "E" (See Parts Layout) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning the Antenna Stage

(a) Remove the signal lead of the test oscillator from the grid of the 6SA7GT tube and connect to the Antenna Terminal of the receiver THROUGH a .000075 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .000075 mfd. mica condenser be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)

(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(d) Adjust the Antenna Trimmer "G" (See Parts Layout) for maximum output.

4. Aligning at 600 Kilocycles

Peak the oscillator padding condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator at 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and adjust the oscillator padding condenser "F" (See Parts Layout) while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

(e) After the above operation turn the condenser rotor plates to the high frequency stop position. Check the 1560 K.C. setting and if necessary readjust trimmer "E". Then return to 1400 K.C. for final antenna trimmer adjustment.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be uniformly sensitive over the entire frequency range.

In addition to manual tuning, there are four push buttons which may be adjusted to tune-in the local broadcasting stations.

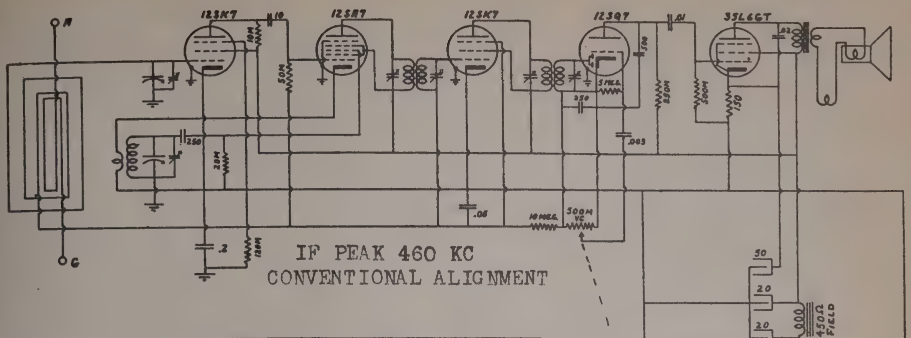
It is not necessary to set the buttons in order of broadcasting stations frequency, but for convenience it is desirable.

To adjust the buttons, proceed as follows:

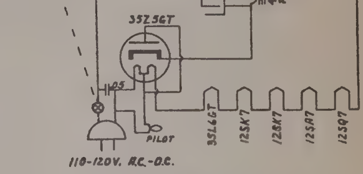
1. Turn on receiver for ten minutes or more.
2. Loosen the four push buttons by turning each button counter clockwise about half a turn.
3. Tune in the first desired station manually and press in the first push button as far as it will go.
4. With the button held all the way in, tighten it gently. Then release it and tighten it securely.
5. Proceed in the same manner for the remaining stations.
6. After all of the buttons have been adjusted, recheck the setting. Push each button and see if the station may be tuned-in more accurately manually. If so, loosen button and re-set it.
7. A station setting may be changed at any time by loosening the push button, tuning in the new station and resetting the button.
8. After the push buttons have been adjusted, insert the call letter tabs for the stations in their proper places above the buttons.

PACKARD BELL CO.

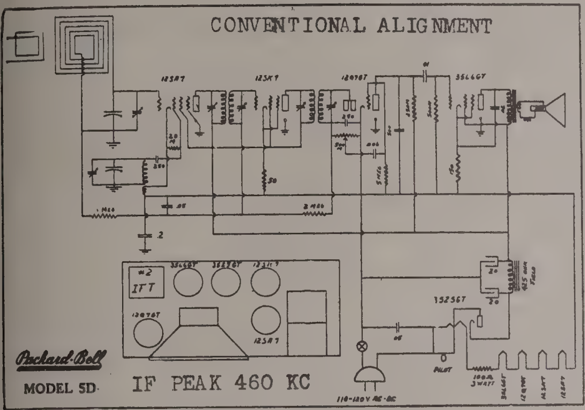
MODEL 5D
MODEL 6A
MODEL 56



IF PEAK 460 KC
CONVENTIONAL ALIGNMENT



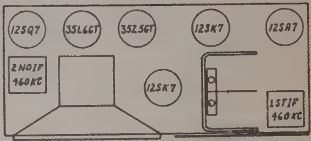
PACKARD BELL CO.
MODEL 6A

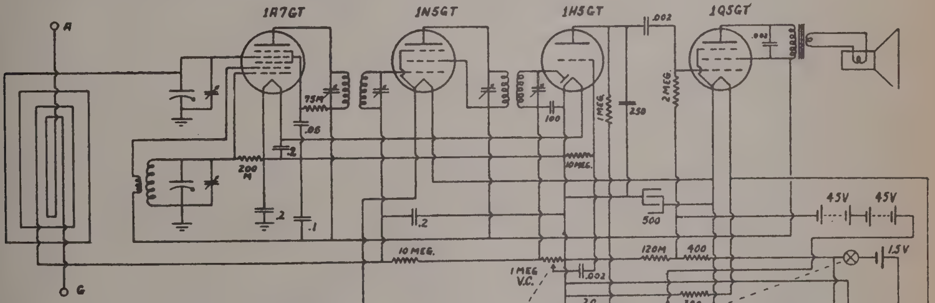


CONVENTIONAL ALIGNMENT

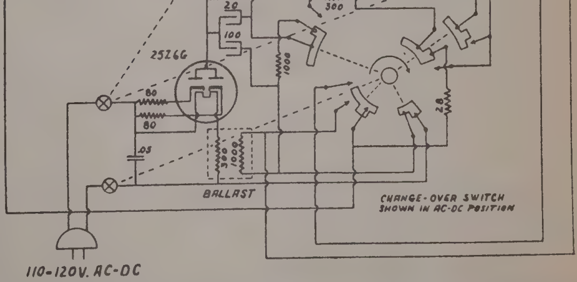
Packard-Bell
MODEL 5D

IF PEAK 460 KC



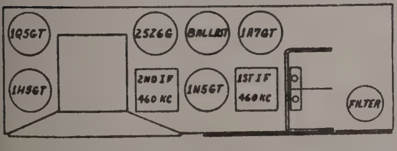


IF PEAK 460 KC



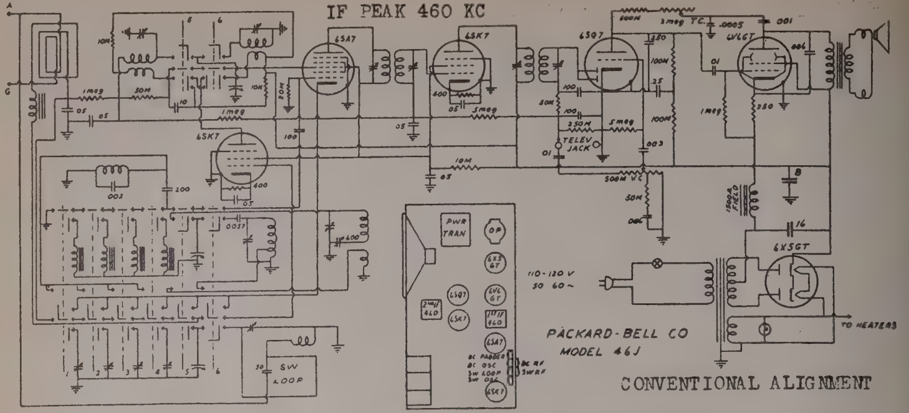
PACKARD BELL CO.
MODEL 56
COMBINATION BATTERY AND AC-DC PORTABLE

CONVENTIONAL ALIGNMENT



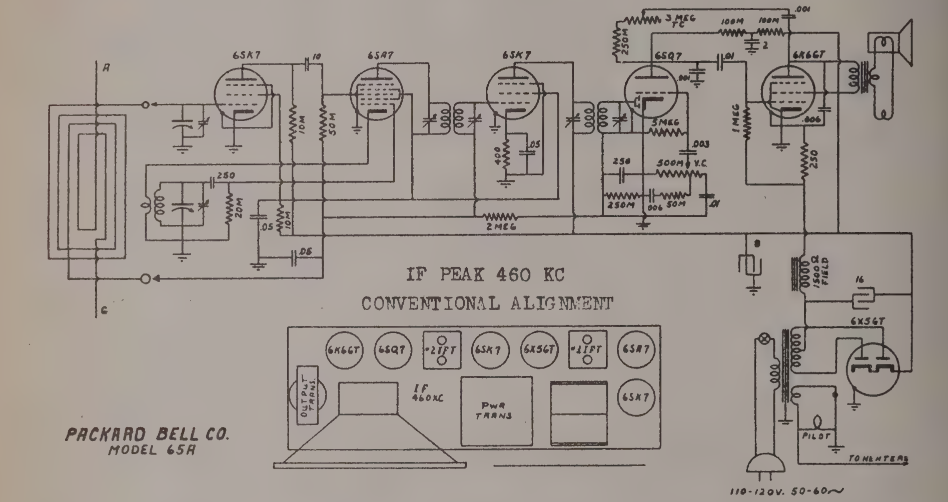
MODEL 46J
MODEL 65A
MODEL 66DPA

PACKARD BELL CO.



PACKARD-BELL CO
MODEL 46J

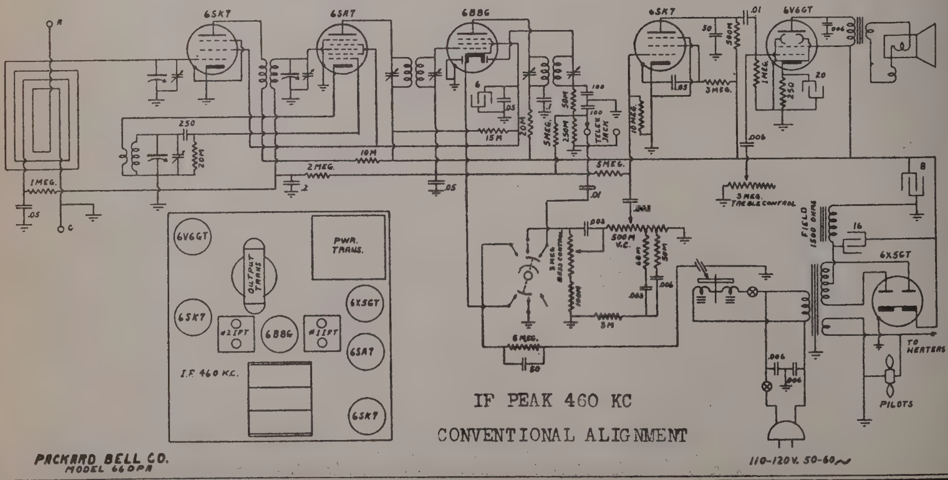
CONVENTIONAL ALIGNMENT



IF PEAK 460 KC

CONVENTIONAL ALIGNMENT

PACKARD BELL CO.
MODEL 65A

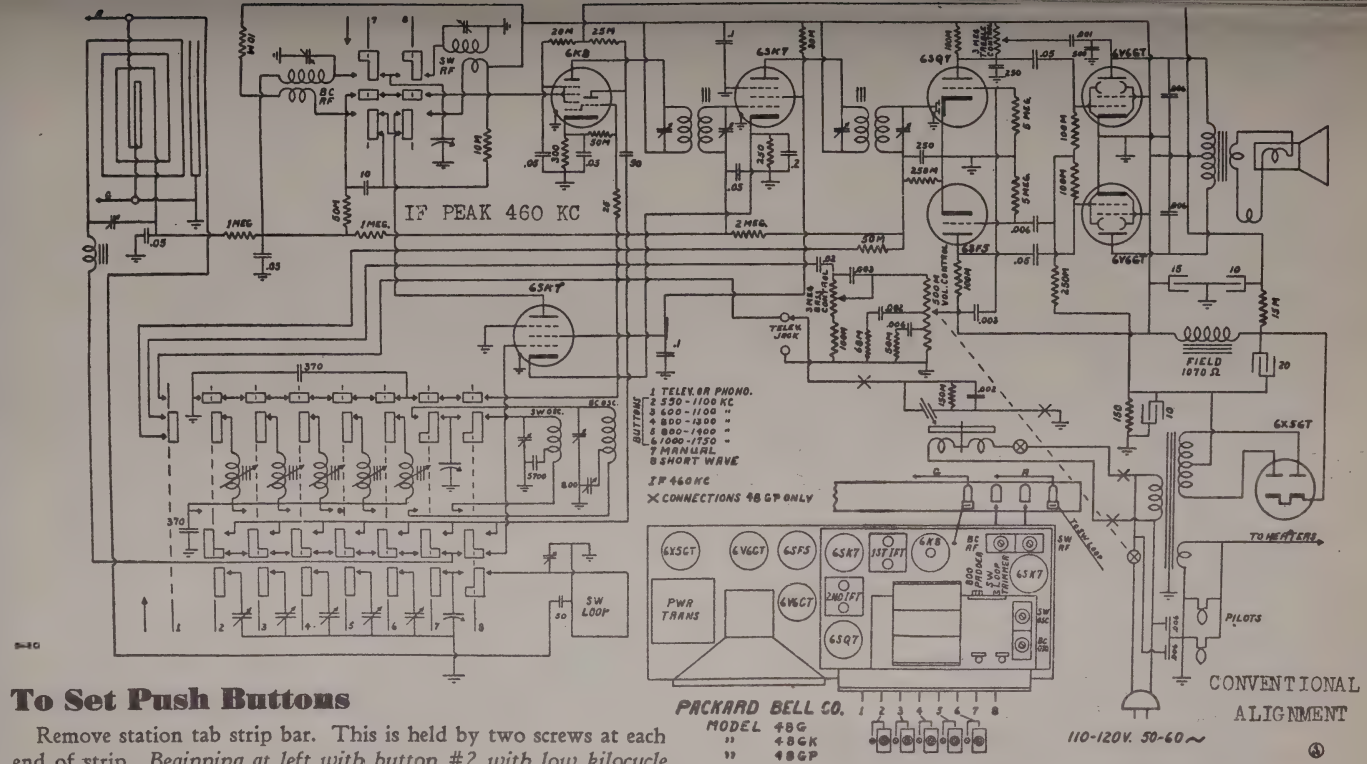


IF PEAK 460 KC

CONVENTIONAL ALIGNMENT

PACKARD BELL CO.
MODEL 66DPA

©John F. Rider, Publisher



To Set Push Buttons

Remove station tab strip bar. This is held by two screws at each end of strip. *Beginning at left with button #2 with low kilocycle frequency stations,* five stations may be set on buttons in the order of their kilocycle frequency as follows:

Tune and play the station desired on manual tuning, (7th button) for identification purposes. Now, push button #2 "in." Using small screw driver, rotate #2 brass selector screw (oscillator) until desired station is heard with maximum volume. Then rotate #2 chrome selector screw (loop trimmer) until station is heard best.

Repeat this procedure for each of the other four broadcast station buttons using corresponding selector and trimmer screws until a total of five stations have been set.

SELECTOR AND TRIMMER SCREWS (UNDER TAB STRIP BAR)

Low Frequency Stations on This End	#2	#3	#4	#5	#6	High Frequency Stations on This End
	● ○	● ○	● ○	● ○	● ○	

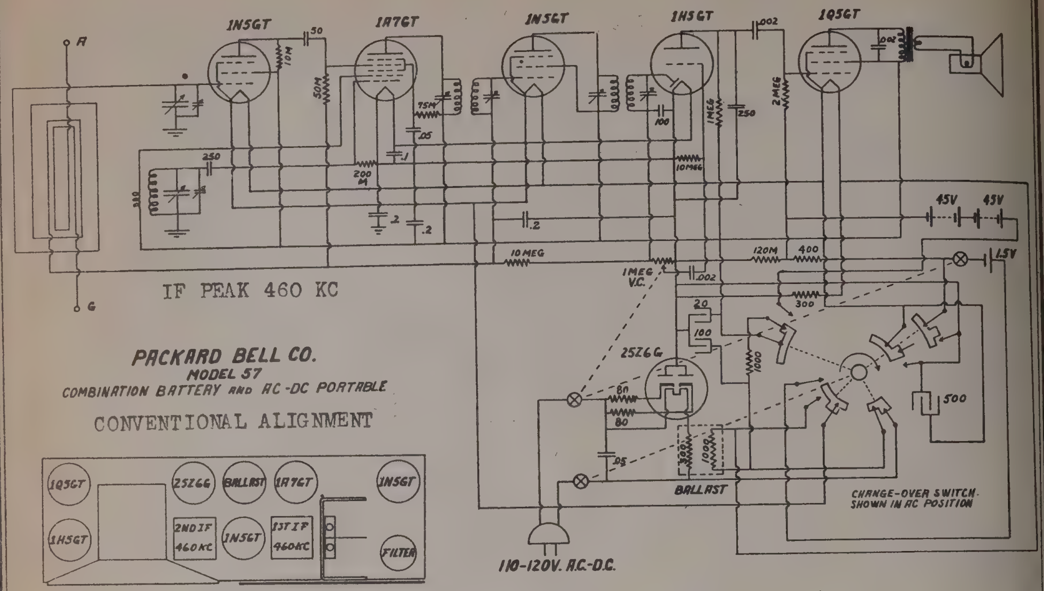
● INDICATES BRASS SCREW   ○ INDICATES CHROME SCREW

PUSH BUTTONS

Button #1	#2	#3	#4	#5	#6	#7	#8
Phonograph or Television	Broadcast Station	Broadcast Station	Broadcast Station	Broadcast Station	Broadcast Station	Manual Dial Tuning	Shortwave Tuning

MODELS 57,57A

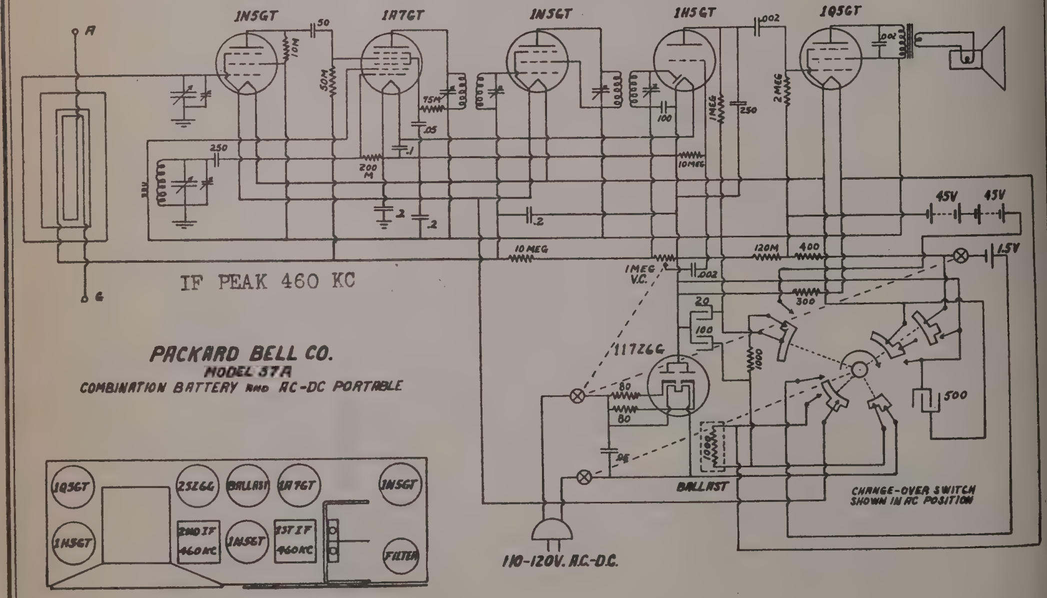
PACKARD BELL CO.



IF PEAK 460 KC

PACKARD BELL CO.
MODEL 57
COMBINATION BATTERY AND AC-DC PORTABLE

CONVENTIONAL ALIGNMENT

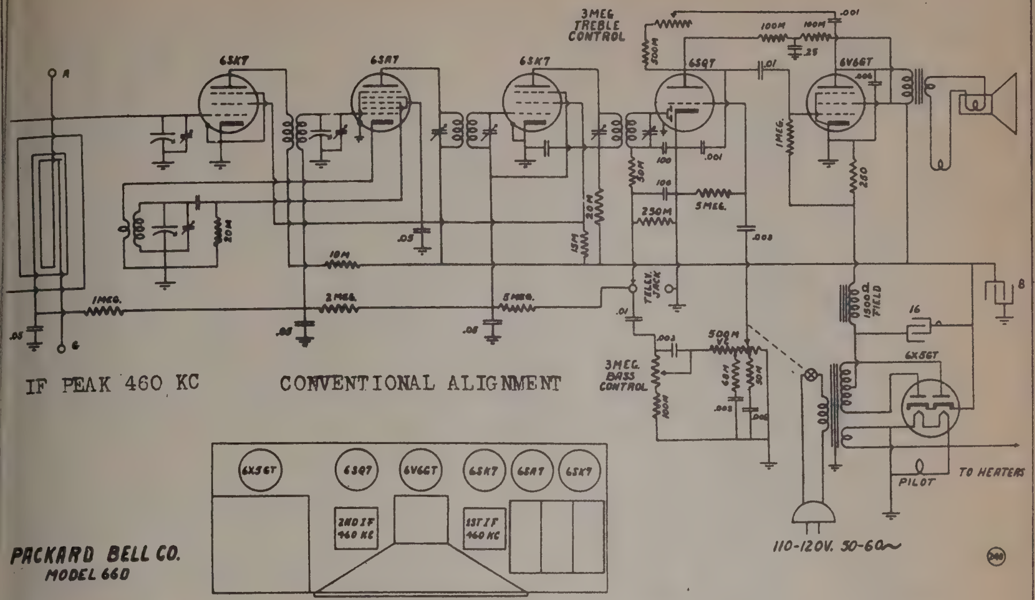


IF PEAK 460 KC

PACKARD BELL CO.
MODEL 57A
COMBINATION BATTERY AND AC-DC PORTABLE

PACKARD BELL CO.

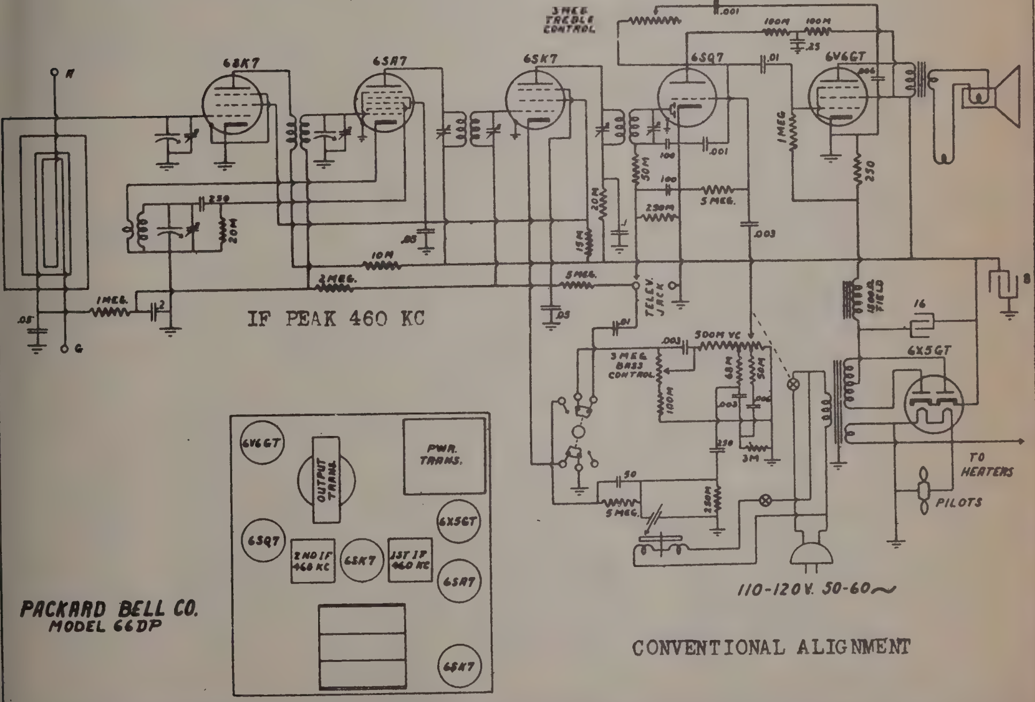
MODELS 66D,66DP



IF PEAK 460 KC

CONVENTIONAL ALIGNMENT

PACKARD BELL CO.
MODEL 66D



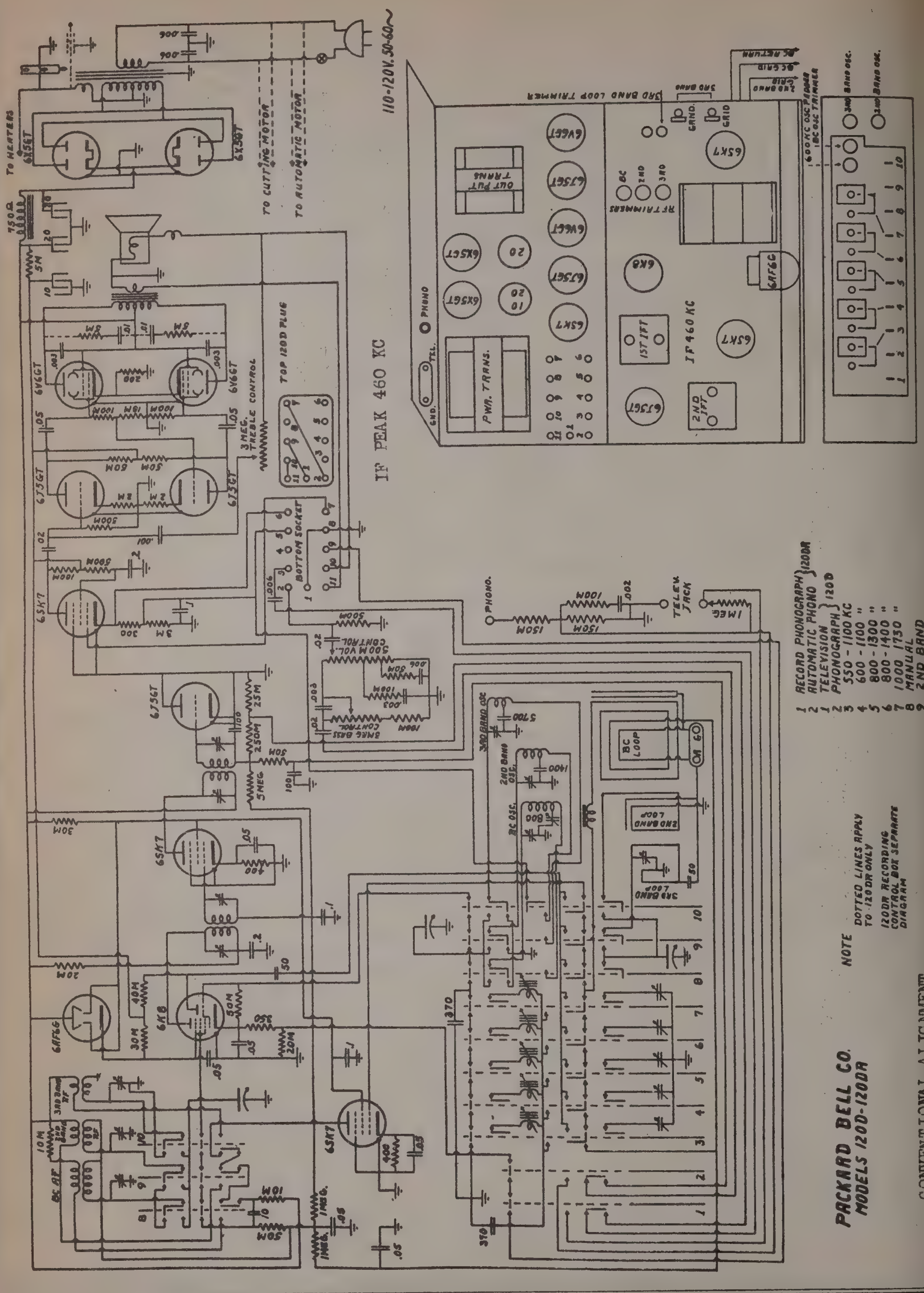
IF PEAK 460 KC

PACKARD BELL CO.
MODEL 66DP

CONVENTIONAL ALIGNMENT

MODELS 120D, 120 DR

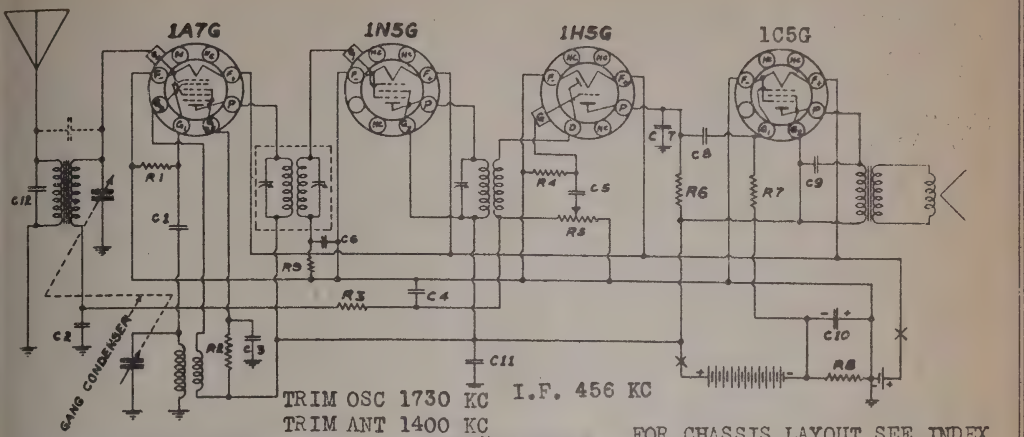
PACKARD BELL CO.



CONVENTIONAL ALIGNMENT

PARKER McCRORY MFG. CO.

1940 DeLuxe MODEL 4A
1939 ROYAL MODEL 4A
1939 MASTERPIECE 6C



TRIM OSC 1730 KC
TRIM ANT 1400 KC

I.F. 456 KC

FOR CHASSIS LAYOUT SEE INDEX

CAPACITORS

No.	CAP.-MFDS.	TYPE	No.	CAP.-MFDS.	TYPE
C1	.00025	MICA	C7	.00025	MICA
C2	.05	200V.	C8	.01	400V.
C3	.1	200V.	C9	.006	400V.
C4	.00025	MICA	C10	20. (ELECT)	25V.
C5	.01	400V.	C11	.1	200V.
C6	.002	400V.	C12	.00005	MICA

RESISTORS

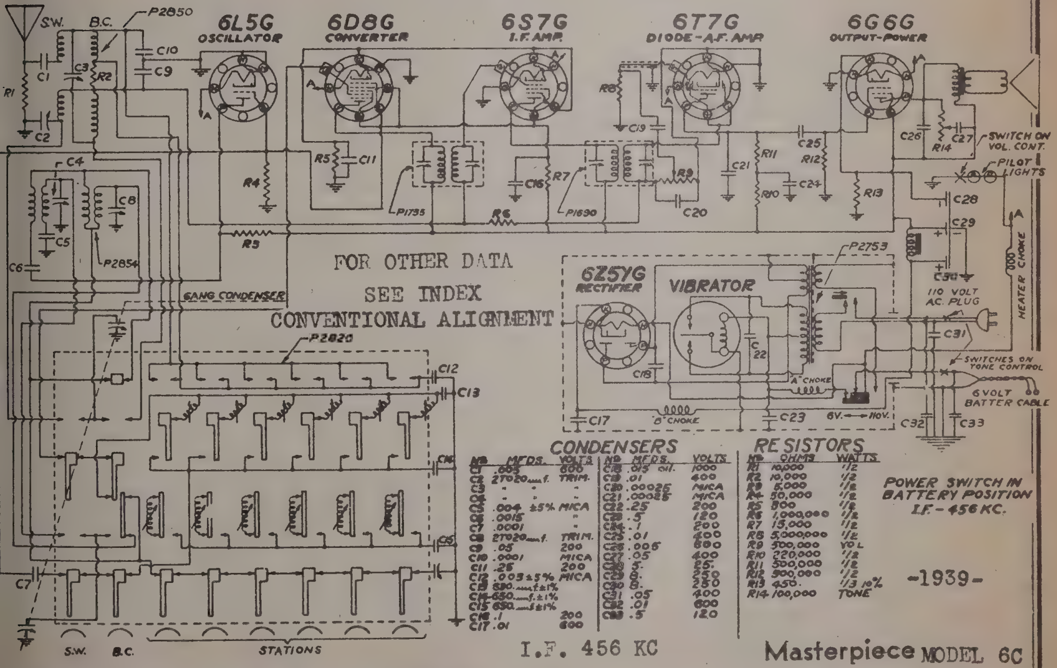
No.	OHMS	WATTS	No.	OHMS	WATTS
R1	200,000	1/4	R6	250,000	1/4
R2	70,000	1/4	R7	500,000	1/4
R3	1 MEG.	1/4	R8	600	1/4
R4	2 MEG.	1/4	R9	2 MEG.	1/4
R5	500,000	VOL. CONTROL			

-1939-

Royal Model 4A

1Q5G used in place of 1C5G in the 1940 DeLuxe Model

CONVENTIONAL ALIGNMENT



FOR OTHER DATA
SEE INDEX
CONVENTIONAL ALIGNMENT

CONDENSERS

No.	MFDS.	VOLTS	No.	MFDS.	VOLTS
C1	.005	600	C18	.015 oil.	1000
C2	2 TO 20 mmf.	TRIM.	C19	.01	400
C3	"	"	C20	.00025	MICA
C4	"	"	C21	.00025	MICA
C5	.004 ±5%	MICA	C22	.25	200
C6	.0015	"	C23	.5	120
C7	.0001	"	C24	.1	200
C8	2 TO 20 mmf.	TRIM.	C25	.01	400
C9	.05	200	C26	.005	600
C10	.0001	MICA	C27	.05	400
C11	.25	200	C28	5.	25.
C12	.003 ±5%	MICA	C29	8.	250
C13	580 mmf. ±1%		C30	8.	250
C14	650 mmf. ±1%		C31	.05	400
C15	650 mmf. ±1%		C32	.01	600
C16	.1	200	C33	.5	120
C17	.01	600			

RESISTORS

No.	OHMS	WATTS
R1	10,000	1/2
R2	10,000	1/2
R3	5,000	1/2
R4	50,000	1/2
R5	800	1/2
R6	1,000,000	1/2
R7	15,000	1/2
R8	5,000,000	1/2
R9	500,000	VOL
R10	220,000	1/2
R11	500,000	1/2
R12	900,000	1/2
R13	450.	1/3 10%
R14	100,000	TONE

POWER SWITCH IN BATTERY POSITION
I.F. - 456 KC.

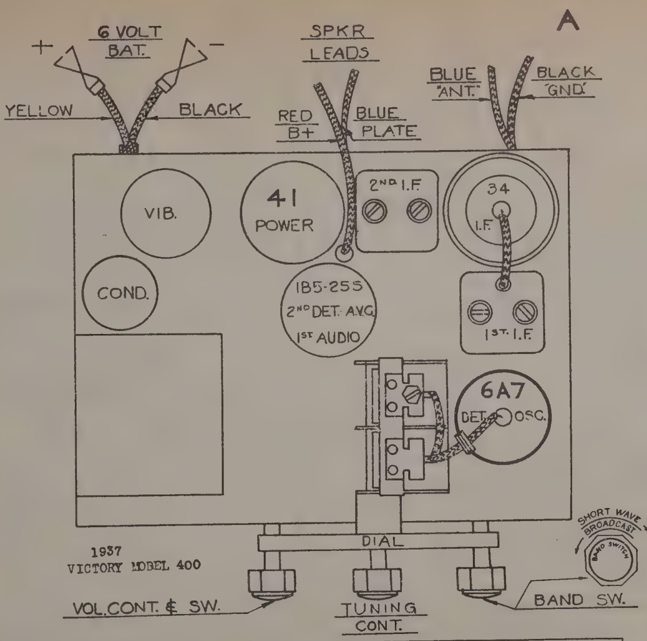
-1939-

I.F. 456 KC

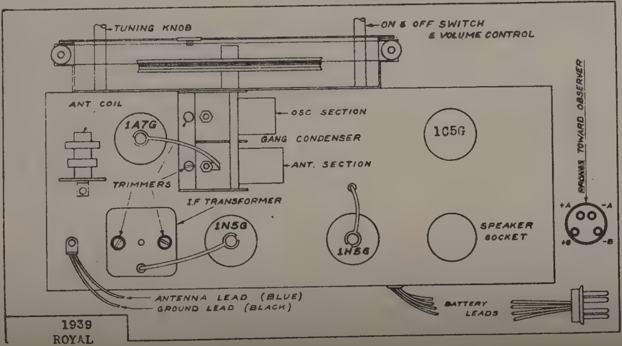
Masterpiece MODEL 6C

1939 ROYAL MODEL 4A
1939 MASTERPIECE 6C
1937 VICTORY MODEL 400

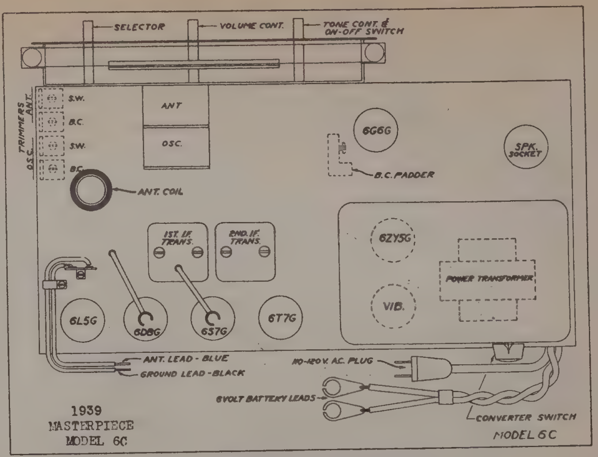
PARKER McCRORY MFG. CO.



1937
VICTORY MODEL 400



1939
ROYAL



1939
MASTERPIECE
MODEL 6C

PROCEDURE FOR SETTING UP

AUTOMATIC PUSH BUTTONS

1939
MASTERPIECE

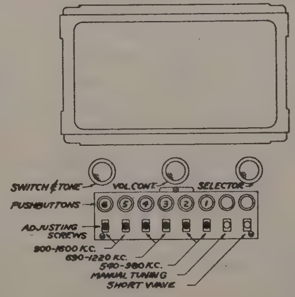


Fig. 1

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these push buttons. Fig. 1 also shows the tuning range or frequencies covered by each button.

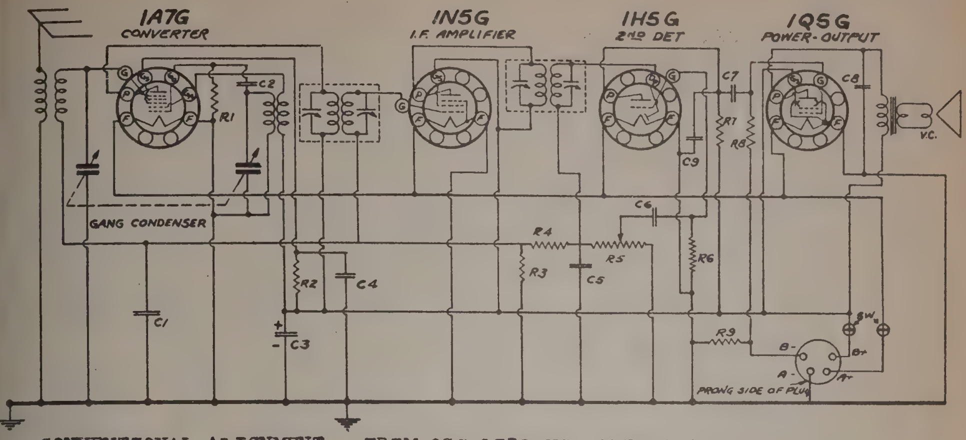
The remaining two (2) push buttons located at the extreme right hand end of the push button plate are for short wave and manual tuning. See Fig. 1. Short wave tuning is accomplished by pressing "short wave" button and tuning with the selector knob. By pressing "manual tuning" button, the automatic disconnects and the selector knob becomes active for the broadcast band.

1. Choose a station having a frequency within the range of button No. 1 (540 to 980 kc).
2. Press "Manual Tuning" button and tune this station conventionally by using the selector knob.
3. Now press button No. 1 and turn adjusting screw in either direction until the previously selected station is heard. Adjust the screw until the station is received with maximum volume.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw.
5. Repeat the above procedure for the remaining five (5) stations.

NOTE: It is advisable to retain the call letter sheet in case of station change later on.

PARKER McCRORY MFG. CO.

1940 ROYAL MODEL 4J
1940 IMPERIAL
TABLE MODEL 7C



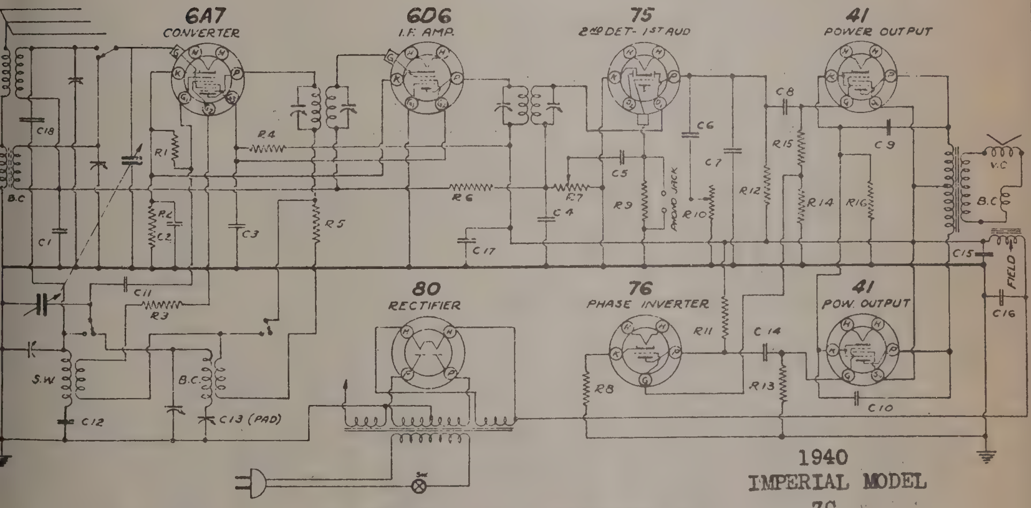
CONVENTIONAL ALIGNMENT - TRIM OSC 1730 KC, ANT 1400 KC

CAPACITORS						RESISTORS					
NO.	MFDS	VOLTS	NO.	MFDS	VOLTS	NO.	OHMS	WATTS	NO.	OHMS	WATTS
C1	.05	200	C6	.01	400	R1	200,000	1/2	R6	2,000,000	1/2
C2	.00005	MICA	C7	.01	400	R2	70,000	1/2	R7	800,000	1/2
C3	4.0 (ELECT.)	150	C8	.002	400	R3	2,000,000	1/2	R8	1,000,000	1/2
C4	.05	200	C9	.00025	MICA	R4	2,000,000	1/2	R9	440	1/2
C5	.00025	MICA				R5	500,000	V.C.			

1940
ROYAL MODEL 4J

I.F. 455 K.C.

CONVENTIONAL ALIGNMENT



1940
IMPERIAL MODEL
7C

I.F.- 455 K.C.

BAND SWITCHES SHOWN IN BROADCAST POSITION
BOTTOM VIEW OF TUBE SOCKETS SHOWN

GANG CONDENSER CAPACITY 443μμfds.

CAPACITORS						RESISTORS					
No.	MFDS	VOLTS	No.	MFDS	VOLTS	No	OHMS	WATTS	No.	OHMS	WATTS
C1	.06	200	C11	.0001	MICA	R1	60.000	1/2	R11	50.000	1/2
C2	.25	200	C12	.004±5%	MICA	R2	200	1/2	R12	250,000	1/2
C3	.05	400	C13	300-600μμfd	PADDER	R3	250	1/2	R13	500,000	1/2
C4	.00025	MICA	C14	.01	400	R4	20.000	1/2	R14	100.000	1/2
C5	.01	400	C15	10.0	350	R5	1,000	1/2	R15	400,000	1/2
C6	.005	600	C16	10.0	350	R6	2 MEG	1/2	R16	300	1/2
C7	.00025	MICA	C17	.05	400	R7	500,000	VOL CON.			
C8	.01	400	C18	GIMMICK		R8	3.000	1/2			
C9	.005	600	C19	.0001	MICA	R9	5 MEG	1/2			
C10	.005	600				R10	500,000	TONE CON			

FOR OTHER DATA SEE INDEX

1940 IMPERIAL
TABLE MODEL 7C

PARKER McCRORY MFG. CO.

1940 IMPERIAL
CONSOLE MODEL 7H

SERVICE INFORMATION

1940 IMPERIAL TABLE MODEL 7C

SPEAKER (Part No. P3499) 6" Dynamic

Field resistance	1500 ohms
D.C. voice coil resistance	3.2 ohms
Voice coil impedance at 400 cycles	3:8 ohms

Voltages—Line 115 volts A.C. Power consumption 60 watts. Volume control maximum. Meter 20,000 ohms per volt.

6A7 tube

Plate (P) to ground	190 volts
Screen grid (G3) to ground	94 volts
Anode grid (G2) to ground	183 volts
Cathode (K) to ground	3½ volts

6D6 tube

Plate (P) to ground	190 volts
Screen grid (G2) to ground	94 volts
Cathode (K) to ground	3½ volts

75 tube

Plate (P) to ground	85 volts

76 tube

Plate (P) to ground	103 volts
Cathode (K) to ground	5 volts

41 tube

Plate (P) to ground	181 volts
Screen grid (G2) to ground	190 volts
Cathode (K) to ground	12 volts

80 tube

Filament (F) to ground	260 volts

Short Wave Antenna Coil (Part No. P3378)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, AVC; No. 2, Ant; No. 3, Grid; No. 4, Ground.

Primary—No. 2 and No. 4—Resistance.... .3 ohm
Secondary—No. 1 and No. 3—Resistance .07 ohm

Broadcast Antenna Coil (Part No. G6031)

Looking at the connection end in a clockwise direction starting at the mounting strip the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting strip.

Primary—No. 3 and No. 4—Resistance....27.1 ohms
Secondary—No. 1 and No. 2—Resistance 1.9 ohms

Short Wave Oscillator Coil (Part No. P3198)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, Plate; No. 2, B+; No. 3, Grid; No. 4, Pad.

Primary—No. 1 and No. 2—Resistance .4 ohm
Secondary—No. 3 and No. 4—Resistance .07 ohm

Broadcast Oscillator Coil (Part No. P3535)

Looking at the connection end in a clockwise direction starting at the mounting lug side (with dot) the connections are: No. 1, B+; No. 2, Grid; No. 3, Plate; No. 4, Pad.

Primary—No. 1 and No. 3—Resistance 1.1 ohms
Secondary—No. 2 and No. 4—Resistance 4.7 ohms

First I.F. Transformer (Part No. P3334)

Primary—Blue white, plate; red white B+.
Resistance ....23.8 ohms
Secondary—White, grid; black white,
AVC—Resistance ....24.1 ohms

Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate; red white B+.
Resistance ....15.1 ohms
Secondary—White, grid; black white,
AVC—Resistance ....11.8 ohms

Power Transformer (Part No. P3511)

Primary—115 volt, 60 cycle; black leads;
Resistance .... 7.4 ohms
Secondary—6.3 volt filament; black leads.
(Sleeved). Resistance .... .25 ohm
Secondary—5 volt rectifier filament;
yellow leads. Resistance.... .22 ohm
Secondary—High voltage; red leads.
Resistance ....500.5 ohms
High voltage center tap; green lead.
Resistance to one side....242.7 ohms
Resistance to other side....258.4 ohms

SERVICE INFORMATION

1940 IMPERIAL CONSOLE MODEL 7H

TUNING DRIVE

If the drive shaft slips when using manual tuning, push this drive shaft toward the power transformer until it clicks and then loosen the two set screws holding the driven wheel in place on the gang condenser shaft. (See Fig. 2.) Move this wheel in or out on the shaft so it is 1/16 of an inch from the rubber ring on the drive shaft. CAUTION, do not turn it on the shaft as this would cause the dial pointer setting to be incorrect. Turning the drive shaft should now cause it to make a firm contact with the driven wheel and then, when this shaft is pushed toward the power transformer, if it swings free of the driven wheel, the adjustment is correct. The driven wheel should now be firmly secured to the gang condenser shaft by means of the set screws.

SPEAKER (Part No. P3388) 8" Dynamic

Field resistance	1400 ohms
D.C. voice coil resistance	2.3 ohms
Voice coil impedance at 400 cycles	2.5 ohms

Voltages—Line 115 volts AC. Power consumption 75 watts. Volume control maximum. Meter 1000 ohms per volt.

6A7 tube

Plate (P) to ground	195 volts
Screen grid (G3) to ground	95 volts
Anode grid (G2) to ground	187 volts
Cathode (K) to ground	3½ volts

6D6 tube

Plate (P) to ground	195 volts
Screen grid (G2) to ground	95 volts
Cathode (K) to ground	3½ volts

75 tube

Plate (P) to ground	75 volts

76 tube

Plate (P) to ground	100 volts
Cathode (K) to ground	5 volts

41 tube

Plate (P) to ground	184 volts
Screen grid (G2) to ground	196 volts
Cathode (K) to ground	13.5 volts

80 tube

Filament (F) to ground	302 volts

Short Wave Antenna Coil (Part No. P3378)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1 AVC; No. 2, Ant; No. 3, Grid; No. 4, Ground.

Primary—No. 2 and No. 4—Resistance.... .3 ohm
Secondary—No. 1 and No. 3—Resistance .07 ohm

Short Wave Oscillator Coil (Part No. P3198)

Looking at the connection end in a clockwise direction starting at the mounting lug side the connections are: No. 1, Plate; No. 2, B+; No. 3, Grid; No. 4, Pad.

Primary—No. 1 and No. 2—Resistance .4 ohm
Secondary—No. 3 and No. 4—Resistance .07 ohm

Broadcast Oscillator Coil (Part No. P3535)

Looking at the connection end in a clockwise direction starting at the mounting lug side (with dot) the connections are: No. 1, B+; No. 2, Grid; No. 3, Plate; No. 4, Pad.

Primary—No. 1 and No. 3—Resistance 1.1 ohms
Secondary—No: 2 and No. 4—Resistance 4.7 ohms

First I.F. Transformer (Part No. P 3334)

Primary—Blue white, plate; red white B+.
Resistance ....23.8 ohms
Secondary—White, grid; black white,
AVC—Resistance ....24.1 ohms

Second I.F. Transformer (Part No. P 2606)

Primary—Blue white, plate; red white B+.
Resistance ....15.1 ohms
Secondary—White, grid; black white,
AVC—Resistance ....11.8 ohms

Power Transformer (Part No. P 3325)

Primary—115 volt, 60 cycle; black leads;
Resistance .... 7.4 ohms
Secondary—6.3 volt filament; black leads.
(Sleeved). Resistance .... .25 ohm
Secondary—5 volt rectifier filament;
yellow leads. Resistance .... .22 ohm
Secondary—High voltage; red leads.
Resistance ....500.5 ohms
High voltage center tap; green lead.
Resistance to one side ....242.7 ohms
Resistance to other side....258.4 ohms

Loop Antenna

Since the loop antenna acts also as the broadcast antenna coil the set will not operate properly with the loop antenna disconnected.

ALIGNMENT DATA

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1730 KC and connect the output to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. The oscillator and antenna trimmers may be reached by removing the dial escutcheon(**See index** for trimmer locations.) The next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. Next, re-set the dial pointer on the receiver and the signal generator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

SHORT WAVE BAND ALIGNMENT

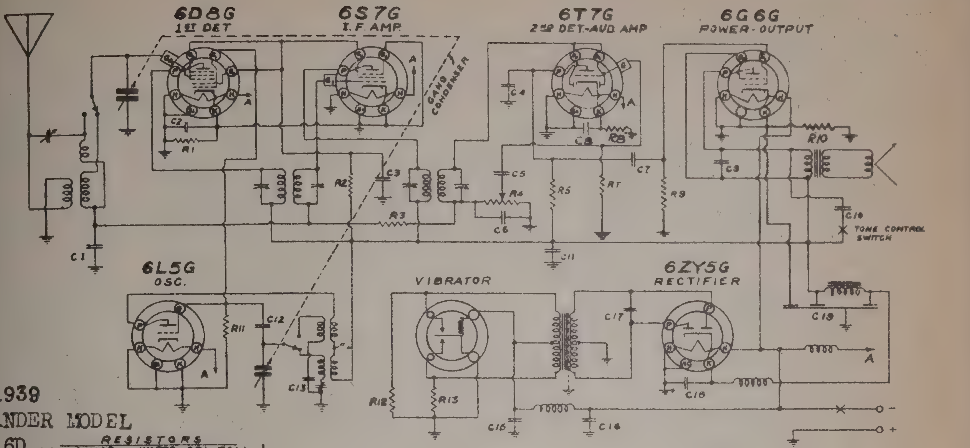
The short wave band is adjusted by setting the signal generator to 18100 KC and connecting the output to the antenna lead through a 400 ohm resistor. Set the gang at minimum and adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested.

ALIGNMENT- MODEL 7H

Because of the built-in loop antenna, it is necessary to align this receiver while in the cabinet. Otherwise the procedure is the same as for the Model 7C described above. Trim the broadcast band oscillator at 1550 KC instead of 1730 Kc.

PARKER McCRORY MFG. CO.

1939 COMMANDER
MODEL 6D
1940 IMPERIAL
CONSOLE MODEL 7H



1939
COMMANDER MODEL
6D

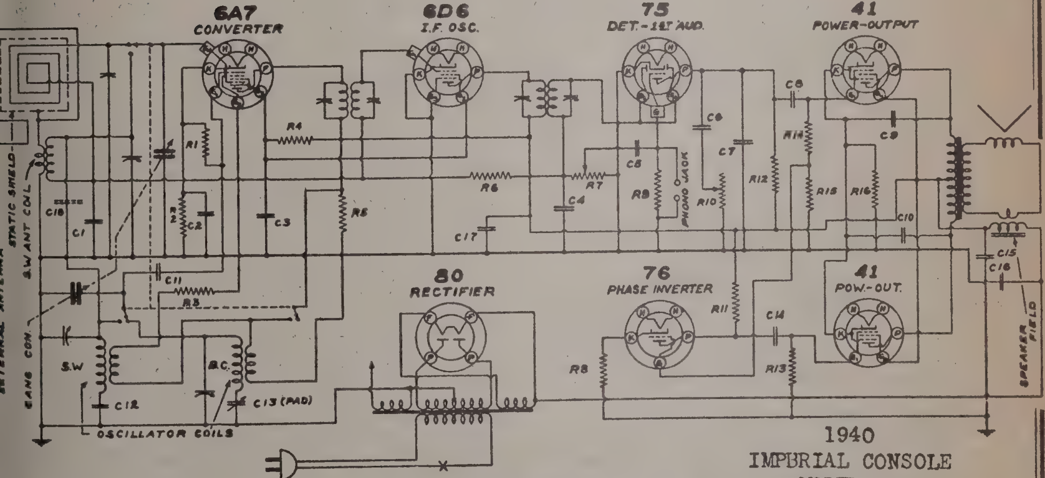
RESISTORS			
NO	OHMS	WATTS	SPL. TOL.
1	500	¼	± 10%
2	15,000	¼	
3	1 MEG	¼	
4	500,000	¼	(VOL. CON.)
5	150,000	¼	
7	1,000,000	½	
8	10,000	¼	
9	400,000	¼	
10	500	¼	
11	40,000	¼	
12	150	¼	
13	150	¼	

CONDENSERS					
NO	CAP.-MFD.	TYPE	NO	CAP.-MFD.	TYPE
1	.05	200 V.	11	.1	200 V.
2	.25	200 V.	12	.00005	MICA
3	.1	200 V.	13	.004 (±5%)	MICA
4	.00025	MICA	14		
5	.01	400 V.	15	.5	50 V.
6	.00025	MICA	16	.5	50 V.
7	.01	400 V.	17	.015	1000 V.
8	.5	200 V.	18	.01	400 V.
9	.005	600 V.	19	8-8	200 W.V.
10	.02	400 V.		5	25 W.V.

SWITCHES IN BROADCAST POSITION

I.F. 456 K.C.

FOR OTHER DATA
SEE INDEX



1940
IMPERIAL CONSOLE
MODEL 7H

CAPACITORS					
NO	MFDS	VOLTS	NO	MFDS.	VOLTS
C1	.05	200	C10	.005	600
C2	.25	200	C11	.0001	MICA
C3	.05	400	C12	.004 ±5%	MICA
C4	.00025	MICA	C13	300-600 μμfds.	
C5	.01	400	C14	.01	400
C6	.005	600	C15	10.0	350
C7	.00025	MICA	C16	10.0	350
C8	.01	400	C17	.05	400
C9	.005	600	C18	GIMMICK	

RESISTORS					
NO	OHMS	WATTS	NO	OHMS	WATTS
R1	50,000	½	R10	500,000	TONE CON.
R2	300	½	R11	50,000	½
R3	250	½	R12	250,000	½
R4	20,000	½	R13	500,000	½
R5	1,000	½	R14	400,000	½
R6	2 MEG.	½	R15	100,000	½
R7	500,000	VOL. CON.	R16	300	½
R8	3,000	½			
R9	5 MEG.	½			

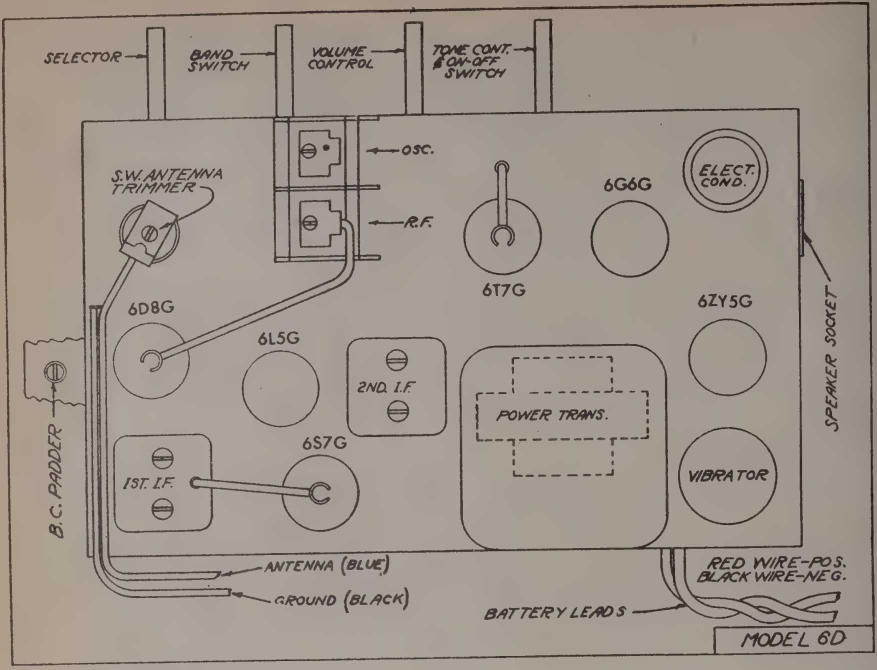
I.F. – 456 K.C.

SWITCHES SHOWN IN BROADCAST POSITION

BOTTOM VIEW OF SOCKETS SHOWN.

GANG CONDENSER CAPACITY 443 μμfds.

FOR OTHER DATA
SEE INDEX



CHASSIS LAYOUT
1939 COMMANDER MODEL 6D

ALIGNMENT DATA AND SERVICING

1939 COMMANDER MODEL 6D

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1730, 6000, 16,000 and 18,100 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output of test oscillator or signal generator to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the Broadcast "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the Broadcast "antenna" trimmer to a maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver.

Note: Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

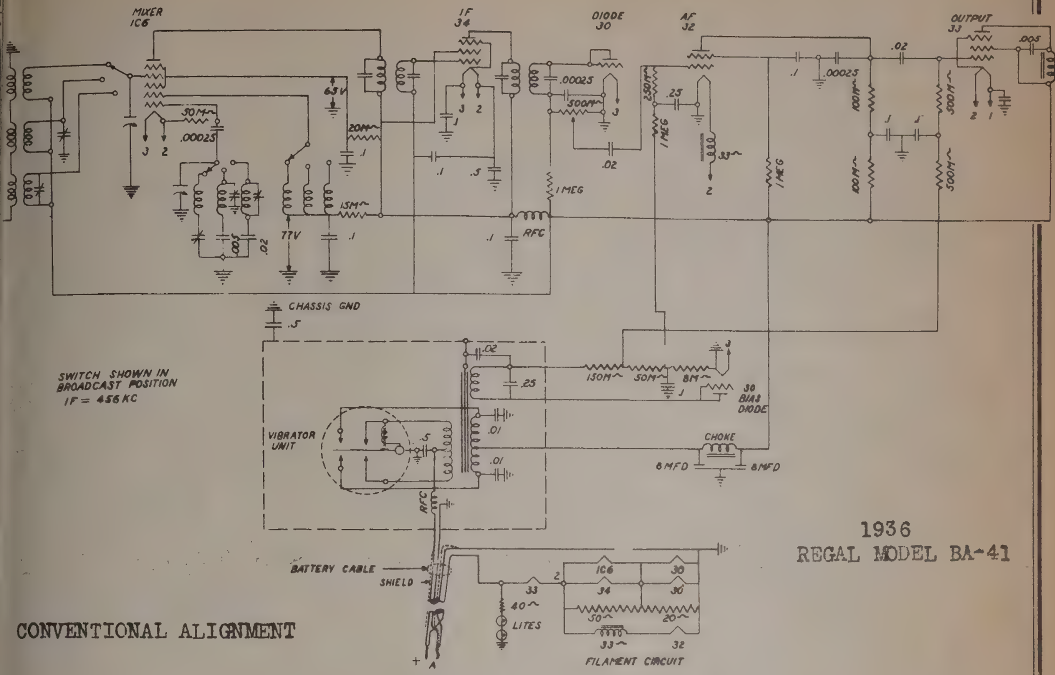
SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 18,100 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

936 REGAL
ODEL BA-41

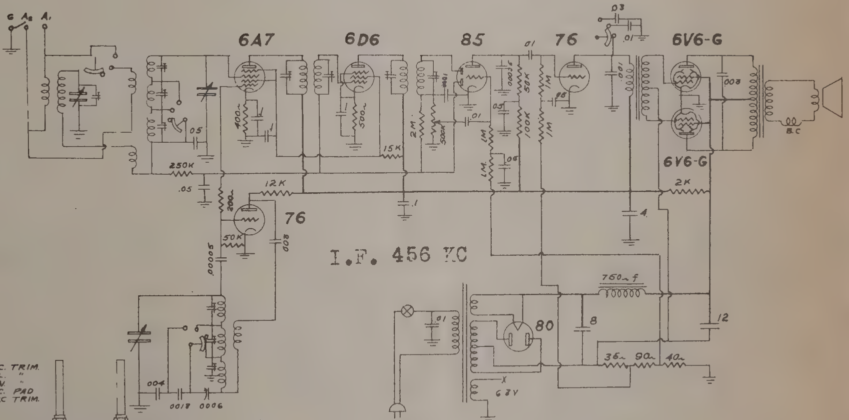
PARKER McCRORY MFG. CO.

1936 ROYAL
MODEL 630



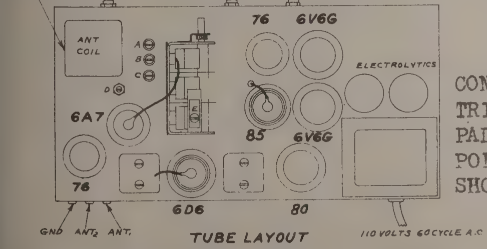
1936
REGAL MODEL BA-41

CONVENTIONAL ALIGNMENT



1938
ROYAL MODEL
630

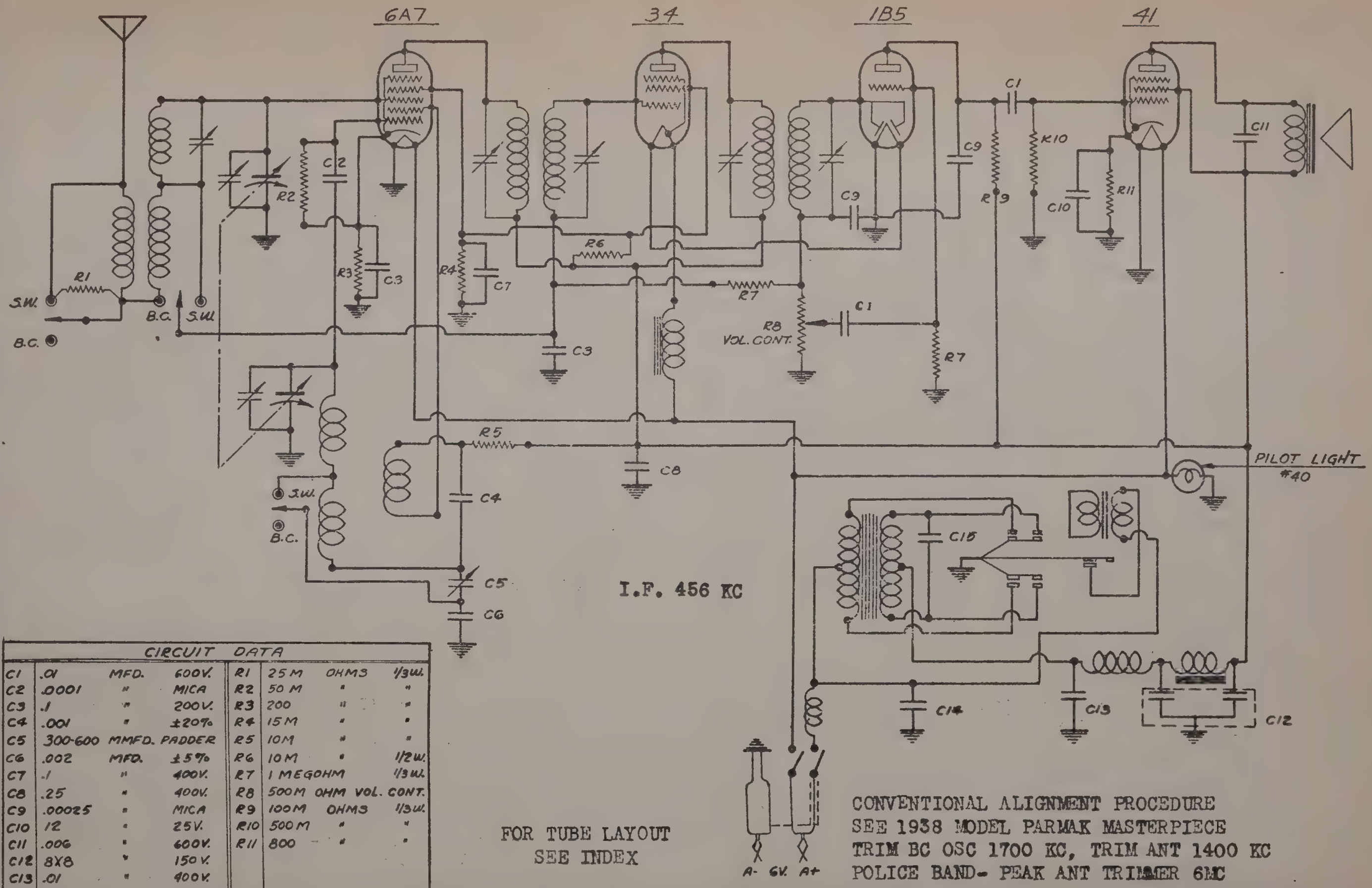
I.F. 456 KC



CONVENTIONAL I.F. ALIGNMENT
TRIM OSC(BC) 1700 KC. TRIM ANT(BC) 1400 KC
PAD(BC) 600 KC.
POLICE BAND-PEAK TRIMMER B at 6 MC
SHORT-WAVE BAND- PEAK C AND ANT-SW 18MC

1937 VICTORY
MODEL 400

PARKER McCRORY MFG. CO.



I.F. 456 KC

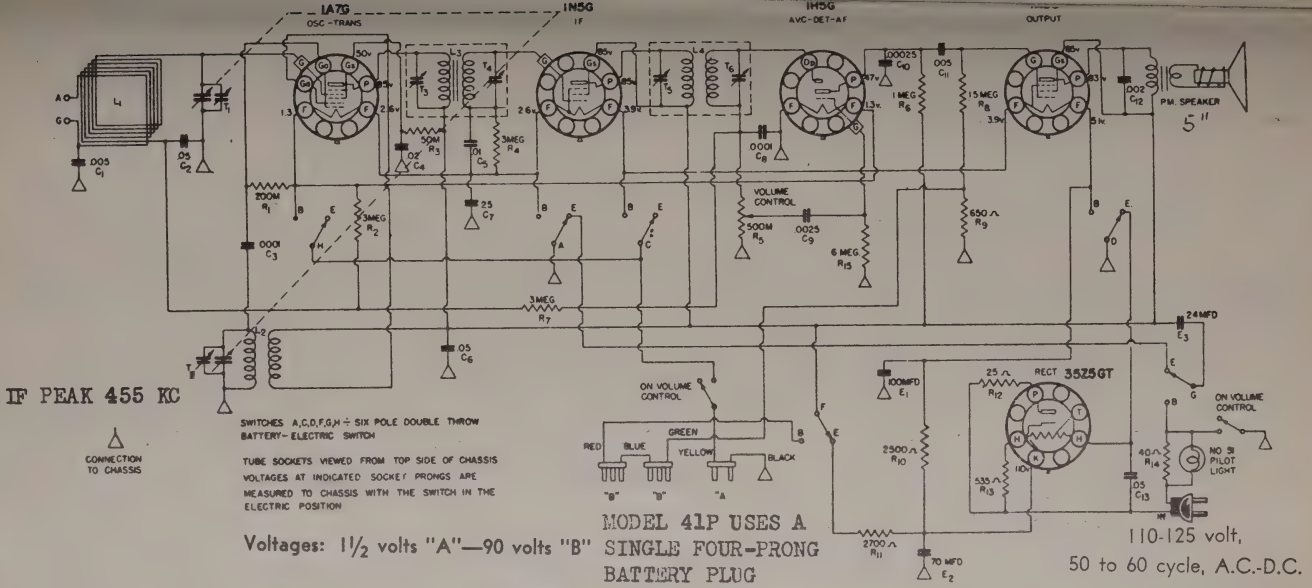
CIRCUIT DATA								
C1	.01	MFD.	600V.	R1	25 M	OHMS	1/3 W.
C2	.0001	"	MICA	R2	50 M	"	"
C3	.1	"	200V.	R3	200	"	"
C4	.001	"	±20%	R4	15 M	"	"
C5	300-600	MMFD.	PADDER	R5	10 M	"	"
C6	.002	MFD.	±5%	R6	10 M	"	1/2 W.
C7	.1	"	400V.	R7	1 MEGOHM		1/3 W.
C8	.25	"	400V.	R8	500 M	OHM VOL. CONT.	
C9	.00025	"	MICA	R9	100 M	OHMS	1/3 W.
C10	12	"	25V.	R10	500 M	"	"
C11	.006	"	600V.	R11	800	"	"
C12	8X8	"	150 V.				
C13	.01	"	400V.				
C14	.5	"	180V.				
C15	.0075	"	1000V.				

FOR TUBE LAYOUT
SEE INDEX

CONVENTIONAL ALIGNMENT PROCEDURE
SEE 1938 MODEL PARMAK MASTERPIECE
TRIM BC OSC 1700 KC, TRIM ANT 1400 KC
POLICE BAND- PEAK ANT TRIMMER 6MC

PATHE

MODEL 41P
MODEL 342P



IF PEAK 455 KC

△ CONNECTION TO CHASSIS

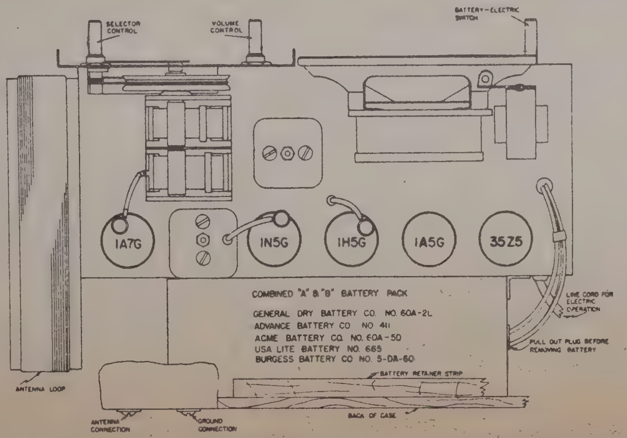
SWITCHES A,C,D,F,G,H ÷ SIX POLE DOUBLE THROW BATTERY-ELECTRIC SWITCH

TUBE SOCKETS VIEWED FROM TOP SIDE OF CHASSIS VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS WITH THE SWITCH IN THE ELECTRIC POSITION

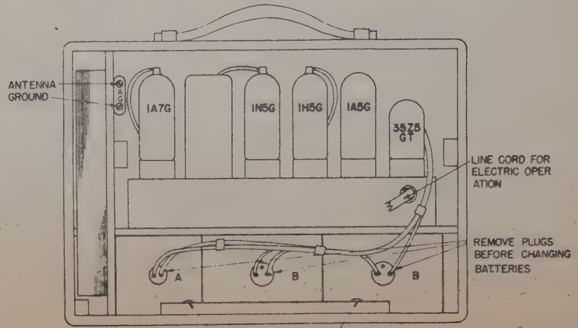
Voltages: 1½ volts "A"—90 volts "B"

MODEL 41P USES A SINGLE FOUR-PRONG BATTERY PLUG

110-125 volt,
50 to 60 cycle, A.C.-D.C.


SELECTOR CONTROL
VOLUME CONTROL
BATTERY-ELECTRIC SWITCH
1A7G
1N5G
1H5G
1A5G
35Z5
LINE CORD FOR ELECTRIC OPERATION
PULL OUT PLUG BEFORE REMOVING BATTERY
COMBINED "A" & "B" BATTERY PACK
GENERAL DRY BATTERY CO. NO. 60A-2L
ADVANCE BATTERY CO NO 411
ACME BATTERY CO. NO. 60A-50
USA LITE BATTERY NO. 665
BURGESS BATTERY CO NO. 5-DA-60
BATTERY RETAINER STRIP
BACK OF CASE
ANTENNA LOOP
ANTENNA CONNECTION
GROUND CONNECTION

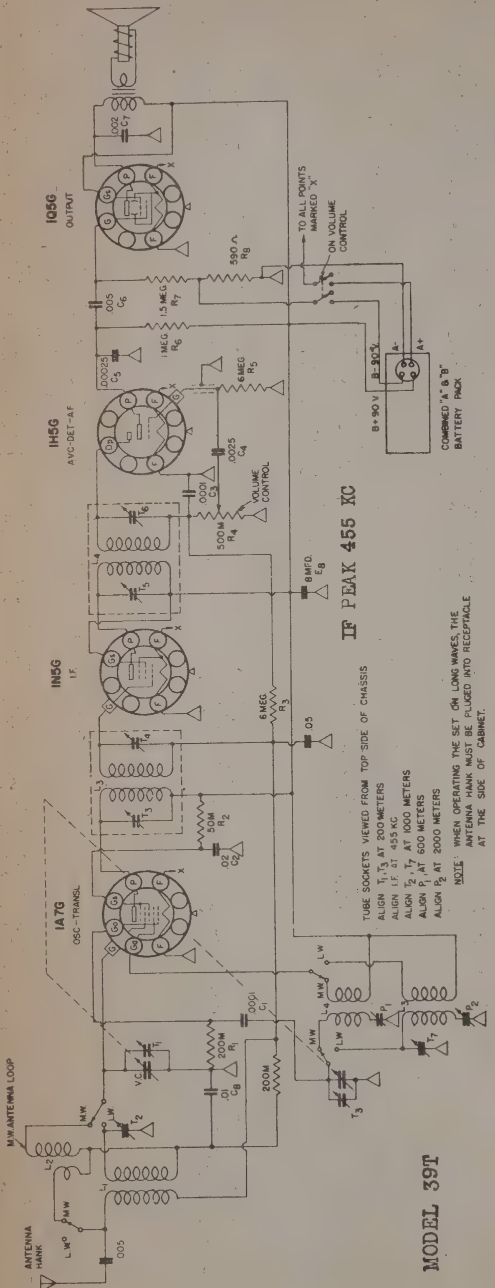
LOCATION OF TUBES & BATTERIES


ANTENNA
GROUND
1A7G
1N5G
1H5G
1A5G
35Z5 GT
LINE CORD FOR ELECTRIC OPERATION
REMOVE PLUGS BEFORE CHANGING BATTERIES
A
B
B

REMOVE 2 SCREWS & STRIP TO INSTALL OR REMOVE BATTERIES

MODEL 39T
MODEL 340

PATHE

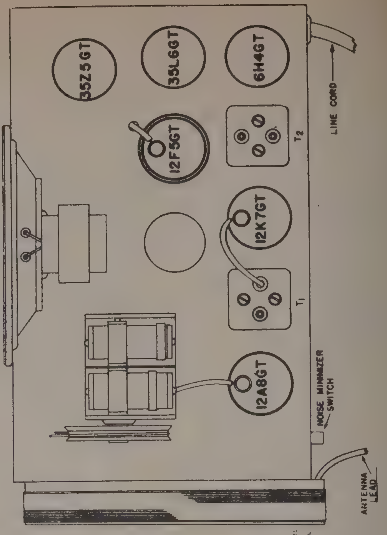


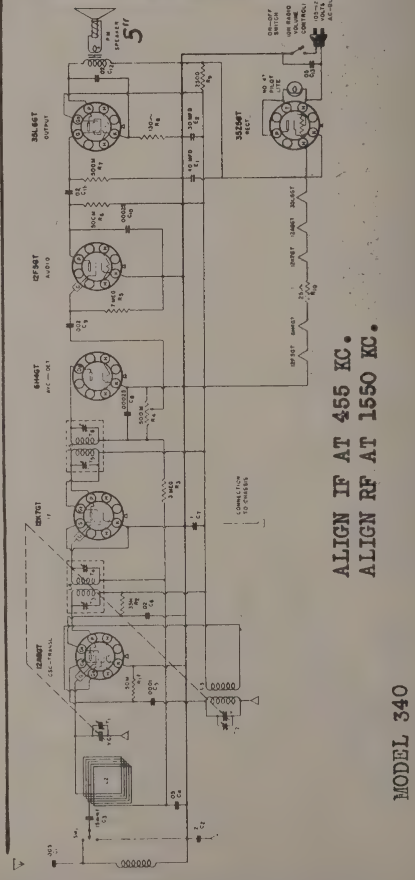
IF PEAK 455 KC

TUBE SOCKETS VIEWED FROM TOP SIDE OF CHASSIS
ALIGN T1, T3 AT 200 METERS
ALIGN I.F. AT 455 KC
ALIGN T2, T7 AT 1000 METERS
ALIGN P1 AT 600 METERS
ALIGN P2 AT 2000 METERS

NOTE: WHEN OPERATING THE SET ON LONG WAVES, THE ANTENNA HANK MUST BE PLUGED INTO RECEPTACLE AT THE SIDE OF CABINET.

MODEL 39T

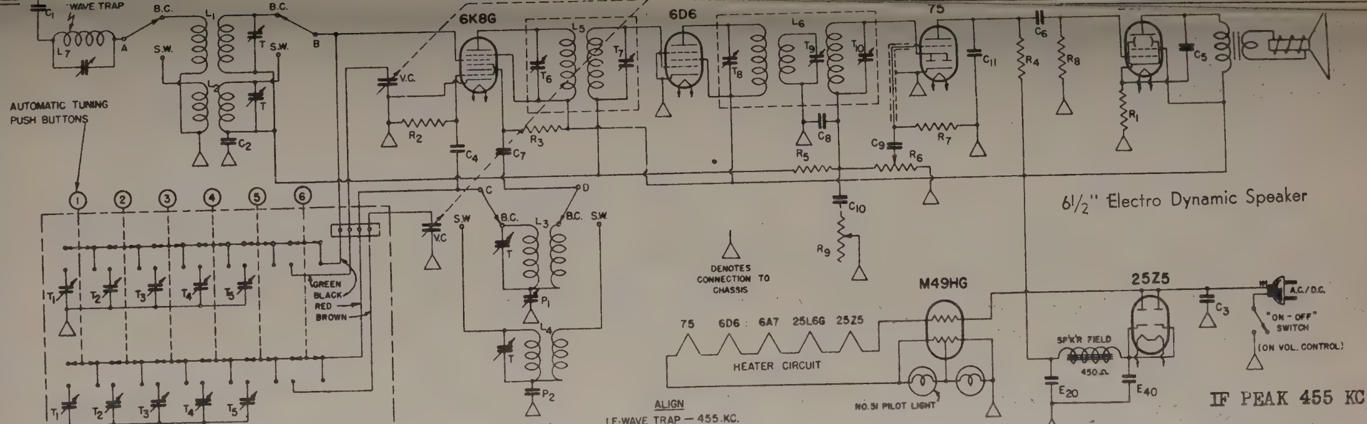




ALIGN IF AT 455 KC.
ALIGN RF AT 1550 KC.

MODEL 340

PATHE



IF PEAK 455 KC

MODEL 201

ALIGN
I.F.;WAVE TRAP — 455.KC.
B.C. – 1500KC., 600 KC.
S.W. – 16 MC.

110-125 Volt, 50 to 60 Cycle, AC-DC

R_1 -	150	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	50,000	"	"	"
R_4 -	300,000	"	"	"
R_5 -	1,000,000	"	"	"
R_6 -	500,000	"	VOL. CONTROL	
R_7 -	6,000,000	"	1/4	WATT
R_8 -	500,000	"	1/4	"
R_9 -	500,000	"	TONE CONTROL	

SWITCHES - A,B,C,D, - FOUR POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - B.C ANTENNA COIL
L_2 - S.W. ANTENNA COIL
L_3 - B.C. OSCILLATOR COIL
L_4 - S.W. OSCILLATOR COIL
L_5 - 455 KC INPUT IF
L_6 - 455 KC. TRIPLE TUNED OUTPUT IF
L_7 - 455 KC. WAVE TRAP

P_1 - 500 MMF. MAXIMUM PADDER
P_2 - 3800 MMF. FIXED PADDER

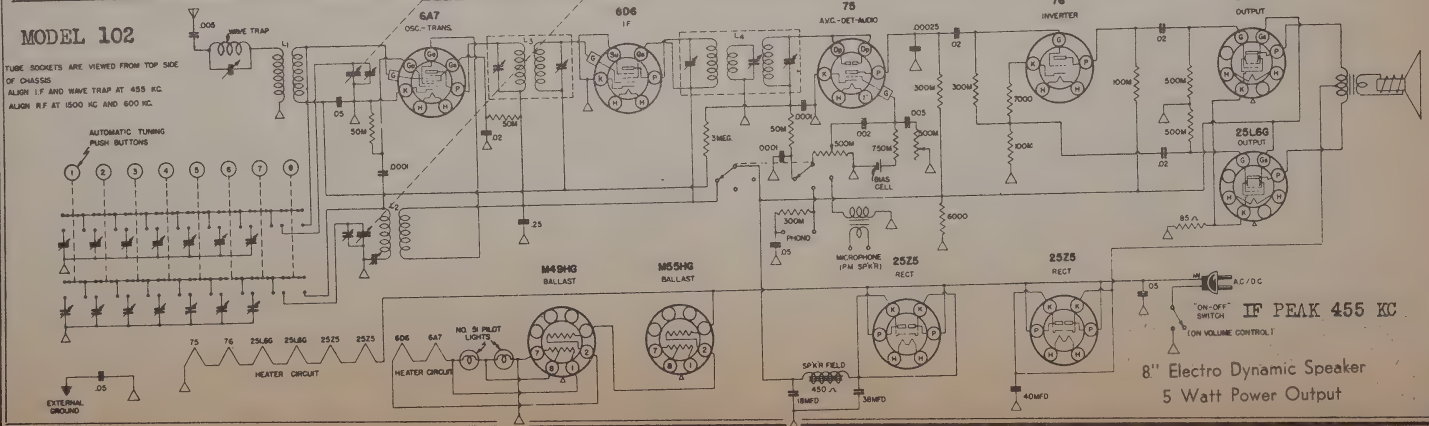
E_{20} - 20 MFD 150 VOLTS
E_{40} - 40 MFD " "

T - 3-35 MMF. TRIMMER

C_1 -	.005	-	400 V.
C_2 -	.05	-	400 V.
C_3 -	.05	-	400 V
C_4 -	.0001	-	MICA
C_5 -	.015	-	400 V.
C_6 -	02	-	"
C_7 -	.01	-	"
C_8 -	.00025	-	MICA
C_9 -	002	-	200 V.
C_{10} -	.005	-	400 V.
C_{11} -	.00025	-	MICA

MODEL 102

TUBE SOCKETS ARE VIEWED FROM TOP SIDE OF CHASSIS
ALIGN I.F AND WAVE TRAP AT 455 KC.
ALIGN R.F AT 1500 KC AND 600 KC.

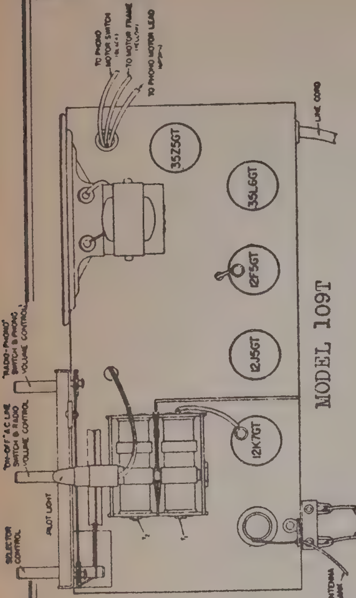


IF PEAK 455 KC

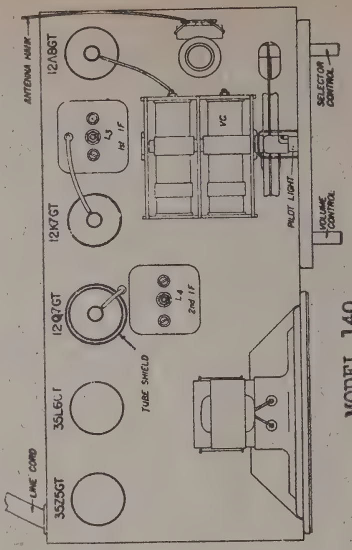
8" Electro Dynamic Speaker
5 Watt Power Output

MODEL 109T
MODEL 140
MODEL 240

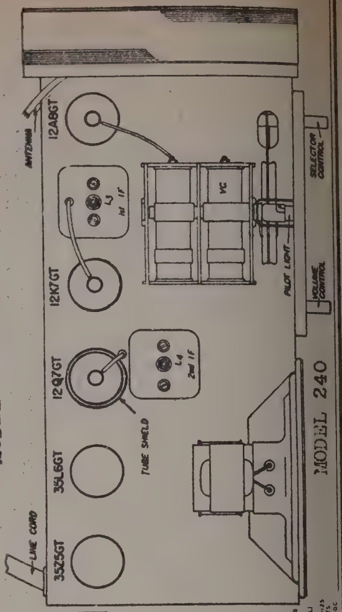
PATHE



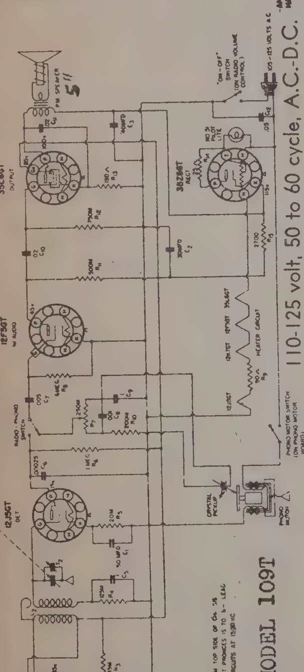
MODEL 109T



MODEL 140

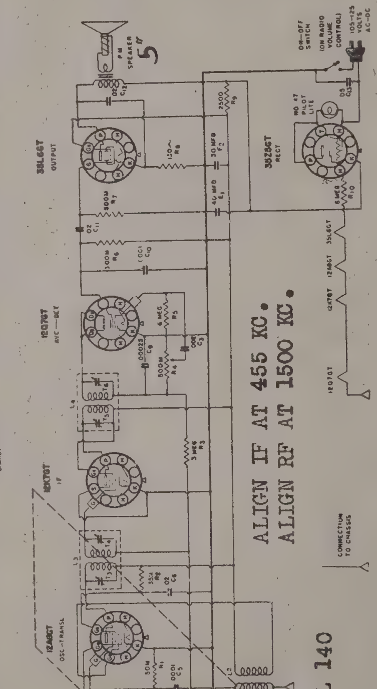


MODEL 240


PM SPEAKER
5"
35L6GT OUTPUT
35Z6GT RECT
"ON-OFF" SWITCH (ON RADIO VOLUME CONTROL)
105-125 VOLTS A.C.
12F5GT
12J5GT DET
12K7GT RF
RADIO-PHONO SWITCH
HEATER CIRCUIT
CRYSTAL PICKUP
PHONO MOTOR
PHONO MOTOR SWITCH (ON PHONO MOTOR BOARD)
DENOTES CONNECTION TO CHASSIS
TUBE SOCKETS VIEWED FROM TOP SIDE OF CHASSIS
VOLTAGE AT INDICATED SOCKET PRONGS IS TO B- LEAD
ALIGN RF AND ANTENNA CIRCUITS AT 1500 KC

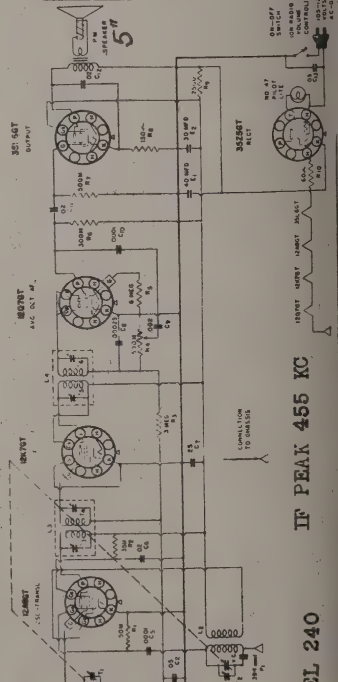
110-125 volt, 50 to 60 cycle, A.C.-D.C.

MODEL 109T



ALIGN IF AT 455 KC.
ALIGN RF AT 1500 KC.

MODEL 140



IF PEAK 455 KC

MODEL 240

©John F. Rider, Publisher

MODELS TH-9, TH-18, TH-22, PT-25 (121-122); PT-27 (121-122) PT-29-31-37-38-39-45-47-49-51-53

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: If an aligning indicator of this type is used, connect it to the plate and screen terminals of the output tube.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make either of the following connections:

1—Attach the negative terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to (B—) of the receiver. (Cathode 7C6)

2—An aligning adaptor, Philco Part No. 45-2767 can be obtained from your Philco Distributor for use with the vacuum tube voltmeter. To use the adaptor, remove the second detector tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the vacuum tube voltmeter to the black wire of the adaptor.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .004 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis. It may be necessary when adjusting these models to reverse the power plug to eliminate hum.

The R. F. and oscillator padders are aligned with the high side of the signal generator connected to the antenna of the receiver through a 100 mmfd. condenser.

After connecting the aligning instruments, adjust the compensators on all models in the order as shown in the tabulation below. The first and second I. F. transformers in all models are located on the top and bottom sections of the chassis respectively. The "antenna" and "oscillator" padders are located on the tuning condenser.

Models PT-25-27-29-31-39-45-47-49-51

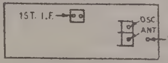
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser	470 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	1st & 2nd I. F.	Push in "Dial" button on push-button models
2	Ant. Ter.	1700 K. C.	1700 K. C.	Vol. Max.	"Osc."	Note A and B
3	Ant. Ter.	1500 K. C.	1500 K. C.	Vol. Max.	"Ant."	

Models TH-18, TH-18E, PT-37-38-53

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser	455 K. C.	Tuning Cond. Closed	Vol. Max. Range Sw. Brdcst.	1st & 2nd I. F.	
2	Aerial with 400 ohm Dummy	18 M. C.	18 M. C.	Range Sw. Brdcst.	3B, 3A on Tuning Condenser	
3	Aerial with 100 mmfd Dummy	1500 K. C.	1500 K. C.	Range Sw. Brdcst.	13 Shunt Padder	
4	Aerial with 100 mmfd Dummy	580 K. C.	580 K. C.	Range Sw Brdcst.	13 Series Padder	Roll Tuning Conds. when Adjusting Padder
5	Aerial with 100 mmfd Dummy	1500 K. C.	1500 K. C.	Range Sw. Brdcst.	13 Shunt Padder	

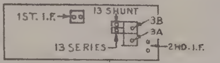
NOTE A—DIAL CALIBRATION: The dial pointers are adjusted by closing the tuning condenser (plates fully meshed) and setting the pointers slightly below the top edge of the brown center line at the extreme left end of pointer.

NOTE B—The Police Band on Models PT-29-31-49 and 51 is automatically adjusted when the "Brdcst" Band is adjusted.



PADDER LOCATIONS
Models PT-25-27-29-31-39-45-47-49-51

PADDER LOCATIONS
Models TH-18, TH-18E, PT-37-38-53



MODELS TH-14, TH-15, TH-16, TH-17, PT-26-28-33-41 (121-122); 46-48-50-57, PT-61 (121-122); and 65-66-69 (121-122)

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser .004 mfd Dummy	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	1st and 2nd I. F. Trans.	Push in "Dial" Button on Push-Button Models
2	Ant. Terminal on loop 100 mmfd. Dummy Note B	1500 K. C.	1500 K. C.	Vol. Max.	"Osc." "Ant."	Note A

NOTE A—DIAL CALIBRATION: The dial pointers are adjusted by closing the tuning condenser (plates fully meshed) and setting the pointers slightly below the top edge of the brown center line at the extreme left end of pointer.

NOTE B—Models PT-26, PT-28, PT-46, PT-48: Aerial padder must be adjusted with the loop connected and the set assembled in cabinet. The aerial connection on these models is the wire at the rear of the tuning condenser which is attached to the chassis. Remove wire lug from chassis and connect the 100 mmfd. condenser.

MODELS TP-20, TP-21, PT-35-36-43, Codes 121-122; and 55-59-67

Procedure PT-35 and PT-59

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser .004 mfd. Dummy	470 K. C.	Tuning Condenser Closed	Vol. Max.	1st and 2nd I. F. Trans.	Press in "Dial" Button on Push-Button Models
2	Ant. Terminal 100 mmfd. Dummy	1720 K. C.	Note A	Vol. Max.	Osc.	Note A
3	Ant. Terminal 100 mmfd. Dummy	1500 K. C.	Note B	Vol. Max.	Ant.	Note B

Procedure TP-20, PT-43 (121, 122)-36-55-67

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser .004 mfd. Dummy	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	1st and 2nd I. F. Trans.	Press in "Dial" Button on Push-Button Models
2	Ant. Terminal on Back of Loop .100 mmfd. Dummy	1600 K. C.	Note A	Vol. Max.	Osc.	Note A
3	Ant. Terminal on Back of Loop .100 mmfd. Dummy	1500 K. C.	Note B	Vol. Max.	Ant.	Note B Note C

NOTE A — Turn the tuning condenser to the extreme high frequency position (all plates out of mesh). Insert a .004 (four thousandths) gauge between the stationary and rotor plates of the oscillator condenser (end where both sections enter). If the gauge is not handy, a piece of bond writing paper can be used. After inserting gauge, turn the rotor toward the low frequency end so that both rotor and stator touch gauge. Then remove gauge, being careful not to disturb condenser setting. Adjust "oscillator" padder for maximum output with the 1600 K. C. signal or 1720 K. C. signal indicated in the tabulation.

NOTE B — Turn signal generator to 1500 K. C. and tune receiver tuning condenser for maximum reading on this signal, then adjust the antenna padder for maximum output.

Place set in cabinet so that the tuning arm on the tuning condenser engages the dial pointer on the cabinet. After placing receiver in the cabinet and it is found that the dial pointer does not track properly with station signals, the dial can be calibrated as follows: Set the signal generator to 900 K. C. and tune receiver until signal shows maximum reading on the output meter. The dial pointer is then set to this signal by inserting a screw driver to the adjustment screw on the tuning condenser pulley. Loosen screw and slightly turn dial so that it reads 600 K. C. then retighten screw. When doing this, however, precaution should be taken so that the tuning condenser is not disturbed while dial is being adjusted and screw is being tightened or loosened.

In Models PT-36 and PT-43, Code 122, the dial pointer is simply pushed onto the tuning condenser shaft, and does NOT require the adjustment as given in the paragraph above.

NOTE C — Model 36 antenna padder must be adjusted with the loop connected and assembled in the cabinet.

SETTING AND OPERATING ELECTRIC PUSH-BUTTON TUNING

MODELS TP-21, PT-45-46-47-48-57-65 and 67

PT-49, PT-51, PT-59, TH-15, AND TH-17

Select five of your favorite nearby broadcast stations and remove their call letters from the station call letter tab sheets supplied. Place the call letters in the windows below the buttons, making sure that each respective button covers the frequency of the station for which it is to be used. The frequencies of the popular stations in your vicinity may be found by consulting any station list. The frequency range of the buttons and corresponding padders is as follows:

Padders (right to left from rear)	Circuit	Buttons (left to right from front)	Frequency Range		Padders (right to left from rear)	Circuit	Buttons (left to right from front)	Frequency Range
1 2	Ant. Osc.	1	540 to 1030 kilocycles		7 8	Ant. Osc.	4	900 to 1470 kilocycles
3 4	Ant. Osc.	2	650 to 1100 kilocycles		9 10	Ant. Osc.	5	1100 to 1600 kilocycles
5 6	Ant. Osc.	3	740 to 1240 kilocycles				6	Dial

The left-hand button looking at the front of the cabinet corresponds to the two right-hand padder screws looking at the rear and covers the lowest frequency range.

With the Dial button depressed, tune in the station whose call letters appear above the left-hand button. Then depressing the left-hand button, tune in this station by rotating the No. 2 "OSC" screw (next to the right end of the unit looking at the rear of the chassis.) (Note: Inherent characteristics of these padders may cause some of them to cover a lower range than required to cover the broadcast band. This may cause the radio to howl or flutter when a station button is depressed. To correct this, loosen the "ANT" padder corresponding to the depressed station button). Turn the "OSC" screw slowly and listen carefully or the station signal may be passed without hearing it. After the "OSC" screw has been adjusted for maximum volume, the corresponding "ANT" screw should be adjusted for maximum. For some stations, it may be necessary to re-adjust the "OSC" screw after the "ANT" screw has been set. Switching from the "Dial" to the automatic push button will enable you to make sure you have the correct station tuned in. When the first station has been set, the same procedure should be followed for the remaining buttons, first tuning in the desired station by means of the "Dial" control, then adjust the push-button.

To tune the radio with the "Push-Buttons", simply press in the button which is under the call letters of the desired station. Your station will be received instantly. The volume of the program may be controlled with the manual volume control.

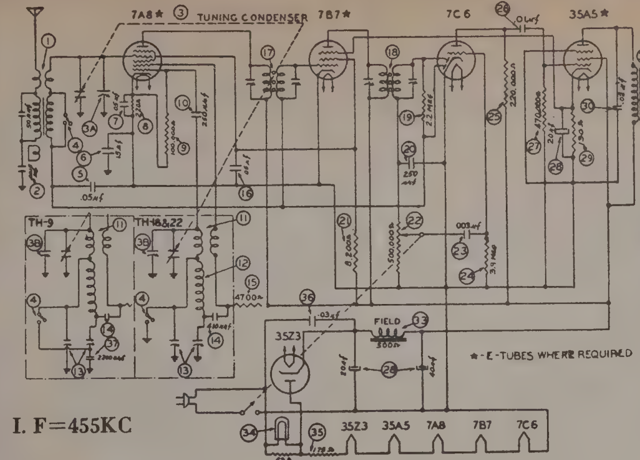
While the above procedure is satisfactory in setting up push-buttons for stations, a very accurate adjustment can be obtained with a vacuum tube voltmeter. The instructions for using a vacuum tube voltmeter will be found below under "Using Vacuum Tube Voltmeter for Aligning Compensators and Adjusting Push-Buttons".

MODELS TH-9,
TH-18, TH-22
MODELS TH-14, TH-16
MODEL TP-20

PHILCO RADIO & TELEVISION CORP.

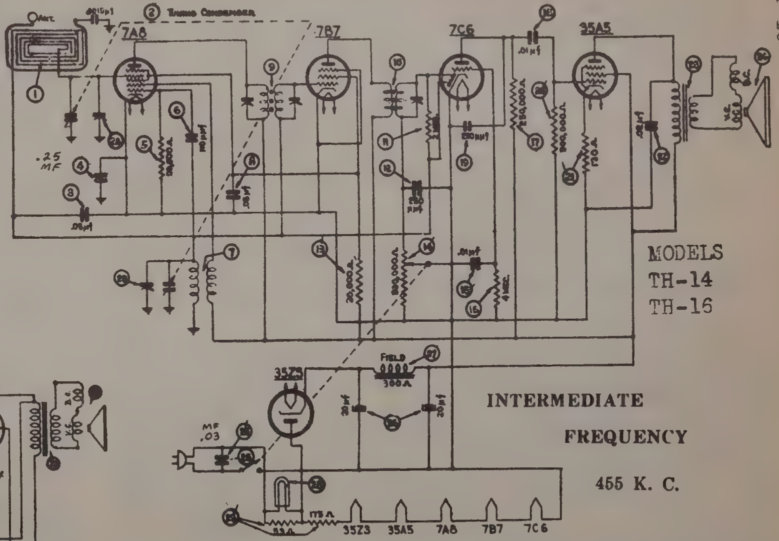
TH-9	— 540 — 1720 K. C.	3.0 — 10 M. C.
TH-18	— 540 — 1720 K. C.	5.5 — 19 M. C.
TH-22	— 540 — 1720 K. C.	7.0 — 24 M. C.

These models are similar with the exception of the tuning frequency ranges and cabinets.



I. F=455KC

MODELS TH-9, TH-18, TH-22



MODELS
TH-14
TH-16

INTERMEDIATE

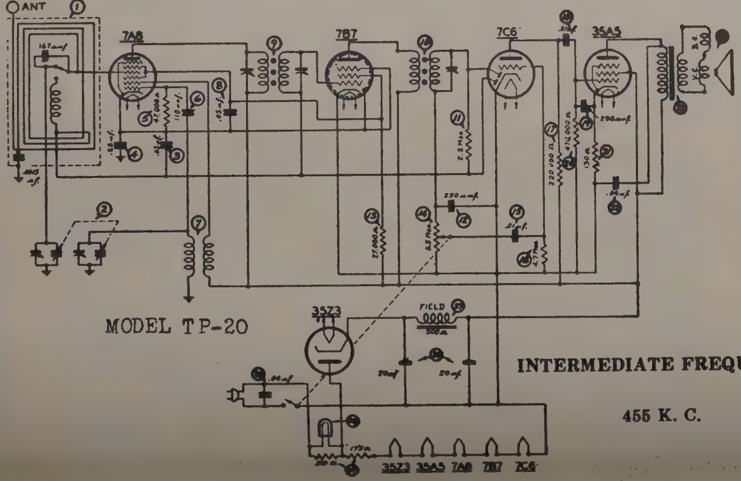
FREQUENCY

455 K. C.

Models TH-14 and TH-16 are five tube, superheterodyne radios covering a frequency range from 540 to 1580 K. C.

These models are similar with the exception of the cabinets.

FOR OTHER DATA, SEE INDEX

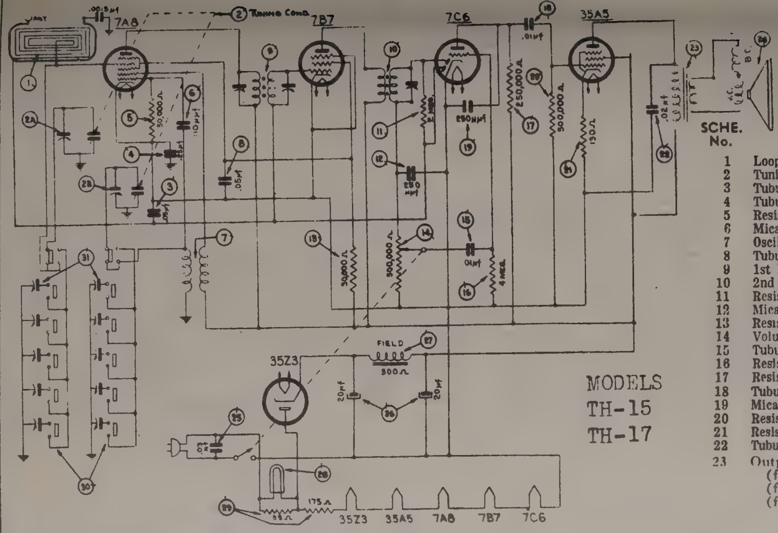


MODEL TP-20

INTERMEDIATE FREQUENCY

455 K. C.

Model TP-20 is a five tube, superheterodyne radio covering a frequency range from 540 to 1580 K. C. on the broadcast band and 2.3 to 2.5 M. C. on the local police tuning range.



MODELS
TH-15
TH-17

Models TH-15 and TH-17 are five tube, electric push-button tuning, superheterodyne radios with a manual tuning range covering 540 to 1580 K. C.

These models are similar with the exception of the cabinet.

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	32-3186
2	Tuning Condenser	31-2371
3	Tubular Condenser (.05 mf., 200 v.)	40-4519S
4	Tubular Condenser (.25 mf., 400 v.)	30-4604S
5	Resistor (50,000 ohms, 1/3 watt)	33-350244
6	Mica Condenser (110 mmf.)	30-1031
7	Oscillator Transformer	32-3152
8	Tubular Condenser (.05 mf., 200 v.)	30-4519S
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2 megs., 1/3 watt)	33-520244
12	Mica Condenser (250 mmf.)	30-1032
13	Resistor (30,000 ohms, 1/3 watt)	33-330244
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-4479S
16	Resistor (4 megs., 1/3 watt)	33-540244
17	Resistor (250,000 ohms, 1/3 watt)	33-425244
18	Tubular Condenser (.01 mf., 400 v.)	30-4572S
19	Mica Condenser (250 mmf.)	30-1032
20	Resistor (500,000 ohms, 1/3 watt)	33-450244
21	Resistor (130 ohms, 1/2 watt)	33-113336
22	Tubular Condenser (.02 mf., 400 v.)	30-4516S
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Speaker	36-1469
	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
	(for Speaker 36-1469-9)	36-4113
25	Tubular Condenser (.03 mf., 400 v.)	30-4449S
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil — Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Push Button Switch	42-1485
31	Padding Condenser Strip	31-6296

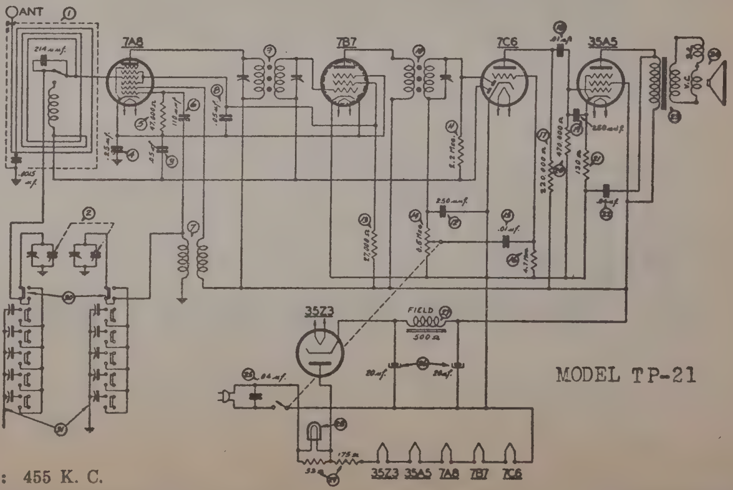
MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cable (Power)	L-3183
Cabinet (TH-15)	10376A
Cabinet Back (TH-15)	27-9358
Cabinet (TH-17)	10379A
Cabinet Back (TH-17)	27-4822
Clip (Coil Mounting)	28-5002
Dial	27-5499
Dial Window	27-5472
Drive Cord (Dial)	31-2358

INTERMEDIATE FREQUENCY: 455 K. C.

Six electric push-buttons are provided on this model. Five are used for stations and one push-button for selecting dial tuning. The push buttons cover a frequency range as follows: 540 to 1600 kilocycles.

FOR OTHER DATA SEE INDEX



MODEL TP-21

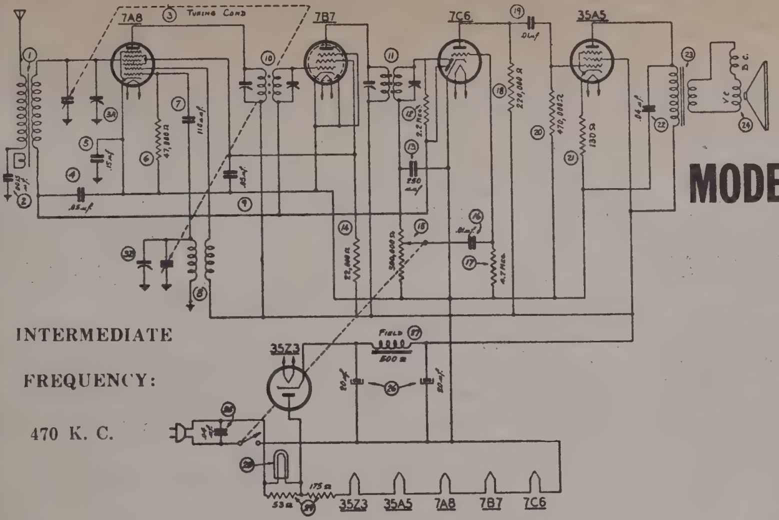
Model TP-21 is a five tube, electric push-button tuning superheterodyne radio with a manual tuning range covering 540 to 1580 K.

Six electric push-buttons are provided on this model. Five are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 K. C.

MODELS PT25,
PT27 (121, 122), PT39
MODELS PT26, PT28, PT36

PHILCO RADIO & TELEVISION CORP.



INTERMEDIATE

FREQUENCY:

470 K. C.

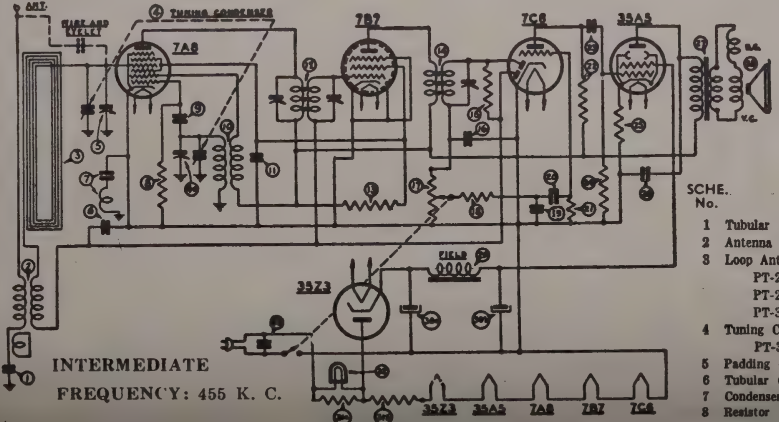
FOR ALIGNMENT, SEE INDEX

CIRCUIT DESIGN: Models PT-25, Codes 121 and 122, Pt-27, Codes 121 and 122, and PT-39 are five tube superheterodyne radios covering a frequency range from 540 to 1720 K. C. These models are similar with the exception of the cabinets. Codes 121 and 122 of Models PT-25 and PT-27 differ also in the type of cabinet used.

MODELS PT-25, PT-27, Codes 121-122; and PT-39

POWER SUPPLY: The receivers are designed for operation on either a 115 volt alternating current (A. C.) or 115 volt direct current (D. C.) power supplies.

Models PT-26, PT-28 and PT-36 are five tube superheterodyne radios covering a tuning frequency range from 540 to 1580 K. C. and designed with a built-in loop aerial for portable use. To obtain maximum performance, however, in steel reinforced buildings, apartment houses, hotels and other shielded locations where signal strength is weak, provisions are also provided at the rear of the cabinet for an outside aerial.



INTERMEDIATE
FREQUENCY: 455 K. C.

MODEL PT-26

MODEL PT-28

MODEL PT-36

SCHE. No.	DESCRIPTION	PART No.
1	Tubular Condenser (.0015 mf., 200V)	30-45558
2	Antenna Transformer	32-3394
3	Loop Antenna — Part of cabinet and loop Assy.	
	PT-26	76-1005
	PT-28	76-1013
	PT-36	76-1014
4	Tuning Condenser — PT-26 & PT-28	31-2439
	PT-36	31-2443
5	Padding Condenser	31-6344
6	Tubular Condenser (.1 mf., 200V)	30-44998
7	Condenser & Choke Assy.	76-1019
8	Resistor (22,000 ohms, ¼ watt)	33-322154
9	Mica Condenser (110 mmf.)	30-1130
10	Oscillator Transformer	32-3182
11	Tubular Condenser (.05 mf., 200V)	30-45198
12	1st I. F. Transformer	32-3390
13	Resistor (22,000 ohms, ⅓ watt)	33-322334
14	2nd I. F. Transformer	32-3391
15	Resistor (2.2 meg., ¼ watt)	33-522154
16	Mica Condenser (250 mmf.)	61-0033
17	Volume Control (500,000 ohms)	33-5306
18	Resistor (47,000 ohms, ¼ watt)	33-347154
19	Mica Condenser (250 mmf.)	61-0033
20	Tubular Condenser (.01 mf., 200V)	30-44798
21	Resistor (4.7 meg., ¼ watt)	33-547154
22	Resistor (220,000 ohms, ¼ watt)	33-422154
23	Tubular Condenser (.01 mf., 400V)	30-45728
24	Resistor (470,000 ohms, ¼ watt)	33-447154
25	Resistor (130 ohms, ½ watt)	33-113336
26	Tubular Condenser (.04 mf., 400V)	30-41198
27	Output Transformer—Part of Speaker No.	36-1469
28	Speaker	36-1469
29	Field Coil—Part of Speaker No.	36-1469
30	Electrolytic Condenser (20-20 mf., 150V)	30-2382
31	Line Resistor	33-3307
32	Pilot Lamp	34-2068
33	Tubular Condenser (.04 mf., 400V)	30-41198

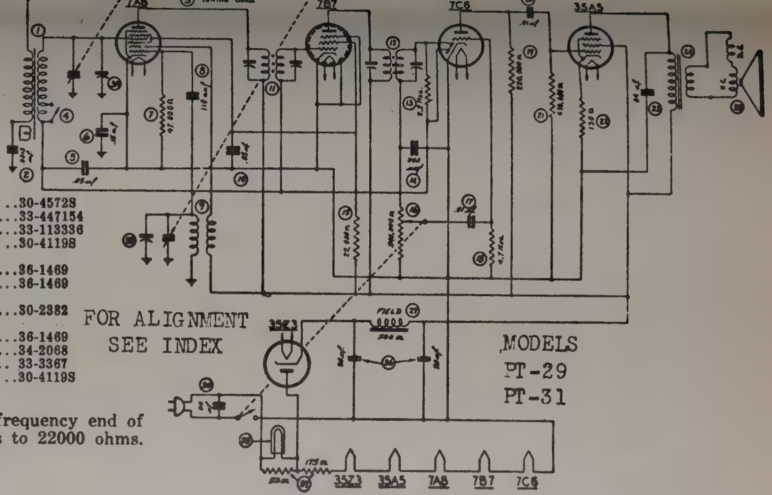
PHILCO RADIO & TELEVISION CORP. MODELS PT29, PT31 MODELS PT33, PT41 (121, 122), PT61 (121, 122)

radios covering a frequency range from 540 to 1720 K. C. on the broadcast band and 2.3 to 2.5 megacycles (M. C.) on the local police range. These models are similar with the exception of the cabinets.

1	Antenna Transformer	32-3164
2	Tubular Condenser (.0015 mf., 200 v.)	30-4555S
3	Tuning Condenser	31-2427
4	Switch	42-1406
5	Tubular Condenser (.05 mf., 200 v.)	30-4519S
6	Tubular Condenser (.15 mf., 400 v.)	30-4505S
7	Resistor (47,000 ohms, ¼ watt)	33-347154
8	Mica Condenser (110 mmf.)	30-1130
9	Oscillator Transformer	32-3152
10	Tubular Condenser (.05 mf., 200 v.)	30-4519S
11	1st I. F. Transformer	32-3149
12	2nd I. F. Transformer	32-3150
13	Resistor (2.2 meg., ¼ watt)	33-522154
14	Mica Condenser (250 mmf.)	61-0033
15	Resistor (22,000 ohms, ½ watt)	33-322334
16	Volume Control (500,000 ohms)	33-5306
17	Tubular Condenser (.01 mf., 200 v.)	30-4479S
18	Resistor (4.7 meg., ¼ watt)	33-547154
19	Resistor (220,000 ohms, ¼ watt)	33-422154
20	Tubular Condenser (.01 mf., 400 v.)	30-4572S
21	Resistor (47,000 ohms, ¼ watt)	33-447154
22	Resistor (130 ohms, ½ watt)	33-113336
23	Tubular Condenser (.04 mf., 400 v.)	30-4119S
24	Output Transformer Part of Speaker No.	36-1469
25	Speaker	36-1469
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil Part of Speaker, Part Number	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Tubular Condenser (.04 mf., 400 v.)	30-4119S

INTERMEDIATE

FREQUENCY: 470 K. C.



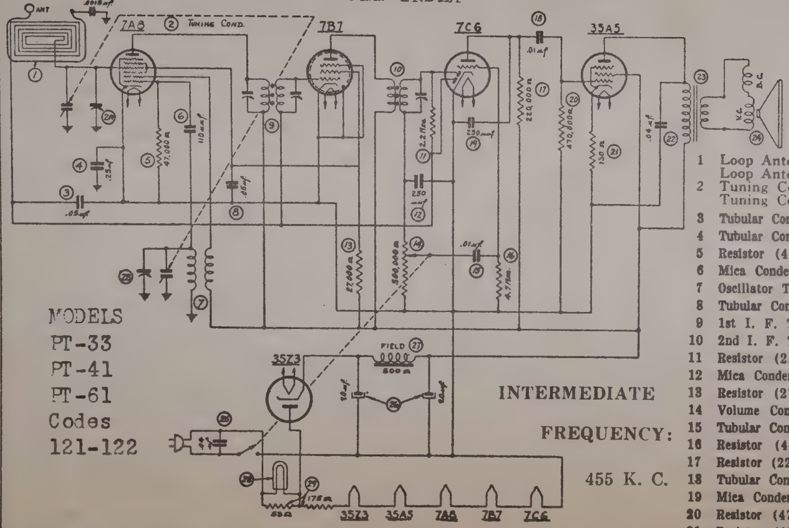
FOR ALIGNMENT SEE INDEX

MODELS
PT-29
PT-31

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

FOR ALIGNMENT SEE INDEX



MODELS
PT-33
PT-41
PT-61
Codes
121-122

INTERMEDIATE

FREQUENCY:

455 K. C.

Models PT-33, PT-41, Codes 121 and 122, PT-61, Codes 121 and 122, are five tube superheterodyne radios covering a frequency range from 540 to 1580 kilocycles (K. C .)

1	Loop Antenna Assem. (Code 121)	38-9858
	Loop Antenna Assem. (Code 122)	32-3179
2	Tuning Condenser (Code 121)	31-2429
	Tuning Condenser (Code 122)	31-2448
3	Tubular Condenser (.05 mf., 200 V.)	30-4519S
4	Tubular Condenser (.25 mf., 400 V.)	30-4604S
5	Resistor (47,000 ohms, ¼ watt)	33-347154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3182
8	Tubular Condenser (.05 mf., 200 V.)	30-4519S
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ⅛ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 V.)	30-4479S
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 V.)	30-4572S
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 V.)	30-4119S
23	Output Transformer Part of Speaker No. 36-1469-1	32-8047
	Part of Speaker No. 36-1469-9	32-8044
	Part of Speaker No. 36-1469-2	32-8044
24	Speaker	36-1469
25	Tubular Condenser (.04 mf., 400 V.)	30-4119S
26	Electrolytic Condenser (20-20 mf., 150 V.)	30-2382
27	Field Coil	Part of Speaker No. 36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367

PRODUCTION CHANGES

Several parts were changed in these models and the code numbers changed from 121 to 122. These changes are as follows:

MODEL PT-41

	Code 121	Code 122
Dial	27-5554	27-5570
Instructions	39-6570	39-6710
Loop Aerial Assembly	38-9858	32-3179
Tuning Condenser	31-2429	31-2448

MODEL PT-61

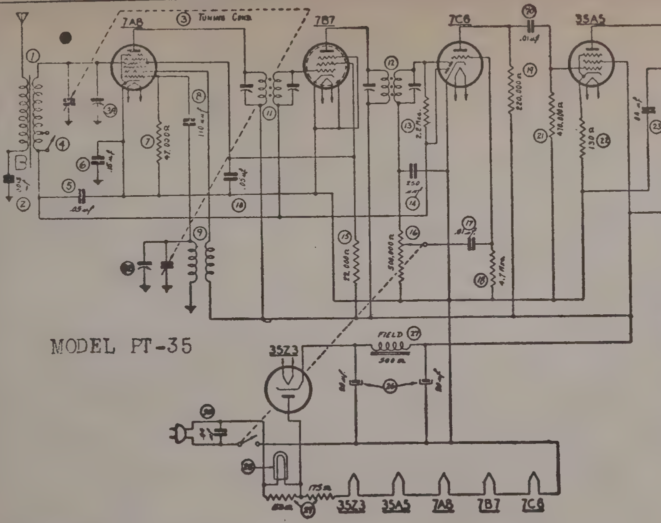
Dial	27-5554	27-5570
Instructions	39-6570	39-6710
Loop Aerial Assembly	38-9858	32-3179
Tuning Condenser	31-2429	31-2448

MODEL PT-35
MODEL PT-50
MODELS PT-37,
PT-38, PT-53

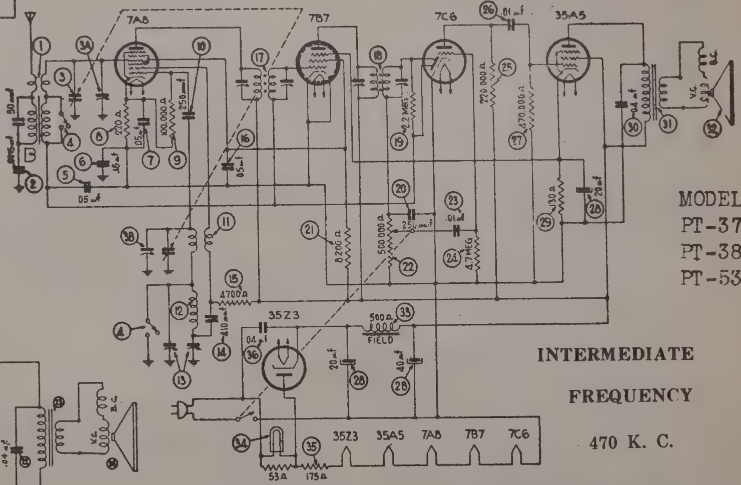
PHILCO RADIO & TELEVISION CORP.

Model PT-35 is a five tube superheterodyne radio, covering a frequency range from 540 to 1720 kilocycles (K. C.) on the broadcast band and 2.3 to 2.5 megacycles (M. C.) on the local police band.

INTERMEDIATE FREQUENCY: 470 K. C.



MODEL PT-35



MODELS
PT-37
PT-38
PT-53

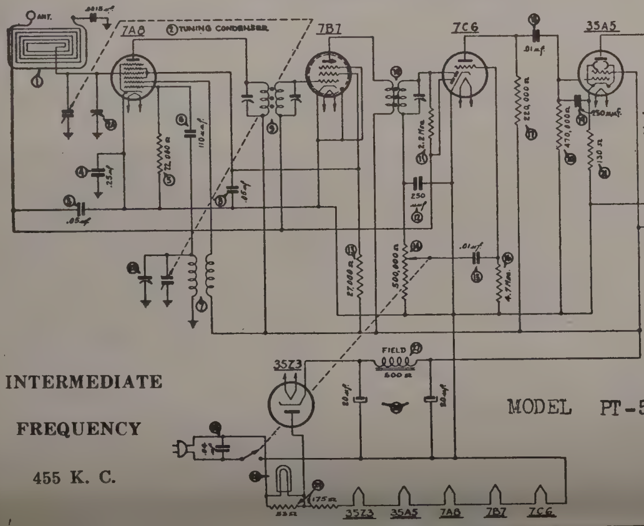
INTERMEDIATE

FREQUENCY

470 K. C.

Models PT-37 and PT-53 are five tube superheterodyne radios covering a tuning frequency range from 540 to 1720 kilocycles (K. C.) on the broadcast band and 5.5 to 19 megacycles (M. C.) on the short wave band. These models are similar with the exception of the cabinet.

Model PT-38 is a five tube superheterodyne radio, covering a frequency range from 540 to 1720 kilocycles (K. C.) on the broadcast band and from 5.5 to 19 megacycles (M. C.) on the short-wave band.



INTERMEDIATE

FREQUENCY

455 K. C.

MODEL PT-50

FOR OTHER DATA SEE INDEX

Model PT-50 is a five-tube superheterodyne radio covering a frequency range from 540 to 1580 kilocycles (K. C.)

PHILCO RADIO & TELEVISION CORP. MODELS PT-43(121, 122), PT-55
MODELS PT-45, PT-47

Models PT-43 and PT-55 are five tube superheterodyne radios, covering a frequency range from 540 to 1580 kilocycles (K. C.) on the broadcast band and 2.3 to 2.5 megacycles (M. C.) on the local police police range.

These models are similar with the exception of the cabinets. The circuit diagram and parts list shown below apply to both models.

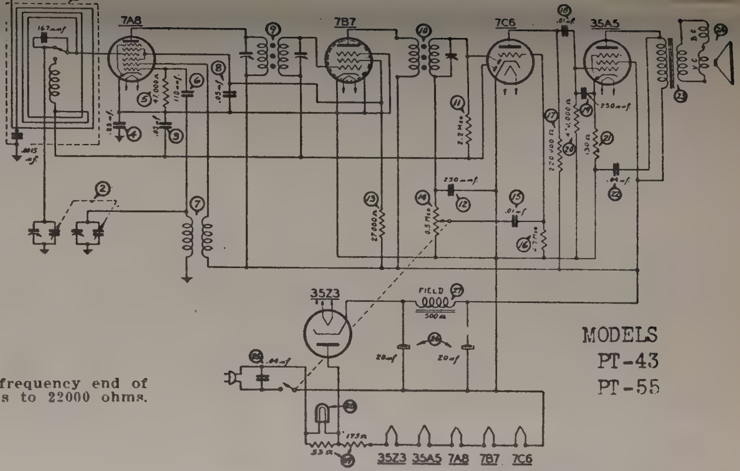
INTERMEDIATE FREQUENCY: 455 K. C.

One 7A8, converter; one 7B7, I. F. amplifier; one 7C6, 2nd detector, 1st audio, A. V. C.; one 35A5, audio output and one 35Z3, rectifier.

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

FOR OTHER DATA AND TUNER, SEE INDEX



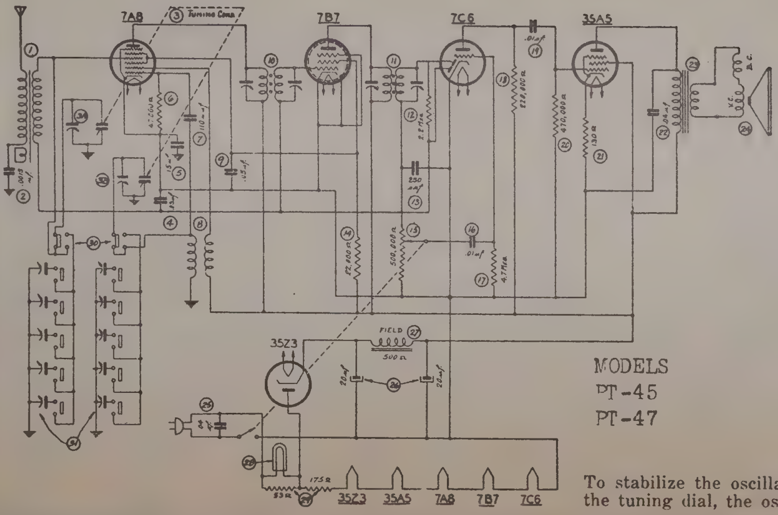
MODELS
PT-43
PT-55

PRODUCTION CHANGES

MODEL PT-43

Code number changed from 121 to 122 in addition to several part changes. These are as follows:

	Code 121	Code 122
Loop Aerial Ass'y	38-9936	32-3402
Tuning Condenser	31-2436	31-2446



MODELS
PT-45
PT-47

Models PT-45 and PT-47 are five tube electric push-button tuning, superheterodyne radios with a manual tuning range covering 540 to 1720 kilocycles (K. C.)

Six electric push-buttons are provided on these models. Five of the push-buttons are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.

The procedure for adjusting and operating the electric push-buttons for stations will be found on page 10.

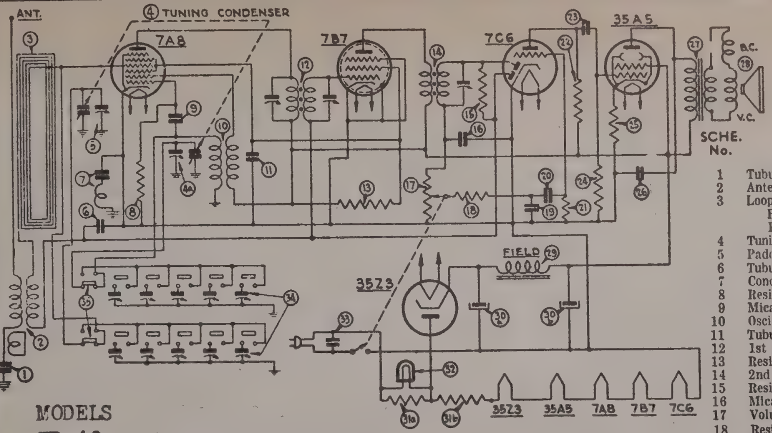
INTERMEDIATE FREQUENCY: 470 K. C.

One 7A8, converter; one 7B7, I. F. amplifier; one 7C6, 2nd detector, 1st audio, A. V. C.; one 35A5, audio output and one 35Z3, rectifier.

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

MODELS PT-46, PT-48
MODELS PT-49, PT-51



MODELS
PT-46
PT-48

Six electric push-buttons are provided on these models. Five of the push-buttons are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1580 kilocycles.

Models PT-46 and PT-48 are five tube electric push-button tuning superheterodyne radios with a manual tuning range covering 540 to 1580 K. C.

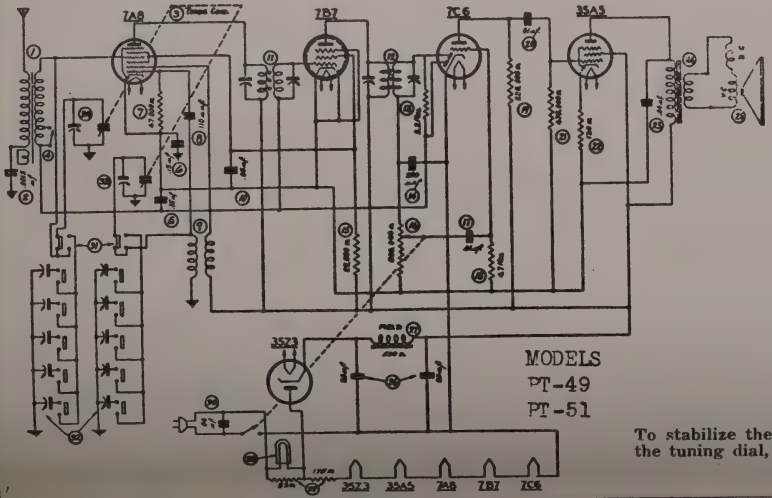
These models are similar with the exception of the cabinets.

SCHE. No.	DESCRIPTION	PART No.
1	Tubular Condenser (.0015 mf., 200 v.)	30-4555
2	Antenna Transformer	32-3394
3	Loop Antenna — Part of Cabinet and Loop Assy.	
	PT-46	76-1015
	PT-48	76-1016
4	Tuning Condenser (PT-46 and PT-48)	31-2445
5	Padding Condenser	31-6344
6	Tubular Condenser (.1 mf., 200 v.)	30-4499
7	Condenser & Choke Assy.	76-1019
8	Resistor (22,000 ohms, ¼ watt)	33-322154
9	Mica Condenser (110 mmf.)	30-1130
10	Oscillator Transformer	32-3152
11	Tubular Condenser (.05 mf., 200 v.)	30-4519
12	1st I. F. Transformer	32-3390
13	Resistor (22,000 ohms, ½ watt)	33-322334
14	2nd I. F. Transformer	32-3391
15	Resistor (2.2 meg., ¼ watt)	33-522154
16	Mica Condenser (250 mmf.)	61-0033
17	Volume Control (500,000 ohms)	33-5306
18	Resistor (47,000 ohms, ¼ watt)	33-347154
19	Mica Condenser (250 mmf.)	61-0033
20	Tubular Condenser (.01 mf., 200 v.)	30-4479
21	Resistor (4.7 meg., ¼ watt)	33-547154
22	Resistor (220,000 ohms, ¼ watt)	33-422154
23	Tubular Condenser (.01 mf., 400 v.)	30-4572
24	Resistor (470,000 ohms, ¼ watt)	33-447154
25	Resistor (130 ohms, ½ watt)	33-113336
26	Tubular Condenser (.04 mf., 400 v.)	30-4119
27	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
28	Speaker	36-1469
29	Field Coil ....Part of Speaker No.	36-1469
30	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
31	Line Resistor	33-3367
32	Pilot Lamp	34-2068
33	Tubular Condenser (.04 mf., 400 v.)	30-4119
34	Padding Condenser Strip	31-6324
35	Push Button Switch	42-1485

INTERMEDIATE

FREQUENCY: 455 K. C.

FOR OTHER DATA AND TUNER, SEE INDEX



MODELS
PT-49
PT-51

One 7A8, converter; one 7B7, I. F. amplifier; one 7C6, 2nd detector, 1st audio, A. V. C.; one 35A5, audio output and one 35Z3, rectifier.

Models PT-49 and PT-51 are five tube electric push button tuning superheterodyne radios with a manual tuning covering 540 to 1720 K. C. on the broadcast range and 2.3 to 2.5 megacycles (M. C.) on the local police range. These models are similar with the exception of the cabinet.

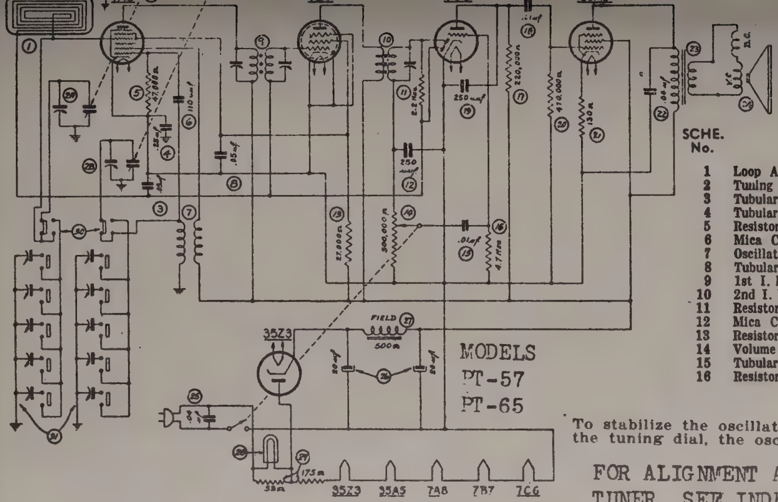
Six electric push-buttons are provided on these models. Five of the push-buttons are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 470 K. C.

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

PHILCO RADIO & TELEVISION CORP. MODELS PT-57, PT-65
MODEL PT-59



FOR ALIGNMENT AND TUNER, SEE INDEX

tuning superheterodyne radios with a manual tuning range covering 540 to 1580 K. C.

The models are similar with the exception of the cabinets

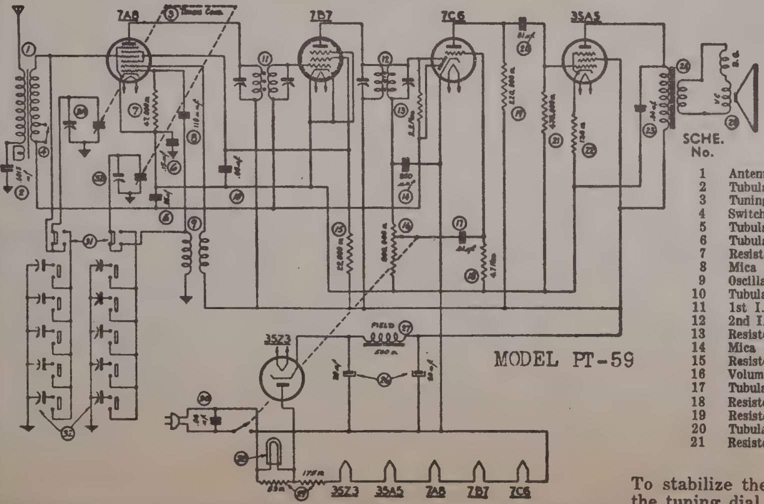
INTERMEDIATE FREQUENCY: 455 K. C.

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	38-9859
2	Tuning Condenser	31-2430
3	Tubular Condenser (.05 mf., 200 v.)	30-4519S
4	Tubular Condenser (.25 mf., 400 v.)	30-4604S
5	Resistor (47,000 ohms, ¼ watt)	33-347154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3152
8	Tubular Condenser (.05 mf., 200 v.)	30-4519S
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ½ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-4479S
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-4572S
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-4119S
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Speaker	36-1469
25	Tubular Condenser (.04 mf., 400 v.)	30-4119S
26	Electrolytic Condenser	
	(20-20 mf., 150 v.)	30-2382
27	Field Coil—Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Push Button Switch	42-1485
31	Padding Condenser Strip	31-6296

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

Six electric push-buttons are provided on these models. Five of the push-buttons are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.



Model PT-59 is a five tube electric push-button tuning superheterodyne radio with a manual tuning covering 540 to 1720 K. C. on the broadcast range and 2.3 to 2.5 megacycles (M. C.) on the local police range.

INTERMEDIATE.

FREQUENCY: 470 K. C.

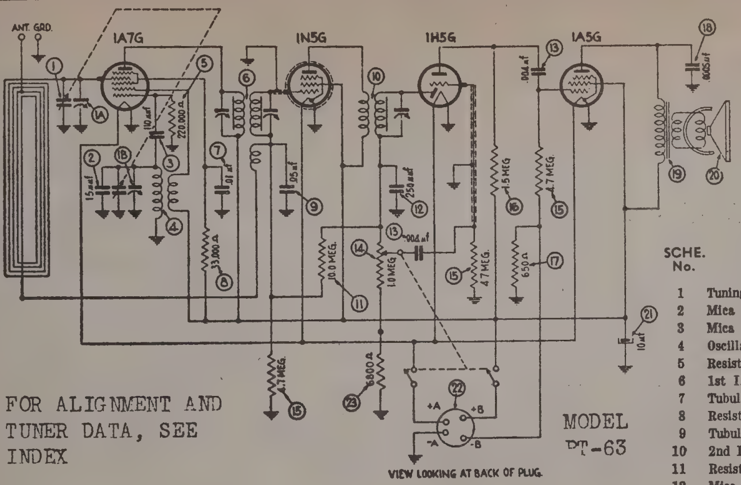
SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3164
2	Tubular Condenser (.0015 mf., 200 v.)	30-4555S
3	Tuning Condenser	31-2435
4	Switch	42-1406
5	Tubular Condenser (.05 mf., 200 v.)	30-4519S
6	Tubular Condenser (.15 mf., 400 v.)	30-4505S
7	Resistor (47,000 ohms, ¼ watt)	33-347154
8	Mica Condenser (110 mmf.)	30-1130
9	Oscillator Transformer	32-3152
10	Tubular Condenser (.05 mf., 200 v.)	30-4519S
11	1st I. F. Transformer	32-3149
12	2nd I. F. Transformer	32-3150
13	Resistor (2.2 meg., ¼ watt)	33-522154
14	Mica Condenser (250 mmf.)	61-0033
15	Resistor (22,000 ohms, ½ watt)	33-322334
16	Volume Control (500,000 ohms)	33-5306
17	Tubular Condenser (.01 mf., 200 v.)	30-4479S
18	Resistor (4.7 meg., ¼ watt)	33-547154
19	Resistor (220,000 ohms, ¼ watt)	33-422154
20	Tubular Condenser (.01 mf., 400 v.)	30-4572S
21	Resistor (470,000 ohms, ¼ watt)	33-447154
22	Resistor (130 ohms, ½ watt)	33-113336
23	Tubular Condenser (.4 mf., 400 v.)	30-4119S
24	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
25	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
	(for Speaker 36-1469-9)	36-4113
26	Electroyltic Condenser	
	(20-20 mf., 150 v.)	30-2382
27	Field Coil	
	Part of Speaker, Part No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Tubular Condenser (.04 mf., 400 v.)	30-4119S

PRODUCTION CHANGE

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.

MODEL PT-63
MODEL PT-66

PHILCO RADIO & TELEVISION CORP.



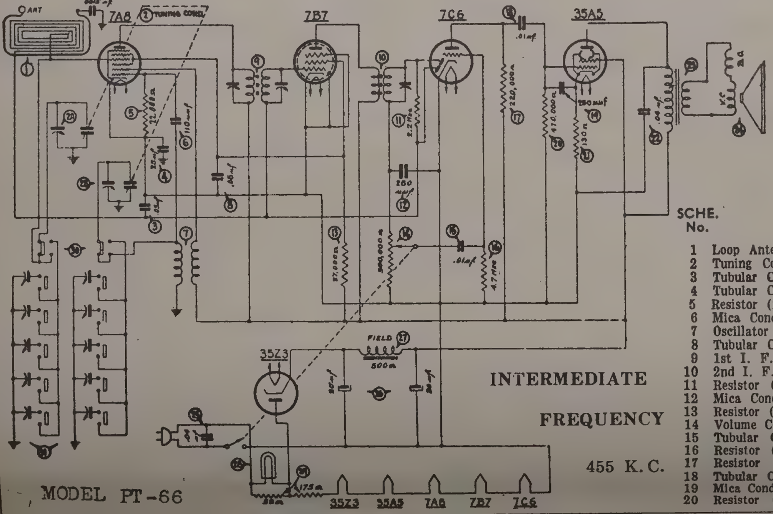
FOR ALIGNMENT AND
TUNER DATA, SEE
INDEX

MODEL
PT-63

Model PT-63 is a four tube portable battery operated superheterodyne receiver designed for reception of standard broadcast stations. In addition other features included are a loop aerial built into the cabinet, extremely sensitive permanent magnet field speaker, automatic volume control and pentode audio output. INTERMEDIATE FREQUENCY: 455 K. C.

TUNING RANGE: 540 to 1550 K. C.
BATTERY CURRENT: "A" 200 M. A. "B" 5.6 M. A.

SCHE. No.	DESCRIPTION	PART No.
1	Tuning Condenser	31-2432
2	Mica Condenser (15 mmf.)	61-0038
3	Mica Condenser (110 mmf.)	30-1031
4	Oscillator Transformer	32-3277
5	Resistor (220,000 ohms ¼ watt)	33-422154
6	1st I. F. Transformer	32-3265
7	Tubular Condenser (.01 mf. 400 v.)	30-4572S
8	Resistor (33,000 ohms ¼ watt)	33-333154
9	Tubular Condenser (.05 mf., 200 v.)	30-4519S
10	2nd I. F. Transformer	32-3266
11	Resistor (10 megs. ¼ watt)	33-610154
12	Mica Condenser (250 mmf.)	61-0033
13	Tubular Condenser (.004 mf., 400 v.)	30-45788
14	Volume Control	33-5331
15	Resistor (4.7 megs. ¼ watt)	33-547154
16	Resistor (1.5 meg. ¼ watt)	33-515154
17	Resistor (650 ohms ½ watt)	33-165326
18	Mica Condenser (.0005 mf.)	30-1114
19	Output Transformer	32-8062
20	Speaker	36-1481
	Cone Assembly (for Speaker 36-1481-3)	36-4121
21	Electrolytic Condenser	30-2396
22	Battery Cable	41-3487
23	Resistor (6800 ohms ¼ watt)	33-268154



INTERMEDIATE
FREQUENCY
455 K. C.

MODEL PT-66

Model PT-66 is a five tube, electric push-button tuning, superheterodyne radio with a manual tuning range covering 540 to 1580 K. C.

Six electric push-buttons are provided on this model. Five of the push-buttons are used for stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.

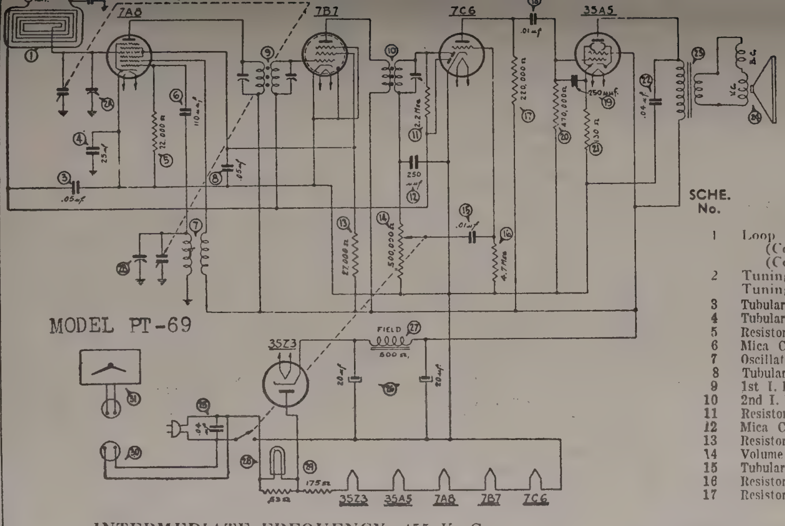
SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	32-3186
2	Tuning Condenser	31-2449
3	Tubular Condenser (.05 mf., 200 v.)	30-4519
4	Tubular Condenser (.25 mf., 400 v.)	30-4604
5	Resistor (22,000 ohms, ¼ watt)	33-322154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3152
8	Tubular Condenser (.05 mf., 200 v.)	30-4519
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ½ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-4479
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-4572
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-4119
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-9)	32-8044
	(for Speaker 36-1469-2)	32-8044
24	Speaker	36-1469
	Cone Assembly	
	(for Speaker 36-1469-9)	36-4113
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
25	Tubular Condenser (.04 mf., 400 v.)	30-4119
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil—Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Push Button Switch	42-1485
31	Padding Condenser Strip	31-6296

PHILCO RADIO & TELEVISION CORP.

MODEL PT-67
MODEL PT-69 (121, 122)

Several parts were changed in this model and the code number changed from 121 to 122. These changes are as follows:

	Code 121	Code 122
Dial	27-5554	27-5570
Instructions	39-6573	39-6712
Loop Aerial Ass'y	38-9858	32-3179
Tuning Condenser	31-2429	31-2448



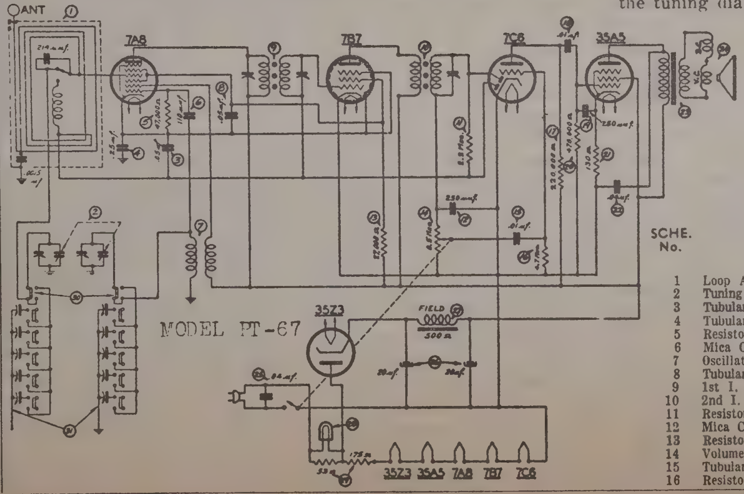
INTERMEDIATE FREQUENCY: 455 K. C.

MODEL PT-69

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	
	(Code 121)	38-9858
	(Code 122)	32-3179
2	Tuning Condenser (Code 121)	31-2429
	Tuning Condenser (Code 122)	31-2448
3	Tubular Condenser (.05 mf., 200 v.)	30-4519
4	Tubular Condenser (.25 mf., 400 v.)	30-4604
5	Resistor (22,000 ohms, ¼ watt)	33-322154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3182
8	Tubular Condenser (.05 mf., 200 v.)	30-4519
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ½ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-4479
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-4572
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-4119
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Speaker	36-1469
25	Tubular Condenser (.04 mf., 400 v.)	30-4119
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Connector Cable	41-3484
31	Complete Clock	
	(For 50 Cycle operation)	45-2778
	(For 60 Cycle operation)	45-2779

PRODUCTION CHANGE MODELS PT-67, PT-69

To stabilize the oscillator circuit and prevent oscillation at the high frequency end of the tuning dial, the oscillator grid leak was changed from 47000 ohms to 22000 ohms.



Model PT-67 is a five tube electric push-button tuning, superheterodyne radio with a manual tuning range covering 540 to 1580 K. C. on the broadcast band and 2.3 to 2.5 M. C. on the local police range.

Six electric push-buttons are provided on this model. Five push-buttons are used for selecting stations and one push-button for selecting dial tuning. The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.

MODEL PT-67

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	38-9937
2	Tuning Condenser	31-2437
3	Tubular Condenser (.05 mf., 200 v.)	30-4519S
4	Tubular Condenser (.25 mf., 400 v.)	30-4604S
5	Resistor (47,000 ohms, ¼ watt)	33-347154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3152
8	Tubular Condenser (.05 mf., 200 v.)	30-4519S
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ½ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-4479S
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-4572S
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-4119S
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Speaker	36-1469
25	Tubular Condenser (.04 mf., 400 v.)	30-4119S
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil ......Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Push Button Switch	42-1485
31	Padding Condenser Strip	31-6324

MODEL 40-74
MODEL 40-84

PHILCO RADIO & TELEVISION CORP.

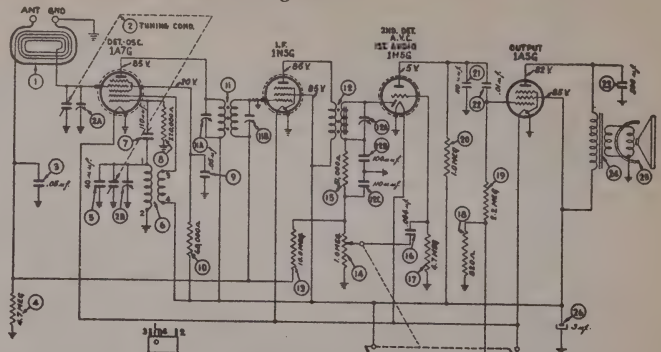
The R. F. and I. F. aligning procedure for this model is the same as that listed for Model 40-81 in Vol. XI with the exception of the padder numbers. Model 40-74 I. F. padders are 12A, 11B and 11A. The R. F. padder located on the bottom of the condenser and reached through the bottom of the cabinet are 2B oscillator and 2A (aerial).

BATTERY DRAIN:
"A" 200 M. A.; "B" 7.2 M. A.

TUNING RANGE:
530 to 1600 K. C.

TYPE OF CIRCUIT: Model 40-74 is a portable, four-tube, battery operated superheterodyne radio, designed with a built-in loop aerial. Connections are also provided for an external aerial and ground.

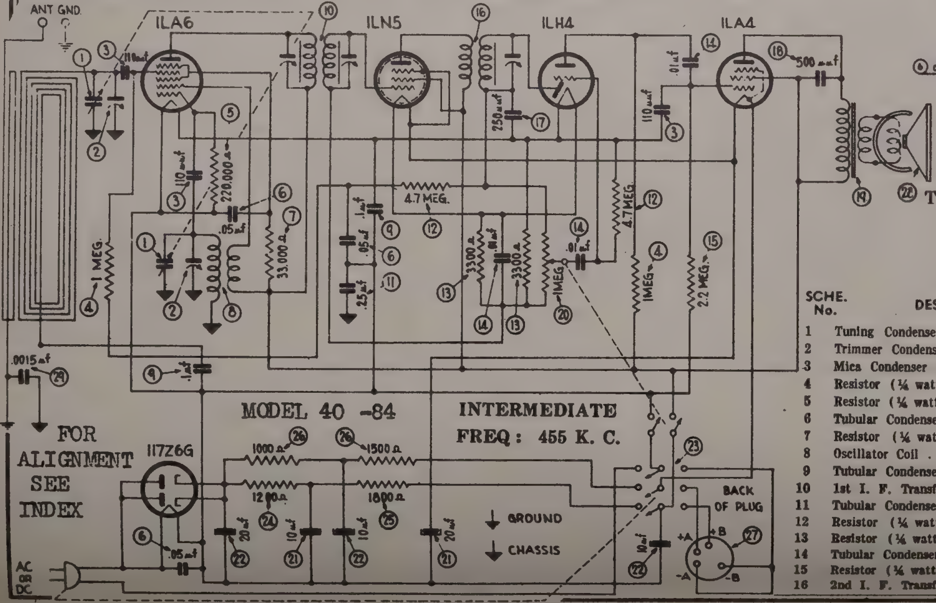
1	Loop Assembly	40-6421
2	Tuning Condenser	31-2403
3	Tubular Condenser (.05 mfd.)	30-4519
4	Resistor (4.7 meg., ½ watt)	33-547339
5	Mica Condenser (40 mmfd.)	30-1095
6	Oscillator Transformer	32-3274
7	Mica Condenser (110 mmfd.)	30-1031
8	Resistor (220,000 ohms, ½ watt)	33-422339
9	Tubular Condenser (.05 mfd.)	30-4444
10	Resistor (68,000 ohms, ½ watt)	33-368339
11	First I. F. Transformer Assembly	32-3103
12	Second I. F. Trans. Assembly	32-3176
12-C	Mica Conndenser (110 mmfd.)	30-1031
13	Resistor (10.0 meg., ½ watt)	33-610339
14	Volume Control (1.0 meg.)	33-5310
15	Resistor (51,000 ohms, ½ watt)	33-351339
16	Tubular Condenser (.004 mfd.)	30-4578
17	Resistor (4.7 meg., ½ watt)	33-547339
18	Resistor (820 ohms, ½ watt)	33-182339
19	Resistor (2.2 meg., ½ watt)	33-522339
20	Resistor (1.0 meg., ½ watt)	33-510339
21	Mica Condenser (110 mmfd.)	30-1031
22	Tubular Condenser (.01 mfd.)	30-4572
23	Mica Condenser (500 mmfd.)	30-1114
24	Output Transformer	32-8096
25	Cone and Voice Coil Assembly (Speaker Part No. 36-1482-3)	36-4121
26	Electrolytic Condenser (3 mfd.)	30-2359



SCHEMATIC DIAGRAM MODEL 40-74

Model 40-84 is a portable five (5) tube A.C.-D.C. power line or battery operated superheterodyne radio. This model covers a tuning frequency range of 540 K. C. to 1550 K. C.

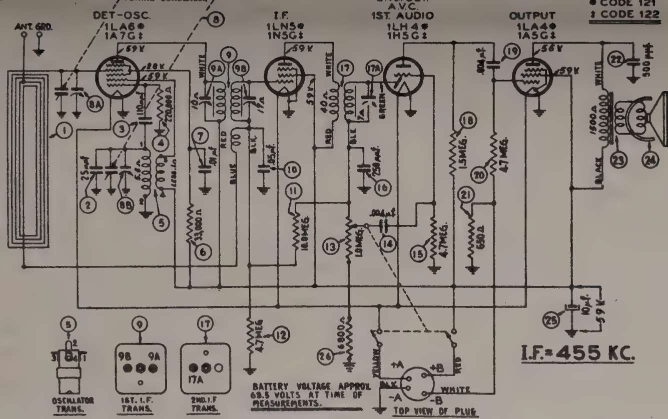
To operate the radio on 115 volt A.C. or D.C. power supply, insert the power line cord plug into the socket on the back of the chassis. This plug-in arrangement automatically disconnects the A.-B. battery from the circuits of the set.



SCHE. No.	DESCRIPTION	PART No.
1	Tuning Condenser	31-2438
2	Trimmer Condenser	31-6211
3	Mica Condenser	30-1130
4	Resistor (¼ watt, 1 meg.)	33-510154
5	Resistor (¼ watt, 220,000 ohms)	33-422154
6	Tubular Condenser (.05 mfd., 400 V.)	30-4518
7	Resistor (¼ watt, 33,000 ohms)	33-333154
8	Oscillator Coil	32-3385
9	Tubular Condenser (.1 mfd., 400 V.)	30-4455
10	1st I. F. Transformer	32-3384
11	Tubular Condenser (.25 mfd., 400 V.)	32-4448
12	Resistor (¼ watt, 4.7 megs.)	33-547154
13	Resistor (¼ watt, 10,000 ohms)	33-310154
14	Tubular Condenser (.01 mfd., 400 V.)	30-4572
15	Resistor (¼ watt, 2.2 meg.)	33-522154
16	2nd I. F. Transformer	32-3266
17	Mica Condenser (250 mmf.)	61-0033
18	Mica Condenser (500 mmf.)	30-1114
19	Output Transformer	32-8100
20	Volume Control	33-5375
21	Electrolytic Condenser (20-10 mfd., 150 V.)	30-2453
22	Electrolytic Condenser (10-10 mfd., 150 V.; 20 mfd., 25 V.)	30-2452
23	Automatic T. P. D. T. Switch	42-1553
24	Resistor (½ watt, 1200 ohms)	33-212334
25	Resistor (½ watt, 1800 ohms)	33-218334
26	Filament Resistor	33-3387
27	Battery Cable	41-3526
28	Speaker	36-1476
	Cone Assembly (for Speaker 36-1476-3)	36-4121
29	Tubular Condenser (.0015 mfd., 200 V.)	30-4555

PHILCO RADIO & TELEVISION CORP.

MODEL 40-81 (121, 122)
MODEL 40-81T, CSL
MODEL 40-82 (121)
MODEL 40-83



SCHEMATIC DIAGRAM MODEL 40-81 CODES 121 & 122.

Models 40-81, Codes 121 and 122 are 4 tube portable battery operated superheterodyne receivers. These receivers are similar with the exception of the type tubes used. Incorporated in the receivers is a self-contained loop aerial and an extremely sensitive permanent magnet field speaker. In addition terminals are provided for connection an outside aerial and ground. The receiver is operated from a self-contained A-B battery pack.

TUNING RANGE: 540 to 1550 K. C.

INTERMEDIATE FREQUENCY: 455 K. C.

SCHE. No.	DESCRIPTION	PART No.
1	Loop Assembly (Part of Cabinet)	10413A
2	Mica Condenser (15 mmfd.)	61-0038
3	Mica Condenser (110 mmfd.)	30-1031
4	Resistor (220,000 ohms, ½ watt)	33-422339
5	Oscillator Transformer	32-3277
6	Resistor (33,000 ohms, ½ watt)	33-333339
7	Tubular Condenser (.01 mfd.)	30-4572
8	Tuning Condenser Assembly	31-2432
9	1st I. F. Transformer Assembly	32-3265
10	Tubular Condenser (.05 mfd.)	30-4519
11	Resistor (10.0 meg., ½ watt)	33-610339
12	Resistor (4.7 meg., ½ watt)	33-547339
13	Volume Control and On-Off Switch	33-5331
14	Tubular Condenser (.004 mfd.)	30-4578
15	Resistor (4.7 meg., ½ watt)	33-547339
16	Mica Condenser (250 mmfd.)	61-0033
17	2nd I. F. Transformer Assembly	32-3266
18	Resistor (1.5 meg., ½ watt)	33-515339
19	Tubular Condenser (.004 mfd.)	30-4578
20	Resistor (4.7 meg., ½ watt)	33-547339
21	Resistor (650 ohms, ½ watt)	33-165326
22	Mica Condenser (500 mmfd.)	30-1114
23	Output Transformer	32-8062
24	Cone and Voice Coil Assembly (Speaker Part No. 36-1481-3)	36-4121
25	Electrolytic Condenser (10 mfd., 150 V.)	30-2396
26	Resistor (6800 ohms, ½ watt)	33-268339

DESCRIPTION	PART No.
Knobs (Volume and Tuning)	27-4876
Pointer	27-4891
Speaker	36-1481
Shield (Tube, Code 122)	56-1566
Sockets (Loktal, Code 121)	55-0575
Sockets (Octal, Code 122)	27-6133
Spring (Drive Cord)	28-8751
Tuning Shaft Assembly	38-9878

MODEL 40-82

Knobs	27-4876
Pointer	27-4891
Scale	27-5561
Tuning Condenser	31-2432
Grille Screen	56-1255
Cabinet	10450A

MODEL 40-81T, CSL

Cabinet	10413C
Dial	27-5561
Knob Assembly	27-4876
Pointer	27-4891

This model is the same as 40-81, Code 122, with the exception of the above parts.

FOR ALIGNMENT SEE INDEX

BATTERY CURRENT:
"A" Battery, 200 M. A.

"B" Battery, 5.6 M. A.

Model 40-82, Code 121, is a 4-tube portable battery operated superheterodyne radio and covers the standard broadcast frequency range from 540 to 1550 K. C. This Model is similar to Philco Model 40-81, Code 122, with the exception of the cabinet, and several of the replacement parts.

The following service data listed for Model 40-81, Code 122, also applies to Model 40-82, Code 121. The parts used in 40-82 which differ from those shown for Model 40-81, Code 122, are as follows:

Knobs	27-4876
Pointer	27-4891
Scale	27-5561
Tuning Condenser	31-2432
Grille Screen	56-1255
Cabinet	10450A

MODEL 40-83

Model 40-83 is similar to Model 40-81, Code 122, with the exception of the following parts:

Grille Screen	56-1539
Scale	27-5550
Pointer	56-1326

The service data listed for Model 40-81, Code 122, applies to Model 40-83.

MODEL 40-81, CODES 121-122

To improve the padding at 1500 K. C., condenser (2) 25 mmfd. Part No. 30-1137 changed to 15 mmfd. Part No. 61-0038.

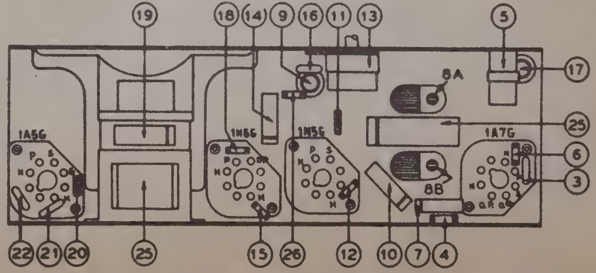
Tuning condenser, dial scale, and pointer changed on later production receivers. These changes are as follows:

		Early Production	Later Production
(8)	Tuning Condenser	31-2402	31-2432
	Dial Scale	27-5538	27-5561
	Pointer	56-1326	27-4891

MODEL 40-81, CODE 122

To improve the operating characteristics of the receiver at 550 K. C. and prevent oscillation the following items should be observed:

1. The loop wire going to the 1A7 grid, the wire from the 1A7 grid to the wiring panel and the wire from the tuning condenser antenna section lug to the wiring panel must be kept as far away from the 1A7 tube as is possible.
2. The second I. F. Shield must be tightly fastened to the sub-base so that no openings exist between the base and the bottom of the shield.



PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 40-81

MODEL 40-90
MODEL 40-95 (121, 122)

PHILCO RADIO & TELEVISION CORP.

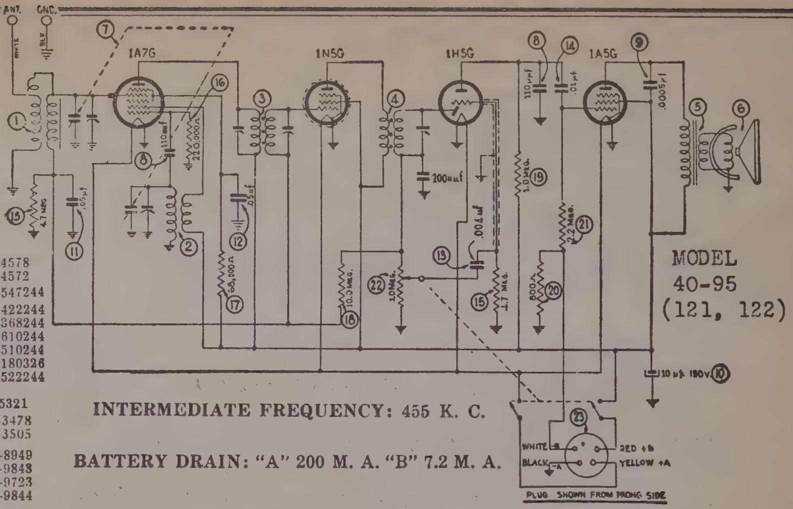
PRODUCTION CHANGES

The two codes of this model differ only in cabinets, speakers, and cables as shown below:

Code 121		Code 122
36-1477-3	Speaker	35-1488-3
36-4121	Cone Assembly	36-4129
41-3478	Battery Cable	41-3505
	Speaker Socket	27-6115
32-8051	Output Transformer	32-8051

MODEL 40-95

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3183
2	Oscillator Transformer	32-3184
3	1st I. F. Transformer	32-3198
4	2nd I. F. Transformer	32-3199
5	Output Transformer (Code 121)	32-8051
	Output Transformer (Code 122)	32-8051
6	Speaker (Code 121)	36-1477-3
	Speaker (Code 122)	36-1488-3
	Cone Assembly	
	(for Speaker 36-1477-3)	36-4121
	(for Speaker 36-1488-3)	36-4129
7	Tuning Condenser	31-2373
8	Moulded Mica Condenser (110 mmf.)	30-1031
9	Moulded Mica Condenser (500 mmf.)	30-1114
10	Electrolytic Condenser (10 mf., 150 v)	30-2396
11	Tubular Condenser (.05 mf., 200 v)	30-4519S
12	Tubular Condenser (.05 mf., 200 v)	30-4444
13	Tubular Condenser (.004 mf., 400v)	30-4578
14	Tubular Condenser (.01 mf.)	30-4572
15	Resistor (4.7 meg.. 1/3 watt)	33-547244
16	Resistor (220,000 ohms, 1/3 watt)	33-422244
17	Resistor (68,000 ohms, 1/3 watt)	33-368244
18	Resistor (10 meg., 1/3 watt)	33-610244
19	Resistor (1 meg., 1/3 watt)	33-510244
20	Resistor (800 ohms, 1/2 watt)	33-180326
21	Resistor (2.2 meg., 1/3 watt)	33-522244
22	Volume Control	
	(1 meg., with D.P.S.T. Switch)	33-5321
23	Battery Cable (Code 121)	41-3478
	Battery Cable (Code 122)	41-3505
	Flag Arm Spring	28-8949
	Flag Arm Transfer Lever Assembly	38-9843
	Flag Cam Assembly	38-9723
	Flag Assembly	38-9844



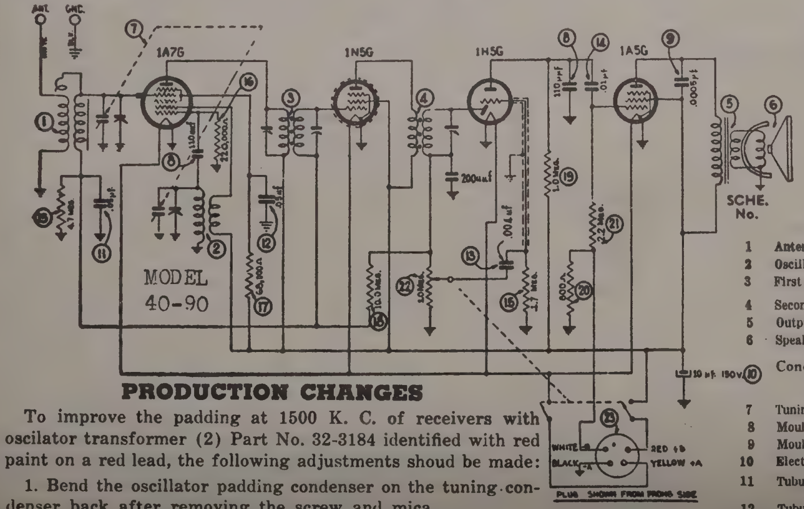
INTERMEDIATE FREQUENCY: 455 K. C.

BATTERY DRAIN: "A" 200 M. A. "B" 7.2 M. A.

Model 40-95 is a four (4) tube battery operated superheterodyne radio covering a tuning frequency range from 540 to 1720 K. C.

FOR ALIGNMENT, SEE INDEX

Model 40-90 is a four (4) tube battery operated superheterodyne radio covering a tuning frequency range from 540 to 1720 K. C.



SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3183
2	Oscillator Transformer	32-3184
3	First I. F. Transformer	32-3180
4	Second I. F. Transformer	32-3181
5	Output Transformer	32-8051
6	Speaker	36-1476
	Cone Assembly	
	(for Speaker 36-1476-3)	36-4121
7	Tuning Condenser	32-2372
8	Moulded Mica Condenser (110 mmf.)	30-1031
9	Moulded Mica Condenser (500 mmf.)	30-1114
10	Electrolytic Condenser (10 mf., 150 v.)	30-2396
11	Tubular Condenser (.05 mf., 200 v.)	30-45198
12	Tubular Condenser (.05 mf., 200 v.)	30-4444
13	Tubular Condenser (.004 mf., 400 v.)	30-4578
14	Tubular Condenser (.01 mf.)	30-4572
15	Resistor (4.7 meg., 1/3 watt)	33-547244
16	Resistor (220,000 ohms, 1/3 watt)	33-422244
17	Resistor (68,000 ohms, 1/3 watt)	33-368244
18	Resistor (10 meg., 1/3 watt)	33-610244
19	Resistor (1 meg., 1/3 watt)	33-510244
20	Resistor (800 ohms, 1/2 watt)	33-180326
21	Resistor (2.2 meg., 1/3 watt)	33-522244
22	Volume Control	
	(1 meg., with D.P.S.T. Switch)	33-5312
23	Battery Cable	41-3477
	Flag Arm Spring	28-8947
	Flag Cam Assembly	38-9723
	Flag Assembly	38-9838

PRODUCTION CHANGES

To improve the padding at 1500 K. C. of receivers with oscilator transformer (2) Part No. 32-3184 identified with red paint on a red lead, the following adjustments shoud be made:

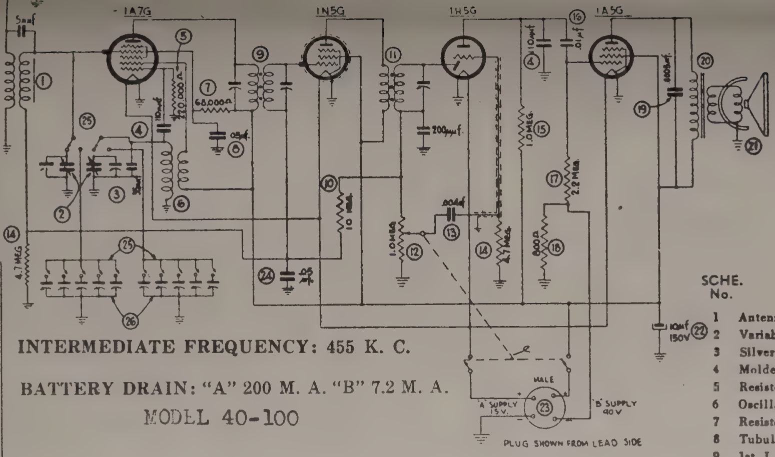
1. Bend the oscillator padding condenser on the tuning condenser back after removing the screw and mica.
2. Set the top of the pointer even with the bottom of the 1500 K. C. division line with set tuned to 1500 K. C.

INTERMEDIATE FREQUENCY: 455 K. C.

Battery Drain "A" 200 M. A. "B" 7.2 M. A.

Model 40-100 is a four (4) tube battery operated superheterodyne receiver with electric push-button tuning. This model covers a tuning frequency range of 540 to 1720 K. C. Features of design included in this model are: low current drain tube; automatic volume control and pentode audio output. The differences in the "codes" of this model are in the cabinets. Code 121 is assembled in a table model cabinet and Code 122 in a floor model.

ELECTRIC PUSH-BUTTON TUNING: Five (5) push-buttons are used for the broadcast stations and one push-button for selecting "dial tuning." The push-buttons cover a frequency range as follows: 540 to 1600 kilocycles.



INTERMEDIATE FREQUENCY: 455 K. C.

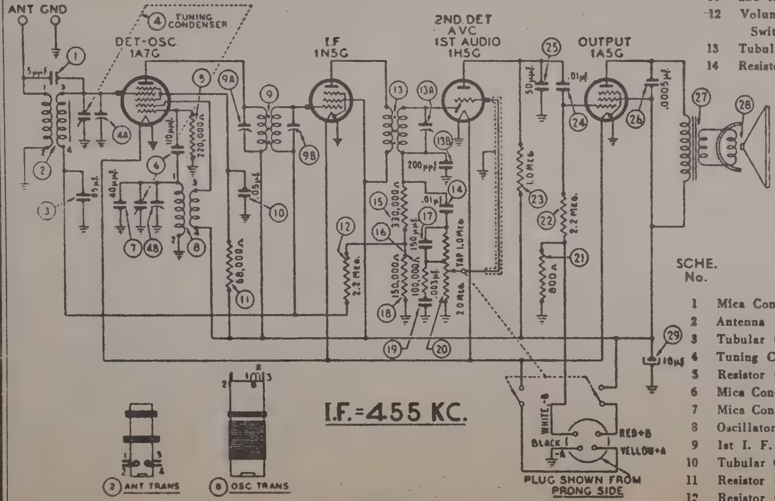
BATTERY DRAIN: "A" 200 M. A. "B" 7.2 M. A.

MODEL 40-100

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3248
2	Variable Condenser	31-2384
3	Silver Mica Condenser	30-1113
4	Molded Mica Condenser (110 mmf.)	30-1031
5	Resistor (220,000 ohms., ⅛ watt)	33-422244
6	Oscillator Transformer	32-3214
7	Resistor (68,000 ohms., ⅛ watt)	33-368244
8	Tubular Condenser (.05 mf., 200 v.)	30-4444
9	1st I. F. Transformer	32-3198
10	Resistor (10 meg., ⅛ watt)	33-610244
11	2nd I. F. Transformer	32-3199
12	Volume Control (1 meg. and D. P. S. T. Switch)	33-5321
13	Tubular Condenser (.004 mf., 400 v.)	30-4578
14	Resistor (4.7 meg., ⅛ watt)	33-547244
15	Resistor (1 meg., ⅛ watt)	33-510244
16	Tubular Condenser (.01 mf., 400 v.)	30-4572
17	Resistor (2.2 meg., ⅛ watt)	33-522244
18	Resistor (800 ohms., ½ watt)	33-180326
19	Molded Mica Condenser (500 mmf.)	30-1114
20	Output Transformer	32-8051
21	Speaker	36-1477
22	Electrolytic Condenser (10 mf., 150 v.)	30-2396
23	Battery Cable	41-3478
24	Tubular Condenser (.05 mf., 200 v.)	30-4519S
25	Push Button Switch	42-1835
26	Push Button Condenser Strip	31-6309
..	Flag Arm Spring	28-8949
..	Flag Arm Transfer Lever Assembly	38-9843
..	Flag Cam Assembly	38-9723
..	Flag Assembly	38-9844

FOR ALIGNMENT AND TUNER, SEE INDEX

Model 40-105 is a four (4) tube battery operated superheterodyne radio covering a tuning frequency range from 540 to 1720 K. C.



SCHEMATIC DIAGRAM MODEL 40-105

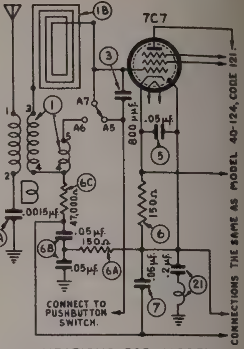
BATTERY CURRENT DRAIN: "A" 200 M. A. "B" 8 M. A.

SCHE. No.	DESCRIPTION	PART No.
1	Mica Condenser (5 mmf.)	30-1097
2	Antenna Transformer	32-3248
3	Tubular Condenser (.05 mfd.)	30-4519
4	Tuning Condenser Assembly	31-2384
5	Resistor (220,000 ohms, ½ watt)	33-422339
6	Mica Condenser (110 mmf.)	30-1130
7	Mica Condenser (40 mmf.)	30-1132
8	Oscillator Transformer	32-3214
9	1st I. F. Transformer Assembly	32-3198
10	Tubular Condenser (.05 mf.)	30-4444
11	Resistor (68,000 ohms, ½ watt)	33-368339
12	Resistor (2.2 megs., ½ watt)	33-522339
13	2nd I. F. Transformer Assembly	32-3199
14	Tubular Condenser (.01 mf.)	30-4572
15	Resistor (330,000 ohms, ½ watt)	33-433339
16	Resistor (100,000 ohms, ½ watt)	33-410339
17	Mica Condenser (150 mmf.)	30-1033
18	Resistor (150,000 ohms, ½ watt)	33-415339
19	Tubular Condenser (.003 mf.)	30-4469
20	Volume Control (2.0 meg.)	33-5326
21	Resistor (800 ohms, ½ watt)	33-180326
22	Resistor (2.2 meg., ½ watt)	33-522339
23	Resistor (1.0 meg., ½ watt)	33-510339
24	Tubular Condenser (.01 mf.)	30-4572
25	Mica Condenser (50 mmf.)	30-1029
26	Mica Condenser (.0005 mf.)	30-1114
27	Output Transformer	32-7984
28	Speaker	36-1410
29	Electrolytic Condenser (10 mf., 150 v.)	30-2396

SETTING AND OPERATING ELECTRIC PUSH-BUTTON TUNING

In order to adjust the electric automatic tuning push-button accurately for reception of broadcast stations, a signal generator, such as Philco Model 077, and a padding screw driver, Philco Part No. 45-2610, are required. With this equipment at hand, proceed as follows: —

1 — Select five (5); seven (7) or eight (8) of the most popular stations received in the locality (depending on the number of push-buttons on the model to be adjusted). Insert the station call letters into the windows above the buttons. The station with the lowest frequency is placed in the first button on the left and the highest frequency station in the extreme right button. Each push-button is adjusted by two set screws. These set screws are located on the rear of the chassis or push-button unit. Each set of screws is numbered and covers a frequency range as follows: —



CONNECTIONS FOR MODEL 40-124 CODE 122.

FREQUENCY RANGES OF PUSH-BUTTONS

Models 40-100, 40-110

Push-Button	Frequency Range
1	540-1030 K. C.
2	650-1100 K. C.
3	650-1100 K. C.
4	740-1240 K. C.
5	1160-1600 K. C.
6	Dial

Models 40-195, 40-200

Push-Button	Frequency Range
1, 2, 3	540-1030 K. C.
4, 5	670-1160 K. C.
6, 7, 8	900-1600 K. C.

Models 40-160, 40-165

Push-Button	Frequency Range
1	540-1000 K. C.
2	650-1100 K. C.
3	740-1300 K. C.
4	900-1500 K. C.
5	1100-1600 K. C.

Models 40-124, 40-125, 40-135, 40-145, 40-503, 40-506, 40-507, 40-525 (121), 40-526 (121)

Push-Button	Frequency Range
1	540-1030 K. C.
2	650-1100 K. C.
3	740-1240 K. C.
4	900-1470 K. C.
5	1160-1600 K. C.
6	Dial

Models 40-150, 40-155, 40-180, 40-185, 40-190, 40-508, 40-509

Push-Button	Frequency Range
1, 2, 3	540-1060 K. C.
4, 5	650-1110 K. C.
6, 7	920-1600 K. C.

Looking at the front of the cabinet, the first button on the left is adjusted by "Osc." and Ant." set screws No. 1; the next push-button by "Osc." and "Ant." set screws No. 2, and the remaining push-buttons in order.

2 — Turn the receiver "on" and set the "Tuning Range Selector" or push-button for "Dial" tuning.

3 — Set up the Model 077 signal generator about 3 feet from the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the "high" and "ground" output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "Mod. ON".

4 — Manually tune in on the radio the first station to be set up; (usually No. 1 push-button first). After doing this, set the indicator of the 077 signal generator to the frequency of the station being received. As the indicator approaches the frequency of the station, a whistle will be heard; leave the indicator at this point.

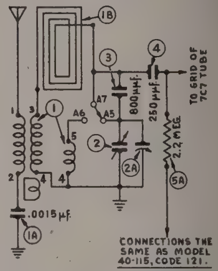
5 — Turn the receiver tuning range selector to "push-button" and press in No. 1 button. (Models without a tuning range selector, simply press in push-button to be set up). Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; then turn signal generator indicator off the frequency of the station.

6 — Readjust No. 1 "Osc." and "Ant." screws until the station is heard clearly and distinctly. The adjustment of No. 1 push-button is then complete. After setting up the first station the same procedure as outlined above is used for the remaining stations.

While the above procedure is satisfactory in setting up push-buttons for stations, a very accurate adjustment can be obtained with a vacuum tube voltmeter. The instructions for using a vacuum tube voltmeter will be found on page 10 under "Using Vacuum Tube Voltmeter for Aligning Compensators and Adjusting Push-Buttons."

When any of these models are to be set up to receive the sound of a television program, tuned in by special type Philco television sets, or if they are to be used in conjunction with a Philco Record Player, push-button No. 1 should be used. To adjust the push-button on these instruments, the same procedure as outlined above is used.

Further details for setting up this receiver for operation with Philco Television sets and Record Players are supplied with the instruments.



CONNECTIONS FOR MODEL 40-115 CODE 122.

FEBRUARY, 1940.

MODEL 40-115, CODE 122

Model 40-115, Code 122, is similar to Code 121 with the addition of a loop aerial mounted inside the cabinet and several part changes in the aerial circuit. These changes are shown in the following circuit diagram and parts list. The service information in RIDER MANUAL VOL. XI for Model 40-115, Code 121, with these changes, applies to Model 40-115, Code 122.

SCHEMATIC NUMBER	DESCRIPTION	PART No. CODE 122
1	Antenna Transformer	32-3404
1A	Tubular Condenser (.0015 mfd.)	30-4555
1B	Loop Assembly	32-3405
2	Tuning Condenser	31-2450
3	Mica Condenser (800 mmfd.)	30-1135
	Cabinet	10432B

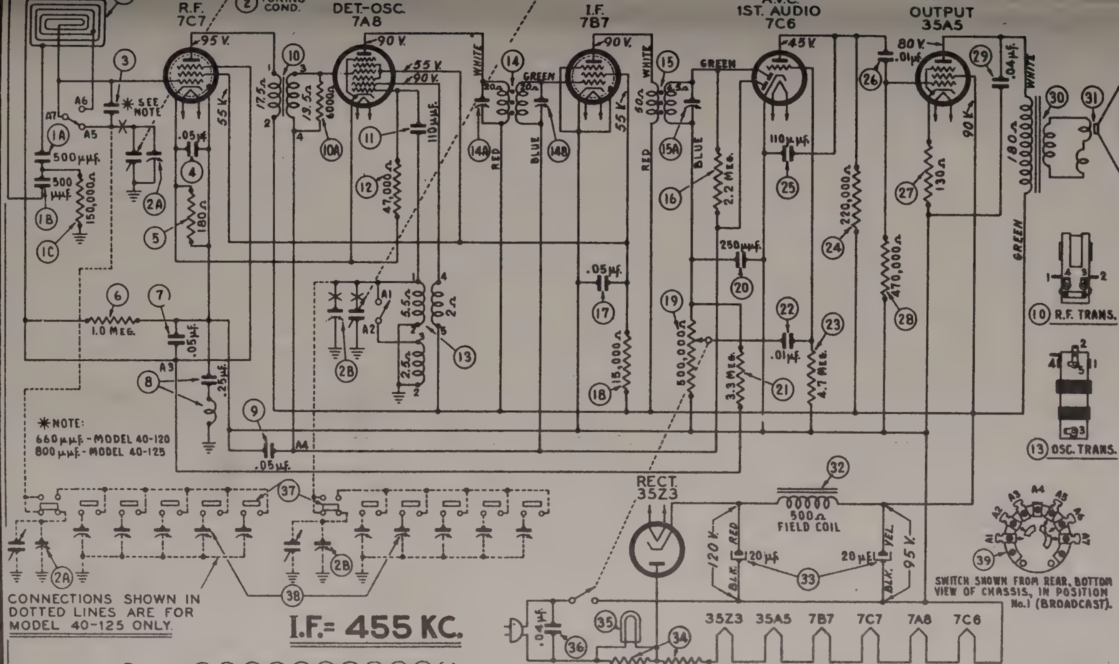
MODEL 40-124, CODE 122

Model 40-124, Code 122, is similar to Code 121 with the addition of a loop aerial mounted inside the cabinet and several part changes in the aerial circuit. These changes are shown in the following circuit diagram and parts list. The service information in RIDER'S VOLUME XI, for Model 40-124, Code 121, with these changes, applies to Model 40-124, Code 122.

SCHEMATIC NUMBER	DESCRIPTION	PART No. CODE 122
1	Antenna Transformer	32-3404
1A	Tubular Condenser (.0015 mfd.)	30-4555
1B	Loop Assembly	32-3411
2	Tuning Condenser	31-2450
3	Mica Condenser (800 mmfd.)	30-1135
4	Not used.	
5	Tubular Condenser (.05 mfd.)	30-4519
6	Resistor (150 ohm, ⅓ watt)	33-115336
6A	Resistor (150 ohm, ⅓ watt)	33-115336
6B	Tubular Condenser (.05, .05 mfd.)	30-4522
6C	Resistor (47,000 ohms, ⅓ watt)	33-347339
7	Tubular Condenser (.05 mfd.,	30-4519
21	Choke and Condenser Assembly (.2 mfd.)	76-1034

PHILCO RADIO & TELEVISION CORP.

MODELS 40-120
40-125



✱NOTE:
660µµf.-MODEL 40-120
800µµf.-MODEL 40-125

CONNECTIONS SHOWN IN DOTTED LINES ARE FOR MODEL 40-125 ONLY.

I.F.= 455 KC.

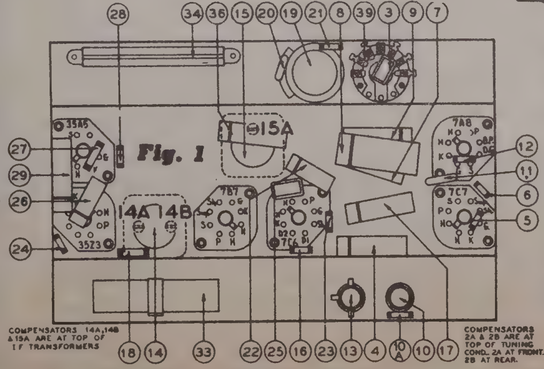


Fig. 1

COMPENSATORS 14A, 14B & 15A ARE AT TOP OF I F TRANSFORMERS

COMPENSATORS 2A & 2B ARE AT TOP OF TUNING COND. 2A AT FRONT. 2B AT REAR.

NO.	DESCRIPTION	NO.
1	Loop Antenna Assy. (Model 40-120)	38-9889
	(Model 40-125)	38-9890
1A	Mica Cond. (500 mmfd.)	30-1114
1B	Mica Cond. (500 mmfd.)	30-1114
1C	Resistor (150,000 ohms, ½ watt)	33-415339
2	Tuning Cond. Assy. (Model 40-120)	31-2386
	(Model 40-125)	31-2397
3	Mica Cond.	
	(660 mmfd., Model 40-120)	30-1136
	(800 mmfd., Model 40-125)	30-1135
4	Tubular Cond. (.05 mfd.)	30-4519
5	Resistor (180 ohms, ½ watt)	33-118339
6	Resistor (1.0 meg., ½ watt)	33-510339
7	Tubular Cond. (.05 mfd.)	30-4519
8	Tubular Cond. & Choke Assy. (.25 mfd.)	38-9851
9	Tubular Cond. (.05 mfd.)	30-4519
10	R. F. Trans. Assy.	32-3273
10A	Resistor (6000 ohms, ½ watt)	33-260339
11	Mica Cond. (110 mmfd.)	30-1130
12	Resistor (47,000 ohms, ½ watt)	33-347339
13	Oscillator Trans. (Model 40-120)	32-3255
	(Model 40-125)	32-3256
14	1st I. F. Trans. Assy.	32-3237
15	2nd I. F. Trans. Assy.	32-3238
16	Resistor (2.2 meg., ½ watt)	33-522339
17	Tubular Cond. (.05 mfd.)	30-4519
18	Resistor (15,000 ohms, ½ watt)	33-315339
19	Volume Control & On-Off Switch	33-5306
20	Mica Cond. (250 mmfd.)	30-1074
21	Resistor (3.3 meg., ½ watt)	33-533339
22	Tubular Cond. (.01 mfd.)	30-4479
23	Resistor (4.7 meg., ½ watt)	33-547339
24	Resistor (220,000 ohms, ½ watt)	33-422339
25	Mica Cond. (110 mmfd.)	30-1130
26	Tubular Cond. (.01 mfd.)	30-4572
27	Resistor (130 ohms, ½ watt)	33-113336
28	Resistor (470,000 ohms, ½ watt)	33-447339
29	Tubular Cond. (.04 mfd.)	30-4119
30	Output Trans.	
	(Spkr. Part No. 36-1469-1)	32-8047
	(Spkr. Part No. 36-1469-9)	32-8044
31	Cone & Voice Coil Assy.	
	(Spkr. Part No. 36-1469-1)	36-4115
	(Spkr. Part No. 36-1469-9)	36-4113
32	Field Coil	
	(Replace Spkr. Part No. 36-1469)	
33	Electrolytic Cond. (20-20 mfd.)	30-2403
34	Filament Resistor	33-3375
35	Pilot Lamp	34-2068
36	Tubular Cond. (.04 mfd.)	30-4119
37	Push Button Switch (Model 40-125)	42-1512
38	Padder Strip (Model 40-125)	31-6312
39	Wave Switch	42-1506
	Cable & Plug (Power Supply)	L-3199
	Cabinet (Model 40-120)	10389A
	Clip (Coil Mtg.)	28-5002
	Dial	27-5517
	Drive Cord Assy.	31-2387
	Drive Shaft Assy.	31-2370
	Knobs (Volume-Tuning-Wave Switch)	27-4809
	Pilot Lamp Socket Assy.	38-9825
	Pointer (Dial)	27-4845
	Pointer (Knob)	56-1465
	Spring (Drive Cord Assy.)	28-8954
	Speaker Assy.	36-1469
	Sockets (Loktal)	55-0575

MISCELLANEOUS PARTS—MODEL 40-125

DESCRIPTION	NO.
Cabinet	10390A
Escutcheon Plate (Pushbutton)	28-8742
Escutcheon Pins	W-1074
Knobs (Pushbutton)	27-4824
Tab (Dial)	27-5536
Tab Kit	40-6473

Models 40-120 and 40-125 are six (6) tube super-heterodyne receivers employing the new Philco built-in super aerial system which eliminate an outside aerial, and Philco High-Efficiency Loktal tubes. In addition, other features of design are: two tuning ranges; special high gain R. F. stage; automatic volume control and a Beam power audio output stage. In general, these models are similar but differ in their tuning mechanisms and cabinets.

Model 40-120 is dial tuned and assembled in cabinet type "C".

Model 40-125 is equipped with six electric push buttons for automatically selecting stations in addition to dial tuning. Five push buttons are used for stations one of which can be used in combination with a Special type PHILCO TELEVISION receiver for reception of television sound programs. The sixth push button selects dial tuning.

FOR ALIGNMENT AND
TUNER, SEE INDEX

TUNING RANGE:

540 to 1600 K. C. 1.6 to 3.3 M. C.

POWER SUPPLY: 115 volts A. C. or D. C. current.

POWER CONSUMPTION: 28 watts.
AUDIO OUTPUT: 1 watt.

ALIGNING PROCEDURE

MODELS 40-81, 40-82, 40-83, 40-84, 40-88, 40-90, 40-95, 40-100, 40-105, 40-110

CONNECTING THE ALIGNING METERS

Audio Output Meter: If an audio output meter is used, connect it across the plate and screen terminals of the output tubes. Adjust the meters to use the 0 to 10 scale.

Vacuum Tube Voltmeter: If a vacuum tube voltmeter is used as an aligning indicator, the negative (—) terminal is connected to the A. V. C. circuit of the receiver through a 2 meg. resistor. The positive (+) terminal is connected to the chassis or ground.

Signal Generator: When adjusting the I. F. padders the high side of the signal generator is connected through a .1 mfd. condenser to the loop tuning condenser stator lug which connects to the grid of the first tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders of the portable models a loop aerial is made from a few turns of wire and connected to the signal generator output terminals. The signal generator is then placed a few feet from the set. The loop aerial of the receiver must be assembled in the cabinet, together with the battery when adjusting the R. F. padders. The R. F. padding condensers can be reached from the bottom of the cabinet.

When aligning the R. F. padders of the battery models using an aerial, connect the signal generator as given in the column "Output Connections to Receiver" with a dummy aerial as indicated.

Models 40-81, Codes 121, 122, 40-82, 40-83, 40-84, PT-63 , 40-74

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1	See Paragraph on Signal Generator above	455 K. C.	580 K. C.	Vol. Max.	17A, 9B, 9A	See Paragraph on Signal Generator above
2	Use Loop on Generator	1500 K. C. 1400KC (40-84)	1500 K. C. 1400KC (40-84)	Vol. Max.	8B, 8A	Padder location Fig. 1 Note A

Model 40-88, Code 121

1	See Signal Generator Paragraph above	455 K. C.	580 K. C.	Vol. Max.	21A, 20B, 20A	
2	Use Loop on Generator	18 M. C.	18 M. C.	Vol. Max. Range Switch "S. W."	8B	Note A
3	Use Loop	1400 K. C.	1400 K. C.	Range Switch "Brdcst"	12, Screw, 8A	
4	Use Loop	580 K. C.	580 K. C.	Range Switch "Brdcst"	12A, Nut	Roll Tuning Condenser
5	Use Loop	1400 K. C.	1400 K. C.	Range Switch "Brdcst"	12, Screw, 8A	
6	Use Loop	18 M. C.	18 M. C.	Range Switch "S. W."	3	See Paragraph on Signal Generator above

Model 40-90

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Aerial	Dial Setting	Dial Setting	Control Setting	Adjust Padders	
1	1A7 Grid	.004 mfd.	455 K. C.	580 K. C.	Vol. Max.	On 1st and 2nd I. F. Trans.	Note B
2	Aerial	225 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	Osc. Ant. on Tuning Conds.	Note B Note A

Models 40-95, 40-100, 40-105

1	1A7 Grid	.004 mfd.	455 K. C.	580 K. C.	Vol. Max.	On 1st and 2nd I. F. Trans.	Note B
2	Aerial	225 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	Osc. Ant. on Tuning Conds.	Note B Note A

Model 40-110

1	Aerial	Note A	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	18A, 17A, 17B	Manual Push-button "IN"
2	Aerial	400 ohms	18 M. C.	18 M. C.	Vol. Max. Range Switch "S. W."	4A	Note B
3	Aerial	225 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	7 screw, 4B	Note B
4	Aerial	225 mmfd.	580 K. C.	580 K. C.	Range Switch "Brdcst"	7A (nut)	Roll Tuning Condenser
5	Aerial	400 ohms	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	7 screw	

NOTE A — DIAL CALIBRATION: Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity) set the dial pointer on the small dot below 550 K. C.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontal at the low frequency end of the scale (530 K. C.).

PRODUCTION CHANGES

MODEL 40-120

Tuning condenser (2) changed from Part No. 31-2388 to Part No. 31-2423. The new condenser uses a rear mounting grommet, Part No. 27-4610, and sleeve, Part No. 28-5583.

MODEL 40-125

Tuning condenser (2) changed from Part No. 31-2397 to Part No. 31-2424. The new condenser uses a rear mounting grommet, Part No. 27-4610, and sleeve, Part No. 28-5583.

MODELS 40-120 and 40-125

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	7C7 See Note C	.1 mf.	455 K. C.	580 K. C.	Vol. Cont. Max.	14A, 14B, 15A	Push "IN" Manual Button Model 40-125
2	Ant. Ter.	10 mmf.	1600 K. C.	1600 K. C.	Vol. Cont. Max.	2B	See Note B See Note C
3	Ant. Ter.	10 mmf.	1400 K. C.	1400 K. C.	Vol. Cont. Max.	2A	

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (High side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontal at the low frequency end of the scale (540 K. C.).

NOTE C — Compensators 2A and 2B are at the top of the tuning condenser. Compensator 2A is on the front section and compensator 2B on the rear section. When padding the I. F. the signal generator can be attached to the 7C7 grid on the front section of the tuning condenser.

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER—To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I. F. Circuit.

Remove the 1232 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire (light color) which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R. F. Circuit.

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 output tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram, page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders that the receiver be left in the cabinet.

MODELS 40-150, 40-155 40-180,–185,–190

Operations	SIGNAL GENERATOR		RECEIVER			Remarks
	Output Connections	Dial Frequency	Dial Frequency	Control Settings	Adjust Compensators for Max. Signal	
1	High Side to No. 1 Ter. Loop Panel	I. F. 455 K. C.	580 K. C. No Signal	Range Sw. "Brdcst." Volume "Max." Push-Button "Dial"	37A, 30, 30A	See Note A.
2	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW." Volume "Max." Push-Button "Dial."	21A	Note B. Note D.
3	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdcst." Volume "Max."	19A, 21B	
4	Use Loop on Generator	580 K. C.	580 K. C.	Range Sw. "Brdcst." Volume "Max."	19	Roll Cond. Note C.
5	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdcst." Volume "Max."	19A, 21B	Roll Cond. Note C.
6	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW."	3	Roll Cond. Note C.

NOTE A—A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic diagram.

NOTE C—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges: the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

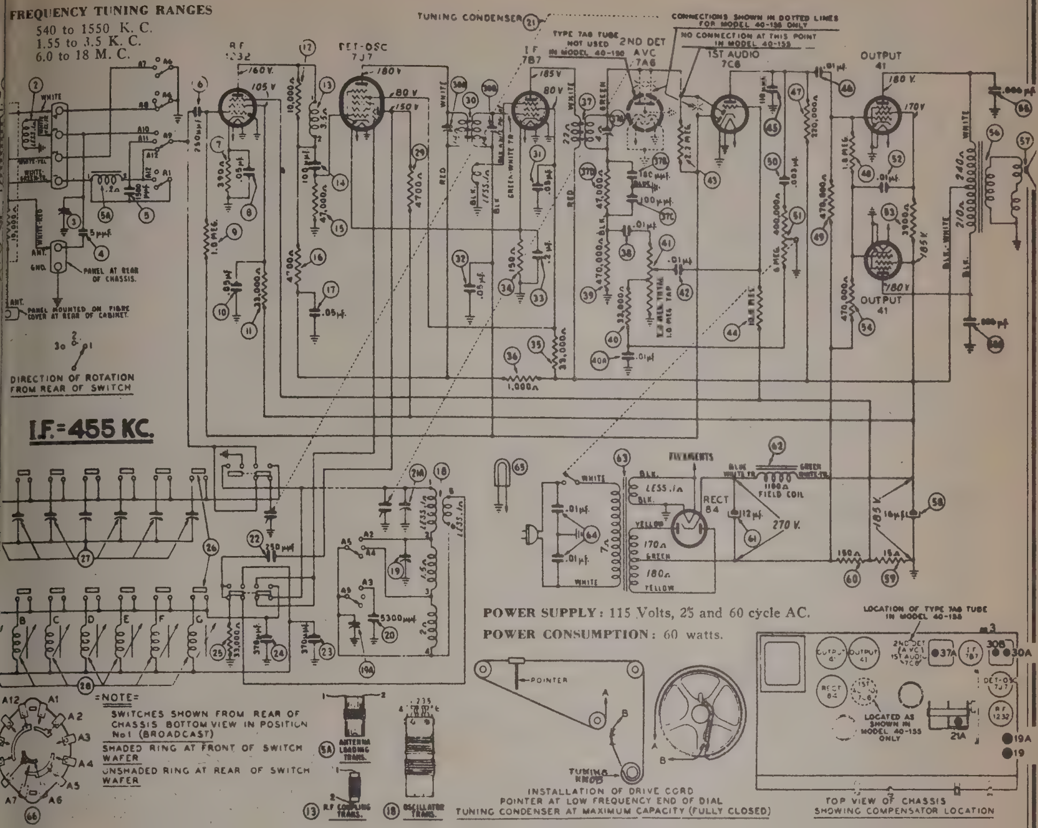
NOTE D—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

PHILCO RADIO & TELEVISION CORP.

MODELS 40-150
40-155

FREQUENCY TUNING RANGES
540 to 1550 K. C.
1.55 to 3.5 K. C.
6.0 to 18 M. C.


TUNING CONDENSER
CONNECTIONS SHOWN IN DOTTED LINES FOR MODEL 40-155 ONLY
NO CONNECTION AT THIS POINT IN MODEL 40-155
TYPE 7A6 TUBE NOT USED IN MODEL 40-150
R F 1232
DET-OSC 7J7
I F 7B7
2ND DET AVC 7A6
1ST AUDIO 7C6
OUTPUT 41
OUTPUT 41
ANT.
GND.
PANEL AT REAR OF CHASSIS
PANEL MOUNTED ON FIBRE COVER AT REAR OF CABINET
DIRECTION OF ROTATION FROM REAR OF SWITCH
I.F.=455 KC.
FILAMENTS
FIELD COIL
RECT 84
270 V.
=NOTE=
SWITCHES SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION No1 (BROADCAST)
SHADED RING AT FRONT OF SWITCH WAFER
UNSHADED RING AT REAR OF SWITCH WAFER
ANTENNA LOADING TRANS.
R.F. COUPLING TRANS.
OSCILLATOR TRANS.
POINTER
TUNING KNOB
INSTALLATION OF DRIVE CORD
POINTER AT LOW FREQUENCY END OF DIAL
TUNING CONDENSER AT MAXIMUM CAPACITY (FULLY CLOSED)
LOCATION OF TYPE 7A6 TUBE IN MODEL 40-155
LOCATED AS SHOWN IN MODEL 40-155 ONLY
TOP VIEW OF CHASSIS SHOWING COMPENSATOR LOCATION

POWER SUPPLY: 115 Volts, 25 and 60 cycle AC.

POWER CONSUMPTION: 60 watts.

Fig. 1. Schematic diagram, models 40-150, 40-155

Each model is equipped with eight electric tuning push buttons for
tomatically selecting stations. Six of the push buttons are used for
oadcast stations, one for selecting dial tuning and one push button may be set up for use with a Philco Record Player or in combination with Philco Television sets for reception of television sound programs.

In general, these models are similar with the exception of the number of tubes used and cabinet design. Model 40-150 employs seven (7) tubes and Model 40-155, eight (8) tubes.

PRODUCTION CHANGES

MODEL 40-150

ginning with Run 1 receivers the converter tube was changed from a
oktal type to a 6J8G octal type. Tube sockets changed from Part 27-6129
to 27-6120 octal.

n 2 — New resistor Part No. 33-115339, 150 ohms connected in series
6J8G tube plate. Change made to stabilize oscillator action at 18 M. C.
hode resistor (34) changed from Part No. 33-115339 to 33-115336.
ver transformer Part No. changed from 32-8065 to 32-8052.

n 3 — Receivers marked with this run number have the converter changed
a 6J8G to a 7J7 loktal type tube as indicated in Service Bulletin. When
hange was made, the resistor Part No. 33-115336 in Run 2 was removed.
rtwave loop changed from Part No. 38-9884 to 38-9935.

MODEL 40-155

n 1 — Beginning with Run 1 receivers the converter tube was changed
a 7J7 loktal type to a 6J8G octal type. Tube sockets changed from
27-6129 (loktal) to 27-6120 octal.
rtwave loop (2) changed from Part No. 38-9884 to Part No. 38-9335.

n 2 — New resistor Part No. 33-115339, 150 ohms connected in series
6J8G tube plate. Change made to stabilize oscillator action at 18 M. C.
hode resistor (34) Part No. 33-115339 changed to wirewound type
No. 33-115336.
ver transformer changed from Part No. 32-8065 to Part No. 32-8052.

n 3 — Receivers marked with this run number have the converter tube
ed from a type 6J8G octal tube to a 7J7 loktal tube. When this
e was made the resistor Part No. 33-115339 added in Run 2 was removed.

MODELS 40-150, 40-155

prevent oscillation at the low end of the broadcast band the 2nd I. F.
ormer (37) changed from Part No. 32-3246 to Part No. 32-3383.
p assembly (1) (Broadcast) Part No. 38-9894 is changed to Part No.
94, a production design change.
e physical location of condenser (4) as shown in Fig. 2 of the service
in has been changed to prevent oscillation at 540 K. C. The condenser
w wired to a three lug wiring panel between the range switch and
e control. The antenna lead is connected to one lug of this panel.
change is made on all sets marked Run No. 6.

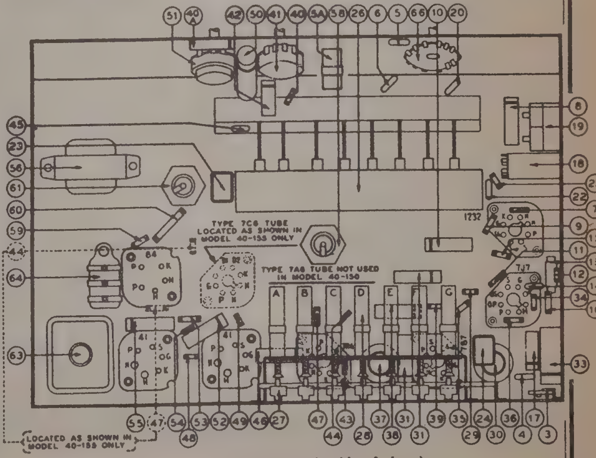
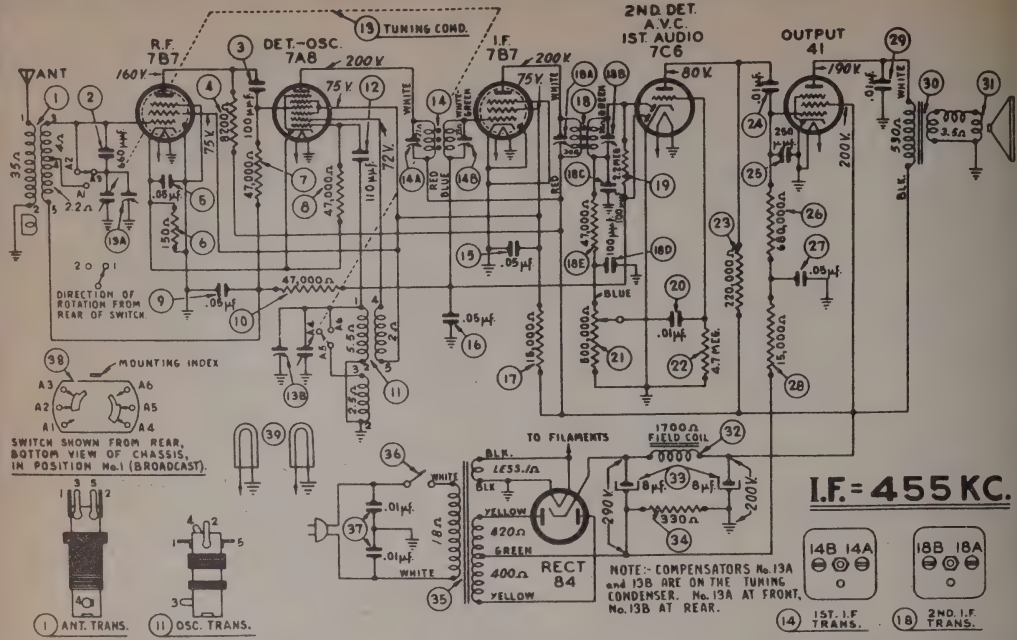

TYPE 7C6 TUBE LOCATED AS SHOWN IN MODEL 40-155 ONLY
TYPE 7A6 TUBE NOT USED IN MODEL 40-150
LOCATED AS SHOWN IN MODEL 40-155 ONLY
84
41
41
7J7
1232
A
B
C
D
E
F
G

Fig. 2. Part locations, underside of chassis.

MODEL 40-158 (121)

PHILCO RADIO & TELEVISION CORP.



NOTE:- COMPENSATORS No. 13A and 13B ARE ON THE TUNING CONDENSER. No. 13A AT FRONT, No. 13B AT REAR.

I.F. = 455 KC.

1	Antenna Transformer	32-3303
2	Mica Condenser (660 mmfd.) ..	30-1136
3	Mica Condenser (100 mmfd.) ..	30-1128
4	Resistor (8200 ohms, ½ watt) .	33-282339
5	Tubular Condenser (.05 mfd.) .	30-4519
6	Resistor (150 ohms, ½ watt) ..	33-115339
7	Resistor (47,000 ohms, ½ watt)	33-347339
8	Resistor (47,000 ohms, ½ watt)	33-347339
9	Tubular Condenser (.05 mfd.) .	30-4519
10	Resistor (47,000 ohms, ½ watt)	33-347339
11	Oscillator Transformer	32-3255
12	Mica Condenser (110 mmfd.) ..	30-1130
13	Tuning Condenser Assembly ...	31-2418
14	1st I. F. Transformer Assy....	32-3361
15	Tubular Condenser (.05 mfd.) .	30-4519
16	Tubular Condenser (.05 mfd.) .	30-4519
17	Resistor (15,000 ohms, 1 watt)	33-315439
18	2nd I. F. Transformer Assembly	32-3211
19	Resistor (2.2 meg., ½ watt) ..	33-522339
20	Tubular Condenser (.01 mfd.) ..	30-4572
21	Volume Control (500,000 ohms)	33-5319
22	Resistor (4.7 meg., ½ watt) ..	33-547339
23	Resist. (220,000 ohms, ½ watt)	33-422339
24	Tubular Condenser (.01 mfd.) ..	30-4572
25	Mica Condenser (250 mmfd.) ..	61-0033
26	Resist. (680,000 ohms, ½ watt)	33-468339
27	Tubular Condenser (.05 mfd.) ..	30-4519
28	Resist. (15,000 ohms, ½ watt)	33-315339
29	Tubular Condenser (.01 mfd.) ..	30-4501
30	Output Transformer	32-8056
31	Cone and Voice Coil Assembly (Speak r Part No. 36-1480-3)	36-4086
32	Field Coil (Replace Speaker Part No. 36-1480)	
33	Elec. Cond. (8-8 mfd., 450 V.) .	30-2447
34	Resistor (330 ohms, 1 watt) ...	33-133439
35	Power Transformer	
	(115-130 V., 50-60 cycles) ..	32-8055
	(115-130 V., 25 cycle)	32-8076
36	A. C. Switch	42-1545
37	Bakelite Cond. (.01-.01 mfd.) ..	3903-DG
38	Wave Switch	42-1494
39	Pilot Lamps	34-2064

MISCELLANEOUS PARTS

Bezel	27-4842
Cabinet	10398C
Cable and Plug (Power Supply)	L-3199
Clip (Coil Mounting)	28-5002
Dial	27-5551
Drive Cord Assembly	
(Tuning Condenser)	31-2400
(Pointer Operation)	31-2382
Insulating Bushing (Dr. Shaft)	27-9437
Knobs (A. C. Switch, Volume, Tuning and Wave Switch) ..	27-4332
Pilot Lamp Socket Assembly ..	38-9904
Pointer	56-1479
Rubber Insulator (Drive Shaft)	27-9432
Socket (5 prong, type 84 tube)	27-6035
Socket (6 prong, type 41 tube)	27-6036
Socket (Loktal)	27-6131
Spring (Drive Cord, Tuning) ..	27-8751
Spring (Drive Cord, Pointer) ..	27-8953
Spring (Dr. Shaft, Grounding)	27-8955
Tuning Drive Drum Assembly .	38-9883
Tuning Shaft	56-6052
Washer ("C" type, tun. shaft)	28-2043

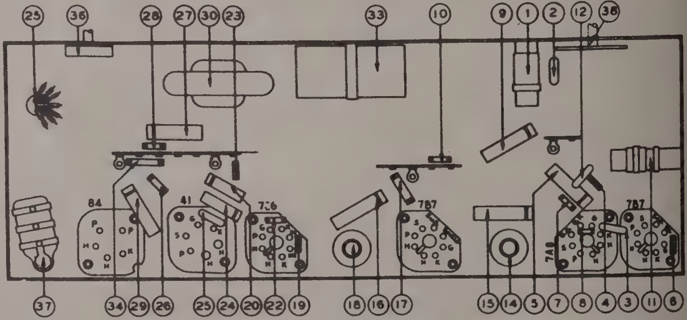
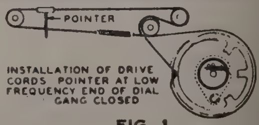


FIG. 2. PART LOCATIONS, UNDERSIDE OF CHASSIS.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Antenna Terminal	455 K. C.	580 K. C.	Vol. Cont. Max. Range Switch "Brdcst"	18A, 18B 14A, 14B	Note A
2	Antenna Terminal	1500 K. C.	1500 K. C.	Vol. Cont. Max. Range Switch "Brdcst"	13B, 13A Note B	

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B — The oscillator padder (13B) and antenna padder (13A) are located on top of the tuning condenser (13B) at the rear and (13A) at the front of the tuning condenser.



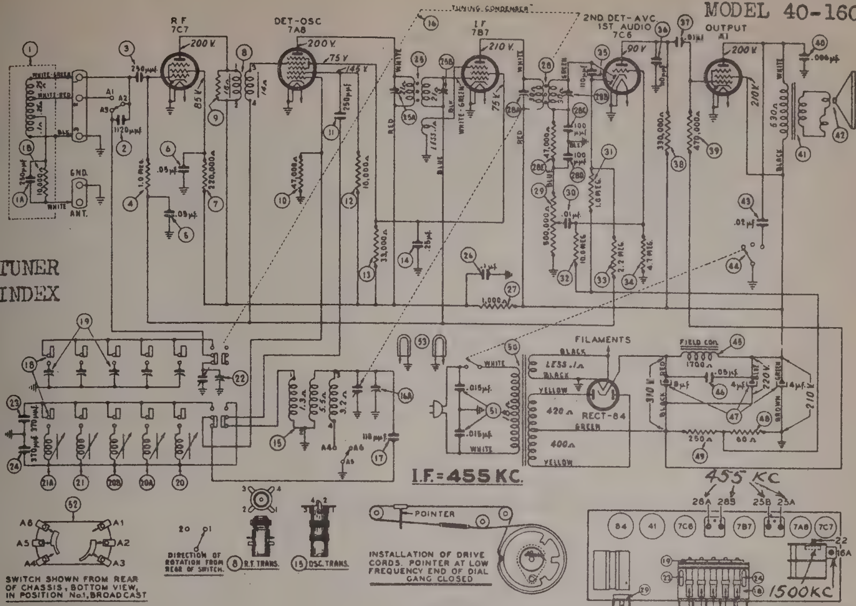
INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED

FIG. 1.

PHILCO RADIO & TELEVISION CORP.

MODELS 40-130,
40-135, 40-170CS
MODEL 40-140, 40-145
MODEL 40-160

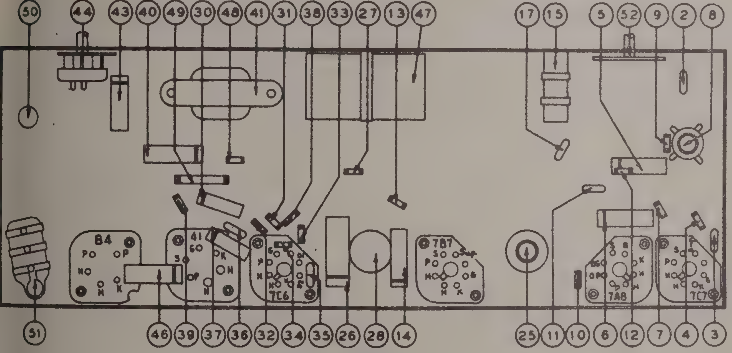
FOR TUNER
SEE INDEX


RF 7C7
DET-OSC 7A8
I.F. 7B7
2ND DET-AVC 1ST AUDIO 7C6
OUTPUT A1
TUNING CONDENSER
200 V.
85 V.
75 V.
145 V.
210 V.
90 V.
GND.
ANT.
WHITE
RED
BLUE
GREEN
WHITE-GREEN
FILAMENTS
RECT-84
FIELD COIL
I.F.=455 KC.
455 KC
1500KC
SWITCH SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No.1, BROADCAST
DIRECTION OF ROTATION FROM REAR OF SWITCH.
R.F. TRANS.
OSC. TRANS.
POINTER
INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED
TOP VIEW OF CHASSIS

SCHEMATIC DIAGRAM MODEL 40-160

Run 3—To prevent oscillation on push-button tuning, resistors (9) **Part No.** 33-268339 were removed from R. F. transformer (9) secondary. A new resistor Part No. 33-260339 is now added across primary winding of the same transformer.

CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOL.VIII



40-170CS

Models 40-135 and 40-170 are similar in design with the exception of the cabinets, speakers, and several circuit changes. The Service information for Model 40-135 covers the Model 40-170 with the exception of the part changes listed below.

Sche. No.	Description	Part No.
1	Loop Assembly	38-9985
3	Mica Condenser	30-1140
30	Tubular Condenser (.006 mfd., 600 V.)	30-4504
31	Tubular Condenser (.02 mfd., 600 V.)	30-4599
34	Cone and Voice Coil Assembly (For Speaker Part No. 36-1480-3)	36-4086
	Cable (A. C.)	L-3240
	Cabinet	10453A
	Speaker	36-1480

PRODUCTION CHANGES

MODELS 40-130 RUN 3, 40-135, 40-170CS

To prevent oscillation at the low end of the broadcast band and 2nd I. F. transformer (21) changed from Part No. 32-3281 to Part No. 32-3382.

MODEL 40-170CS

The speaker, Part No. 36-1480-3 and cone assembly, Part No. 36-4086 listed in No. 1 change notice for Model 40-170CS has been changed on later production receivers to speaker 36-1480-4. The cone assembly for this new speaker is 36-4136.

PRODUCTION CHANGES

MODEL 40-140

Dial Scale changed from Part No. 27-5507 to Part No. 27-5552.
Tone Control (27) changed from Part No. 42-1496 to 33-5333.

MODEL 40-145

Dial Scale changed from Part No. 27-5507 to Part No. 27-5552.
Tone Control (27) changed from Part No. 42-1496 to 33-5333.

MODELS 40-140, 40-145

Operating on 115 Volt, 25 Cycle and 220 Volt, 60 Cycle Current

To operate Model 40-140 and 40-145 on 115 volts, 25 cycle current the power transformer (52) Part No. 32-8064, 115 volts, 60 cycle listed in the Service Bulletin, must be changed to Part No. 32-8075, 115 volts, 25 cycle. In addition, Electrolytic Condenser (49) Part No. 30-2409, 12 mfd., 400 volts must be changed to Part No. 30-2438, 20 mfd., 400 volts.

Model 40-140 can be operated on 220 volts, 60 cycle current by changing the power transformer (52), Service Bulletin 328, from Part No. 32-8064, 115 volts, 60 cycle to Part No. 32-8093, 220 volts, 60 cycle. The new transformer Part No. 32-8093 can be operated on either 115 or 220 volts, 60 cycle current by connecting the primary wiring as listed below:

Power Supply: 220 Volts—Red and Yellow to White. 110 Volts—Red to White.
Connect together: 220 Volts—Black and White to Red. 110 Volts—Black and White to Re and Yellow.

To prevent oscillation at the low end of the broadcast band the 2nd I. F. transformer (33) changed from Part No. 32-3281 to Part No. 32-3382.

The cabinet and B. C. loop assembly was changed on late production receivers as follows:

Model 40-140	Original Part No.	New Part No.
Cabinet	10395A	10464A
B. C. Loop	38-9892	76-1009

Model 40-145	Original Part No.	New Part No.
Cabinet	10395B	10464B
B. C. Loop	38-9892	76-1009

MODEL 40-165
MODELS 40-180,
40-185, 40-190

PHILCO RADIO & TELEVISION CORP.

MODEL 40-165 PRODUCTION CHANGES

Run 1 — Beginning with Run 1 receivers the converter tube was changed from a 7J7 loktal type to a 6J8G octal type. Tube sockets change from 27-6129 loktal to 27-6120 octal.

Run 2 — Additional condenser Part No. 30-4123 added across condenser (54) to reduce hum.

Run 3 — 6J8G converter tube socket Part No. 27-6120 reversed 180 degrees to prevent oscillation at 18 M. C. This reversed the position of the socket as wired in Run 1 receiver.

Run 4 — Converter tube changed back to a 7J7 loktal type from a 6J8G tube. This change makes the set correspond to the circuit diagram in the Service Bulletin.

S. W. loop assembly in Model 40-165K is Part No. 38-9968. This differs from loops used in the "F" cabinet.

For other data, see Index

MODELS 40-180,40-185,40-190

In general, these models are similar with the exception of the number of tubes used and the cabinet design. Model 40-180 employs a seven tube receiver. Models 40-185 and 40-190 employ eight tube receivers assembled in different type cabinets.

MODELS 40-180,40-185,40-190

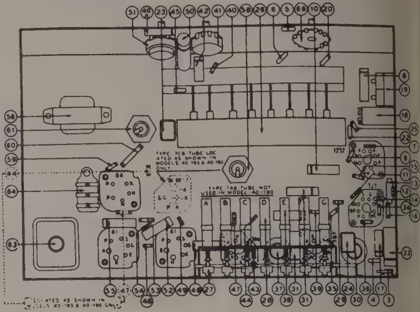

51
40A
23
45
50
42
41
40
58
26
6
5
66
10
20
8
19
18
25
22
7
9
15
11
13
12
14
34
16
33
56
61
60
59
44
64
63
TYPE 7C6 TUBE LOCATED AS SHOWN IN MODELS 40-185 & 40-190 ONLY
TYPE 7A6 TUBE NOT USED IN MODEL 40-180
7J7
A
B
C
D
E
F
G
55
47
54
53
52
49
46
27
47
43
37
31
39
35
24
36
17
48
44
28
38
31
29
30
4
3
LOCATED AS SHOWN IN MODELS 40-185 & 40-190 ONLY

Fig. 1 — Part locations underside of chassis

PRODUCTION CHANGES

MODEL 40-180

Run 4 — Beginning with Run 4 receivers the converter tube was changed from a type 7J7 loktal to a 6J8G octal type.

Run 5 — A new resistor Part No. 33-115339 not shown on diagram of Service Bulletin was added in series with plates of tre 6J8G tube. This change made to improve oscillator action at 18 M. C.

Cathode resistor (34) changed from Part No. 33-115339 carbon type to Part No. 33-115336 wirewound.

MODEL 40-185

Run 4 — Beginning with Run 4 receivers the converter tube was changed from a type 7J7 loktal to a 6J8G octal type. Tube sockets changed from Part No. 27-6129 to Part No. 27-6120.

MODEL 40-190

Run 4 — Beginning with Run 4 receivers the converter tube was changed from a type 7J7 loktal to a 6J8G octal type. Tube sockets changed from Part No. 27-6129 to Part No. 27-6120.

Run 5 — A new resistor Part No. 33-115339 not shown on diagram of the Service Bulletin was added in series with the plates of the 6J8G tube. This change was made to improve oscillation action at 18 M.C.

Cathode resistor (34) changed from Part No. 33-115339 carbon type to Part No. 33-115336 wirewound.

MODELS 40-180, 40-190

To prevent oscillation at the low end of the broadcast band the 2nd I. F. transformer (37) changed from Part No. 32-3246 to Part No. 32-3383.

The physical location of condenser (4) as shown in Fig. 2 of the Service Bulletin has been changed to prevent oscillation at 540 K. C. The condenser is now wired to a three lug wiring panel between the range switch and the volume control. The antenna lead is connected to one lug of the panel. This change is made on all sets marked Run No. 9, Model 40-180 and Run No. 10, Model 40-190.

MODELS 40-185, 40-190

Beginning with Run "8" receivers the converter tube is changed from a type 6J8G octal to a 7J7 loktal. Tube sockets changed from Part No. 27-6120 to 27-6129 loktal.

This change reverses the change made on Run "4" receivers.

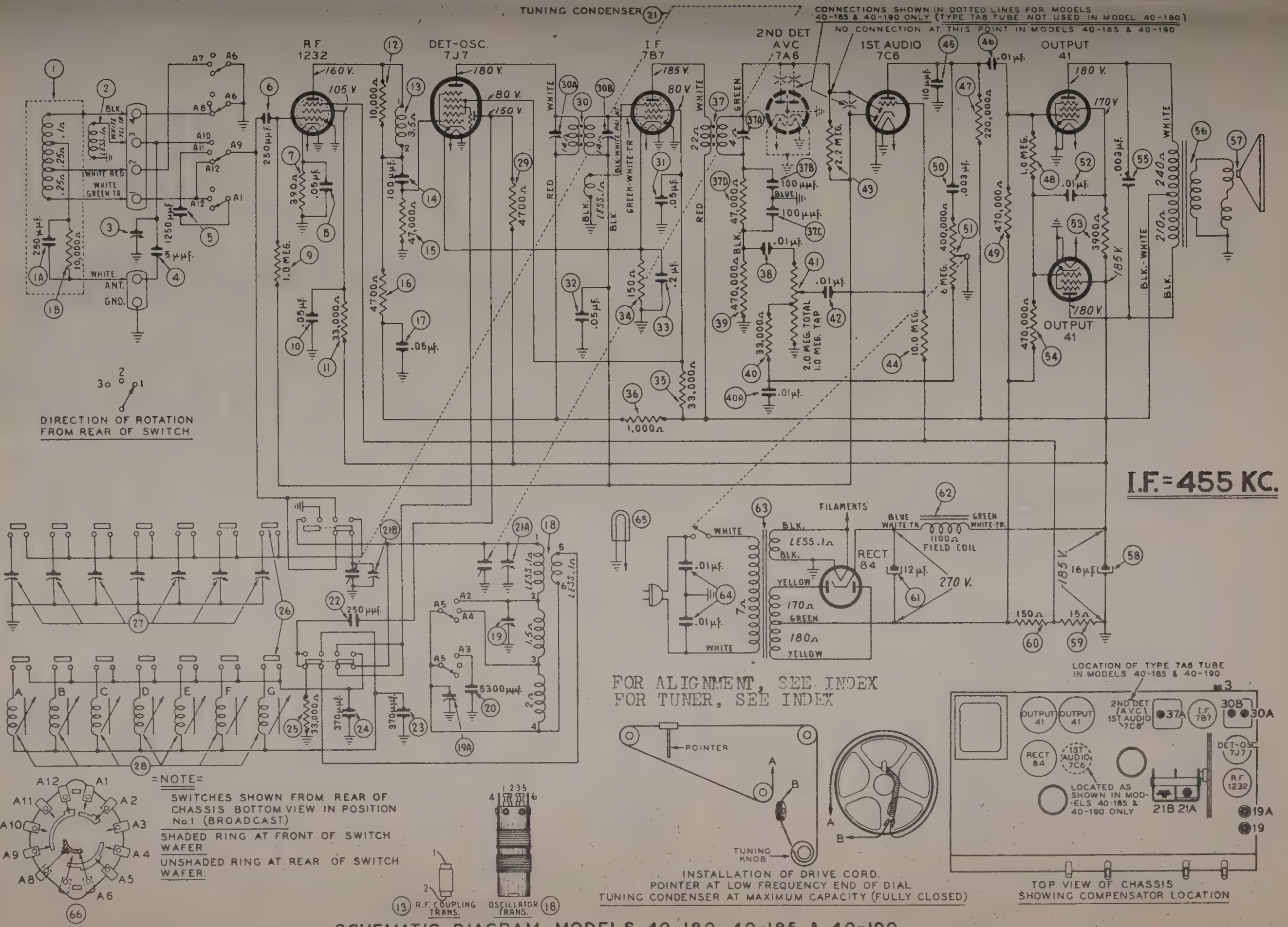
SCHE. No.	DESCRIPTION	PART No.
1	Loop Ass'y (Broadcast)	38-9880
1A	Mica Cond. (250 mmfd.)	61-0033
1B	Resistor (10,000 ohms, ½ watt)	33-310339
2	Loop Ass'y (Short Wave)	38-9884
3	Compensator	31-6308
4	Mica Cond. (5 mmfd.)	30-1097
5	Mica Cond. (1250 mmfd.)	5886
6	Mica Cond. (250 mmfd.)	61-0033
7	Resistor (390 ohms, ½ watt)	33-139339
8	Tubular Cond. (.05 mfd.)	30-4444
9	Resistor (1.0 meg., ½ watt)	33-510339
10	Tubular Cond. (.05 mfd.)	30-4123
11	Resistor (33,000 ohms, ½ watt)	33-333339
12	Resistor (10,000 ohms, ½ watt)	33-310339
13	R. F. Coupling Trans.	32-3194
14	Mica Cond. (100 mmfd.)	30-1128
15	Resistor (47,000 ohms, ½ watt)	33-347339
16	Resistor (4700 ohms, ½ watt)	33-247339
17	Tubular Cond. (.05 mfd.)	30-4123
18	Oscillator Trans.	32-3195
19	Compensator (2 Section)	31-6298
20	Mica Cond. (5300 mmfd.)	30-1134
21	Tuning Cond. Ass'y	31-2391
22	Mica Cond. (250 mmfd.)	61-0033
23	Silver Mica Cond. (370 mmfd.)	30-1110
24	Silver Mica Cond. (370 mmfd.)	30-1110
25	Resistor (33,000 ohms, ½ watt)	33-333339
26	Push Button Switch	42-1489
27	Padder Strip (Push Buttons)	31-6299
28	Coil Strip Ass'y	
28A	Coil No. 1	
28B	Coil No. 2 540-1060 K. C.	32-3042
28C	Coil No. 3	
28D	Coil No. 4	
28E	Coil No. 5 650-1110 K. C.	32-3042
28F	Coil No. 6	
28G	Coil No. 7 920-1600 K. C.	32-3041
29	Resistor (4700 ohms, ½ watt)	33-247339
30	1st I. F. Trans. Ass'y	32-3245
31	Tubular Cond. (.05 mfd.)	30-4123
32	Tubular Cond. (.05 mfd.)	30-4519
33	Tubular Cond. (.2 mfd.)	30-4536
34	Resistor (150 ohms, ½ watt)	33-115339
35	Resistor (33,000 ohms, ½ watt)	33-333339
36	Resistor (1000 ohms, ½ watt)	33-210339
37	2nd I. F. Trans. Ass'y	32-3246
38	Tubular Cond. (.01 mfd.)	30-4479
39	Resistor (470,000 ohms, ½ watt)	33-447339
40	Resistor (33,000 ohms, ½ watt)	33-333339
40A	Tubular Cond. (.01 mfd.)	30-4479
41	Volume Control (2.0 meg.)	33-5275
42	Tubular Cond. (.01 mfd.)	30-4479
43	Resistor (2.2 megs., ½ watt)	33-522339
44	Resistor (10.0 megs., ½ watt)	33-610339
45	Mica Cond. (110 mmfd.)	30-1130
46	Tubular Cond. (.01 mfd.)	30-4572
47	Resistor (220,000 ohms, ½ watt)	33-422339
48	Resistor (1.0 meg., ½ watt)	33-510339
49	Resistor (470,000 ohms, ½ watt)	33-447339
50	Tubular Cond. (.003 mfd.)	30-4469
51	Tone Control & On-Off Switch	33-5314
52	Tubular Cond. (.01 mfd.)	30-4572
53	Resistor (3900 ohms, ½ watt)	33-239339
54	Resistor (470,000 ohms, ½ watt)	33-447339
55	Tubular Cond. (.003 mfd.)	30-4469
56	Output Trans.	32-8053
57	Cone & Voice Coil Ass'y	
	(Spkr. Part No. 36-1479-2)	36-4089
	(Spkr. Part No. 36-1479-4)	36-4111
58	Electrolytic Cond. (16 mfd., 200 V.)	30-2406
59	Resistor (15 ohms, ½ watt)	33-015351
60	Resistor (150 ohms, 1 watt)	33-115451
61	Electrolytic Cond. (12 mfd., 350 V.)	30-2405
62	Field Coil (Replace Speaker, Part No. 36-1479)	
63	Power Transformer	
	(115 Volts, 50 to 60 Cycle)	32-8052
	(115 Volts, 25 Cycle)	32-8086
	(120/240 Volts, 60 Cycle)	32-8092
64	Line Cond.. (Bakelite, .01-.01 mfd.)	390
65	Pilot Lamp	34-2
66	Wave Switch	42-1

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Bezel Ass'y	40-6489
Bezel Gasket	27-9175
Cable & Plug (Power Supply)	L-3199
Cabinet Model 40-180	10372
Cabinet Model 40-185	10400A
Cabinet Model 40-190	10391A
Clip (Coil mtg.)	28-5003
Dial	27-5508
Dial Tuning Drum Ass'y	38-985
Drive Cord Ass'y	31-2383
Knobs (Tuning, Tone, Volume, Wave Switch)	27-4332
Knobs (Pushbuttons)	27-485
Pilot Lamp Socket Ass'y	38-960
Pointer	56-151
Screws (Bezel mtg.)	W-183
Spring (Drive Cord)	28-891
Spring (Dial Background Plate mtg.)	28-8908
Socket (Type 84 Tube)	27-603
Socket (Type 41 Tube)	27-603
Socket (Loktal, Type 7J7 Tube)	27-612
Socket (Loktal, Type 7A6, 7C6 Tubes)	27-613
Speaker	36-147
Tab (Dial)	27-553
Tab (Television)	27-944
Tab Kit	40-647
Tuning Shaft Ass'y	38-987
Washer	
("C" Type, Tuning Shaft Ass'y)	28-2043
(Spring Type, Tuning Shaft Ass'y)	28-4186

PHILCO RADIO & TELEVISION CORP.

MODELS 40-180, 40-185, 40-190



DIRECTION OF ROTATION FROM REAR OF SWITCH

=NOTE=
SWITCHES SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION No.1 (BROADCAST)
SHADED RING AT FRONT OF SWITCH WAFER
UNSHADED RING AT REAR OF SWITCH WAFER

(13) R.F. COUPLING TRANS.

OSCILLATOR TRANS. (18)

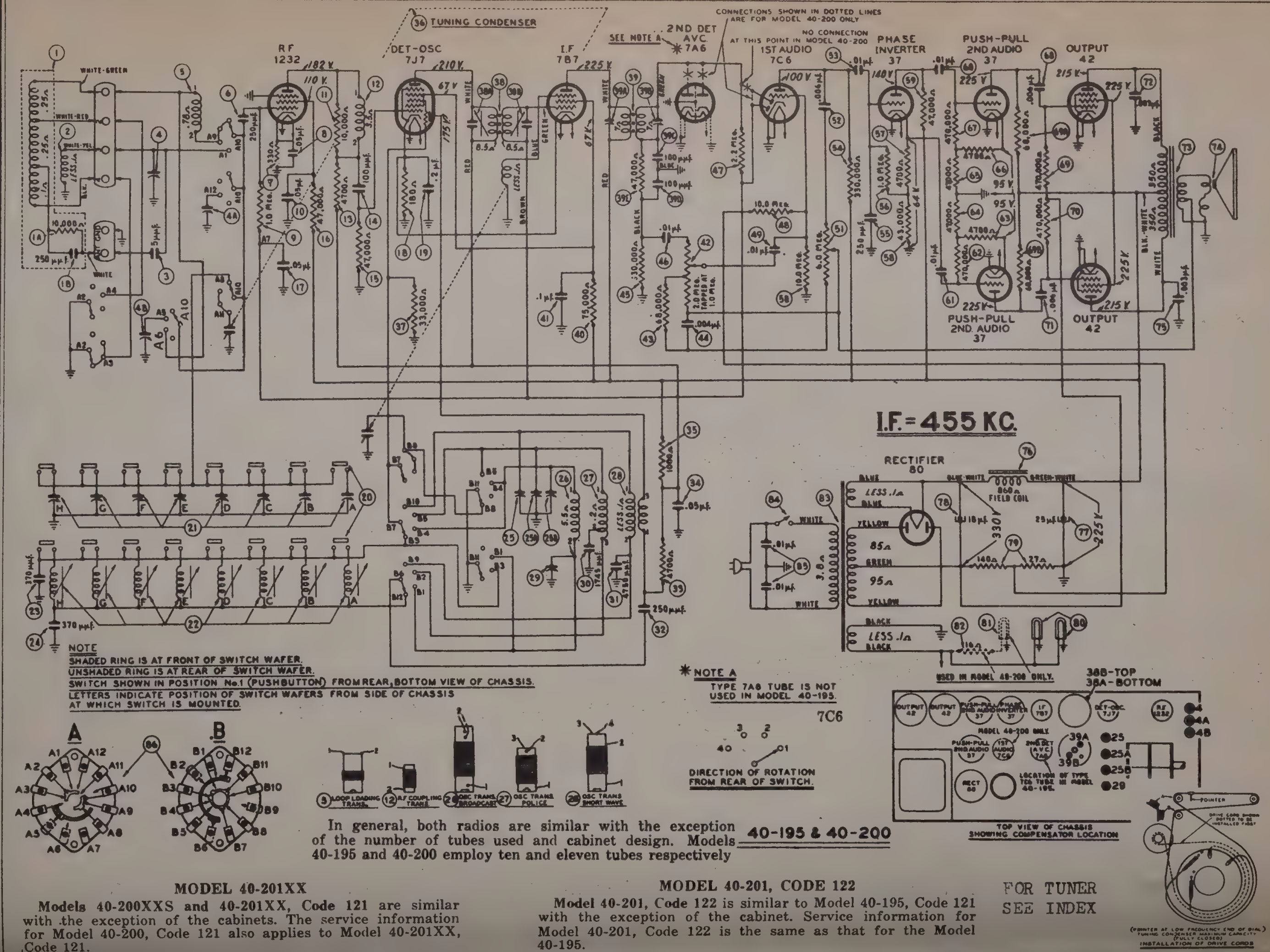
INSTALLATION OF DRIVE CORD.
POINTER AT LOW FREQUENCY END OF DIAL
TUNING CONDENSER AT MAXIMUM CAPACITY (FULLY CLOSED)

TOP VIEW OF CHASSIS
SHOWING COMPENSATOR LOCATION

SCHEMATIC DIAGRAM MODELS 40-180, 40-185 & 40-190

The voltages indicated were measured with a Philco Model 027 Voltmeter (1000 ohms per volt) — Power supply 115 volts, 60 cycle — Volume control minimum — No signal being received — Range switch "Brdcst."

PHILCO RADIO & TELEVISION CORP.



I.F. = 455 KC.

NOTE
SHADED RING IS AT FRONT OF SWITCH WAFER.
UNSHADED RING IS AT REAR OF SWITCH WAFER.
SWITCH SHOWN IN POSITION No.1 (PUSHBUTTON) FROM REAR, BOTTOM VIEW OF CHASSIS.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM SIDE OF CHASSIS AT WHICH SWITCH IS MOUNTED.

✱ NOTE A
TYPE 7A6 TUBE IS NOT USED IN MODEL 40-195.

40-195 & 40-200

In general, both radios are similar with the exception of the number of tubes used and cabinet design. Models 40-195 and 40-200 employ ten and eleven tubes respectively

MODEL 40-201XX

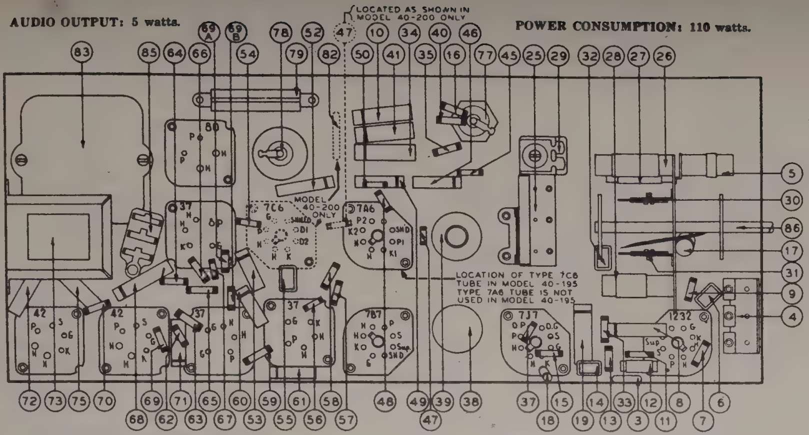
Models 40-200XXS and 40-201XX, Code 121 are similar with the exception of the cabinets. The service information for Model 40-200, Code 121 also applies to Model 40-201XX, Code 121.

MODEL 40-201, CODE 122

Model 40-201, Code 122 is similar to Model 40-195, Code 121 with the exception of the cabinet. Service information for Model 40-201, Code 122 is the same as that for the Model 40-195.

FOR TUNER
SEE INDEX

AUDIO OUTPUT: 5 watts. POWER CONSUMPTION: 110 watts.


LOCATED AS SHOWN IN MODEL 40-200 ONLY
MODEL 40-200 ONLY
LOCATION OF TYPE 7C6 TUBE IN MODEL 40-195 TYPE 7A6 TUBE IS NOT USED IN MODEL 40-195
42
42
37
37
37
80
7C6
7A6
7B7
7J7
1232
83 85 64 66 69A 69B 54 78 79 52 82 47 50 10 41 34 35 40 16 46 77 45 25 29 32 28 27 26
5 30 86 17 31 9 4
72 73 75 70 68 69 62 71 63 65 67 60 53 59 55 61 56 58 57 48 49 47 39 38 37 18 15 19 14 13 33 3 12 11 8 7 6

PRODUCTION CHANGES

MODEL 40-195

Run 2—A mica condenser Part No. 61-0038 was added to the police band and oscillator padder (25A) to improve padding of the circuit.

Run 4—Beginning with Run 4 receiver the converter tube was changed from a type 7J7 loktal to a 6J8G octal. Tube sockets changed from Part No. 27-6129 to 27-6120.

Run 5—To improve the operating characteristics of the set, screen by-pass condenser ( ) was changed from .05 mfd. Part No. 30-4518 to .01 mfd. Part No. 30-4572.

Run 6—A resistor, 27 ohms Part No. 33-027339 was connected in series with the oscillator grid circuit of sets using the 6J8G tube. This change was made to improve the oscillator performance.

MODEL 40-200

Run 3—A mica condenser Part No. 62-0038 was added to the police band oscillator padder (25A) to improve padding of the circuit.

Run 4—Beginning with Run 4 receiver the converter tube was changed from a type 7J7 loktal to a 6J8G octal. Tube sockets changed from Part No. 27-6129 to 27-6120.

Runs 5 and 6—Same as Model 40-195.

MODELS 40-195, 40-200

Beginning with Run "7" receivers the converter tube is changed from a type 6J8G octal to a 7J7 loktal. The tube sockets are changed from Part No. 27-6120 to Part No. 27-6129.

This change is the reverse of the change made on Run "4" receivers.

MODELS 40-195, 40-200, 40-201

To improve the padding at 1500 K. C. a mmfd. condenser Part No. 30-1097 was connected in parallel with compensator (25B). This change is on all sets marked Run 8.

To prevent low frequency rumble at various points on the dial scale, another condenser Part No. 30-4334, .004 mfd. was connected in parallel with the present condenser (44) in the bass compensation circuit.

FREQUENCY TUNING RANGES: (Three)
540 to 1550 K. C. 1.5 to 4.0 M. C. 6.0 to 18 M. C.
INTERMEDIATE FREQUENCY: 455 K. C.

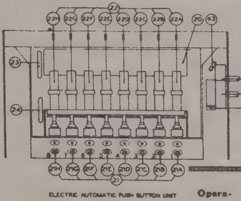

22
22H 22G 22F 22E 22D 22C 22B 22A
20
43
23
24
42
51
44
8 7 6 5 4 3 2 1
21H 21G 21F 21E 21D 21C 21B 21A
21
ELECTRIC AUTOMATIC PUSH BUTTON UNIT

Fig. 3

MODELS 40-195, 40-200 and 40-201, Codes 121-122

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER — To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. ADJUSTING I. F. CIRCUIT:

Remove the 1232 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. ADJUSTING R. F. CIRCUIT:

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 42 type tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

NOTE A — A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Fig. 4.

NOTE C — When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE D — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order See Fig.	
1	High Side to No. 1 Ter. Loop Panel	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst."	39B, 39A 38B, 38A	See Note A
2	Use Loop on Generator		1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst."	29B, 4B	See Note B
3	Use Loop on Generator		580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst."	29	Roll Tuning Condenser Note C
4	Use Loop on Generator		1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst."	25B, 4B	
5	Use Loop on Generator		3.5 M. C.	3.5 M. C.	Vol. Max. Range Switch "Police"	25A, 4A	
6	Use Loop on Generator		18.0 M. C.	18.0 M. C.	Vol. Max. Range Switch "S. W."	25, 4	Check Image Signal Note D

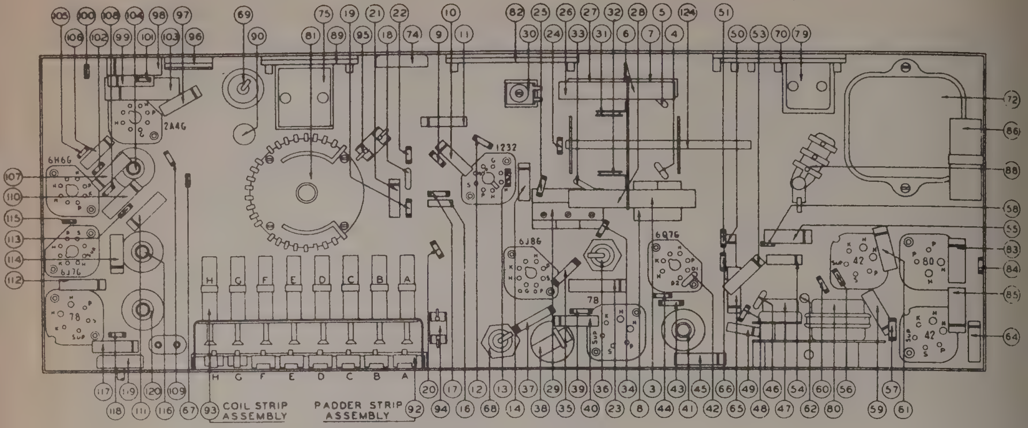


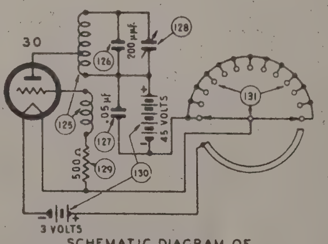
FIG. 2. REPLACEMENT PARTS, UNDERSIDE OF CHASSIS.

REPLACEMENT PARTS

SCHE. No.	DESCRIPTION	PART No.
1	Loop Assembly (Broadcast)	38-9862
1A	Resistor (10,000 ohms, 1/2 watt)	33-310339
1B	Mica Condenser (250 mmfd.)	61-0033
2	Loop Assembly (Short Wave)	38-9977
2A	Compensator	31-6326
3	Short Wave Series Transformer	32-3378
4	Mica Condenser (5 mmfd.)	30-1097
5	Mica Condenser (250 mmfd.)	61-0033
6	Broadcast Series Transformer	32-3376
7	Police Shunt Transformer	33-3377
8	Compensator (2 section)	31-6339
9	Resistor (82,000 ohms, 1/2 watt)	33-382339
10	Tubular Condenser (.05 mfd.)	30-4123
11	Tubular Condenser (.05 mfd.)	30-4444
12	Resistor (1.0 meg., 1/2 watt)	33-510339
13	Resistor (330 ohms, 1/2 watt)	33-133339
14	Tubular Condenser (.05 mfd.)	30-4444
15	Tuning Condenser Assembly	31-2433
16	Peaking Transformer	32-3372
17	Resistor (10,000 ohms, 1/2 watt)	33-310339
18	Mica Condenser (100 mmfd.)	30-1128
19	Resistor (4700 ohms, 1/2 watt)	33-247339
20	Resistor (1000 ohms, 1/2 watt)	33-210339
21	Tubular Condenser (.05 mfd.)	30-4123
22	Resistor (47,000 ohms, 1/2 watt)	33-347339
23	Tubular Condenser (.05 mfd.)	30-4123
24	Resistor (33,000 ohms, 1/2 watt)	33-333339
25	Resistor (27 ohms, 1/2 watt)	33-027339
26	Oscillator Transformer (Broadcast)	32-3373
27	Oscillator Transformer (Police)	32-3374
28	Oscillator Transformer (Short Wave)	32-3375
29	Compensator (3 section)	31-6338
30	Compensator	31-6230
31	Tracking Condenser (Police, 1330 mmfd.)	31-6286
32	Tracking Condenser (Short Wave, 6100 mmfd.)	31-6341
33	Mica Condenser (250 mmfd.)	61-0033
34	Resistor (10 000 ohms, 1/2 watt)	33-310339
35	Resistor (15,000 ohms, 1 watt)	33-315439
36	Electrolytic Condenser (4 mfd., 250 V.)	30-2334
37	Resistor (5000 ohms, 3 watts)	33-250639
38	1st I. F. Transformer Assembly	32-3089
39	Resistor (390 ohms, 1/2 watt)	33-139339
40	Tubular Condenser (.05 mfd.)	30-4444
41	2nd I. F. Transformer Assembly	32-2645
41E	Resistor (51,000 ohms, 1/2 watt)	33-351339
41F	Resistor (330,000 ohms, 1/2 watt)	33-433339
42	Mica Condenser (110 mmfd.)	30-1031
43	Resistor (2.0 meg., 1/2 watt)	33-520339
44	Resistor (1.0 meg., 1/2 watt)	33-510339
45	Tubular Condenser (.01 mfd.)	30-4479
46	Mica Condenser (50 mmfd.)	30-1029
47	Volume Control (2.0 meg.)	33-5300
48	Resistor (70,000 ohms, 1/2 watt)	33-370339
49	Tubular Condenser (.004 mfd.)	30-4334
50	Tubular Condenser (.015 mfd.)	30-4358
51	Resistor (1.0 meg., 1/2 watt)	33-510339
52	Tone Control (3.0 meg.)	33-5287
53	Tubular Condenser (.02 mfd.)	30-4481
54	Tubular Condenser (.006 mfd.)	30-4445
55	Tubular Condenser (.03 mfd.)	30-4517
56	Resistor (490,000 ohms, 1/2 watt)	33-449339
57	Resistor (330,000 ohms, 1/2 watt)	33-433339
58	Resistor (99,000 ohms, 1/2 watt)	33-339339
59	Tubular Condenser (.01 mfd.)	30-4501
60	Resistor (3500 ohms, 1/2 watt)	33-235339
61	Tubular Condenser (.01 mfd.)	30-4501
62	Output Transformer	32-7997
63	Cone and Voice Coil Assembly (Speaker Part No. 36-1450-2)	36-4089
	(Speaker Part No. 36-1450-4)	36-4111
64	Tubular Condenser (.01 mfd.)	30-4501
65	Tubular Condenser (.1 mfd.)	30-4499
66	Resistor (1.0 meg., 1/2 watt)	33-510339
67	Resistor (3000 ohms, 1/2 watt)	33 230339
68	Electrolytic Condenser (25 mfd., 300 V.)	30-2360
69	Electrolytic Condenser (18 mfd., 475 V.)	30-2200
70	Resistor (Wirewound, Bias)	33-3361
71	Field Coil (Replace Spkr. Part No. 36-1450)	
72	Power Trans. (115 V., 50-60 cycles)	32-7999
	Power Trans. (115 V., 25-40 cycles)	32-8013
73	Bypass Condenser (.05 mfd., 110 V. Plug)	30-4576
74	Choke Coil	32-1281
75	Filament Trans. (115 V., 50-60 cycles)	32-7993
	Filament Trans. (115 V., 25-40 cycles)	32-8016
76	Resistor (16 ohms, Pilot Lamp)	33-016439
77	Pilot Lamp (Bullseye)	34-2210
78	Pilot Lamps (Dial)	34-2064
79	Motor Trans. (115 V., 50-60 cycles)	32-7990
	Motor Trans. (115 V., 25-40 cycles)	32-8015
80	Motor Assembly (Volume Control, 60 cycles)	35-1151
	(110 volts, 25 cycles)	35-1152
80A	Switch (Volume Control Motor)	42-1469
81	Rotary Switch (Stepper Unit)	42-1468
82	Resistor (10 ohms, wirewound)	33-3363
83	Tubular Condenser (.1 mfd.)	30-4499
84	Resistor (150 ohms, 1/2 watt)	33-115339
85	Tubular Condenser (.1 mfd.)	30-4499
86	Electrolytic Condenser (30 mfd., 30 V.)	30-2361
87	Stepper Unit (Complete)	38-9689
87A	Spark Filt. Assy. (inside of Stepper Unit)	38-9898
87B	Spark Filter Choke	32-3276
87C	Tubular Condenser (.05 mfd.)	30-4444
87D	Tubular Condenser (.05 mfd.)	30-4444
87E	Resistor (100 ohms, 1/2 watt)	33-110339
88	Bakelite Condenser (.05 mfd.)	3615-SG
89	Resistor (150 ohms, wirewound)	33-3362
90	Electrolytic Condenser (16 mfd., 150 V.)	30-2387
91	Pilot Lamps (Station Indicator)	34-2064
92	Compensator Strip (Pushbuttons)	31-6264
92A	Compensator No. 1	
92B	Compensator No. 2 540-1030 K. C.—Part of 92	
92C	Compensator No. 3	
92D	Compensator No. 4 670-1130 K. C.—Part of 92	
92E	Compensator No. 5	
92F	Compensator No. 6 900-1470 K. C.—Part of 92	
92G	Compensator No. 7	
92H	Compensator No. 8 1100-1600 K. C.—Part of 92	
93	Elec. Pushbutton Trans. Assy. (8 Trans.)	32-3091
93A	Oscillator Transformer No. 1	
93B	Oscillator Transformer No. 2 540-1030 K. C.	32-3042
93C	Oscillator Transformer No. 3	
93D	Oscillator Transformer No. 4 670-1160 K. C.	32-3042
93E	Oscillator Transformer No. 5	
93F	Oscillator Transformer No. 6 900-1470 K. C.	32-3041
93G	Oscillator Transformer No. 7	
93H	Oscillator Transformer No. 8 1100-1600 K. C.	32-3041
94	Silver Mica Cond. (370 mmfd.)	30-1110
95	Silver Mica Cond. (370 mmfd.)	30-1110
96	Choke Coil	32-1281
97	Tubular Condenser (.05 mfd.)	30-4123
98	Tubular Condenser (.05 mfd.)	30-4123
99	Tubular Condenser (.1 mfd.)	30-4499
100	Resistor (4000 ohms, 1/2 watt)	33-240339
101	Resistor (51,000 ohms, 1/2 watt)	33-351339
102	Resistor (120,000 ohms, 1/2 watt)	33-412339
103	Tubular Condenser (.5 mfd.)	30-4551
104	No. 3 Control Amplifier Transformer	32-3275
105	Resistor (750,000 ohms, 1/2 watt)	33-475339
106	Tubular Condenser (.02 mfd.)	30-4516
107	Tubular Condenser (.1 mfd.)	30-4455
108	Resistor (150 000 ohms, 1/2 watt)	33-415339
109	Resistor (2700 ohms, 1/2 watt)	33-227339
110	Tubular Condenser (.05 mfd.)	30-4123
111	Tubular Condenser (.05 mfd.)	30-4123
112	Tubular Condenser (.05 mfd.)	30-4123
113	Resistor (1.5 meg., 1/2 watt)	33-515339
114	Tubular Condenser (.05 mfd.)	30-4519
115	Resistor (99,000 ohms, 1/2 watt)	33-399339
116	No. 2 Control Amplifier Transformer	32-3087
117	Tubular Condenser (.05 mfd.)	30-4444
118	Resistor (300 ohms, 1/2 watt)	33-130339
119	Sensitivity Control (50,000 ohms)	33-5295
120	No. 1 Control Amplifier Transformer	32-3086
121	Silver Mica Cond. (155 mmfd.)	30-1121
122	Compensator (Secondary Inductor)	31-6268
123	Secondary Inductor (Remote Tuning)	40-6414
124	Wave Switch	42-1550
	Wireless Remote Control Unit	45-2709
125	Primary Inductor	32-3097
126	Silver Mica Cond. (200 mmfd.)	30-1115
127	Tubular Condenser (.05 mfd.)	30-4519
128	Compensator (Primary Inductor)	31-6268
129	Resistor (500 ohms, 1/2 watt)	33-150339
130	Remote Control Battery Pack	41 8023
131	Dial Unit (Pulser)	38-9704

MISCELLANEOUS PARTS

Bezel	56-1509
Bezel Gasket and Staple Assembly	38-9734
Cabinet (Model 40-215RX)	104028
Cabinet (Model 40-217RX)	104038
Cable (Power Supply)	L-3176
Dial	27-5563
Drive Cord (Tuning Condenser)	31-2315
Drive Cord (Pointer Operation)	31-2320
Disc (Tuning)	27-4766
Disc (Volume)	27-4765
Disc (Wave Switch)	27-4767
Disc (Tone Control)	27-4764
Knob (Sensitivity Control)	27-4326
Pilot Lamp Assy. (R. H. Bracket)	38-9694
Pilot Lamp Assy. (L. H. Bracket)	38-9711
Pilot Lamp Assy. (Station Lights)	38-9709
Pilot Lamp Assy. (Cabinet Bullseye)	38-9712
Pilot Lamp Jewel (Bullseye)	27-4777
Socket (4 prong, type 80 tube)	27-6044
Socket (6 prong, type 42 & 78 tubes)	27-6036
Socket (Octal, type 6J7G tube)	27-6057
Socket (Octal, type 6H6G, 2A4G & 6Q7G tubes)	27-6086
Socket (Octal, type 6J8G tube)	27-6099
Socket (Loktal, type 1232 tube)	27-6129
Spring (Drive Cords)	28-8913
Speaker	36-1450
Washer (Keyed Washer, Tuning Disc)	56-1029



SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

FIG. 3. SCHEMATIC DIAGRAM, WIRELESS REMOTE CONTROL.

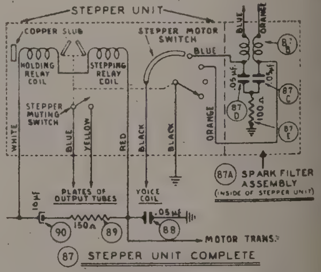
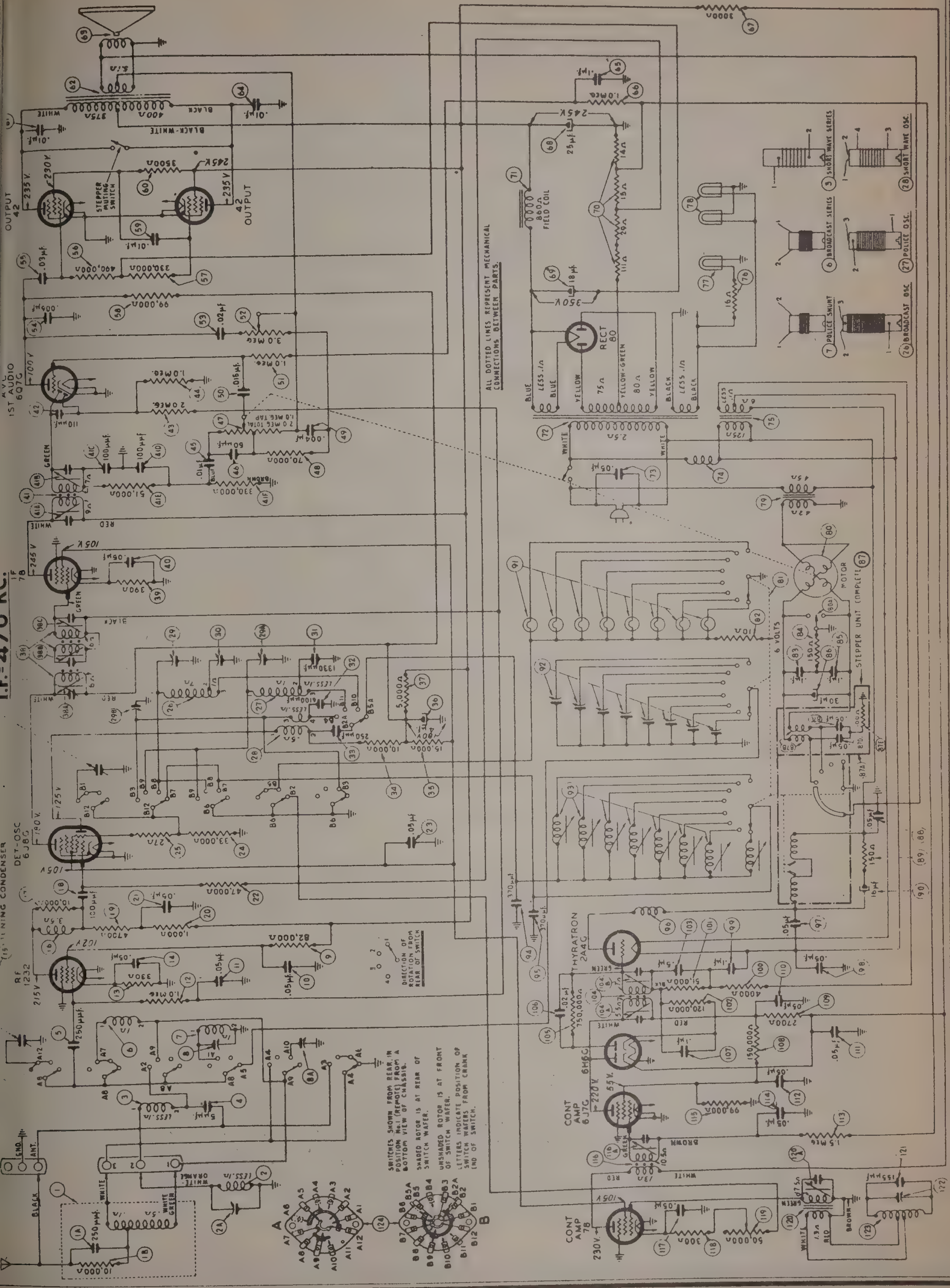


FIG. 4. WIRING OF STEPPER UNIT. WIRELESS REMOTE CONTROL.

PHILCO RADIO & TELEVISION CORP.

MODELS 40-215RX
40-217RX


I.F.-470 KC.
RF 1232
DET-OSC 6J8G
IF 7B
AVC 1ST AUDIO 6Q7G
OUTPUT 42
42 OUTPUT
STEPPER MUTING SWITCH
RECT 80
860Ω FIELD COIL
THYRATRON 2A4G
6H6G
CONT AMP 6J7G
CONT AMP 7B
MOTOR
STEPPER UNIT COMPLETE
6 VOLTS
ALL DOTTED LINES REPRESENT MECHANICAL CONNECTIONS BETWEEN PARTS.
SWITCHES SHOWN FROM REAR, IN POSITION No. 1 (REMOTE) FROM A BOTTOM VIEW OF CHASSIS.
SHADED ROTOR IS AT REAR OF SWITCH WAFER.
UNSHADED ROTOR IS AT FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM CRANK END OF SWITCH.
DIRECTION OF ROTATION FROM REAR OF SWITCH
TUNING CONDENSER
GND. ANT.
SHORT WAVE SERIES
SHORT WAVE OSC.
BROADCAST SERIES
POLICE OSC.
POLICE SHUNT
BROADCAST OSC.

MODELS 40-215RX
40-217RX

PHILCO RADIO & TELEVISION CORP.

SPECIFICATIONS

Models 40-215, code 121, and 40-217, code 121, are twelve (12) tube super-heterodyne radios employing Philco Wireless Remote Control and a Built-in Super-Aerial System. Three tuning ranges are also provided for reception of standard, Police and Short Wave Broadcast stations. These models are also designed to receive the sound of a television program, tuned in by Philco Television Sets and can be set up for use with a Wireless Record Player.

The Wireless Remote Control will automatically tune in eight (8) broadcast stations, increase and decrease volume and turning off the radio without any connections between the set and the control unit.

The Built-in Super-Aerial System eliminates an outside aerial and ground. Included in the Built-in Super Aerial System is a statically shielded loop for broadcast band reception and a short wave broadcast loop. The feature of the built-in broadcast band statically shielded loop, is that it may be turned to the position in which it picks up a minimum amount of interference; or if interference is not present, the loop may be set in the position where best reception is obtained.

In addition, other features of design are; automatic volume control, continuously variable tone control, bass compensation, and degenerated push-pull pentode audio output. Outside aerial connections are also provided for remote localities where station signal strength is exceptionally weak.

POWER SUPPLY: 115 volts, 60 cycles.

This model can also be operated on a 115 volt, 25 cycle power supply, changing the power transformers and several parts as indicated on the replacement parts on page 79.

FREQUENCY TUNING RANGES:

540 to 1520 K. C. 1.4 to 3.6 M. C. 6.0 to 18 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

PHILCO TUBES USED: Receiver — 1232, R. F. Amplifier; 6J8G, Detector Oscillator; 78, I. F. Amplifier; 6Q7G, 2nd Detector, A. V. C., 1st Audio; two 42, Push-Pull Audio Output; 80, Rectifier.

Control Frequency Amplifier — 78, 6J7G, 6H6G, 2A4G.

Wireless Remote Control — Type 30 tube.

AUDIO OUTPUT: 7 Watts.

CABINET DIMENSIONS:	Height	Width	Depth
Model 40-215	38"	30"	15⅝"
Model 40-217	36¼"	35"	14¼"

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to the grid of the 78 I. F. tube. The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the resistor.

2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of one of the 42 tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the R. F. and I. F. compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 5, page 80. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the grid of the tubes. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

RECEIVER CIRCUIT ADJUSTMENTS — Models 40-215, 40-217

Operation	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1	78 I. F. Grid	470 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	41A, 41B	Turn Out 38B Full
2	6J8G Det. Osc. Grid	470 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	38A, 38C, 38B	Note A
3	Use Loop on Generator	18.0 M. C.	18.0 M. C.	Vol. Max. Range Switch "Short Wave"	29B, 2A	Note C, Note D 2A on SW Loop
4	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	29, 8A	Note A
5	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	30	Rollgang
6	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	29	
7	Use Loop on Generator	3.5 M. C.	3.5 M. C.	Vol. Max. Range Switch "Police"	29A, 8	Note B

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable and dial pointer is shown in Fig. 1.

NOTE B — See Wireless Remote Control Amplifier adjustments.

NOTE C — If two peaks (signals) are observed on the aligning meter when adjusting the oscillator padder No. 29B, tune the padder to the second peak from the maximum capacity position (screw all the way in).

NOTE D — If two peaks (signals) are observed on the aligning meter when adjusting the loop padder 2A, tune the padder to the first peak signal from the maximum capacity position (screw all the way in). When adjusting the padders to this first peak roll the tuning condenser (rock) slightly back and forth to obtain the maximum readings on the aligning meter.

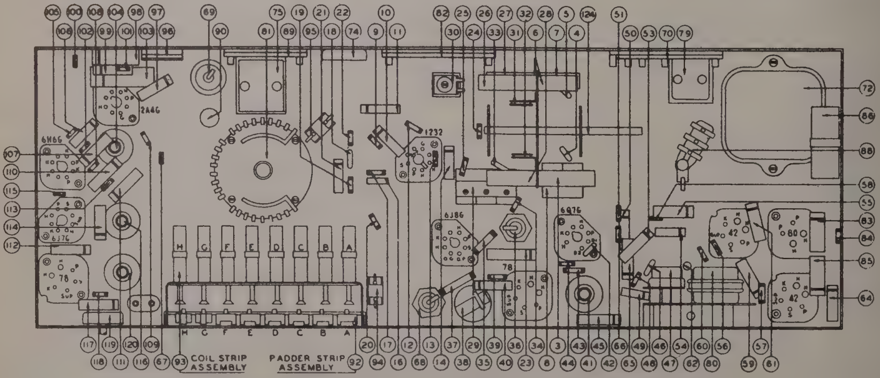
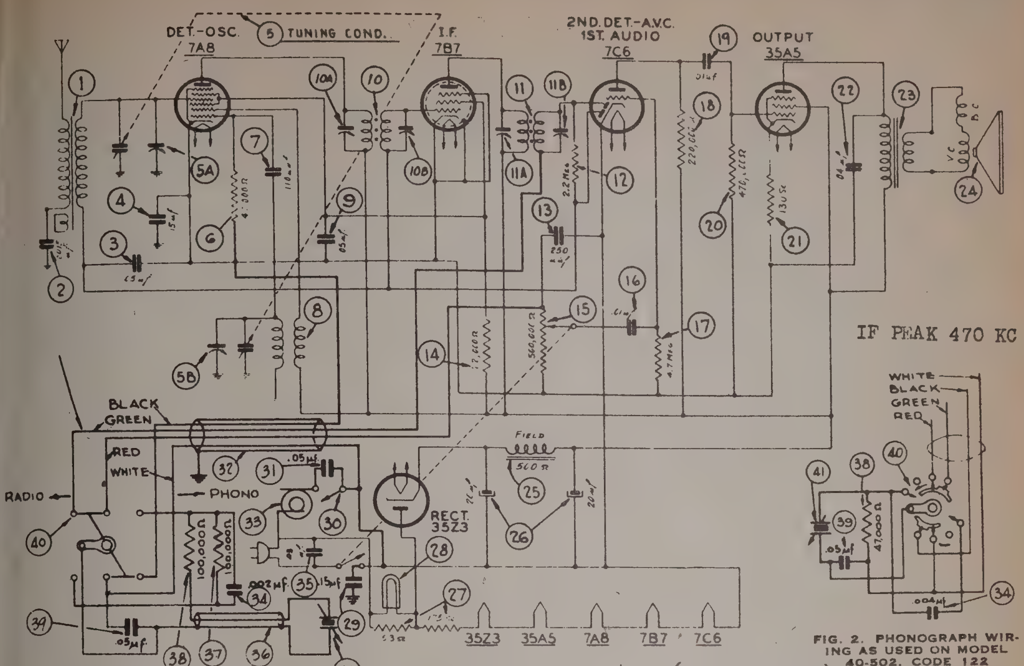


FIG. 2. REPLACEMENT PARTS, UNDERSIDE OF CHASSIS.

PHILCO RADIO & TELEVISION CORP.

MODELS 40-501 (121)
40-502 (121, 122)



MODELS 40-501, CODE 121 AND 40-502, CODES 121 AND 122

FIG. 2. PHONOGRAPH WIRING AS USED ON MODEL 40-502, CODE 122

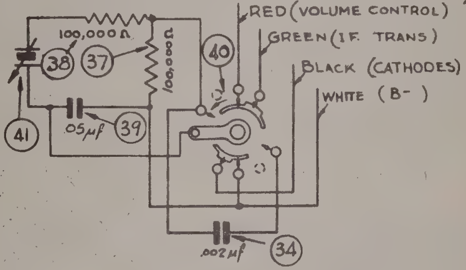


FIG. 1. PHONOGRAPH WIRING AS USED ON MODEL 40-502, CODE 121

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3151
2	Condenser (.0015 mfd., 200 volts)	30-4555
3	Condenser (.05 mfd., 400 volts)	30-4519
4	Condenser (.15 mfd., 400 volts)	30-4505
5	Tuning Condenser	31-2354
5A	Antenna Compensator, Part of 5	
6	Resistor (47,000 ohms, Model 40-502)	33-347339
7	Condenser (110 mmfd.)	30-1130
8	Oscillator Transformer	32-3152
9	Condenser (.05 mfd., 200 volts)	30-4519
10	1st I. F. Transformer	32-3149
11	2nd I. F. Transformer	32-3150
12	Resistor (2.2 megohms)	33-522339
13	Condenser, Mica (250 mmfd.)	61-0033
14	Resistor (22,000 ohms, Model 40-502, Code 122)	33-322339
15	Volume Control	33-5306
16	Condenser (.01 mfd., 200 volts)	30-4479
17	Resistor (4.7 megohms, Model 40-502, Code 122)	33-547339
18	Resistor (220,000 ohms, Model 40-502, Code 122)	33-422339
19	Condenser, Tubular (.01 mfd., 400 volts)	30-4572
20	Resistor (470,000 ohms, Model 40-502, Code 122)	33-447339
21	Resistor (130 ohms)	33-113339
22	Condenser (.02 mfd., 400 volts)	30-4516
23	Output Transformer	
	For use with Speaker 36-1469-1	32-8057
	For use with Speaker 36-1469-9	32-8044
24	Cone Assembly for Speaker 36-1469-1	36-4115
	Cone Assembly for Speaker 36-1469-9	36-4113
25	Field Coil—Replace Speaker 36-1469	
26	Electrolytic Condenser (20-20 mfd.)	30-2382
27	Resistor	33-3367
28	Pilot Lamp	34-2068
29	Condenser (.15 mfd.)	
30	Motor Switch (40-501, 121, 40-502, 121-122)	42-1521

SCHE. No.	DESCRIPTION	PART No.
31	Condenser, Tubular (.05 mfd.)	30-4518
32	Radio-Phono Cable, Model 40-501	L-3192
	Radio-Phono Cable, Model 40-502, Code 121-122	L-3206
33	Motor (115 volts, 60 cycle)	
	40-501, Code 121, 40-502, Code 121	35-1158
	40-502, Code 122	35-1216
34	Condenser (.002 mfd., 40-501, 40-502, Code 121)	30-4579
	Condenser (.004 mfd., 40-502, Code 122)	30-4578
35	Condenser (.03 mfd., 400 volts)	30-4449
36	Pickup Cable	

SCHE. No.	DESCRIPTION	PART No.
37	Resistor (100,000 ohms, 40-501, Code 121, 40-502, Code 121)	33-410339
38	Resistor (100,000 ohms, 40-501, 40-502, Code 121)	33-410339
	Resistor (47,000 ohms, 40-502, Code 122)	33-347339
39	Condenser, Tubular (.05 mfd., 400 volts)	30-4519
40	Radio-Phono Switch	
	(Model 40-501)	42-1523
	(Model 40-502, Code 121-122)	42-1524
41	Pickup Crystal Cartridge	
	40-501, 40-502, Code 121	415-1027
	40-502, Code 122	35-2069

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond.	470 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	11A, 11B 10A, 10B	
2	Ant. Ter.	1700 K. C.	1700 K. C.	Vol. Max.	5B	Note A
3	Ant. Ter.	1500 K. C.	1500 K. C.	Vol. Max.	5A	

NOTE A — DIAL CALIBRATION: The dial pointer is adjusted by closing the tuning condenser (plates fully meshed) and setting the pointer on the dot below 55 on the dial.

PRODUCTION CHANGES

MODELS 40-501, CODE 121; 40-502, CODES 121-122

Beginning with sets marked Run 2, resistor (6) 47000 ohms, Part No. 33-347339 was changed to 22000 ohms, Part No. 33-322339. This change was made to stabilize oscillator circuit.

Output Transformer for Speaker Part No. 36-1469-1 listed as Part No. 32-8057 should be Part No. 32-8047.

MODEL 40-502, Code 122

Motor (33) 115 volts, 60 cycle, Part No. 35-1216 changed to Part No. 35-1222. The turntable for the new motor is Part No. 35-3044.

MODEL 40-504
MODELS 40-525,
40-526, 40-527

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS — Models 40-525, 40-526, 40-527

SCHE. No.	DESCRIPTION	PART No.
1	Loop Assembly	38-9897
1A	Compensator	31-6308
1B	Mica Condenser (250 mmfd.)	61-0033
1C	Resist. (10,000 ohms, ½ watt)	33-310339
2	Mica Condenser (250 mmfd.)	61-0033
3	Mica Condenser (1120 mmfd.)	30-1140
4	Tubular Condenser (.05 mfd.)	30-4518
5	Resistor (1.0 meg., ½ watt)	33-510339
6	Tubular Condenser (.05 mfd.)	30-4518
7	Resis. (270,000 ohms, ½ watt)	33-427339
8	R. F. Transformer	32-3283
9	Tuning Condenser	31-2374
10	Resistor (5600 ohms, ½ watt)	33-256339
11	Resist. (47,000 ohms, ½ watt)	33-347339
12	Mica Condenser (250 mmfd.)	61-0033
13	Tubular Condenser (.05 mfd.)	30-4518
14	Tubular Condenser (.05 mfd.)	30-4518
15	Resist. (10,000 ohms, ½ watt)	33-310339
16	Mica Condenser (250 mmfd.)	61-0033
17	Oscillator Transformer	32-3212
18	1st I. F. Trans. Assembly	32-3210
19	Resistor (27,000 ohms, 1 watt)	33-327439
20	Resistor (1,000 ohms, ½ watt)	33-210339
21	2nd I. F. Trans. Assembly	32-3281
22	Resistor (2.2 meg., ½ watt)	33-522339
23	Tubular Condenser (.01 mfd.)	30-4572
24	Volume Control (.5 meg.)	33-5332
25	Resistor (4.7 meg., ½ watt)	33-547339
26	Mica Condenser (250 mmfd.)	61-0033
27	Tubular Cond. (.004 mfd.)	30-4578
28	Resistor (1.0 meg., ½ watt)	33-510339
29	Resis. (330,000 ohms, ½ watt)	33-433339
30	Tubular Cond. (.006 mfd.)	30-4445
31	Tubular Condenser (.02 mfd.)	30-4481
32	Tone Control & On-Off Switch	42-1520
33	Output Transformer	32-8063
34	Cone & Voice Coil Assembly: For Speaker 36-1480-3	36-4086
35	Field Coil (Replace Spkr. Part No. 36-1480)	
36	Electrolytic Condenser (4 mfd., 400 V.)	30-2401
37	Electrolytic Condenser (12-20 mfd., 475 V.)	30-2437
38	Resistor (39 ohms, ½ watt)	33-039339
39	Resistor (220 ohms, 1 watt)	33-122431
40	Power Transformer (115 V., 50-60 cycles)	32-8064
41	Bakelite Cond. (.01-.01 mfd.)	3903-DG
42	Pilot Lamps	34-2064
43	Wave Switch	42-1494
44	Pushbutton Switch	42-1528
45	Padder Strip	31-6315
46	Motor Switch	42-1548
47	Motor (110 volts, 60 cycles)	35-1204
48	Switch (Part of 46)	
49	Crystal Cartridge (Pickup)	35-2030
50	Pickup Cable Assembly	
	Switch Section	41-3508
	Changer	318-1775
51	Radio-Phono Switch	42-1551
52	Cable (Radio-Phono Switch)	L-3217
53	Condenser (.05 mfd.)	30-4518
	MISCELLANEOUS PARTS	
	Automatic Record Changer	35-1180
	Cabinet	10452-A
	Cable (Power)	L-3199
	Cable (Speaker)	41-3329
	Cable (Radio-Phono)	L-3217
	Dial Scale	27-5506
	Drive Cord (Pointer Drive)	31-2399
	Drive Cord (Cond. Drive)	31-2400
	Drive Drum (Tuning)	38-9883
	Escutcheon (Station Tabs)	28-5742
	Knobs (Vol., Tone., Wave Sw.)	27-4332
	Knob (Pushbutton Switch)	27-4824
	Knob (Phono Off-On)	27-4627
	Pilot Light Socket Assy.	38-9904
	Pointer	56-1532
	Shaft (Tuning)	318-1506
	Spring (Cond. Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Spring (Tuning Shaft Assy.)	28-8955
	Speaker	36-1480
	Sockets	55-0575
	Tab (Dial)	27-5526
	Tab (Television)	27-9450
	Tab Kit (Station Call Letters)	40-6473
	MOUNTING PARTS	
	Nail Escutcheon Mounting	W-1074
	Nut Speaker Mounting	W-124FA3
	Nut Phono Switch Mtg.	W-684FA4
	Screw (Chassis Mounting)	W-2068
	Screw (Speaker Plug)	W-1714
	Washer (Chassis Mounting)	W-410FA3
	Washer (Speaker Mounting)	27-7467
	"C" Washer (Tuning Shaft)	28-2043
	MODEL 40-526	
21	2nd I. F. Transformer Assembly	32-3382
46	Motor Switch	42-1536
47	Motor (110 volts, 60 cycles)	35-1225
48	Switch (pick-up shorting—is not used in Model 40-526)	
49	Crystal Cartridge (Pick-up)	35-2069
	Rubber Washer (Motor Board Mtg.)	27-4201
	Rubber Bushing (Motor Board Mtg.)	27-4202
	Plug Motor Connecting (Motor Board)	27-4863
	Connector (Pick-up Lead)	27-7133
	Connector Housing (Pick-up Lead)	28-1270
	Sleeve (Motor Board Mounting)	28-2257
	Pick-up and Tone Arm Complete	35-2064
	Speaker	36-1480
	Motor Connecting Plug and Wires (Chassis)	41-3507
	Turntable	35-3045
	MODEL 40-527, Code 121	
34	Cone Assem. (for Speaker 36-1491-2)	36-4133
	Cabinet	10465A
51	Phono-Radio Switch	42-1523
	Speaker	36-1491
	Knob (Phono Off-On Switch)	27-4627
	Pilot Lamp Asstmbly (Cabinet)	38-9939
	Connector	27-7133
	Housing	28-1270
	Cable (Pick-up)	L-3195

MODEL 40-525

Model 40-525 is a combination radio-phonograph consisting of a six tube electric push-button tuning superheterodyne radio receiver and an automatic record changer. The radio receiver contains six (6) electric push-buttons; five (5) of the push-buttons are used for reception of stations and one (1) to select manual tuning (Dial). The Specifications with the exception of those listed below are the same as Model 40-135.

The Automatic Record Changer, Philco Part No. 35-1180, plays twelve 10-inch records or ten 12-inch records at one loading.

MODEL 40-526, Code 121

Model 40-526, Code 121, is similar to Model 40-525, Code 121, with the exception of the cabinet and phonograph mechanism. A manually operated tone arm and pick-up is used in the Model 40-526. The same radio set is incorporated in both models.

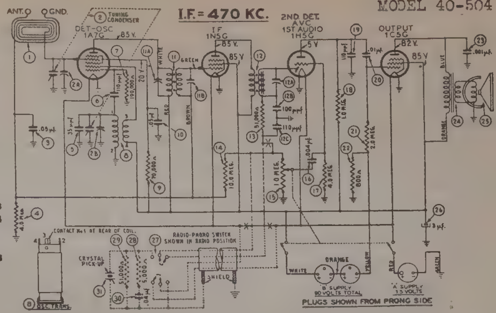
The circuit diagram and replacement parts for Model 40-525, Code 121, apply also to Model 40-526. There are several part changes, however, which differ from those of Model 40-525. These parts are as follows:

MODEL 40-527, Code 121

Model 40-527, Code 121, is similar to Model 40-525, Code 121, with the exception of the cabinet, speaker and several parts. The service information for the Model 40-525, Code 121, also applies to Model 40-527, Code 121.

Model 40-504 is a portable battery operated combination phonograph and radio. The radio consists of a four tube superheterodyne circuit covering a frequency range from 540 to 1600 K. C. A loop aerial is also built into the cabinet for portable use in addition to connections for an external aerial

MODEL 40-504



SCHE. No.	DESCRIPTION	PART No.
1	Loop Assembly	40-6421
2	Tuning Condenser	31-2322
3	Tubular Cond. (.05 mfd.)	30-4519
4	Resistor (4.0 meg., ½ watt)	33-540339
5	Mica Cond. (35 mmfd.) mounted at top of tuning condenser	30-1095
6	Mica Cond. (110 mmfd.)	30-1031
7	Resistor (190,000 ohms, ½ watt)	33-419339
8	Oscillator Trans.	32-3118
9	Resistor (70,000 ohms. ½ watt)	33-370339
10	Tubular Cond. (.05 mfd.)	30-4444
11	1st I. F. Trans. Assy.	32-3103
12	2nd I. F. Trans. Assy.	32-3176
12C	Mica Cond. (110 mmfd.)	30-1031
13	Resistor (51,000 ohms, ½ watt)	33-351339
14	Resistor (10.0 meg., ½ watt)	33-610339
15	Volume Control (1.0 meg.)	33-5310
16	Tubular Cond. (.004 mfd.)	30-4578
17	Resistor (4.0 meg., ½ watt)	33-540339
18	Resistor (1.0 meg., ½ watt)	33-510339
19	Mica Cond. (110 mmfd.)	30-1031
20	Tubular Cond. (.01 mfd.)	30-4572
21	Resistor (2.0 meg., ½ watt)	33-520339
22	Resistor (800 ohms, ½ watt)	33-180339
23	Tubular Cond. (.001 mfd.)	30-4201
24	Output Trans. (Spkr. No. 36-1451-3)	32-8036
25	Cone & Voice Coil Assy. (Spkr. No. 36-1451-3)	36-4090
26	Electrolytic Cond. (3 mf., 150 V.)	30-2359
27	Radio-Phono Switch	42-1501
28	Resistor (5000 ohms, ½ watt)	33-250339
29	Resistor (51,000 ohms, ½ watt)	33-351339
30	Tubular Cond. (.04 mfd.)	30-4119
31	Crystal Pick-up (less tone arm)	35-2033
	Pick-up and tone arm complete	35-2036
	Tone arm (less pick-up)	35-2037

INTERMEDIATE FREQUENCY: 470 K. C.
BATTERIES REQUIRED: "A" Philco Type P-94,
"B" Philco Type P-305
BATTERY DRAIN: "A" 240 M. A.; "B" 8.5 M. A

MODEL 40-504

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	1A7G Grid	.1 mfd.	470 K. C.	580 K. C.	Vol. Cont. Max.	12A, 11B, 11A	Note C
2	Ant. & Grd. Terminals	400 ohms	1550 K. C.	1550 K. C.	Vol. Cont. Max.	2B, 2A	Note B Note C

NOTE A—The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

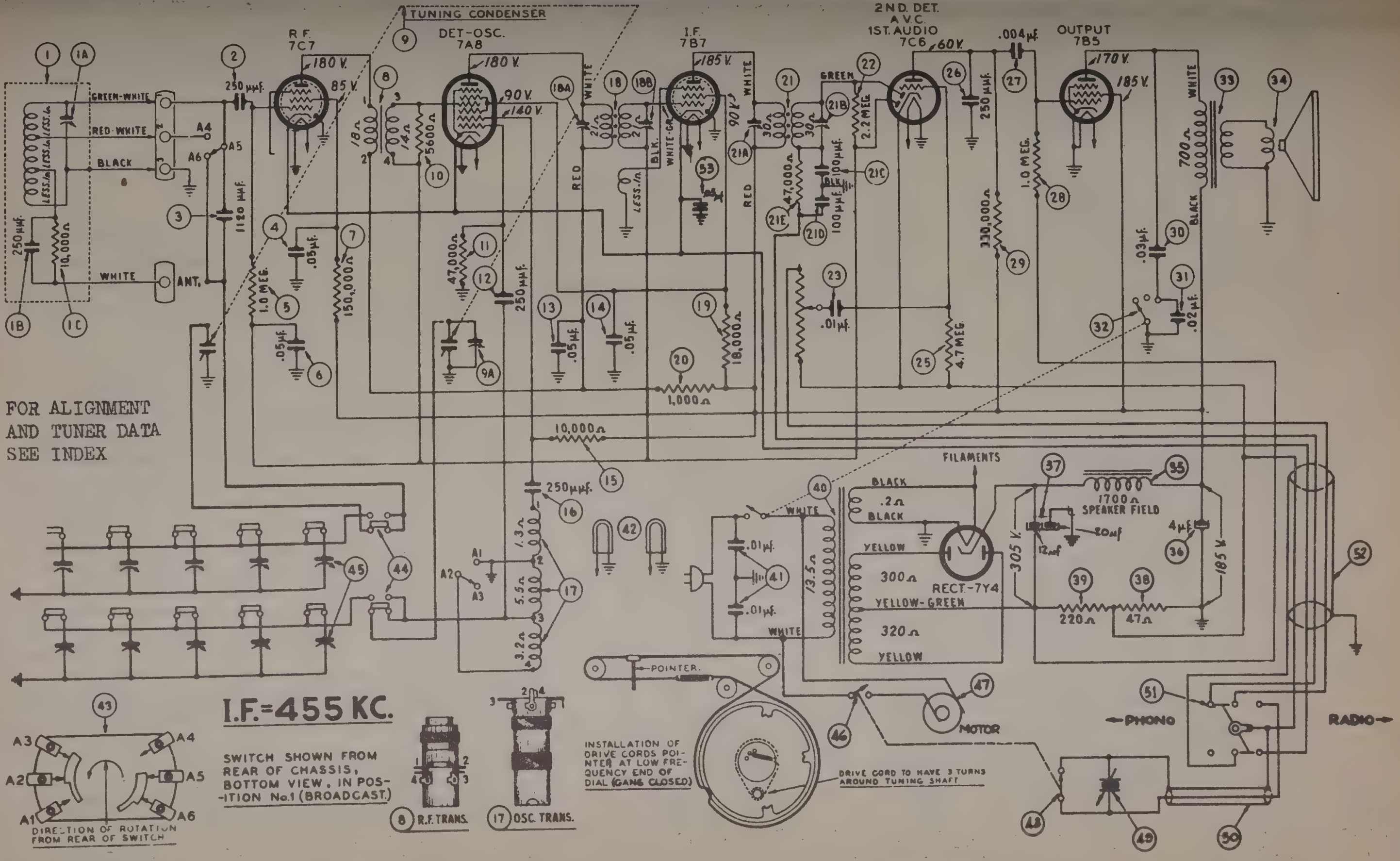
NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With tuning condenser in this position set the pointer to the small "black dot" at the low frequency end of the dial scale.

NOTE C—To adjust the I. F. compensators, remove the back from the cabinet, which is held in place by four screws. The chassis is then taken out by removing the four screws and two corks underneath the cabinet, and the Tuning and Volume knobs. The I. F. compensators are located on top of the I. F. transformers.

When adjusting the Antenna (2A) and Oscillator (2B) compensators, the chassis must be assembled in the cabinet with the batteries and loop in place. The Signal Generator output lead with the "Dummy Antenna" is then connected to the terminals marked "Ant" and "Grd" underneath the cabinet. The antenna and oscillator compensators are then adjusted through the holes in the bottom of the cabinet.

PHILCO RADIO & TELEVISION CORP.

MODELS 40-525,
40-526, 40-527



FOR ALIGNMENT
AND TUNER DATA
SEE INDEX

MODEL 40-525
RADIO-PHONOGRAPH

To prevent oscillation at the low end of the Broadcast Band, the 2nd I. F. Transformer (21) Part No. 32-3281 is changed to Part No. 32-3382.

To stabilize the R. F. circuit and prevent oscillation, the cathode of the 7C7 R. F. tube is removed from the common connection of the R. F., I. F. and converter cathodes and connected directly to the ground. See diagram on page 9. Sets with this change marked "Run No. 3".

MODELS 40-525, 40-526

The cabinet and speaker of these models were changed in later production. The part number changes are as follows:

	Early Production	Later Production
Cabinet Model (40-526)	104528	10452D
Cabinet Model (40-525)	10452A	10452C
Baffle and Silk Assembly	40-6512	40-6582
Speaker	36-1480	36-1491
Cone and Voice Coil Assembly		
(For Speaker 36-1480-3)		36-4086
(For Speaker 36-1480-4)		36-4136
(For Speaker 36-1491-2)		36-4133
(For Speaker 36-1491-4)		36-4147

Models 40-508 and 40-509 are radio-phonograph combinations consisting of an 8 tube electric push button tuning superheterodyne radio and an automatic record changer. The same radio receiver is used in each model. The automatic record changer and cabinet, however, are different.

Model 40-508 employs an improved type automatic record changer, Philco Part No. 35-1180, which plays twelve 10" records or ten 12" records at one loading.

Model 40-509 incorporates the Philco Inter-Mix Record Changer Part No. 35-1176. This record changer plays fourteen 10" and 12" records intermixed, or fifteen 10" or thirteen 12" records at one loading.

The radio receiver of these models contains 8 electric push buttons; 6 of the electric push buttons are used for reception of stations, one for television sound and one to switch to dial tuning.

In addition, the Philco Built-In Super Aerial System is included in these models. This system eliminates an outside aerial and reduces local static interference to a minimum. Included in the Built-In Super Aerial System is a statically shielded loop for broadcast band reception and a shortwave receiving loop. A feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference or if interference is not present, the loop may be set in the position where best reception is obtained. Outside aerial connections are also provided for remote localities where signal strength is weak.

POWER SUPPLY: 115 volts, 60 cycle A. C.

POWER CONSUMPTION:

Model 40-508—90 watts.

Model 40-509—110 watts.

TUNING RANGES: Three

540 to 1550 K. C. 1.5 to 3.4 M. C. 6 to 18 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

AUDIO OUTPUT: 2 watts.

Replacement Parts — Models 40-508, 40-509

SCHE. No.	DESCRIPTION	PART No.
1	Loop Assy. (Broadcast)	38-9940
1A	Mica Cond. (250 mmfd.)	61-0033
1B	Resistor (10,000 ohms, ½ watt)	33-310339
2	Loop Assy. (Short Wave)	38-9941
3	Compensator	31-6308
4	Mica Cond. (5 mmfd.)	30-1097
5	Mica Cond. (1250 mmfd.)	5886
6	Mica Cond. (250 mmfd.)	61-0033
7	Resistor (390 ohms, ½ watt)	33-139339
8	Tubular Cond. (.05 mfd.)	30-4444
9	Resistor (1.0 meg., ½ watt)	33-510339
10	Tubular Cond. (.05 mfd.)	30-4123
11	Resistor (33,000 ohms, ½ watt)	33-333339
12	Resistor (10,000 ohms, ½ watt)	33-310339
13	R. F. Coupling Trans.	32-3194
14	Mica Cond. (100 mmfd.)	30-1128
15	Resistor (47,000 ohms, ½ watt)	33-347339
16	Resistor (4700 ohms, ½ watt)	33-247339
17	Tubular Cond. (.05 mfd.)	30-4123
18	Oscillator Trans.	32-3195
19	Compensator (2 Section)	31-6298
20	Mica Cond. (5300 mmfd.)	30-1134
21	Tuning Cond. Assy.	31-2391
22	Mica Cond. (250 mmfd.)	61-0033
23	Silver Mica Cond. (370 mmfd.)	30-1110
24	Silver Mica Cond. (370 mmfd.)	30-1110
25	Resistor (33,000 ohms, ½ watt)	33-333339
26	Push Button Switch	42-1489
27	Padder Strip (Push Buttons)	31-6290
28	Coil Strip Assy.	
28A	Coil No. 1 } 540-1060 K. C.	32-3042
28B	Coil No. 2 }	
28C	Coil No. 3 }	
28D	Coil No. 4 } 650-1110 K. C.	32-3042
28E	Coil No. 5 }	
28F	Coil No. 6 } 920-1600 K. C.	32-3041
28G	Coil No. 7 }	
29	Resistor (4700 ohms, ½ watt)	33-247339
30	1st I. F. Trans. Assy.	32-3245
31	Tubular Cond. (.05 mfd.)	30-4123
32	Tubular Cond. (.05 mfd.)	30-4519
33	Tubular Cond. (.2 mfd.)	30-4536
34	Resistor (150 ohms, ½ watt)	33-115339
35	Resistor (33,000 ohms, ½ watt)	33-333339
36	Resistor (1000 ohms, ½ watt)	33-210339
37	2nd I. F. Trans. Assy.	32-3246
38	Tubular Cond. (.01 mfd.)	30-4479
39	Resistor (470,000 ohms, ½ watt)	33-447339
40	Resistor (220,000 ohms, ½ watt)	33-420339
40A	Tubular Cond. (.001 mfd.)	30-4453
41	Volume Control (2.0 meg.)	33-5275
42	Tubular Cond. (.01 mfd.)	30-4479
43	Resistor (2.2 megs, ½ watt)	33-522339
44	Resistor (10.0 meg., ½ watt)	33-610339
45	Mica Cond. (110 mmfd.)	30-1130
46	Tubular Cond. (.002 mfd.)	30-4579
47	Resistor (100,000 ohms, ½ watt)	33-410339
48	Resistor (470,000 ohms, ½ watt)	33-447339
49	Resistor (4700 ohms, ½ watt)	33-247339
50	Tubular Cond. (.004 mfd.)	30-4456
51	Tone Control and On-Off Switch	33-5314
52	Resistor (47,000 ohms, ½ watt)	33-347339
53	Tubular Cond. (.004 mfd.)	30-4456
54	Resistor (470,000 ohms, ½ watt)	33-447339
55	Resistor (470,000 ohms, ½ watt)	33-447339
56	Resistor (47,000 ohms, ½ watt)	33-347339
57	Tubular Cond. (.004 mfd.)	30-4456
58	Tubular Cond. (.003 mfd.)	30-4469
59	Output Transformer	32-8070
60	Cone and Voice Coil Assy. (Spkr. Part No. 36-1450-2)	36-4089
61	Tubular Cond. (.003 mfd.)	30-4469
62	Resistor (6800 ohms, ½ watt)	33-268339
63	Tubular Cond. (.05 mfd.)	30-4123
64	Electrolytic Cond. (16 mfd., 300 V.)	30-2412
65	Resistor (18 ohms, ½ watt)	33-018351
66	Resistor (180 ohms, 1 watt)	33-118451
67	Electrolytic Cond. (12 mfd., 450 V.)	30-2413
68	Field Coil (Replace Spkr. Part No. 36-1450)	
69	Power Trans. (115 V., 50-60 cycles)	32-8069
70	Bakelite Cond. (.01-.01 mfd.)	3903-DG
71	Crystal Cartridge (40-508, 40-509)	35-2030
72	Pilot Lamp (Chassis)	34-2210
72A	Pilot Lamp (Cabinet)	34-2210
73	Tubular Cond. (.01 mfd.)	30-4581
74	Resistor (330,000 ohms, ½ watt)	33-433339
75	Phono Pickup Cable (40-508)	41-3514
	Phono Pickup Cable (40-509)	41-3511
76	Resistor (10,000 ohms, ½ watt)	33-310339
77	Toggle Switch (Model 40-509)	42-1503
78	Phono Motor (Model 40-509)	35-1177
79	Parallel Switch Assy. (Model 40-509)	42-1555

SCHE. No.	DESCRIPTION	PART No.
80	Tone Arm Switch Contact Spring Blade	56-1663
80	Tone Arm Switch Adjusting Screw	W-2100
81	Reject Switch (Part of 79)	
82	Reject Solenoid	42-1552
83	Phono Motor (40-508)	35-1204
84	On-Off Switch (Phono Motor)	42-1546
85	Wave Switch (Tuning Ranges)	42-1530

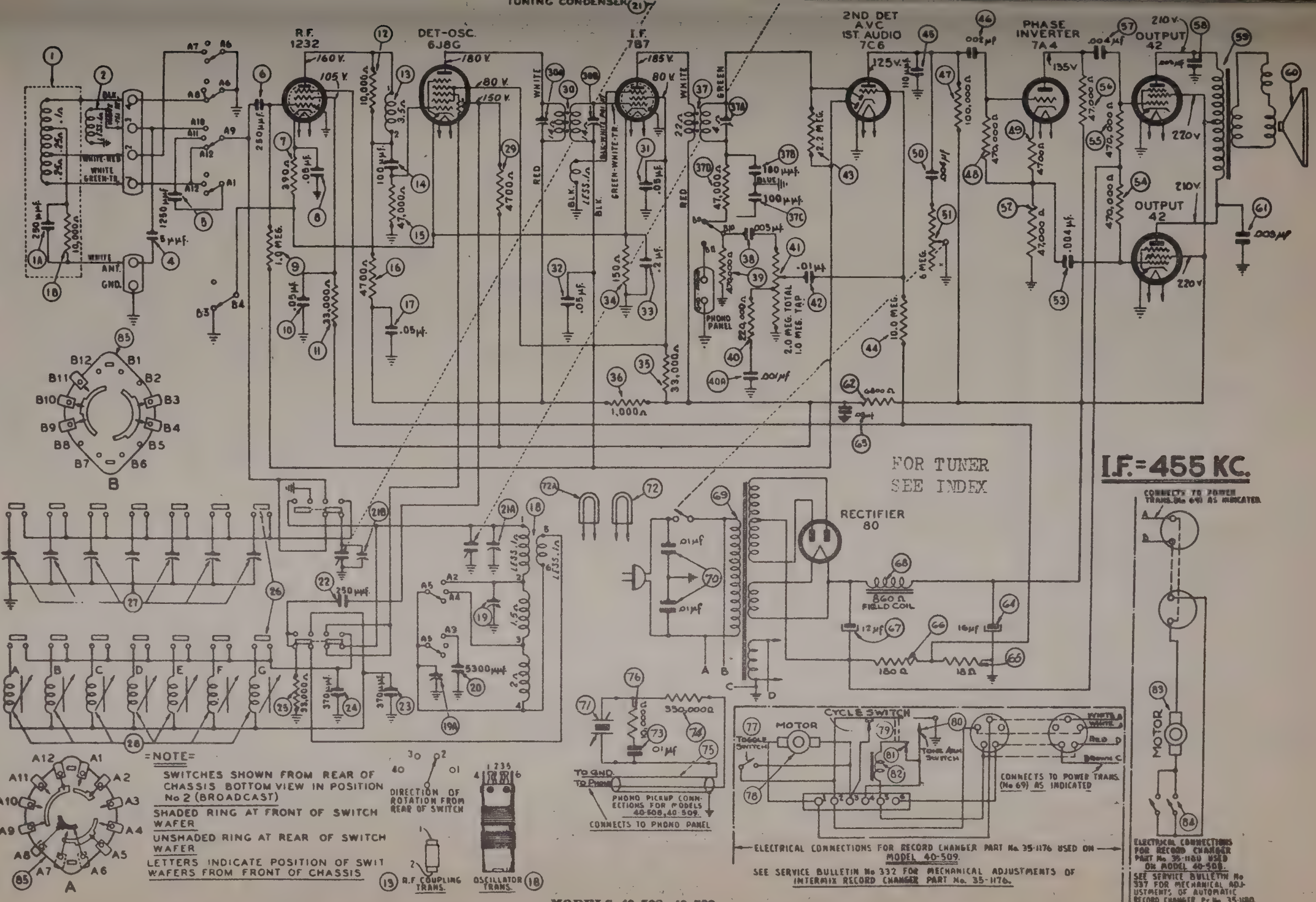
MISCELLANEOUS PARTS

Automatic Record Changer (Model 40-509, Additional Parts Bulletin 332)	35-1176
Automatic Record Changer (Model 40-508, Additional Parts Bulletin 337)	35-1180
Bezel Assembly	40-6489
Bezel Gasket	27-9175
Cable Speaker (Model 40-508)	41-3489
Cable Speaker (Model 40-509)	41-3488
Cable (Chassis to Changer, Model 40-509)	41-3501
Cable (Power)	L-3199
Cable (Chassis to Changer, Model 40-508)	41-3516
Cabinet (Model 40-508)	10410A
Cabinet (Model 40-509)	
Dial Scale	27-5508
Drive Cord	31-2383
Drive Cord Drum Assy.	38-9856
Jewel (Cabinet Pilot Lamp)	27-4777
Knob Assy. (Tuning, Tone, Vol.)	27-4332
Knob (Push-Button)	27-4866
Motor (Automatic Record Changer Model 40-509)	35-1177
Pointer	56-1516
Pilot Lamp	34-2210
Shaft (Tuning)	38-9874
Socket Assembly Cabinet	38-9939
Socket Assy. (Pilot Lamp, Chassis)	38-9607
Socket (Loktal)	27-6131
Socket (Loktal)	27-6126
Socket (42 tubes)	27-6036
Socket (80 tubes)	27-6044
Speaker	36-1450
Terminal Panel (Phono)	38-9918
Terminal Panel (Loop)	38-9870
Tab Television	27-9449
Tab Dial	27-5530
Tab Kit	40-6475

MODEL 40-515, CODE 121
SERVICE INFORMATION

Model 40-515, Code 121 is a radio phonograph combination similar to Model 40-509, Code 121, with the exception of the cabinets. The service information listed in Radio Service Bulletin No. 323A for Model 40-509, also applies to Model 40-515 P-W, and P-M with the part changes as follows:

Cable Assembly (Power from chassis to changer)	41-3506
Cable and Plug (Speaker)	41-3515
Cable Assembly (Terminal Strip Changer)	41-3510
Cable and Plug Assembly (Motor)	41-3523
Cabinet Walnut (40-515 P-W)	10471A
Cabinet Maghogany (40-515 P-M)	10471B
Pilot Lamp Socket Assembly	38-9922


TUNING CONDENSER (21)
R.F. 1232
DET-OSC. 6J8G
I.F. 7B7
2ND DET A.V.C. 1ST AUDIO 7C6
PHASE INVERTER 7A4
OUTPUT 42
OUTPUT 42
RECTIFIER 80
I.F.=455 KC.
FOR TUNER SEE INDEX
ANT.
GND.
PHONO PANEL
860 Ω FIELD COIL
MOTOR
CYCLE SWITCH
TOGGLE SWITCH
TONE ARM SWITCH
CONNECTS TO POWER TRANS. (No 69) AS INDICATED
CONNECTS TO POWER TRANS. No 69 AS INDICATED
PHONO PICKUP CONNECTIONS FOR MODELS 40-508, 40-509.
CONNECTS TO PHONO PANEL
TO GND
TO PHONO
ELECTRICAL CONNECTIONS FOR RECORD CHANGER PART No. 35-1176 USED ON MODEL 40-509.
SEE SERVICE BULLETIN No 332 FOR MECHANICAL ADJUSTMENTS OF INTERMIX RECORD CHANGER PART No. 35-1176.
ELECTRICAL CONNECTIONS FOR RECORD CHANGER PART No 35-1180 USED ON MODEL 40-508.
SEE SERVICE BULLETIN No 337 FOR MECHANICAL ADJUSTMENTS OF AUTOMATIC RECORD CHANGER Pt No 35-1180.
=NOTE=
SWITCHES SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION No 2 (BROADCAST)
SHADED RING AT FRONT OF SWITCH WAFER
UNSHADED RING AT REAR OF SWITCH WAFER
LETTERS INDICATE POSITION OF SWIT WAFERS FROM FRONT OF CHASSIS
DIRECTION OF ROTATION FROM REAR OF SWITCH
R.F. COUPLING TRANS.
OSCILLATOR TRANS.
A
B

MODELS 40-508, 40-509

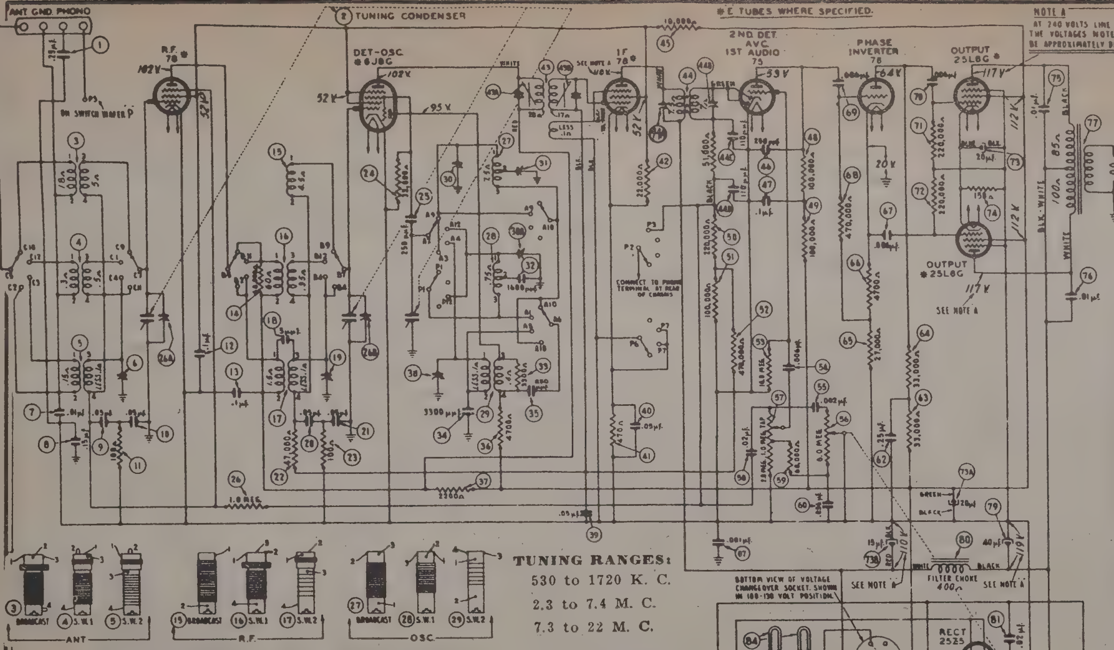
Beginning with Run "5" receivers, the converter tube is changed from a type 6J8G octal to a 7J7 loktal. The tube sockets are changed from Part No. 27-6120 to Part No. 27-6129.

The 2nd I. F. transformer (37) beginning with Run "6" receivers was changed from Part No. 32-3246 to Part No. 32-3383.

POWER CONSUMPTION:

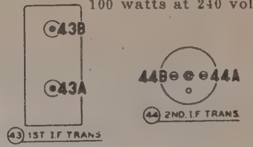
50 watts at 120 volts.

100 watts at 240 volts.



E TUBES WHERE SPECIFIED.

NOTE A
AT 240 VOLTS LINE VOLTAGE, THE VOLTAGES NOTED WILL BE APPROXIMATELY DOUBLED



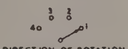
TUNING RANGES:

530 to 1720 K. C.

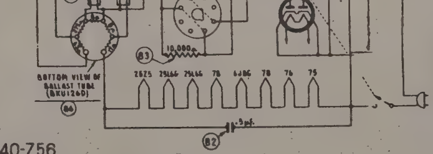
2.3 to 7.4 M. C.

7.3 to 22 M. C.

I.F.=455 KC.



DIRECTION OF ROTATION FROM REAR OF SWITCH.



BOTTOM VIEW OF VOLTAGE CHANGEOVER SOCKET. SHOWN IN 100-130 VOLT POSITION.
SEE NOTE A
FILTER CHOKE 400Ω
RECT 25Z5
BOTTOM VIEW OF BALLAST TUBE (BKU126D)
25Z5 25L6G 25L6G 78 6J8G 78 76 75

MODEL 40-756

TUBES: 78E, R. F. Amplifier; 6J8EG, Converter-Oscillator; 78E, I. F. Amplifier; 75, Second Detector, First Audio and A. V. C.; 76, Phase Inverter; two 25L6EG, Pentode Audio Output; BKU126D, Ballast Tube; and 25Z5, Rectifier.

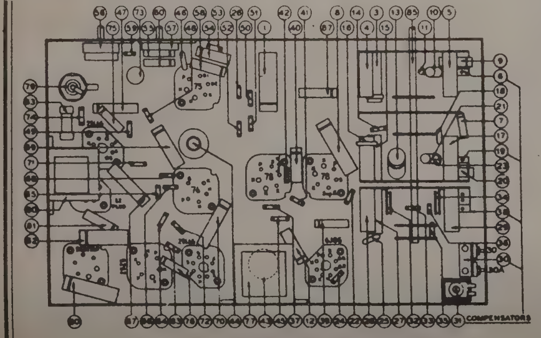
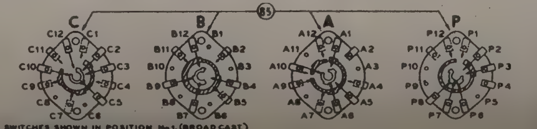


FIG. 1. PART LOCATIONS, UNDERSIDE OF CHASSIS.



SWITCHES SHOWN IN POSITION No. 1, (BROADCAST)
SHADED RING IS AT FRONT OF SWITCH WAFER.
UNSHADED RING IS AT REAR OF SWITCH WAFER.

	DESCRIPTION	PART No.
1	Tubular Condenser (.25 mfd.)	30-4589
2	Tuning Condenser Assembly	31-2384
3	Antenna Transformer (Broadcast)	32-2588
4	Antenna Transformer (Short Wave 1)	32-3093
5	Antenna Transformer (Short Wave 2)	32-2885
6	Compensator	31-6288
7	Tubular Condenser (.01 mfd.)	30-4572
8	Tubular Condenser (.15 mfd.)	30-4600
9	Tubular Condenser (.05 mfd.)	30-4519
10	Tubular Condenser (.05 mfd.)	30-4519
11	Resistor (100 ohms, ½ watt)	33-110336
12	Tubular Condenser (.1 mfd.)	30-4586
13	Tubular Condenser (.1 mfd.)	30-4611
14	Resistor (68,000 ohms, ½ watt)	33-368339
15	R. F. Transformer (Broadcast)	32-2379
16	R. F. Transformer (Short Wave 1)	32-3099
17	R. F. Transformer (Short Wave 2)	32-3168
18	Mica Condenser (5 mmfd.)	30-1120
19	Compensator	31-6288
20	Tubular Condenser (.05 mfd.)	30-4519
21	Tubular Condenser (.05 mfd.)	30-4519
22	Resistor (47,000 ohms, ½ watt)	33-347339
23	Resistor (100 ohms, ½ watt)	33-110336
24	Resistor (33,000 ohms, ½ watt)	33-333339
25	Mica Condenser (250 mmfd.)	30-1119
26	Resistor (1.0 meg., ½ watt)	33-510339
27	Oscillator Transformer (Broadcast)	32-2120
28	Oscillator Transformer (Short Wave 1)	32-3094
29	Oscillator Transformer (Short Wave 2)	32-2889
30	Compensator (2 section)	31-6287
31	Compensator	31-6289
32	Tracking Condenser (1600 mmfd.)	31-6282
33	Resistor (3300 ohms, ½ watt)	33-233339
34	Tracking Condenser (3300 mmfd.)	31-6283
35	Mica Condenser (250 mmfd.)	30-1119
36	Resistor (4700 ohms, ½ watt)	33-247339
37	Resistor (2200 ohms, ½ watt)	33-222339
38	Compensator	31-6288
39	Tubular Condenser (.05 mfd.)	30-4519
40	Tubular Condenser (.05 mfd.)	30-4519
41	Resistor (470 ohms, ½ watt)	33-147336
42	Resistor (22,000 ohms, ½ watt)	33-322339
43	1st I. F. Transformer Assembly	32-3187
44	2nd I. F. Transformer Assembly	32-3133
45	Resistor (10,000 ohms, ½ watt)	33-310339
46	Mica Condenser (250 mmfd.)	30-1119
47	Tubular Condenser (.1 mfd.)	30-4586
48	Resistor (100,000 ohms, ½ watt)	33-410339
49	Resistor (100,000 ohms, ½ watt)	33-410339
50	Resistor (220,000 ohms, ½ watt)	33-422339
51	Resistor (100,000 ohms, ½ watt)	33-410339
52	Resistor (470,000 ohms, ½ watt)	33-447339
53	Resistor (10.0 meg., ½ watt)	33-610339
54	Tubular Condenser (.006 mfd.)	30-4583
55	Tubular Condenser (.002 mfd.)	30-4579
56	Tone Control and On-Off Switch	33-5299
57	Volume Control (2.0 meg.)	33-5304
58	Tubular Condenser (.02 mfd.)	30-4584
59	Resistor (68,000 ohms, ½ watt)	33-368339
60	Tubular Condenser (.006 mfd.)	30-4583
61	Removed in first production	
62	Tubular Condenser (.25 mfd.)	30-4588
63	Resistor (33,000 ohms, ½ watt)	33-333339
64	Resistor (33,000 ohms, ½ watt)	33-333339
65	Resistor (27,000 ohms, ½ watt)	33-327339
66	Resistor (4700 ohms, ½ watt)	33-247339
67	Tubular Condenser (.006 mfd.)	30-4610
68	Resistor (470,000 ohms, ½ watt)	33-447339
69	Tubular Condenser (.006 mfd.)	30-4610
70	Tubular Condenser (.006 mfd.)	30-4610
71	Resistor (220,000 ohms, ½ watt)	33-422339
72	Resistor (220,000 ohms, ½ watt)	33-422339
73	Electrolytic Condenser (15 mfd., 300 V.; 20 mfd., 150 V.; 20 mfd.)	30-2446
74	Resistor (150 ohms, 1 watt)	33-115439
75	Tubular Condenser (.01 mfd.)	30-4581
76	Tubular Condenser (.01 mfd.)	30-4581
77	Output Transformer	32-8072
78	Cone and Voice Coil Assembly	
	(Speaker Part No. 36-1455-3)	36-4107
	(Speaker Part No. 36-1456-3)	36-4108
79	Electrolytic Condenser (40 mfd., 300 V.)	30-2373
80	Filter Choke	32-8029
81	Tubular Condenser (.02 mfd.)	30-4599
82	Tubular Condenser (.5 mfd.)	30-4590
83	Resistor (10,000 ohms, 3 watt)	33-3366
84	Pilot Lamps	34-2068E
85	Wave Switch	42-1474

POWER SUPPLY: 100-130 or 200-260 volt, A. C. or D. C. current

The voltage ranges are selected by inserting the changeover

PHILCO RADIO & TELEVISION CORP.

MODEL 40-756
MODEL 40-780
(121, 251)

MODEL 40-756

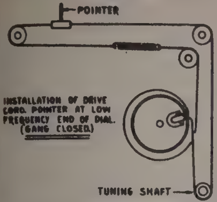

POINTER
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. (GANG CLOSED)
TUNING SHAFT

FIG. 2. TUNING DRIVE CORD AND POINTER ARRANGEMENT.

Operations in Order	SIGNAL GENERATOR			Model 40-756 RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	6J8G Grid and Ground	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Tone Treble Range Switch "Brdcst"	44A, 44B, 43A, 43B	
2	Ant. & Grnd.	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	30, 26B, 26A	Note B
3	Ant. & Grnd.	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	31	Roll Gang Repeat Operation 2
4	Ant. & Grnd.	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Tone Treble Range Switch "S.W.1"	30A	Roll Gang
5	Ant. & Grnd.	400 ohms	21 M. C.	21 M. C.	Vol. Max. Tone Treble Range Switch "S.W.1"	38, 19, 6	Note C

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (38) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20.090 M. C.

MODEL 40-780, Codes 121-251

Signal Generator: The signal generator is connected to the receiver as indicated in the tabulations below under "output connections to receiver". A Dummy Antenna is also required. This is listed under column, "Dummy Antenna, Note A".

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to the Det-Osc. tube grid (6J8EG). The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the other end of the resistor.

2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of one of the 6V6EG tubes. Adjust the meter of the 0 to 30 volt A. C. scale.

After connecting the aligning meters, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram. If the aligning meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	6J8G Grid and Ground	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Tone Treble	38A, 37A, 37B, 36A, 36C	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	27, 26B, 26A	Note B
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	31	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	27, 26B, 26A	
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Tone Treble Range Switch "S.W.1"	27A	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Tone Treble Range Switch "S.W.2"	33, 18, 5	Note C

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

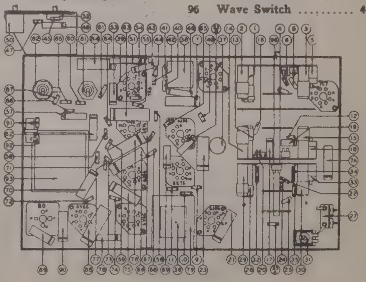
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (33) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 19.090 M. C.

NOTE D — Before adjusting padders 38A, 37A, 37B, 36A, 36C, turn padder 36B all the way out. After the padders are adjusted to maximum, then adjust padder 36B for maximum.

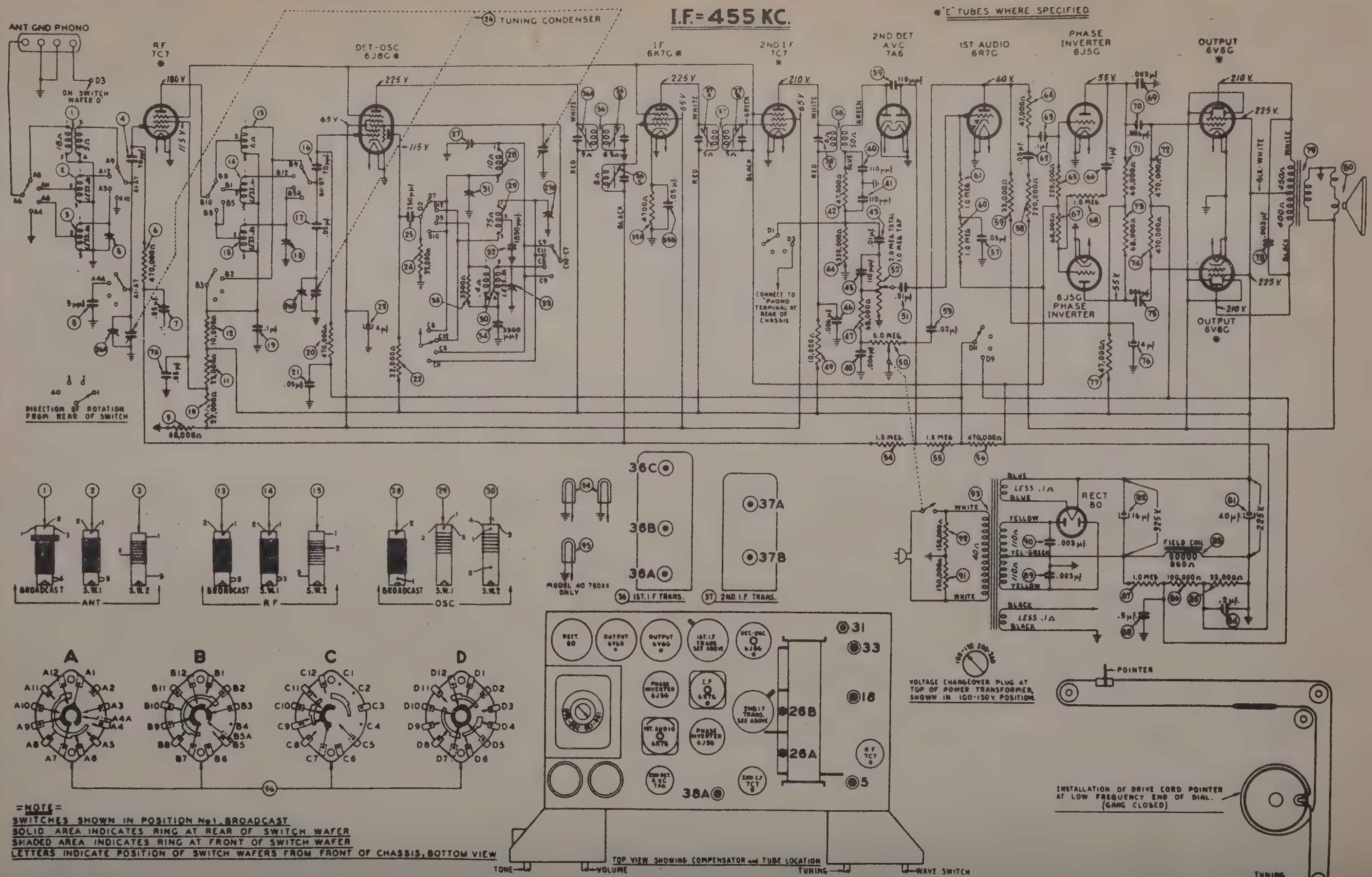
REPLACEMENT PARTS
Model 40-780

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Trans. (Brdcst)	32-2588
2	Antenna Trans. (S.W.1)	32-3191
3	Antenna Trans. (S.W.2)	32-3196
4	Mica Cond. (70 mmfd.)	30-1117
5	Compensator	31-6288
6	Resistor (470,000 ohms, ½ watt)	33-447339
7	Tubular Cond. (.05 mfd.)	30-4609
7A	Tubular Cond. (.05 mfd.)	30-4518
8	Mica Cond. (5 mmfd.)	30-1120
9	Resistor (68,000 ohms, ½ watt)	33-368339
10	Resistor (22,000 ohms, ½ watt)	33-322339
11	Resistor (33,000 ohms, ½ watt)	33-333339
12	Resistor (10,000 ohms, 1 watt)	33-310439
13	R. F. Trans. (Broadcast)	32-3189
14	R. F. Trans. (S.W.1)	32-3190
15	R. F. Trans. (S.W2)	32-3197
16	Mica Cond (70 mmfd.)	30-1117
17	Tubular Cond. (.05 mfd.)	30-4519
18	Compensator	31-6288
19	Tubular Cond. (.1 mfd.)	30-4611
20	Resistor (470,000 ohms, ½ watt)	33-447339
21	Tubular Cond. (.05 mfd.)	30-4609
22	Resistor (22,000 ohms, ½ watt)	33-322339
23	Electrolytic Condenser (4 mfd., 300 V.)	30-2415
24	Resistor (33,000 ohms, ½ watt)	33-333339
25	Mica Cond. (250 mmfd.)	30-1119
26	Tuning Cond. Assy.	31-2386
27	Compensator (2 section)	31-6287
28	Oscillator Trans. (Brdct)	32-3254
29	Oscillator Trans. (S.W.1)	32-3094
30	Oscillator Trans. (S.W.2)	32-3102
31	Compensator	31-6289
32	Tracking Condenser (1850 mmfd.)	31-6310
33	Compensator	31-6288
34	Tracking Condenser (3300 mmfd.)	31-6311
35	Resistor (3300 ohms, ½ watt)	33-233339
35A	Resistor (4700 ohms, ½ watt)	33-247339
35B	Tubular Cond. (.05 mfd.)	30-4519
36	1st I. F. Trans. Assy.	32-3284
37	2nd I. F. Trans. Assy.	32-3285
38	3rd I. F Trans. Assy.	32-3286
39	Mica Cond. (110 mmfd.)	30-1118
40	Mica Cond. (110 mmfd.)	30-1118
41	Mica Cond .(110 mmfd.)	30-1118
42	Resistor (47,000 ohms, ½ watt)	33-347339
43	Tubular Cond. (.01 mfd.)	30-4581
44	Resistor (330,000 ohms, ½ watt)	33-433339
45	Mica Cond. (110 mmfd.)	30-1118
46	Tubular Con. (.006 mfd.)	30-4591
47	Resistor (68,000 ohms, ½ watt)	33-368339
48	Tubular Con. (.006 mfd.)	30-4583
49	Resistor (10,000 ohms, ½ watt)	33-310339
50	Tone Control and On-Off Switch	33-5335
51	Tubular Cond. (.01 mfd.)	30-4581
52	Vol. Control (2.0 meg.)	33-5334
53	Tubular Cond. (.02 mfd.)	30-4516
54	Resistor (1.5 meg., ½ watt)	33-515339
55	Resistor (1.5 meg., ½ watt)	33-515339
56	Resistor (470,000 ohms, ½ watt)	33-447339
57	Tubular Cond. (.05 mfd.)	30-4519
58	Resistor (220,000 ohms, ½ watt)	33-422339
59	Resistor (33,000 ohms, ½ watt)	33-333339
60	Resistor (1.0 meg., ½ watt)	33-510339
61	Resistor (1.0 meg., ½ watt)	33-510339
62	Tubular Cond. (.05 mfd.)	30-4518
63	Tubular Cond. (.1 mfd.)	30-4611
64	Resistor (47,000 ohms, ½ watt)	33-347339
65	Resistor (220,000 ohms, ½ watt)	33-422339
66	Tubular Cond. (.1 mfd.)	30-4611
67	Resistor (68,000 ohms, ½ watt)	33-368339
68	Resistor (1.0 meg., ½ watt)	33-510339
69	Tubular Con. (.003 mfd.)	30-4582
70	Tubular Con. (.006 mfd.)	30-4610
71	Resistor (68,000 ohms, ½ watt)	33-368339
72	Resistor (470,000 ohms, ½ watt)	33-447339
73	Resistor (68,000 ohms, ½ watt)	33-368339
74	Resistor (470,000 ohms, ½ watt)	33-447339
75	Tubular Con. (.006 mfd.)	30-4610
76	Electrolytic Condenser (4 mfd., 300 V.)	30-2415
77	Resistor (47,000 ohms, ½ watt)	33-347339
78	Tubular Con. (.003 mfd.)	30-4582
79	Output Transformer	32-8058
80	Cone and Voice Coil Assy. (Spr. Pt. No. 36-1459-2) (Spr. Pt. No. 36-1460-3)	 36-4106 36-4105
81	Electrolytic Condenser (40 mfd., 300 V.)	30-2366
82	Electrolytic Condenser (16 mfd., 400 V.)	30-2364
83	Field Coil (Replace Spkr.)	
84	Tubular Cond. (.2 mfd.)	30-4587
85	Resistor (33,000 ohms, ½ watt)	33-333339
86	Resistor (100,000 ohms, ½ watt)	33-410339
87	Resistor (1.0 meg., ½ watt)	33-510339
88	Tubular Cond. (.5 mfd.)	30-4590
89	Tubular Con. (.003 mfd.)	30-4608
90	Tubular Con. (.003 mfd.)	30-4608
91	Resistor (150,000 ohms, ½ watt)	33-415339
92	Resistor (150,000 ohms, ½ watt)	33-415339
93	Power Trans. (100-130 V., 200-260 V., 50-60 cycles)	32-8007
94	Pilot Lamps (Dial)	34-2064E
95	Pilot Lamp (XX Cabinet only)	34-2210E
96	Wave Switch	42-1525



MODEL 40-780
(121, 251)

PHILCO RADIO & TELEVISION CORP.


I.F.=455 KC.
*"E" TUBES WHERE SPECIFIED
ANT GND PHONO
RF 7C7 *
DET-OSC 6J8G *
IF 6K7G *
2ND I F 7C7 *
2ND DET AVC 7A6
1ST AUDIO 6R7G
PHASE INVERTER 6J5G
OUTPUT 6V6G *
TUNING CONDENSER
ON SWITCH WAFER D
DIRECTION OF ROTATION FROM REAR OF SWITCH
CONNECT TO PHONO TERMINAL AT REAR OF CHASSIS
RECT 80
FIELD COIL
BROADCAST
S.W.1
S.W.2
ANT
RF
OSC
MODEL 40 780ES ONLY
1ST. I.F TRANS.
2ND. I.F. TRANS.
A
B
C
D
VOLTAGE CHANGEOVER PLUG AT TOP OF POWER TRANSFORMER. SHOWN IN 100-130V. POSITION
POINTER
INSTALLATION OF DRIVE CORD POINTER AT LOW FREQUENCY END OF DIAL. (GANG CLOSED)
TUNING SHAFT
TOP VIEW SHOWING COMPENSATOR and TUBE LOCATION
TONE
VOLUME
TUNING
WAVE SWITCH

=NOTE=
SWITCHES SHOWN IN POSITION No.1 BROADCAST
SOLID AREA INDICATES RING AT REAR OF SWITCH WAFER
SHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW

SCHEMATIC DIAGRAM MODEL 40-780

POWER SUPPLY: 118 or 236 Volt, 50 to 60 Cycle A. C.
118 or 236 Volt, 25 to 40 Cycle A. C.

The receiver is adjusted for operation on either of the above operating voltages by inserting the plug as indicated on top of the power transformer.

TUNING RANGES:
530 to 1720 K. C. 2.3 to 7.4 M. C. 7.4 to 22 M. C.

©John F. Rider, Publisher

PHILCO RADIO & TELEVISION CORP. MODEL 40-2710

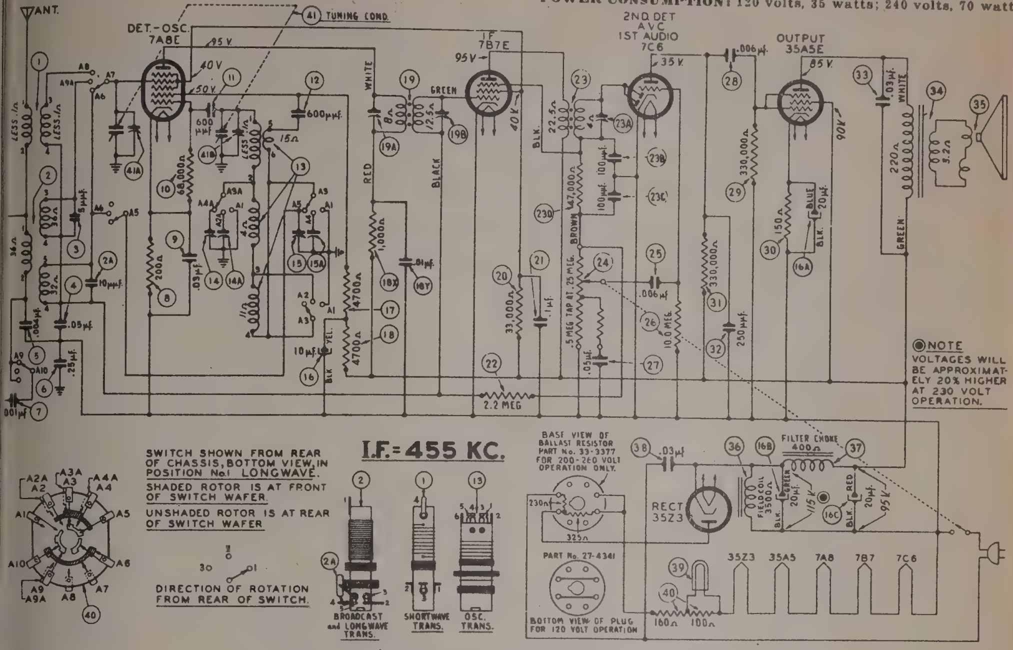
TUNING RANGES:
530 to 1720 K. C. 150 to 390 K. C. 7.2 to 24 M. C.

I. F. FREQUENCY: 455 K. C.

AUDIO OUTPUT: 1 watt.

POWER SUPPLY: 100-130 or 200-260 volts A. C. or D. C. To operate the receiver on 200-260 volts A. C. or D. C. requires the use of a Ballast resistor, Part No. 33-3377 which can be obtained from your distributor. The Ballast resistor is inserted in the socket provided on the top of the chassis.

POWER CONSUMPTION: 120 volts, 35 watts; 240 volts, 70 watts.



SWITCH SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No. 1 LONGWAVE.

SHADED ROTOR IS AT FRONT OF SWITCH WAFER.

UNSHADED ROTOR IS AT REAR OF SWITCH WAFER.

DIRECTION OF ROTATION FROM REAR OF SWITCH.

◉NOTE
VOLTAGES WILL BE APPROXIMATELY 20% HIGHER AT 230 VOLT OPERATION.

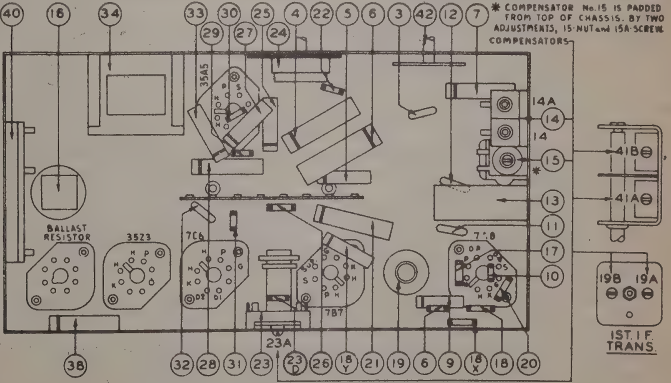
SCHEMATIC DIAGRAM MODEL 40-2710

Replacement Parts — Model 40-2710

SCHE. No.	DESCRIPTION	PART No.
1.	Antenna Trans. (Short Wave)	32-3381
2	Antenna Transformer (Broadcast, Long Wave)	32-3370
2A	Mica Condenser (10 mmfd., Part of No. 2)	30-1124
3	Mica Condenser (5 mmfd.)	30-1120
4	Tubular Condenser (.05 mfd.)	30-4609
5	Tubular Condenser (.004 mfd.)	30-4578
6	Tubular Condenser (.25 mfd.)	30-4589
7	Tubular Condenser (.001 mfd.)	30-4601
8	Resistor (200 ohms, ½ watt)	33-120339
9	Tubular Condenser (.03 mfd.)	30-4585
0	Resistor (68,000 ohms, ½ watt)	33-368339
1	Mica Condenser (600 mmfd.)	30-1154
2	Mica Condenser (600 mmfd.)	30-1154
3	Oscillator Transformer	32-3371
4	Compensator (2 section)	31-6337
5	Compensator	31-6044
6	Electrolytic Condenser (20, 20, 20, 10 mfd., 250 V.)	30-2436
7	Resistor (4700 ohms, ½ watt)	33-247339
8	Resistor (4700 ohms, ½ watt)	33-247339
8X	Resistor (1000 ohms, ½ watt)	33-210339
8Y	Tubular Condenser (.01 mfd.)	30-4581
9	1st I. F. Transformer Assembly	32-3297
0	Resistor (33,000 ohms, ½ watt)	33-333339
1	Tubular Condenser (.1 mfd.)	30-4586
2	Resistor (2.2 meg., ½ watt)	33-522339
3	2nd I. F. Transformer Assembly	32-2674
4	Volume Control and On-Off Switch (.5 meg.)	33-5336
5	Tubular Condenser (.006 mfd.)	30-4583
6	Resistor (10.0 meg., ½ watt)	33-610339
7	Tubular Condenser (.05 mfd.)	30-4519
8	Tubular Condenser (.006 mfd.)	30-4610
9	Resist. (330,000 ohms, ½ watt)	33-433339
0	Resistor (150 ohms, ½ watt)	33-115339
1	Resist. (330,000 ohms, ½ watt)	33-433339
2	Mica Condenser (250 mmfd.)	30-1119
3	Tubular Condenser (.03 mfd.)	30-4585
4	Output Transformer	32-8095
5	Cone and Voice Coil Assembly (Spkr. Part No. 36-1486-2)	36-4126
6	Field Coil (Replace Speaker Part No. 36-1486)	
7	Filter Choke	32-8073
8	Tubular Condenser (.03 mfd.)	30-4520
9	Pilot Lamp	34-2068E
40	Filament Resistor (Wirewound)	33-3372
41	Tuning Condenser Assembly	31-2410
42	Wave Switch	42-1549

MISCELLANEOUS PARTS

SCHE. No.	DESCRIPTION	PART No.
	Acetate Window	27-5370
	Ballast Resistor (200-260 V. operation)	33-3377
	Changeover Plug (Voltage, 115-130 V. operation)	27-4341
	Cabinet	10313B
	Cable and Plug (Power Supply)	L-2289
	Dial	27-5566
	Drive Cord Assembly	31-2415
	Knobs (Volume, Tuning, Wave Switch)	27-4632
	Pointer	28-5201
	Pilot Lamp Assembly	38-9127
	Socket (Loktal Tubes)	27-6131
	Socket (8 prong, Ballast Resis.)	27-6058
	Spring (Drive Cord)	28-8953
	Spring Clip (Mtg. and Trans.)	28-5002
	Spring Clip (Mtg. Osc. Trans.)	28-5003
	Speaker	36-1486
	Tube Shield	56-1566
	Tube Shield Clip	56-1567
	Tuning Drum	31-1283
	Tuning Shaft & Bracket Assy.	38-9888



✱ COMPENSATOR No. 15 IS PADDED FROM TOP OF CHASSIS, BY TWO ADJUSTMENTS, 15-NUT and 15A-SCREW COMPENSATORS

FIG. 2. PART LOCATIONS, UNDERSIDE OF CHASSIS.

MODEL 40-2710
MODEL 40-2725

PHILCO RADIO & TELEVISION CORP.

MODEL 40-2710

CONNECTING ALIGNING INSTRUMENTS

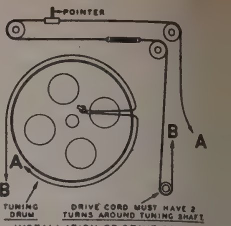
Signal Generator: The signal generator is connected to the receiver as indicated in the tabulations below under "Output Connections to Receiver." A dummy antenna is also required. This is listed under column, "Dummy Antenna, Note A."

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit with the Philco aligning adaptor, Part No. 45-2767, as follows:

Remove the 7C6 tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 35A5 tube. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.



INSTALLATION OF DRIVE CORD
POINTER AT LOW FREQUENCY END OF DIAL
GANG CLOSED

FIG. 1. DIAL CALIBRATION.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Antenna	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	23A, 19A, 19B	
2	Ant. & Grnd.	400 ohms	21 M. C.	21 M. C.	Range Switch "S.W."	41B, 41A	Notes B-C
3	Ant. & Grnd.	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	14A	
4	Ant. & Grnd.	200 mmfd.	580 K. C.	580 K. C.	Range Switch "Brdcst"	15A (Nut)	Roll Gang
5	Ant. & Grnd.	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	14A	
6	Ant. & Grnd.	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	14	
7	Ant. & Grnd.	200 mmfd.	175 K. C.	175 K. C.	Range Switch "L.W."	15 (Screw)	
8	Ant. & Grnd.	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	14	

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (41B) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20.090 M. C.

Model 40-2725 CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to the converter grid (6J8G). The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the resistor.
2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 41 tube. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	6J8G	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	38B, 38A, 32B, 32A	
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	27, 22B, 22A	Note B
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Range Switch "Brdcst"	23	
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Brdcst"	27, 22B, 22A	
5	Antenna and Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
6	Antenna and Ground	200 mmfd.	175 K. C.	175 K. C.	Range Switch "L.W."	28	
7	Antenna and Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
8	Antenna and Ground	400 ohms	21 M. C.	21 M. C.	Range Switch "S.W."	29, 15, 5	Note C

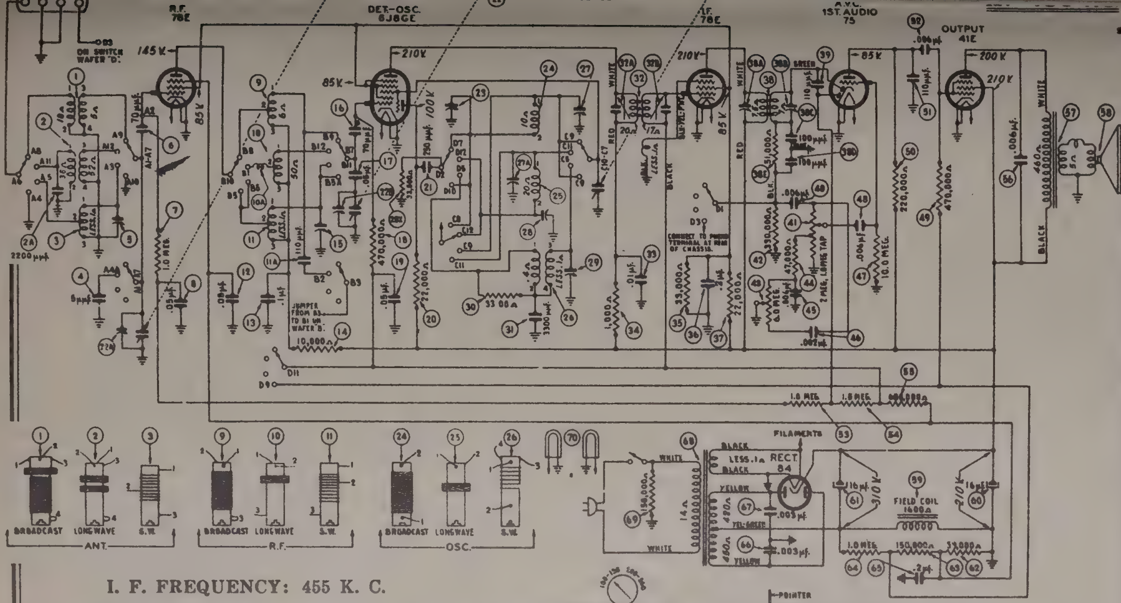
NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

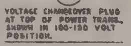
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale. See Schematic Diagram.

NOTE C — When adjusting compensator (29) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 20.090 M. C.

PHILCO RADIO & TELEVISION CORP.

MODEL 40-2725 (121)





VOLTAGE CHANGEOVER PLUG AT TOP OF POWER TRANS. SHOWN IN 100-130 VOLT POSITION.

I. F. FREQUENCY: 455 K. C.

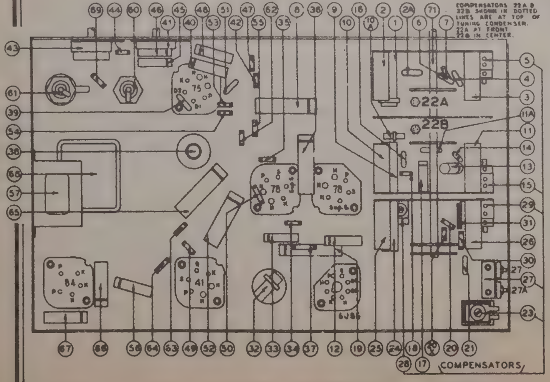
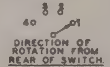
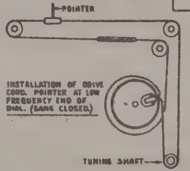

COMPENSATORS 22A & 22B SHOWN IN DOTTED LINES ARE AT TOP OF TUNING CONDENSER. 22A AT FRONT 22B IN CENTER.
COMPENSATORS
22A
22B
75
78
78
41
84
6J8G

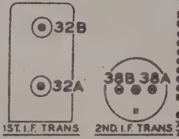
FIG. 2. PART LOCATIONS, UNDERSIDE OF CHASSIS.



DIRECTION OF ROTATION FROM REAR OF SWITCH.

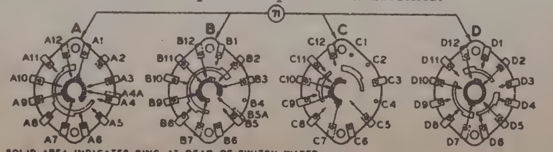


INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. (GANG CLOSED)



1ST. I.F. TRANS   2ND. I.F. TRANS

POWER SUPPLY: 100-130 or 200-260 volt, 50-60 cycle, 60 watts. The voltage ranges are selected by inserting the plug as indicated on top of the power transformer.



SOLID AREA INDICATES RING AT REAR OF SWITCH WAFER.
SHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW.
SWITCHES SHOWN IN POSITION No.1 BROADCAST.

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer (Broadcast)	32-2588
2	Antenna Transformer (Long Wave)	32-3368
2A	Mica Condenser (2200 mmfd.)	30-1125
3	Antenna Transformer (S. W. 2)	32-3196
4	Tubular Condenser (5 mmfd.)	30-1120
5	Compensator (Antenna S. W. 2)	31-6288
6	Mica Condenser (70 mmfd.)	30-1117
7	Resistor (1.0 meg., ½ watt)	33-510339
8	Tubular Condenser (.05 mfd.)	30-4609
9	R. F. Transformer (Broadcast)	32-3189
10	R. F. Transformer (Long Wave)	32-3369
10A	Suppressor Coil	32-3352
11	R. F. Transformer (S. W. 2)	32-3197
11A	Mica Condenser (110 mmfd.)	30-1118
12	Tubular Condenser (.05 mfd.)	30-4519
13	Tubular Condenser (.1 mfd.)	30-4611
14	Resistor (10,000 ohms, 1 watt)	33-310439
15	Compensator (R. F., S. W. 2)	31-6288
16	Mica Condenser (70 mmfd.)	30-1117
17	Tubular Condenser (.05 mfd.)	30-4519
18	Resistor (470,000 ohms, ½ watt)	33-447339
19	Tubular Condenser (.05 mfd.)	30-4609
20	Resistor (22,000 ohms, ½ watt)	33-322339
20X	Resistor (33,000 ohms, ½ watt)	33-333339
21	Mica Condenser (250 mmfd.)	30-1119
22	Tuning Condenser Assembly	31-2386
23	Compensator (Broadcast series)	31-6287
24	Oscillator Transformer (Broadcast)	32-3254
25	Oscillator Transformer (Long Wave)	32-3137
26	Oscillator Transformer (S. W. 2)	32-3102
27	Compensator (Broadcast shunt)	31-6337
27A	Compensator (Long Wave, Part of No. 27)	
28	Tracking Condenser (Long Wave)	31-6297
29	Compensator (S. W. 2)	31-6288
30	Resistor (3300 ohms, ½ watt)	33-233339
31	Tracking Condenser (3300 mmfd.)	31-6311
32	1st I. F. Transformer Assembly	32-3187
33	Tubular Condenser (.01 mfd.)	30-4572
34	Resistor (1,000 ohms, ½ watt)	33-210339
35	Resistor (33,000 ohms, ½ watt)	33-333339
36	Tubular Condenser (.2 mfd.)	30-4587
37	Resistor (22,000 ohms, 1 watt)	33-322439
38	2nd I. F. Transformer Assembly	32-3133
39	Mica Condenser (110 mmfd.)	30-1118
40	Tubular Condenser (.006 mfd.)	30-4583
41	Volume Control (2 meg.)	33-5298
42	Resistor (330,000 ohms, ½ watt)	33-433339
43	Tone Control and On-Off Switch	33-5299
44	Resistor (47,000 ohms, ½ watt)	33-347339
45	Tubular Condenser (.006 mfd.)	30-4583
46	Tubular Condenser (.002 mfd.)	30-4579
47	Resistor (10.0 meg., ½ watt)	33-610339
48	Tubular Condenser (.006 mfd.)	30-4583
49	Resistor (470,000 ohms, ½ watt)	33-447339
50	Resistor (220,000 ohms, ½ watt)	33-422339
51	Mica Condenser (110 mmfd.)	30-1118
52	Tubular Condenser (.006 mfd.)	30-4610
53	Resistor (1.0 meg., ½ watt)	33-510339
54	Resistor (1.5 meg., ½ watt)	33-515339
55	Resistor (680,000 ohms, ½ watt)	33-468339
56	Tubular Condenser (.006 mfd.)	30-4591
57	Output Transformer	32-8018
58	Cone and Voice Coil Assembly (Speaker Part No. 36-1452-2)	36-4103
59	Field Coil (Replace Spkr. Part No. 36-1452)	
60	Electrolytic Condenser (16 mfd., 300 V.)	30-2319
61	Electrolytic Condenser (16 mfd., 400 V.)	30-2364
62	Resistor (39,000 ohms, ½ watt)	33-339339
63	Resistor (150,000 ohms, ½ watt)	33-415339
64	Resistor (1.0 meg., ½ watt)	33-510339
65	Tubular Condenser (.2 mfd.)	30-4587
66	Tubular Condenser (.003 mfd.)	30-4608
67	Tubular Condenser (.003 mfd.)	30-4608
68	Power Transformer (100-130 V., 200-260 V., 50-60 cycles)	32-8006
69	Resistor (150,000 ohms, ½ watt)	33-415339
70	Pilot Lamps	34-2064E
71	Wave Switch	42-1504

AUDIO OUTPUT: 2.5 watts.

TUNING RANGES:
150 to 390 K. C.

530 to 1720 K. C.

7.3 to 22 M. C.

SPECIFICATIONS

The **Model RP-1** is a remote type record player which can be used in conjunction with any standard broadcast receiver to reproduce phonograph records.

The unit is designed to operate on various power supplies as follows:

110 volts, 60 cycles; 110 volts, 25 cycles; 220 volts, 60 cycles.

To operate on any one of these power supplies, it is necessary that the proper power transformer and turntable motor is used as indicated in the parts list below.

To operate the unit: — Place record on turn-table and slide "Off-On Switch" (Diagram "A") to "On" position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Next go to your radio and tune to approximately 540 K. C. (54 on most dials), at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver's volume control in the normal way.

At the end of the record, turn the tone arm to rest position, which will automatically turn motor off. It is not necessary to slide "Off-On Switch" to the "Off" position between records.

If interference from broadcast stations is encountered the frequency of the unit can be changed to any other frequency between 530 K. C. and 580 K. C. by adjusting the small screw indicated in Diagram "B". Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. **This adjustment is best made while the unit is in operation.**

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In most cases it is preferable to use different receptacles for record player and radio.

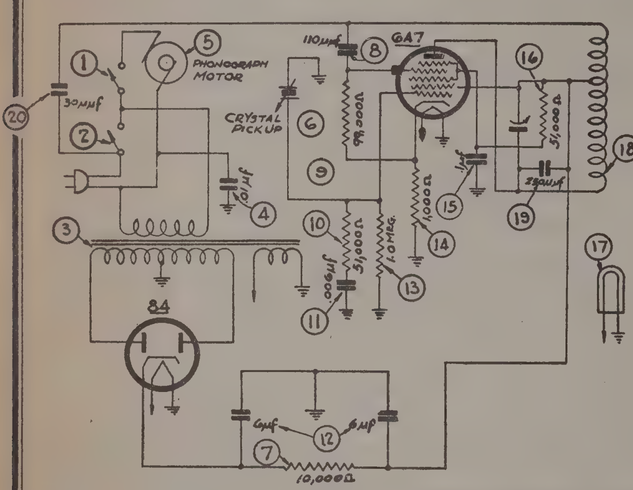
No definite rule can be established for the relative location of the record player to your radio; individual trial will establish best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

PRODUCTION CHANGES

Master On-Off switch changed from Part No. 42-1406 to 42-1562.

Two types of motor and turntable assemblies were used on this model. The part numbers are as follows:

Motor — 110 volts, 60 cycles	35-1222
Motor — 110 volts, 60 cycles	35-1216
Turntable for Motor 35-1222	35-3044
Turntable for motor 35-1216	35-1217



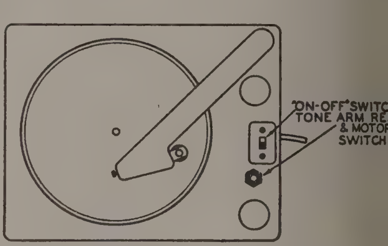


DIAGRAM A

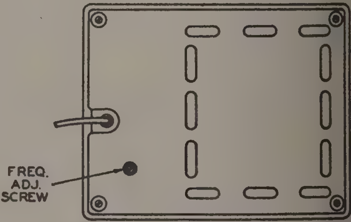


DIAGRAM B

REPLACEMENT PARTS

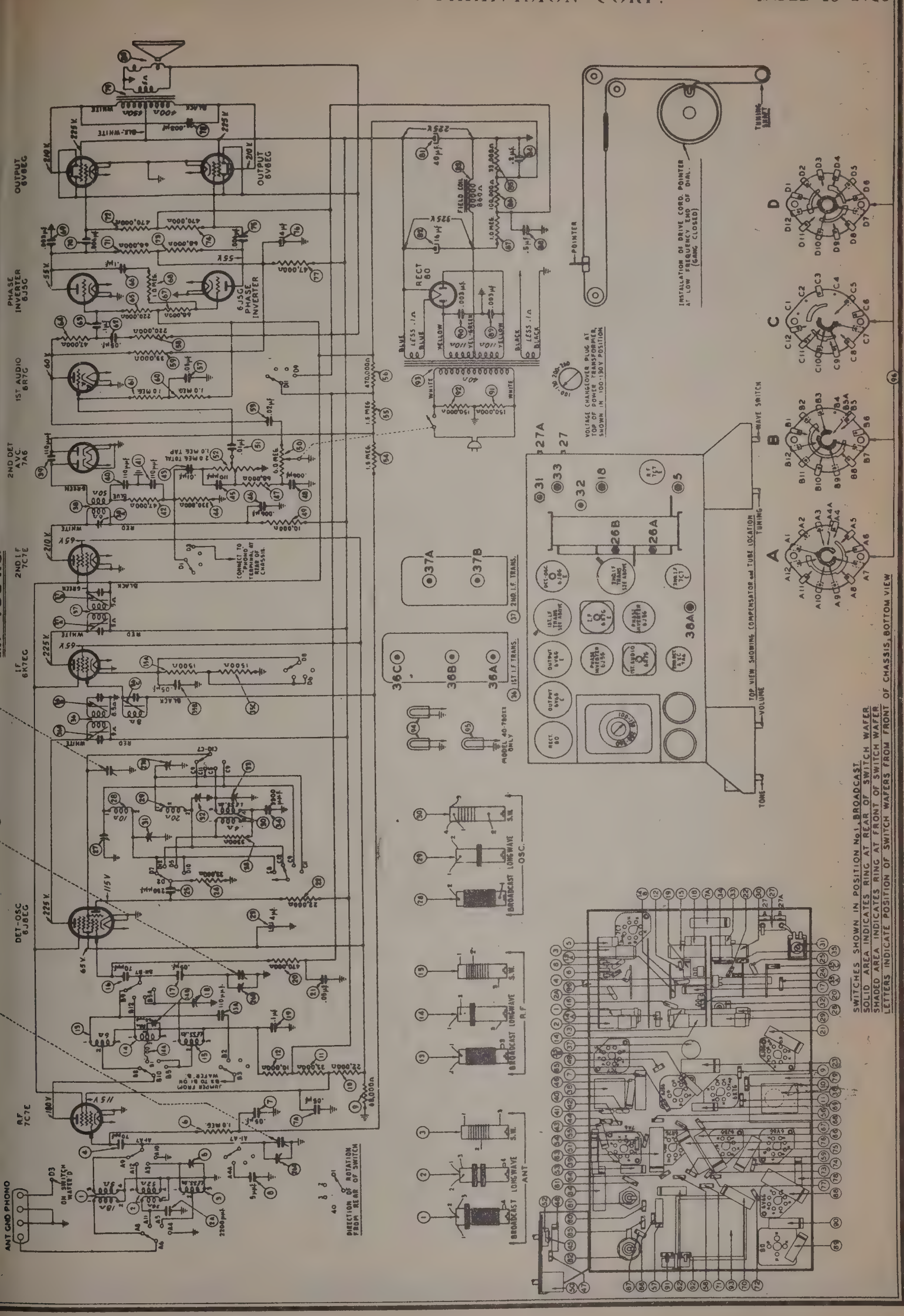
SCHE. No.	DESCRIPTION	PART No.
1	Motor Switch	42-1557
2	Master Switch	42-1562
3	Power Trans. (110 V., 60 cycles)	32-8043
4	Line Condenser (.01 mf., 600 V.)	3903-SG
	Power Trans. (110 V., 25 cycles)	32-8049
5	Motor (110 V., 60 cycles)	35-1222
	Motor (110 V., 60 cycles)	35-1216
	Motor (110 V., 25 cycles)	315-1004
	Motor (220 V., 60 cycles)	315-1005
	Motor (220 V., 50 cycles)	315-1006
6	Crystal Pickup and Tone Arm	35-2068
	Crystal Cartridge	35-2069
7	Filter Resistor (10,000 ohms, ½ watt)	33-310344
8	Oscillator Grid Cond. (110 mmf.)	30-1031
9	Oscillator Grid Resistor (99,000 ohms, ½ watt)	33-399344
10	Comp. Resistor (51,000 ohms, ½ watt)	33-351344
11	Comp. Cond. (.006 mf., 200 V.)	30-4467
12	Electrolytic Condenser (6 mf., 6 mf., 150 V., 60 cy.)	30-2388
	(6 mf., 6 mf., 150 V., 25 cy.)	35-2394
13	Grid Resistor (1 meg., ½ watt)	33-510344
14	Cathode Bias Resistor (1000 ohms, ½ watt)	33-210344
15	Screen By-Pass (.1 mf., 200 V.)	30-4499-S
16	Screen Resistor (51,000 ohms, ½ watt)	33-351344
17	Pilot Light (6-8 V., 250 amp.)	34-2064
18	Oscillator Coil & Padder Assem.	32-3218
19	Mica Condenser (250 mmf.)	30-1032
20	Coupling Condenser (30 mmf.)	30-1059

MISCELLANEOUS PARTS

SCHE. No.	DESCRIPTION	PART No.
	Cable (Power)	L-2778
	Cover (Bottom of Cabinet)	27-9326
	Cabinet	10459
	Mounting Feet Cabinet	27-4817
	Switch Plate	56-1383
	Socket (5 prong)	27-6035
	Socket (7 prong)	27-6037
	Turntable (for Motor 35-1222)	35-3044
	Turntable (for Motor 35-1216)	35-1217
	Turntable (for Motor 315-1004)	35-1004

Two types of 110 volt, 60 cycle motors were used on this model, when ordering be sure correct turntable is ordered for motor.

PHILCO RADIO & TELEVISION CORP. MODEL 40-2780


OUTPUT 6V6EG
PHASE INVERTER 6J5G
1ST AUDIO 6R7G
2ND DET AVC 1A6
2ND I.F. 7C7E
I.F. 6K7EG
TUNING CONDENSER
DET-OSC 6J8EG
R.F. 7C7E
ANT GND PHONO
RECT 80
FIELD COIL 860Ω
CONNECT TO "PHONO" TERMINAL AT REAR OF CHASSIS
DIRECTION OF ROTATION FROM REAR OF SWITCH
BROADCAST LONGWAVE S.W. ANT
BROADCAST LONGWAVE S.W. R.F.
BROADCAST LONGWAVE S.W. OSC.
(36) 1ST I.F. TRANS.
(37) 2ND I.F. TRANS.
MODEL 40-780XX ONLY
VOLTAGE CHANGEOVER PLUG AT TOP OF POWER TRANSFORMER, SHOWN IN 100-130 V POSITION
TOP VIEW SHOWING COMPENSATOR and TUBE LOCATION
VOLUME
TONE
TUNING
WAVE SWITCH
POINTER
TUNING SHAFT
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. (GANG CLOSED)
A
B
C
D
SWITCHES SHOWN IN POSITION No.1 BROADCAST.
SOLID AREA INDICATES RING AT REAR OF SWITCH WAFER.
SHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW

TYPE CIRCUIT: Model 40-2780, code 121, is an Eleven (11) Tube A. C. operated Superheterodyne radio. The features of design included in this model are three (3) tuning ranges for reception of standard, long wave and short wave broadcast stations; connections for attaching a high impedance electric phonograph pick-up; automatic volume control; continuously variable tone control; bass compensation and a degenerated push-pull audio output circuit.

POWER SUPPLY: 118 or 236 Volt, 50 to 60 Cycle A. C.
118 or 236 Volt, 25 to 40 Cycle A. C.

The receiver is adjusted for operation on either of the above operating voltages by inserting the plug as indicated on top of the power transformer.

TUNING RANGES:
150 to 390 K. C. 530 to 1720 K. C. 7.4 to 22 M. C.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	6J8EG Grid	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	38A, 37A, 37B, 36A, 36C, 36B	Note D
2	Antenna to Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	27, 26B, 26A	Note B
3	Antenna to Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	31	Roll Gang
4	Antenna to Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	27, 26B, 26A	
5	Antenna to Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
6	Antenna to Ground	200 mmfd.	175 K. C.	175 K. C.	Range Switch "L.W."	32	
7	Antenna to Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
8	Antenna to Ground	400 ohms	20 M. C.	20 M. C.	Range Switch "S.W."	33, 16, 5	Note C

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale. See Schematic Diagram for dial pointer cord adjustment.

NOTE C — When adjusting compensator (33) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 19.090 M. C.

NOTE D — Before adjusting padders 38A, 37A, 37B, 36A, 36C, turn padder 36B all the way out. After the padders are adjusted to maximum, then adjust padder 36B for maximum.

REPLACEMENT PARTS

Model 40-2780

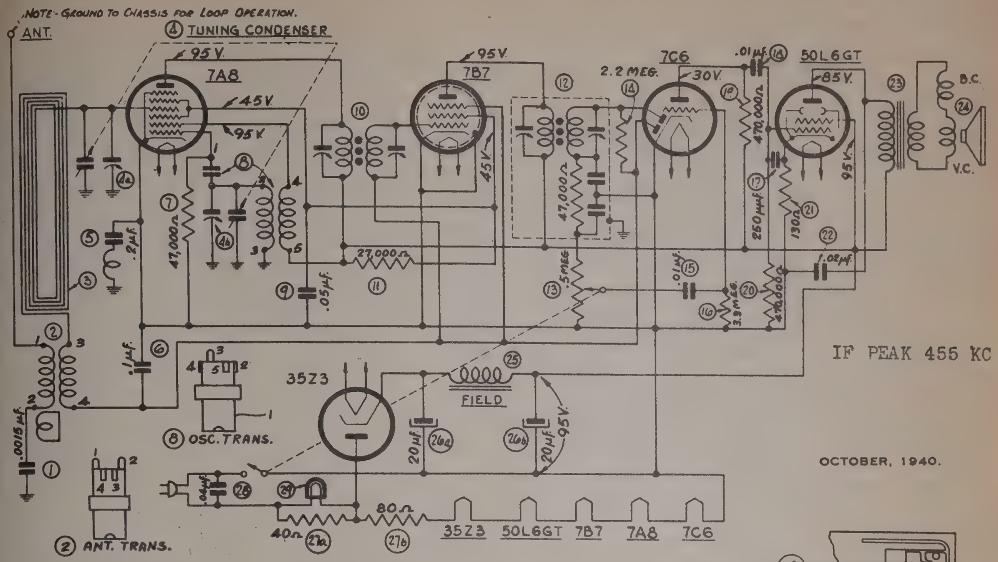
SCHE. No.	DESCRIPTION	PART No.
1	Antenna Trans. (Brdcst)	32-2588
2	Ant. Tran. (Long Wave)	32-3368
2A	Mica Cond. (2200 mmfd.)	30-1125
3	Antenna Trans. (S.W.2)	32-3196
4	Mica Cond. (70 mmfd.)	30-1117
5	Compensator	31-6288
6	Resist. (1.0 meg., ½ watt)	33-510339
7	Tubular Cond. (.05 mfd.)	30-4609
7A	Tubular Cond. (.05 mfd.)	30-4518
8	Mica Cond. (5 mmfd.)	30-1120
9	Resistor (68,000 ohms, ½ watt)	33-368339
10	Resistor (22,000 ohms, ½ watt)	33-322339
11	Resistor (33,000 ohms, ½ watt)	33-333339
12	Resistor (10,000 ohms, 1 watt)	33-310439
13	R. F. Trans. (Broadcast)	32-3189
13A	Mica Cond. (110 mmfd.)	30-1118
14	R. F. Tran. (Long Wave)	32-3369
14A	Suppressor Coil	32-3352
14B	Mica Cond. (60 mmfd.)	30-1040
15	R. F. Trans. (S.W2)	32-3197
16	Mica Cond (70 mmfd.)	30-1117
17	Tubular Cond. (.05 mfd.)	30-4519
18	Compensator	31-6288
19	Tubular Cond. (.1 mfd.)	30-4611
20	Resistor (470,000 ohms, ½ watt)	33-447339
21	Tubular Cond. (.05 mfd.)	30-4609
22	Resistor (22,000 ohms, ½ watt)	33-322339
23	Electrolytic Condenser (4 mfd., 300 V.)	30-2415
24	Resistor (33,000 ohms, ½ watt)	33-333339
25	Mica Cond. (250 mmfd.)	30-1119
26	Tuning Cond. Assy.	31-2386
27	Compensator (2 section)	31-6337
28	Oscillator Trans. (Brdct)	32-3254
29	Osc. Tran. (Long Wave)	32-3137
30	Oscillator Trans. (S.W.2)	32-3102
31	Compensator	31-6289
32	Compensator	31-6297
33	Compensator	31-6288
34	Tracking Condenser (3300 mmfd.)	31-6311
35	Resistor (3300 ohms, ½ watt)	33-233339
35A	Resistor (1500 ohms, ½ watt)	33-215339
35B	Tubular Cond. (.05 mfd.)	30-4519
35C	Resistor (1500 ohms, ½ watt)	33-215339
36	1st I. F. Trans. Assy.	32-3284
37	2nd I. F. Trans. Assy.	32-3285
38	3rd I. F Trans. Assy.	32-3286
39	Mica Cond. (110 mmfd.)	30-1118
40	Mica Cond. (110 mmfd.)	30-1118
41	Mica Cond .(110 mmfd.)	30-1118
42	Resistor (47,000 ohms, ½ watt)	33-347339
43	Tubular Cond. (.01 mfd.)	30-4581
44	Resistor (330,000 ohms, ½ watt)	33-433339
45	Mica Cond. (110 mmfd.)	30-1118
46	Tubular Con. (.006 mfd.)	30-4591
47	Resistor (68,000 ohms, ½ watt)	33-368339
48	Tubular Con. (.006 mfd.)	30-4583
49	Resistor (10,000 ohms, ½ watt)	33-310339
50	Tone Control and On-Off Switch	33-5335
51	Tubular Cond. (.01 mfd.)	30-4581
52	Vol. Control (2.0 meg.)	33-5334
53	Tubular Cond. (.02 mfd.)	30-4516
54	Resistor (1.5 meg., ½ watt)	33-515339
55	Resistor (1.5 meg., ½ watt)	33-515339
56	Resistor (470,000 ohms, ½ watt)	33-447339
57	Tubular Cond. (.05 mfd.)	30-4519
58	Resistor (220,000 ohms, ½ watt)	33-422339
59	Resistor (33,000 ohms, ½ watt)	33-333339
60	Resistor (1.0 meg., ½ watt)	33-510339
61	Resistor (1.0 meg., ½ watt)	33-510339
62	Tubular Cond. (.05 mfd.)	30-4518
63	Tubular Cond. (.1 mfd.)	30-4611
64	Resistor (47,000 ohms, ½ watt)	33-347339
65	Resistor (220,000 ohms, ½ watt)	33-422339
66	Tubular Cond. (.1 mfd.)	30-4611
67	Resistor (68,000 ohms, ½ watt)	33-368339
68	Resistor (1.0 meg., ½ watt)	33-510339
69	Tubular Con. (.003 mfd.)	30-4582
70	Tubular Con. (.006 mfd.)	30-4610
71	Resistor (68,000 ohms, ½ watt)	33-368339
72	Resistor (470,000 ohms, ½ watt)	33-447339
73	Resistor (68,000 ohms, ½ watt)	33-368339
74	Resistor (470,000 ohms, ½ watt)	33-447339
75	Tubular Con. (.006 mfd.)	30-4610
76	Electrolytic Condenser (4 mfd., 300 V.)	30-2415
77	Resistor (47,000 ohms, ½ watt)	33-347339
78	Tubular Con. (.003 mfd.)	30-4582
79	Output Transformer	32-8058
80	Cone and Voice Coil Assy.	
	(Spr. Pt. No. 36-1459-2)	36-4106
	(Spr. Pt. No. 36-1460-3)	36-4105
81	Electrolytic Condenser (40 mfd., 450 V.)	30-2445
82	Electrolytic Condenser (16 mfd., 300 V.)	30-2412
83	Field Coil (Replace Spkr.)	
84	Tubular Cond. (.2 mfd.)	30-4587
85	Resistor (33,000 ohms, ½ watt)	33-333339
86	Resistor (100,000 ohms, ½ watt)	33-410339
87	Resistor (1.0 meg., ½ watt)	33-510339
88	Tubular Cond. (.5 mfd.)	30-4590
89	Tubular Con. (.003 mfd.)	30-4608
90	Tubular Con. (.003 mfd.)	30-4608
91	Resistor (150,000 ohms, ½ watt)	33-415339
92	Resistor (150,000 ohms, ½ watt)	33-415339
93	Power Trans. (100-130 V., 200-260 V., 50-60 cycles)	32-8007
94	Pilot Lamps (Dial)	34-2064E
95	Pilot Lamp (XX Cabinet only)	34-2210E
96	Wave Switch	42-1525

MISCELLANEOUS PARTS

Bezel	56-1222
Cable and Plug (Power Supply)	L-3238
Spec. Export A.C. Plug	L-1367
Cabinet (40-2780T)	10419B
Cabinet (40-2780XX)	10421B
Dial	27-5558
Drive Cord Assy. (Dial)	31-2407
Felt Strip (Bezel Mtg.)	27-8225
Gasket (Dial Mtg.)	27-9258
Knob (Tuning)	27-4330
Knob (Tuning)	27-4862
Knob (Volume and Wave Switch)	27-4332
Knob (Tone Control)	27-4872
Pointer	56-1276

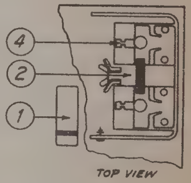
PHILCO RADIO & TELEVISION CORP.

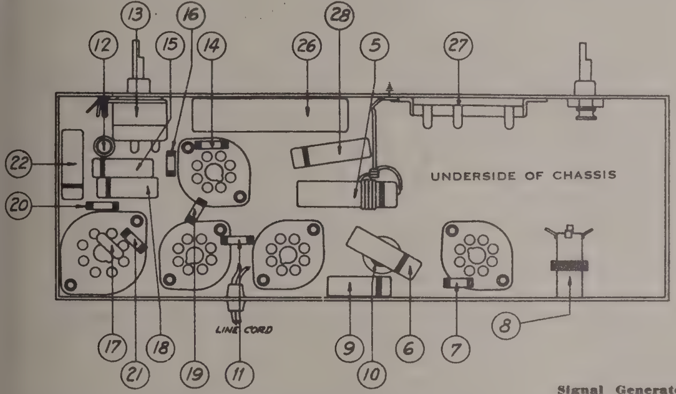
MODELS PT2, PT6

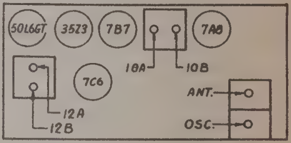


IF PEAK 455 KC

OCTOBER, 1940.







When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	12A, 12B, 10A, 10B	Note B
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	(4B, Note C)	Note A
3	Loop see above instructions	1500 K. C	1500 K. C.	Vol. Max. Range Switch Brdcst.	(4A, Note D)	

NOTE A: DIAL POINTER CALIBRATION—In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side.

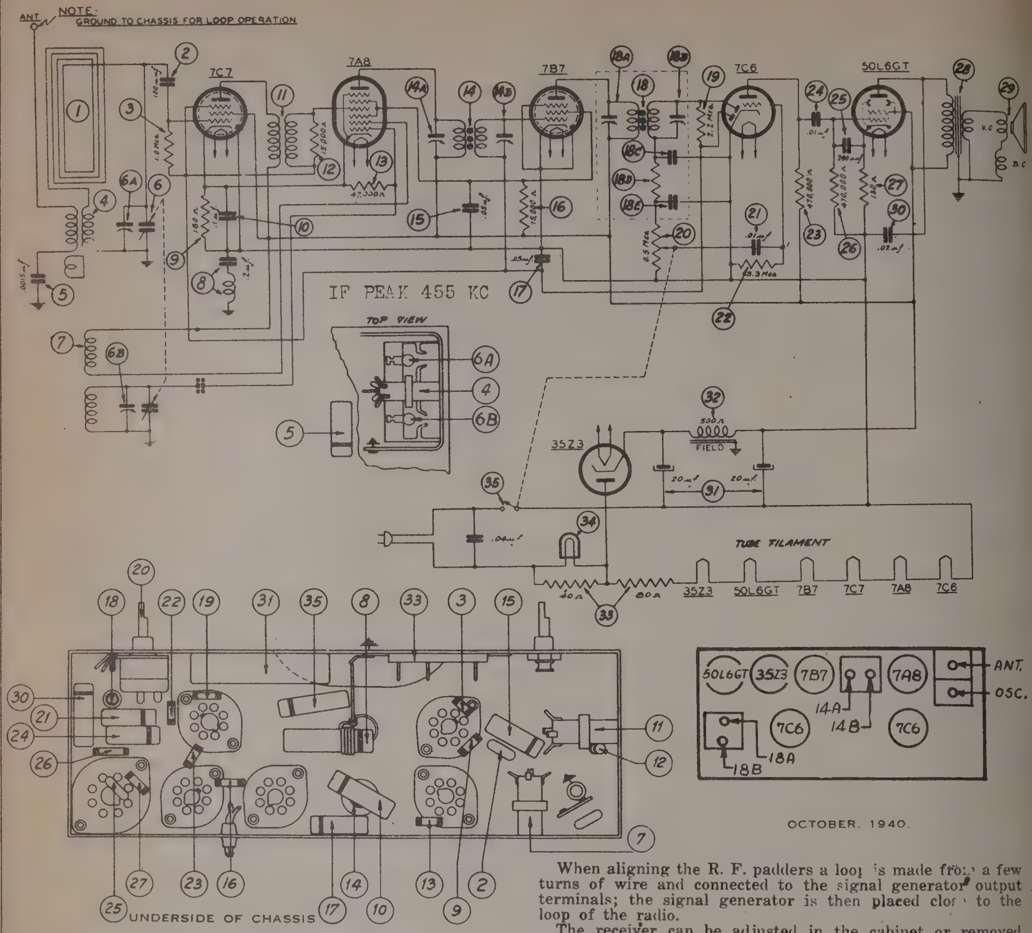
NOTE B—Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

NOTE C—Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (4B) to maximum at this point.

NOTE D—Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (4A) to maximum at this point.

MODEL PT12

PHILCO RADIO & TELEVISION CORP.



OCTOBER. 1940.

Signal Generator. When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled. Locations are shown on Schematic.

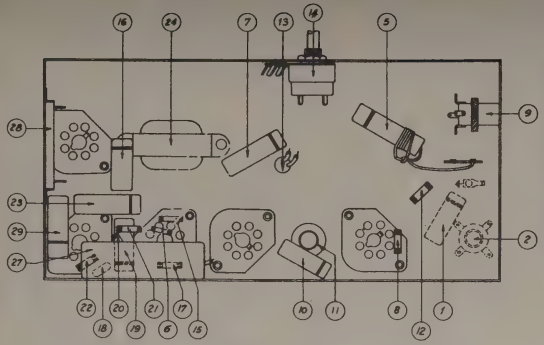
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	18A, 18B, 14A, 14B	Note B
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	(6B, Note C)	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	(6A, Note D)	

NOTE A: DIAL POINTER CALIBRATION—In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side.

NOTE B—Before adjusting compensators, turn down (14B) to tight position. Then adjust the compensators for maximum output in the following order: 18A, 18B, 14A and 14B.

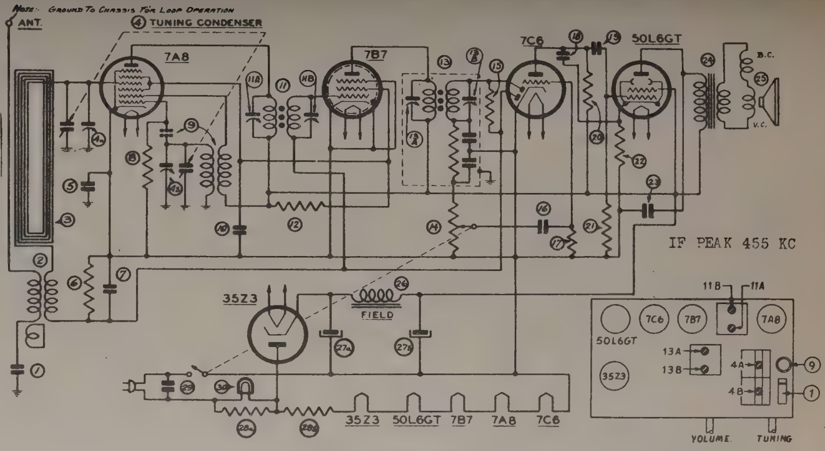
NOTE C—Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (6B) to maximum at this point.

NOTE D—Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (6A) to maximum at this point



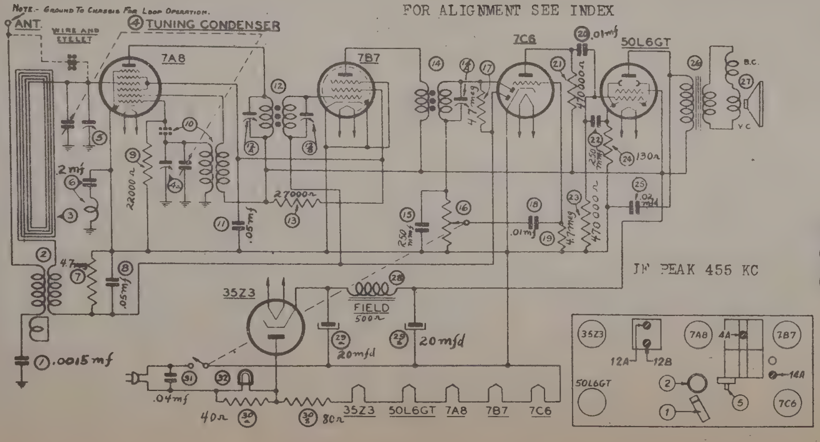
PART LOCATIONS — UNDERSIDE OF CHASSIS PT-30, PT-49

AUGUST, 1940.



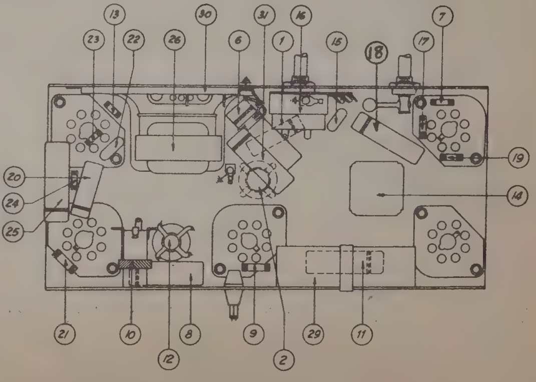
SCHEMATIC DIAGRAM — PT-30, PT-49

FOR ALIGNMENT SEE INDEX



FOR ALIGNMENT SEE INDEX

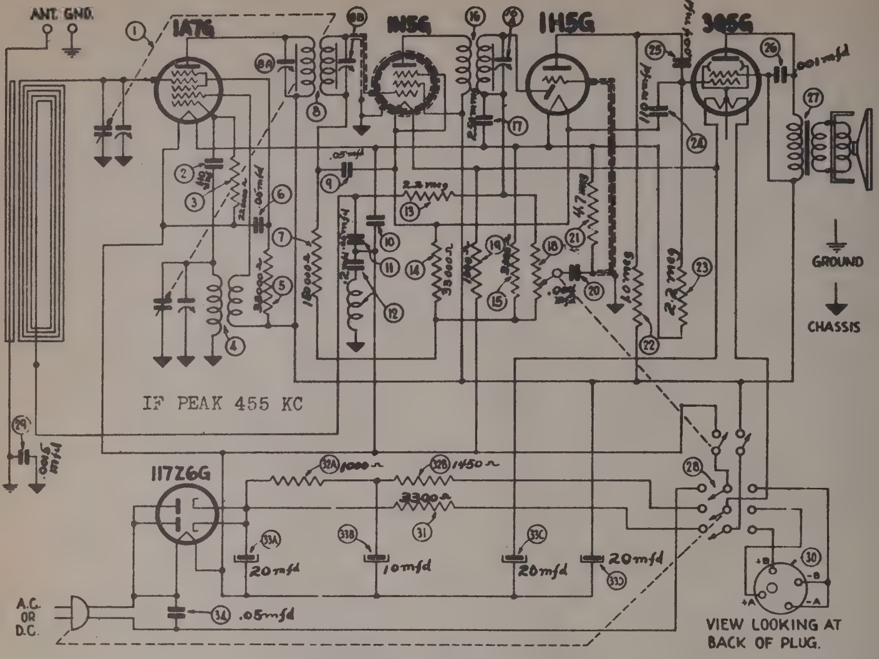
SCHEMATIC DIAGRAM — PT-42, PT-44



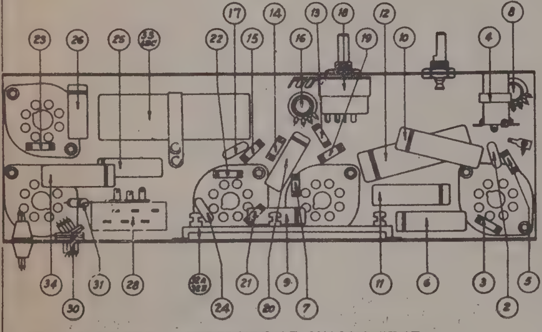
PART LOCATIONS — UNDERSIDE OF CHASSIS PT-42, PT-44

MODEL PT87
MODELS PT30,
PT42, PT44, PT49

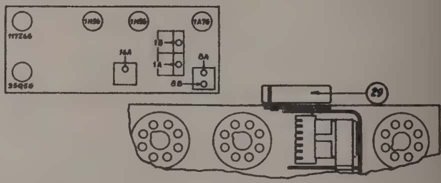
PHILCO RADIO & TELEVISION CORP.



SCHEMATIC DIAGRAM — PT-87



PART LOCATIONS — UNDERSIDE OF CHASSIS PT-87



When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approxiamtely the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

MODELS PT30, PT42, PT44, PT49, PT87

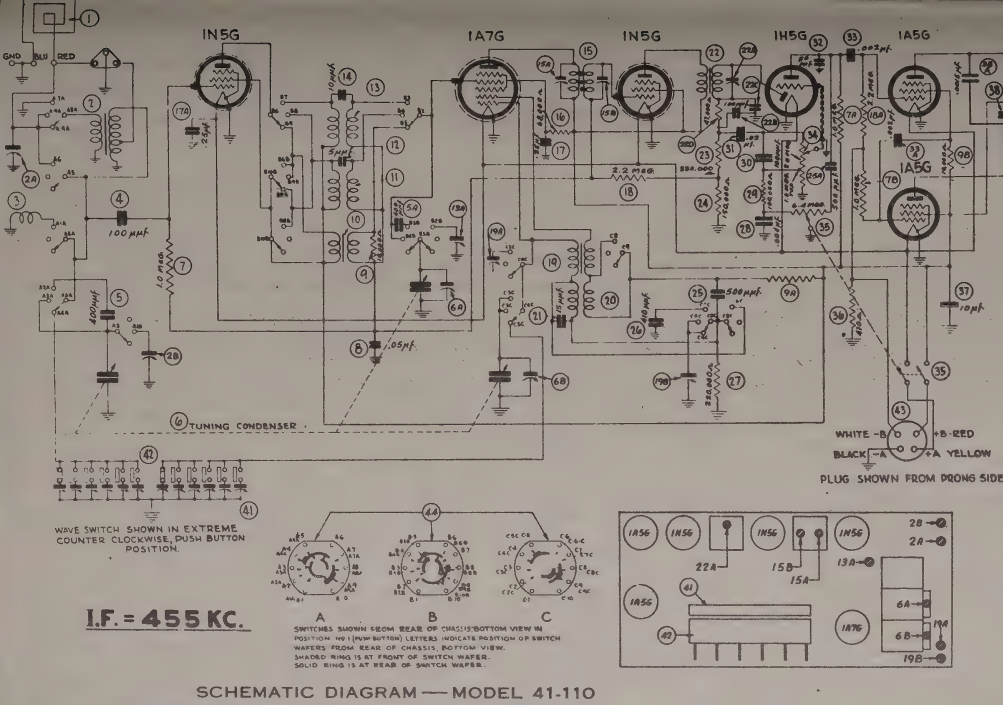
Operations in Order	SIGNAL GENERATOR		RECEIVER					SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order			
					PT-30, 49	PT-42, 44	PT-87	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol Max. Range Switch Brdcst.	11B, 11A 13A, 13B	12A, 12B 14A	8A, 8B 16A	Note B
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	4B	4A	1B	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	4A	5	1A	

NOTE A: — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 550 K. C.

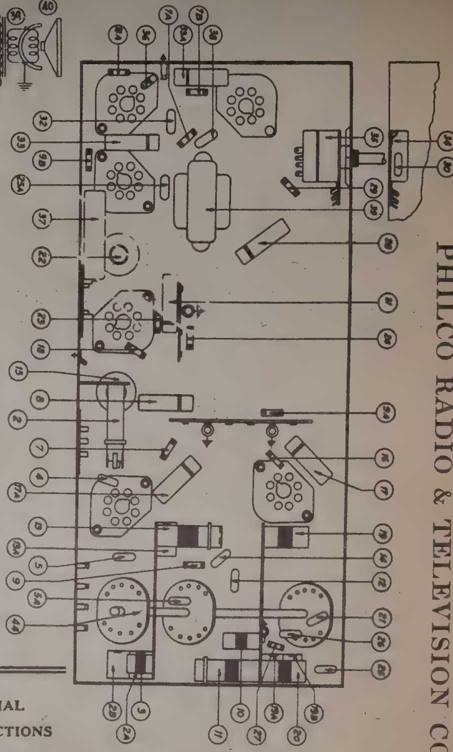
NOTE B: — When adjusting the I. F. compensators of Models PT-30 and PT-49, turn compensator (11B) clockwise to the tight position and pad compensators 11A, 13A and 13B to maximum output, then pad 11B to maximum.

PHILCO RADIO & TELEVISION CORP.

MODEL 41-110


1N5G
1A7G
1N5G
1H5G
1A5G
1A5G
GND
BLU
RED
100 µµf
400 µµf
1.0 MEG
.05 µf
2.2 MEG
500 µµf
410 µµf
.002 µf
10 µµf
TUNING CONDENSER
WHITE -B
BLACK -A
+B RED
+A YELLOW
PLUG SHOWN FROM PRONG SIDE
WAVE SWITCH SHOWN IN EXTREME COUNTER CLOCKWISE, PUSH BUTTON POSITION.
I.F. = 455 KC.
A
B
C
SWITCHES SHOWN FROM REAR OF CHASSIS: BOTTOM VIEW IN POSITION NO 1 (PUSH BUTTON) LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS, BOTTOM VIEW.
SHADED RING IS AT FRONT OF SWITCH WAFER.
SOLID RING IS AT REAR OF SWITCH WAFER.
1A5G
1N5G
1N5G
1N5G
1A5G
1A7G
22A
15B
15A
13A
6A
6B
19A
19B
28
2A

SCHEMATIC DIAGRAM — MODEL 41-110



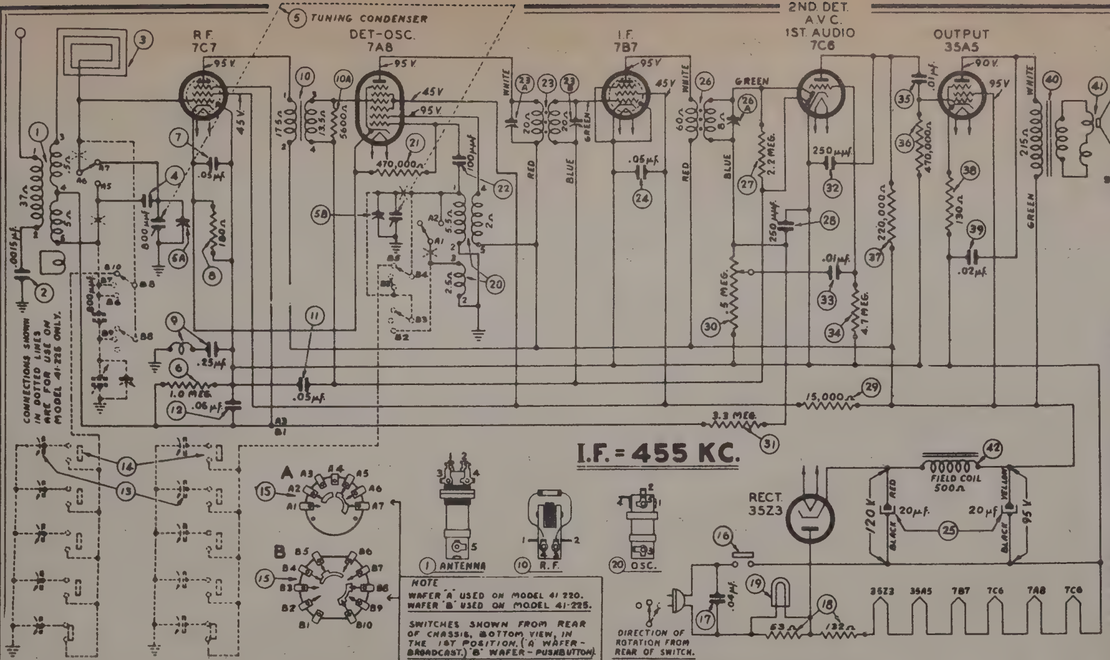
PART LOCATIONS, UNDERSIDE OF CHASSIS

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections	Dummy Aerial	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	1A7G (Grid)	.1 mmfd.	455 K. C.	540 K. C.	Vol. Max. Range Switch Brdcst.	15A, 15B 22A	
2	Aerial Connection Receiver	225 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	Osc., R. F., aerial 6B, 6A, 2B	
3	Aerial Connection Receiver	225 mmfd.	580 K. C.	580 K. C.	Vol. Max. Range Switch Brdcst.	19B	Roll Gang
4	Aerial Connection Receiver	Recheck Operation No. 2					
5	Aerial Connection Receiver	400 Ohms	12 M. C.	12 M. C.	Range Switch S. W.	Osc., R. F., Ant. 19A, 13A, 2A	

AUGUST, 1940.

NOTE A: DIAL CALIBRATION: Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity) set the dial pointer on the small dash below 540 K. C.

PHILCO RADIO & TELEVISION CORP.



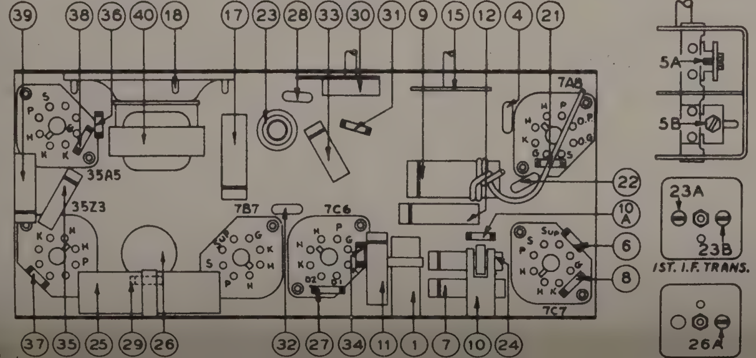
CONNECTIONS SHOWN IN DOTTED LINES ARE FOR USE ON MODEL 41-225 ONLY.

NOTE
WAFER 'A' USED ON MODEL 41 220.
WAFER 'B' USED ON MODEL 41-225.
SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN THE 1ST POSITION. ('A' WAFER - BROADCAST.) 'B' WAFER - PUSHBUTTON.

DIRECTION OF ROTATION FROM REAR OF SWITCH.

JULY, 1940.

SCHEMATIC DIAGRAM MODELS 41-220 & 41-225



FOR ALIGNMENT, SEE INDEX

SCHE. No.	DESCRIPTION	PART No.
1	Aerial Transformer	32-3404
2	Condenser (.0015 mfd., 200 volts)	30-4555
3	Loop Aerial (Model 41-220)	32-3521
	Loop Aerial (Model 41-225)	32-3480
4	Mica Condenser (800 mmfd.)	60-180127
5	Tuning Condenser (Model 41-220)	31-2492
	Tuning Condenser (Model 41-225)	31-2493
6	Resistor (1 megohm)	33-510339
7	Condenser (.05 mfd., 200 volts)	30-4519
8	Resistor (180 ohms)	33-118336
9	Condenser (.25 mfd.) and Choke	38-9851
10	R. F. Transformer	32-3273
10B	Resistor (5600 ohms) Part of 10	
11	Condenser (.05 mfd., 200 volts)	30-4519
12	Condenser (.05 mfd., 200 volts)	30-4519
13	Compensator Assembly (Push-buttons) Model 41-225 Only	31-6376
14	Push-button Switch Assembly (Model 41-225 Only)	42-1591
15	Range Switch (Model 41-220)	42-1505
	Range Switch (Model 41-225)	42-1590
16	Off-On Switch (Part of 14)	
17	Condenser (.04 mfd., 400 volts)	30-4119
18A	Resistor (53-132 ohms)	33-3375
19	Pilot Lamp	34-2068
20	Oscillator Transformer	32-3256
21	Resistor (47,000 ohms)	33-347339
22	Condenser (100 mmfd.)	60-110157
23	1st I. F. Transformer	32-3489
24	Condenser (.05 mfd.)	30-4519
25A	Electrolytic Cond. (20 mfd., 20 mfd.)	30-2403
25B	Electrolytic Cond. (20 mfd., Part of 25A)	
26	2nd I. F. Transformer	32-3304
27	Resistor (2.2 megohm)	33-522154
28	Mica Condenser (250 mmfd.)	60-125157
29	Resistor (15,000 ohms)	33-315339
30	Volume Control (Model 41-220)	33-5404
	Volume Control (Model 41-225)	33-5411
31	Resistor (3.3 megohm)	33-533339
32	Condenser (100 mfd.)	61-0033
33	Condenser (.01 mfd., 200 volts)	30-4479
34	Resistor (4.7 megohms)	33-547154
35	Condenser (.01 mfd., 400 volts)	30-4572
36	Resistor (470,000 ohms)	33-447339
37	Resistor (220,000 ohms)	33-422339
38	Resistor (130 ohms)	33-113336
39	Condenser (.02 mfd., 400 volts)	30-4516
40	Output Transformer	32-8144
41	Cone Assembly (for Speaker 36-1512-9)	36-4167
42	Field Coil (Replace Speaker 36-1512)	

Model 41-220, is manually tuned and employs two tuning ranges covering 540 to 1600 K. C. and 1.6 to 3.3 M. C.

Model 41-225 has Electric Push-button tuning in addition to Manual tuning and two tuning ranges covering the same frequencies as Model 41-220. The electric push-button mechanism consists of six (6) push-buttons. One push-button is used to turn the power source OFF and ON and the remaining five (5) for automatically tuning in broadcasting stations.

PHILCO RADIO & TELEVISION CORP.

MODELS 41-220, 41-225
MODEL 41-RP6

Model 41-RP-6 is a remote type record player which can be used in conjunction with any standard broadcast radio to reproduce phonograph records.

POWER SUPPLY: 115 volts, 60 cycle, A. C.

POWER CONSUMPTION: 30 watts.

This model may be also operated on a 115 volts, 50 cycle power supply by changing the motor as indicated in the parts list.

PHILCO TUBES USED: 6A7, Oscillator; 84, Rectifier.

OPERATION

Place record on turntable and slide "Off-On Switch" (Figure 1) to "On" position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Tune the radio to approximately 540 KC. (54 on most dials) at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver's volume control in the normal way.

At the end of the record, return the tone arm to rest position which will automatically turn motor off. It is not necessary to slide "Off-On" Switch to the "Off" position between records.

OPERATION VERY CLOSE TO THE RECEIVER: A range switch will be found on the lower side of the drawer. (See Figure 2). If the player is installed very close to the receiver, slide this switch to the "near" position for best tone quality. When the player is more than a short distance from the receiver, with the switch in the "near" position, the noise in the receiver will be louder than the music from the record. In this case, leave the range switch in the "distant" position. After the best position for the range switch is determined, it is not necessary to change it as long as the player and receiver are not moved. Note after changing position of switch it is advisable to either retune the record player or the radio.

INTERFERENCE

If interference from broadcasting stations is encountered, the frequency of the unit can be changed to any other frequency between 530 KC. and 570 KC. by removing snap button and adjusting small screw indicated in Diagram "A". This adjustment is best made while the unit is in operation.

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In most cases it is preferable to use different receptacles for record player and radio.

No definite rule can be established for the relative location of the record player to your radio; individual trial will establish best location. However, in general, satisfactory operation may be obtained up to a comfortable listening distance, provided local noise conditions are not too severe.

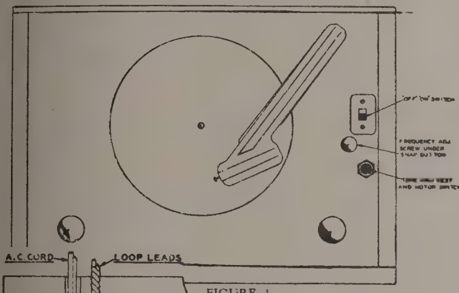


FIGURE 1

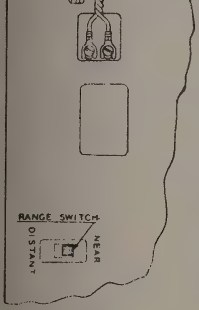
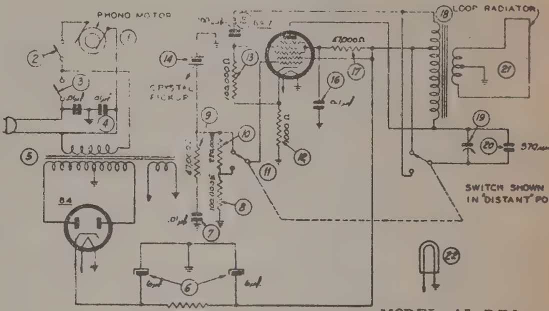


FIGURE 2



MODEL 41-RP6

Schem. No.	Description	Part No.
①	Phono-motor (115 volts, 60 cycles)	35-1240
	Screw (Mtg.)	W-89
	Turntable	35-3047
②	Motor Switch	42-1651
③	Master "On-Off" Power Switch	42-1562-2
④	Line Filter Condenser (.01-.01 mfd.)	3903-DG
⑤	Power Transformer (115 volts, 60 cycle)	32-8043
⑥	Electrolytic Condenser (6-6 mfd.)	30-2388
	Clamp	56-1346
⑦	Condenser (.01 mfd.)	30-4572
⑧	Resistor (100,000 ohms)	33-410339
⑨	Resistor (47,000 ohms)	33-347339
⑩	Resistor (220,000 ohms)	33-422339
⑪	Range Switch	42-1657
⑫	Resistor (1,000 ohms)	33-210339
⑬	Resistor (100,000 ohms)	33-410339
⑭	Crystal Pickup (Complete)	35-2476
	Bumper (Pickup Arm)	54-4070
⑮	Condenser (100 mmfd.)	60-110157
⑯	Condenser (.1 mfd.)	30-4455

Schem. No.	Description	Part No.
⑰	Resistor (47,000 ohms)	33-347339
⑱	Coupling Transformer	32-3646
	Clip Mtg.	28-5002
⑲	Compensator	31-6268
⑳	Silver Mica Condenser (370 mmfd.)	30-1110
㉑	Loop Aerial	Consists of short piece of wire
㉒	Pilot Lamp	34-2064
	Cabinet	10534A
	Screw (Chassis Mtg.)	W-218
	Washer (Chassis Mtg.)	W-751
	Bottom Cover	27-9858
	Cable (Power)	L-2778
	Needle Kit	40-6458
	Screw (Chassis Mtg.)	W-218
	Socket (5-prong)	27-6035
	Socket (7-prong)	27-6037

MODELS 41-220, 41-225

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond.	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Range Switch "Brdcst"	26A, 23B, 23A	
2	Loop—See above Instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch "Brdcst"	5B Tuning Condenser	Note A
3	Loop—See above Instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	5A Tuning Condenser	

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

MODELS 41-221
41-226
MODEL 41-231

PHILCO RADIO & TELEVISION CORP.

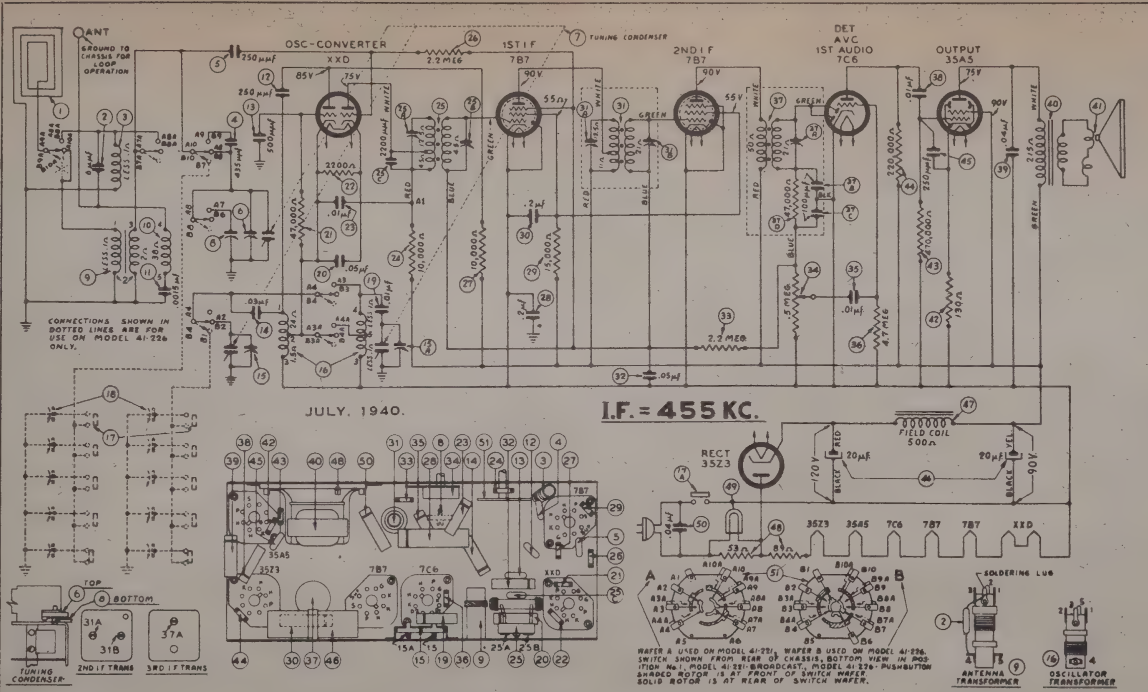
Model 41-221 is manually tuned and is assembled in two type (C & CI.) cabinets. Type "C" is a diagonal grain Sapel wood cabinet with carrying handle. Cabinet Type "CI" use diagonal grained walnut wood with ivory finished bezel, knobs and trim.

Model 41-226 incorporates Electric Push-button tuning in addition to manual tuning and is assembled in a sliced Walnut Cabinet. The electric push-button mechanism consists of six (6) push-buttons. One push-button is used to turn the power off and on. The remaining five (5) push-buttons automatically tune in stations.

When aligning the R. F. padders a loop is made from a f turns of wire and connected to the signal generator outp terminals; the signal generator is then placed close to t loop of the radio.

The receiver can be adjusted in the cabinet or removed fro the cabinet.

When adjusting the radio outside the cabinet the lo aerial should be placed in approximately the same positi around or near the chassis as when assembled.



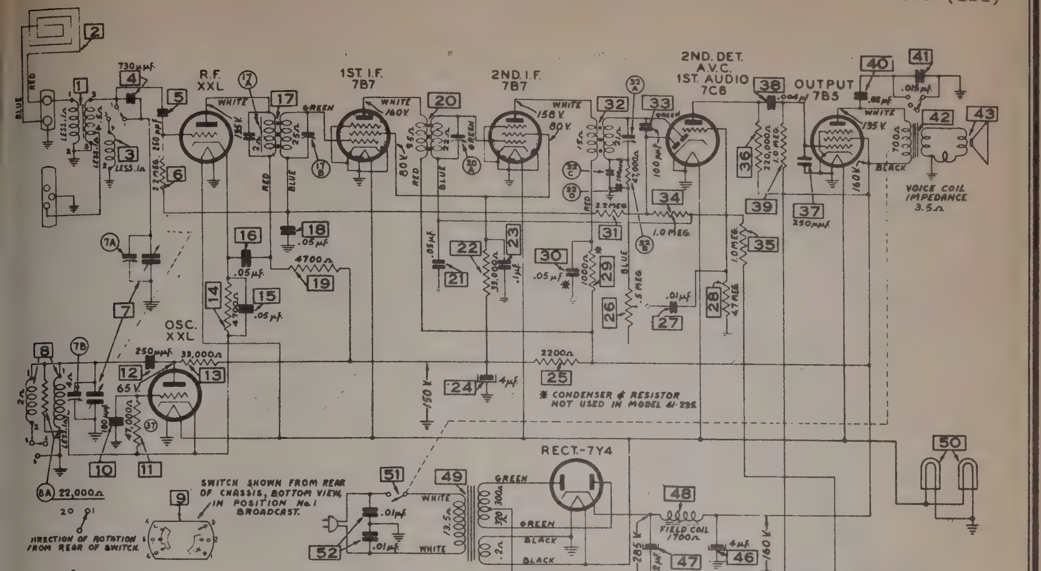
SCHEMATIC DIAGRAM MODEL 41-221 & 41-226

ALIGNMENT FOR MODELS 41-221, 41-226, 41-231

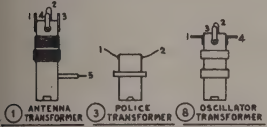
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol Max. Range Switch Brdcst.	37A, 31A, 31B, 25A, 25B	
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	15	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	6	
4	Loop see above instructions	12 M. C.	12 M. C.	Range Switch "S. W."	15A, 8	Roll (8) for Max. Note B

NOTE A: — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 550 K. C.

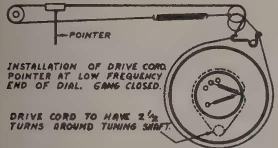
NOTE B — When adjusting oscillator compensator 15A, tune for maximum on the first signal peak from Tight position (compensator closed).

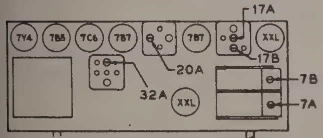


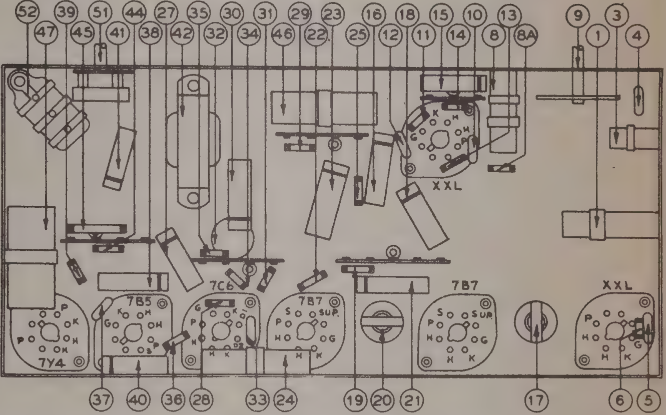
I.F. = 455 KC.



JUNE, 1940


POINTER
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED.
DRIVE CORD TO HAVE 2½ TURNS AROUND TUNING SHAFT.




(52) (47) (39) (45) (51) (41) (44) (38) (27) (42) (35) (32) (30) (34) (31) (46) (29) (22) (23) (25) (16) (12) (18) (11) (15) (14) (10) (8) (13) (8A) (9) (1) (3) (4)
XXL
7B5
7C6
7B7
7B7
XXL
7Y4
(37) (40) (36) (28) (33) (24) (19) (20) (21) (17) (6) (5)

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet. If adjustments are made outside the cabinet a Service Tuning Scale, Part No. 45-2819, will be required. This scale is placed underneath the pointer on the metal dial plate.

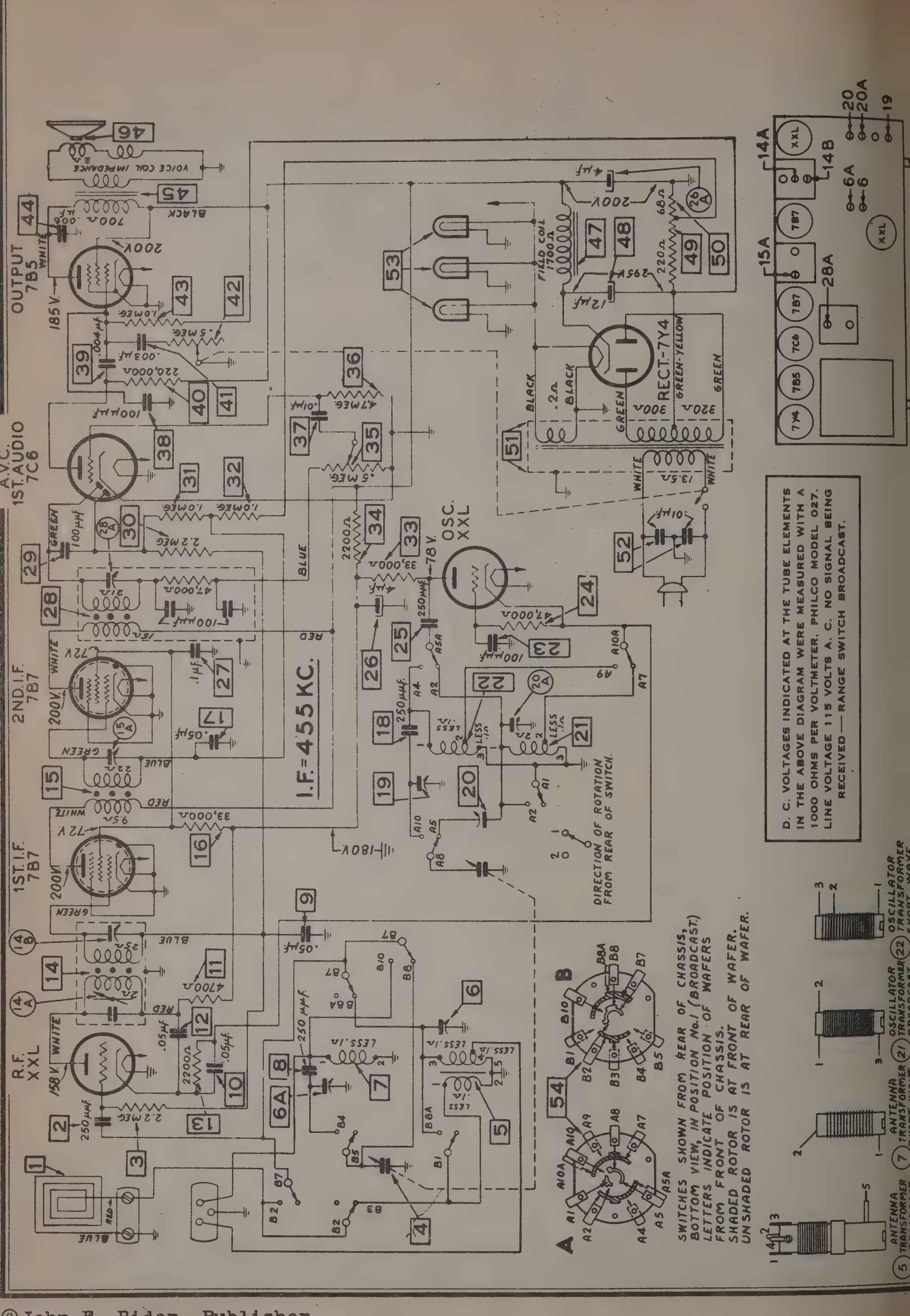
When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond.	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Range Switch "Brdcst"	32A, 20A 17B, 17A	
2	Loop—See above Instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch "Brdcst"	7B	Note A
3	Loop—See above Instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	7A	

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

MODEL 41-240 (121)

PHILCO RADIO & TELEVISION CORP.

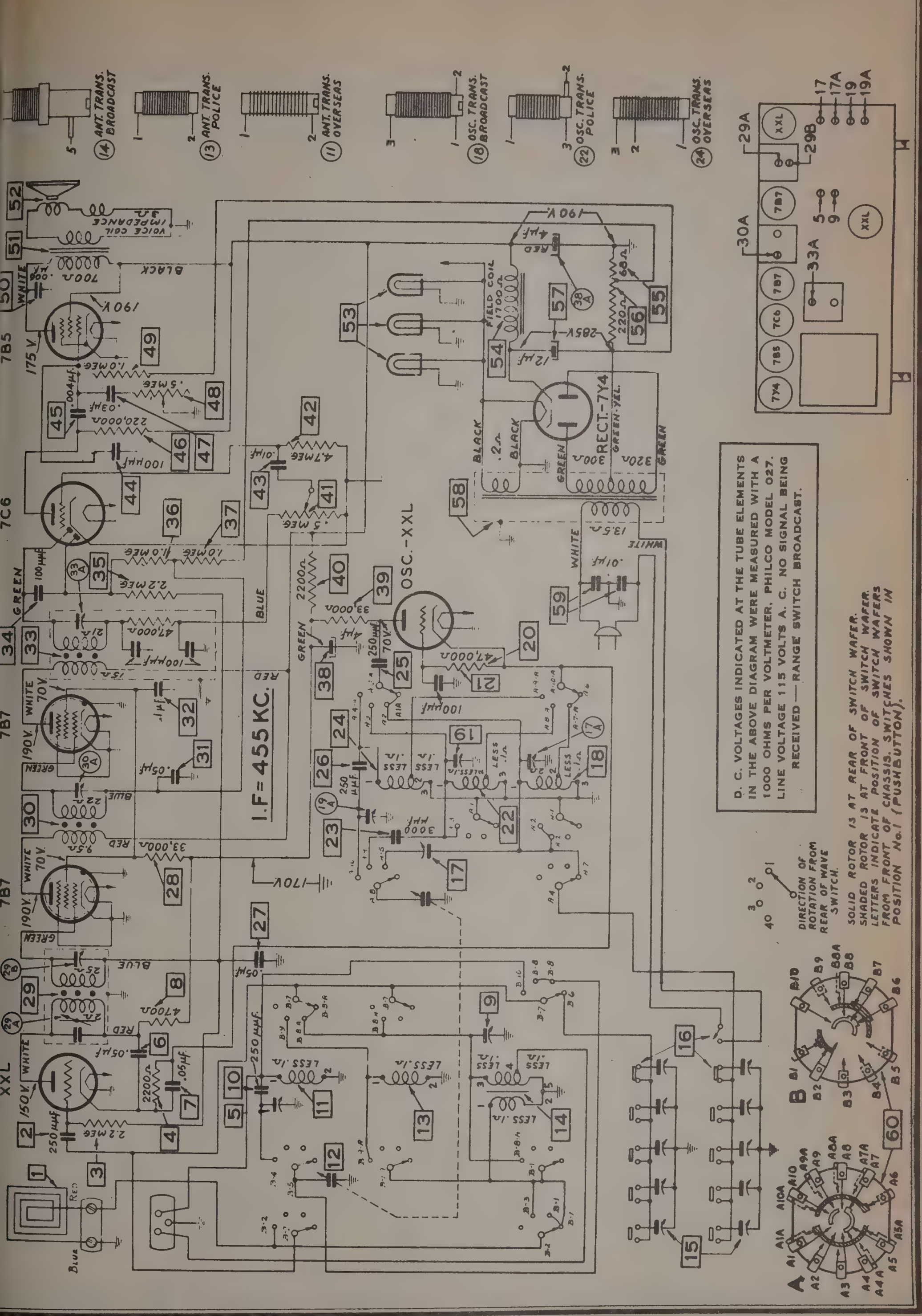


D. C. VOLTAGES INDICATED AT THE TUBE ELEMENTS IN THE ABOVE DIAGRAM WERE MEASURED WITH A 1000 OHMS PER VOLTMETER, PHILCO MODEL 027. LINE VOLTAGE 115 VOLTS A. C. NO SIGNAL BEING RECEIVED — RANGE SWITCH BROADCAST.

SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No.1 (BROADCAST.) LETTERS INDICATE POSITION OF WAFERS FROM FRONT OF CHASSIS. SHADED ROTOR IS AT FRONT OF WAFER. UNSHADED ROTOR IS AT REAR OF WAFER.

PHILCO RADIO & TELEVISION CORP.

MODEL 41-245 (121)



D. C. VOLTAGES INDICATED AT THE TUBE ELEMENTS IN THE ABOVE DIAGRAM WERE MEASURED WITH A 1000 OHMS PER VOLTMETER, PHILCO MODEL 027. LINE VOLTAGE 115 VOLTS A. C. NO SIGNAL BEING RECEIVED — RANGE SWITCH BROADCAST.

SOLID ROTOR IS AT REAR OF SWITCH WAFER. SHADED ROTOR IS AT FRONT OF SWITCH WAFER. LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS. SWITCHES SHOWN IN POSITION No. 1 (PUSHBUTTON).

SPECIFICATIONS

Model 41 - 240

TYPE OF CIRCUIT: Model 41-240, Code 121, is a seven (7) tube A. C. operated super-heterodyne radio employing the Philco Built-in American and Overseas Aerial system. Provisions are also provided for an outside aerial. The Philco Outdoor aerial, Part No. 45-2817 is especially designed for use with this radio and is recommended for maximum performance. In addition, other features of design are:—two tuning ranges; two I. F. stages; Philco loktal tubes; variable tone control; automatic volume control, and a pentode audio output stage.

TUNING RANGES: 540 to 1720 K. C.: 9 to 12 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

POWER SUPPLY: 115 volts A. C., 60 cycles. To operate the radio on 115 Volt, 25 cycle current, it will be necessary to change power transformers as indicated in the parts list.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: one XXL, 1st detector; one XXL, oscillator; one 7B7, 1st I. F.; one 7B7, 2nd I. F.; one 7C6, 2nd detector, 1st audio, A. V. C.; one 7B5, audio output and a 7Y4 rectifier.

CABINET DIMENSIONS: Height, 11"; Width, 15⅛"; Depth, 9⅛".

Model 41 - 245

TYPE OF CIRCUIT: Model 41-245, Code 121, is a seven (7) tube A. C. operated super-heterodyne radio with electric push button tuning. In addition, the radio employs the Philco Built-in American and Overseas Aerial system for operation without an outside aerial. Provisions are also provided for an outside aerial for sections where signal strength is weak, such as in steel reinforced buildings and other shielded locations. For installations of this type the Philco 1941 Outdoor Aerial, Part No. 45-2817, is recommended. This aerial can be conveniently connected to the radio by inserting the plug attached to the transformer unit into the socket provided at the rear of the chassis. A ground is not required with either type of installation. Other features of design included in the radio are three tuning ranges; covering standard, police, and shortwave frequencies: two I. F. stages, Philco loktal tubes; variable tone control, automatic volume control; and a pentode audio output stage. Six (6) electric tuning push buttons are provided for automatically selecting stations. Five of the push buttons are used for broadcast stations, and one for turning the power of the set "on" and "off". The procedure for adjusting the push buttons will be found in the instructions supplied with the Radio.

TUNING RANGES:
540 to 1720 K. C.: 2.0 to 7.0 M. C.: 9 to 12.0 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

POWER SUPPLY: 115 volts A. C., 60 cycles. To operate the radio on 115 volt, 25 cycle current, it is necessary to change the power transformers as indicated in the parts list.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: one XXL, 1st detector; one XXL, oscillator; one 7B7, 1st I. F.; one 7B7, 2nd I. F.; one 7C6, 2nd detector, 1st audio, A. V. C.: one 7B5, audio output and a 7Y4 rectifier.

CABINET DIMENSIONS:
Height, 11¾": Width, 16½"; Depth, 9⅛"

ALIGNING R. F. AND I. F. COMPENSATING CONDENSERS

THE FOLLOWING PROCEDURE IS THE SAME FOR BOTH MODELS.

Model 41 - 240

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser	455 K. C.	Tuning Cond. closed	Vol. Max. Range Switch "Brdcst"	28A, 15A, 14A, 14B	Note A
2	Loop to Radio Loop See Sig. Gen. above	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	20A, 6	Note B
3	Loop to Radio Loop See Sig. Gen. above	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	20	Rock Comp. to "max." Recheck Operation No. 2
4	Loop to Radio Loop See Sig. Gen. above	9.5 M. C.	9.5 M. C.	Range Switch "S. W."	19, 6A	Note C
5	Loop to Radio Loop See Sig. Gen. above	12 M. C.	12 M. C.	Range Switch "S. W."	19, 6A	Note D

Model 41 - 245

Operations in Order	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	SPECIAL INSTRUCTIONS
1	Ant. Section of Tuning Condenser	455 K. C.	Tuning Cond. closed	Vol. Max. Range Switch "Brdcst"	33A, 30A, 29A, 29B	Note A
2	Loop to Radio Loop See Sig. Gen. above	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	17A, 9	Note B
3	Loop to Radio Loop See Sig. Gen. above	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	17	Rock Comp. to "max." Recheck Operation No. 2
4	Loop to Radio Loop See Sig. Gen. above	6 M. C.	6 M. C.	Range Switch "Police"	19	Rock Comp. to "max."
5	Loop to Radio Loop See Sig. Gen. above	9.5 M. C.	9.5 M. C.	Range Switch "S. W."	19A, 5	Note C
6	Loop to Radio Loop See Sig. Gen. above	12 M. C.	12 M. C.	Range Switch "S. W."	19A, 5	Note D

NOTE A — Compensator (14A) Model 41-240, must be adjusted before (14B) Model 41-240, and should be done in the following manner. Turn 14A all the way up, then slowly turn down and select the first I. F. peak. Padder 14B is now adjusted to maximum. This procedure applies also to Model 41-245, padder 29A should be adjusted before 29B.

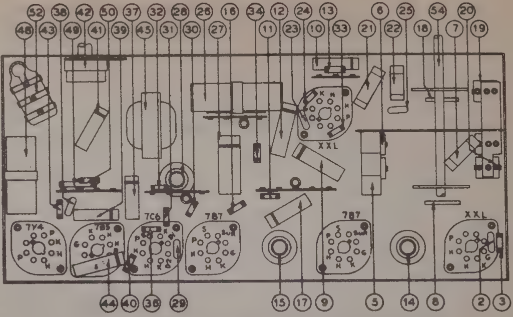
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE C — Set pointer at 9.5 M. C. and adjust padders (19) Model 240, and (19A) Model 245 to the second peak from tight. Adjust padders (6A) Model 240 and (5A) Model 245 to first peak from tight. (This gives the approximate correct setting of padders for next operation.)

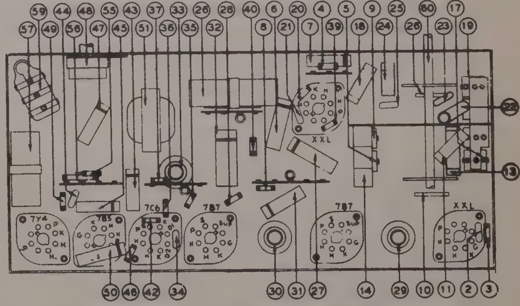
NOTE D — Tune in the 2nd signal peak from the tight position. Padder 19 Model 240, 19A Model 245, then roll padder 6A Model 41-240, 5 Model 41-245, slowly to maximum on the first peak from tight position.

Replacement Parts — Model 41-240

SCHE. No.	DESCRIPTION	PART No.
1	Loop Aerial	76-1092
2	Mica Condenser (250 mmfd.)	60-125257
3	Resistor (2.2 megohms)	33-522154
4	Tuning Condenser	31-2481
	Mounting Rubber	27-4596
5	Aerial Transformer (Broadcast)	32-3461
6	Comp. (Aerial Broadcast) Dual Capacity	31-6373
6A	Compensator (Aerial S. W.) (Part of 6)	
7	Aerial Transformer (S. W.)	32-3462
8	Mica Condenser (250 mmfd.)	30-1179
9	Tubular Condenser (.05 mfd., 200 volts)	30-4519
10	Tubular Condenser (.05 mfd., 200 volts)	30-4519
11	Resistor (4700 ohms, ½ watt)	33-247339
12	Tubular Condenser (.05 mfd., 400 ohms)	30-4518
13	Resistor (2200 ohms, ½ watt)	33-222339
14	1st I. F. Transformer	32-3465
15	2nd I. F. Transformer	32-3466
16	Resistor (33,000 ohms, ½ watt)	33-333339
17	Tubular Condenser (.05 mfd., 200 volts)	30-4519
18	Mica Condenser (250 mmfd.)	30-1179
19	Compensator (S. W. Osc.)	31-6380
20	Compensator Series (Broadcast, Osc.)	31-6382
20A	Comp. Shunt (Brdcst, Osc.) (Part of 20)	
21	Osc. Transformer (Broadcast)	32-3464
22	Osc. Transformer (S. W.)	32-3460
23	Mica Condenser (100 mmfd.)	60-110257
24	Resistor (47,000 ohms, ½ watt)	33-347339
25	Mica Condenser (250 mmfd.)	60-125257
26	Electrolytic Condenser, Dual (4-4 mfd.)	30-2477
26A	Electrolytic Condenser (Part of 26)	
27	Tubular Condenser (.1 mfd., 400 volts)	30-4455
28	3rd I. F. Transformer	32-3467
29	Mica Condenser (100 mmfd.)	60-110157
30	Resistor (2.2 megohms)	33-522339
31	Resistor (1 megohm)	33-510339
32	Resistor (1 megohm)	33-510339
33	Resistor (33,000 ohms)	33-333339
34	Resistor (2200 ohms)	33-222339
35	Volume Control (500,000 ohms)	33-5332
	Palnut	W-2157
36	Resistor (4.7 megohms)	33-547339
37	Tubular Condenser (.01 mfd., 400 volts)	30-4572
38	Mica Condenser (100 mmfd.)	60-110157
39	Tubular Condenser (.004 mfd., 400 volts)	30-4578
40	Resistor (220,000 ohms, ½ watt)	33-422339
41	Condenser (.003 mfd., 400 volt)	30-4469
42	Tone Control	33-5333
43	Resistor (1 megohm)	33-510339
44	Tubular Condenser (.006 mfd.)	30-4591
45	Output Transformer	32-8063
46	Cone Assembly (for Speaker 36-1510-3)	36-4163
47	Field Coil (Replace Speaker 36-1510)	
48	Electrolytic Condenser (12 mfd.)	30-2477
49	Resistor (220 ohms, 1 watt)	33-122436
50	Resistor (68 ohms, ½ watt)	33-068336
51	Power Transformer (110 volts, 60 cycle)	32-8064
	Power Transformer (110 volts, 25 cycle)	32-8075
52	Bakelite Condenser, Dual (.01 mfd.)	3903-DDG
53	Pilot Lamps	34-2068
54	Range Switch	42-1589
	Palnut (Range Switch)	W-2157



MODEL 41-240 — PART LOCATIONS. UNDERSIDE OF CHASSIS



MODEL 41-245 — PART LOCATIONS. UNDERSIDE OF CHASSIS

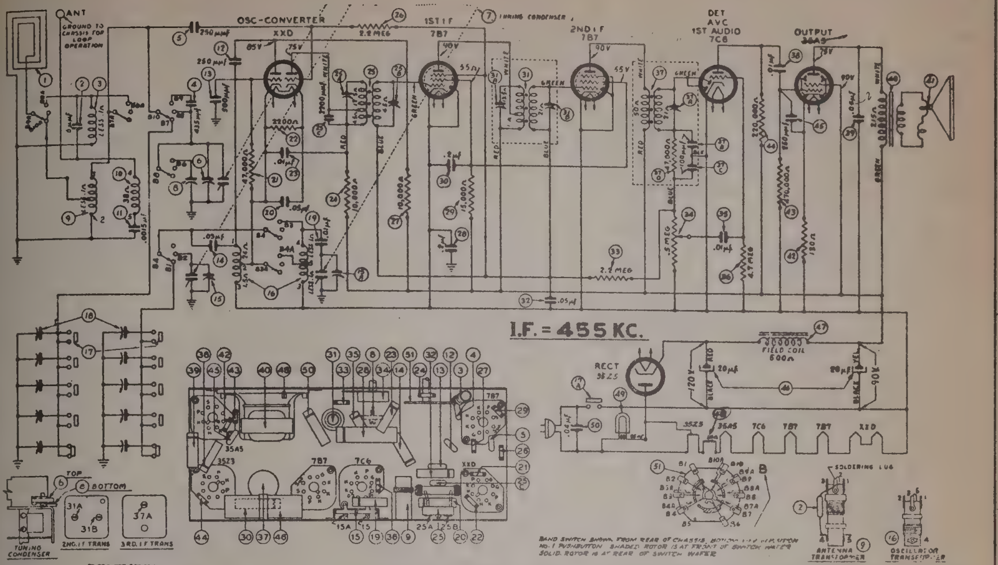
Replacement Parts — Model 41-245

MISCELLANEOUS PARTS

SCHE. No.	DESCRIPTION	PART No.
1	Loop Assembly	76-1092
2	Mica Condenser (250 mmfd., wax)	60-125257
3	Resistor (2.2 megohm, ½ watt)	33-522339
4	Resistor (2200 ohms, ½ watt)	33-222339
5	Compensator (Aerial S. W.)	31-6373
6	Condenser (.05 mfd., 400 volts)	30-4518
7	Condenser (.05 mfd., 200 volts)	30-4519
8	Resistor (4700 ohms, ½ watt)	33-247339
9	Compensator (Aerial Brdcst) (Part of 5)	
10	Mica Condenser (250 mmfd.)	30-1179
11	Aerial Transformer (S. W.)	32-3462
12	Tuning Condenser	31-2471
	Tuning Condenser Rubber Connection	27-9432
	Tuning Condenser Spacer (Mounting)	28-5665
13	Aerial Transformer (Police)	32-3463
14	Aerial Transformer (Broadcast)	32-3461
15	Push-Button Padder Strip Complete	31-6372
16	Push-Button Switch	42-1576
17	Compensator (Broadcast Series)	31-6382
18	Oscillator Transformer (Broadcast)	32-3464
19	Compensator (Police Shunt)	31-6351
19A	Compensator (S. W. Shunt) (Part of 19)	
20	Resistor (47,000 ohms, ½ watt)	33-347339
21	Mica Condenser (100 mmfd.)	60-110157
22	Oscillator Transformer (Police)	32-3459
23	Mica Condenser (3000 mmfd.)	60-230334
24	Oscillator Transformer (S. W.)	32-3460
25	Mica Condenser (250 mmfd.)	30-1119
26	Mica Condenser (250 mmfd.)	30-1179
27	Condenser (.05 mfd., 200 volts)	30-4519
28	Resistor (33,000 ohms, ½ watt)	33-333339
29	1st I. F. Transformer	32-3465
30	2nd I. F. Transformer	32-3466
31	Condenser (.05 mfd., 200 volts)	30-4519
32	Condenser (.1 mfd., 400 volts)	30-4455
33	3rd I. F. Transformer	32-3467
34	Mica Condenser (100 mmfd.)	60-110157
35	Resistor (2.2 megohms)	33-522339
36	Resistor (1 megohm)	33-510339
37	Resistor (1 megohm)	33-510339
38	Electrolytic Condenser (4-4 mfd.)	30-2477
38A	Electrolytic Condenser (Part of 38)	
39	Resistor (33,000 ohms, ½ watt)	33-333339
40	Resistor (2200 ohms, ½ watt)	33-222339
41	Volume Control	33-5332
42	Resistor (4.7 megohms, ½ watt)	33-547339
43	Condenser (.01 mfd., 400 volts)	30-4572
44	Mica Condenser (100 mmfd.)	60-110157
45	Condenser (.004 mfd., 400 volts)	30-4578
46	Resistor (220,000 ohms, ½ watt)	33-422339
47	Condenser (.003 mfd.)	30-4469
48	Tone Control	33-5404
49	Resistor (1 megohm, ½ watt)	33-510339
50	Condenser (.006 mfd., 400 volts)	30-4591
51	Output Transformer	32-8063
52	Cone Assembly	
	(for Speaker 36-1510-4)	36-4168
	(for Speaker 36-1510-3)	36-4163
53	Pilot Lamps	34-2068
54	Field Coil (Replace Speaker 36-1510)	
55	Resistor (68 ohms, 1 watt)	33-068336
56	Resistor (220 ohms, 1 watt)	33-122436
57	Electrolytic Cond. (12 mfd., 400 volts)	30-2409
58	Power Transformer (110 volts, 60 cycle)	32-8064
	Power Transformer (110 volts, 25 cycle)	32-8075
	Power Transformer Shield	56-1528
	Power Transformer Base (Shield)	56-1526
59	Condenser Dual (.01 mfd.)	3903-DDG
60	Range Switch	42-1578

PHILCO RADIO & TELEVISION CORP.

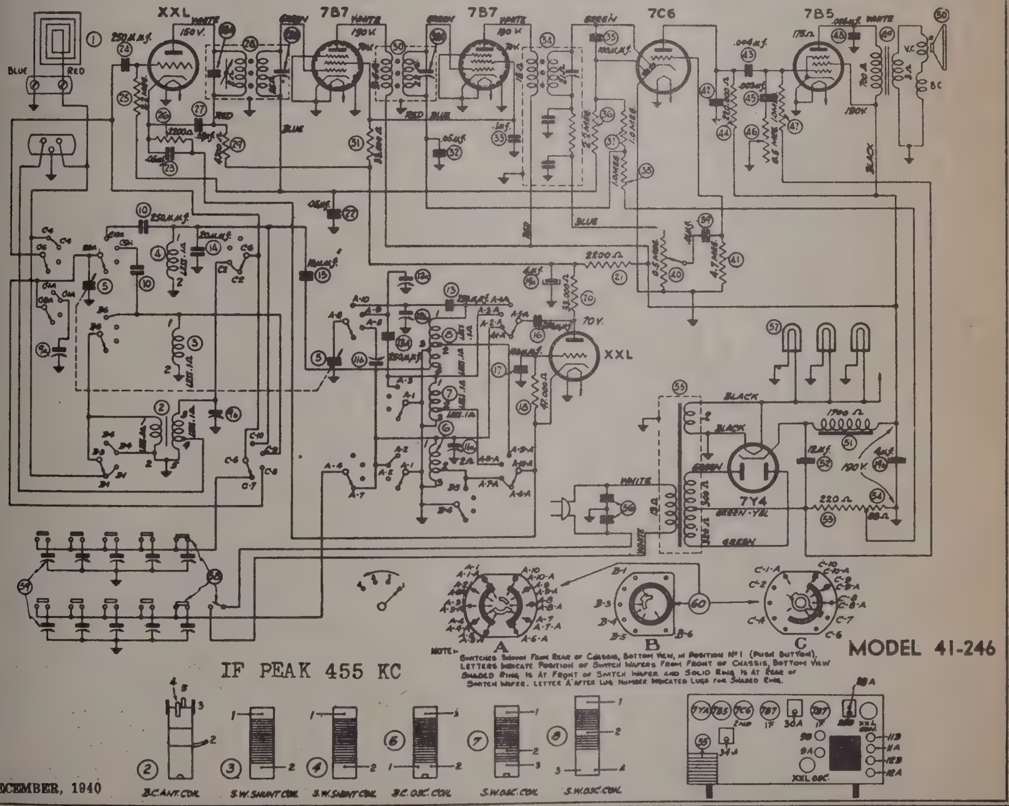
MODELS 41-231, 41-246 (121)



DECEMBER, 1940

SCHEMATIC DIAGRAM MODEL 41-231

FOR ALIGNMENT SEE INDEX
FOR OTHER DATA SEE INDEX



NOTE:- SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION Nº 1 (PUSH BUTTON). LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW SHADED RING IS AT FRONT OF SWITCH WAFER AND SOLID RING IS AT REAR OF SWITCH WAFER. LETTER A AFTER LUG NUMBER INDICATES LUGS FOR SHADED RING.

IF PEAK 455 KC

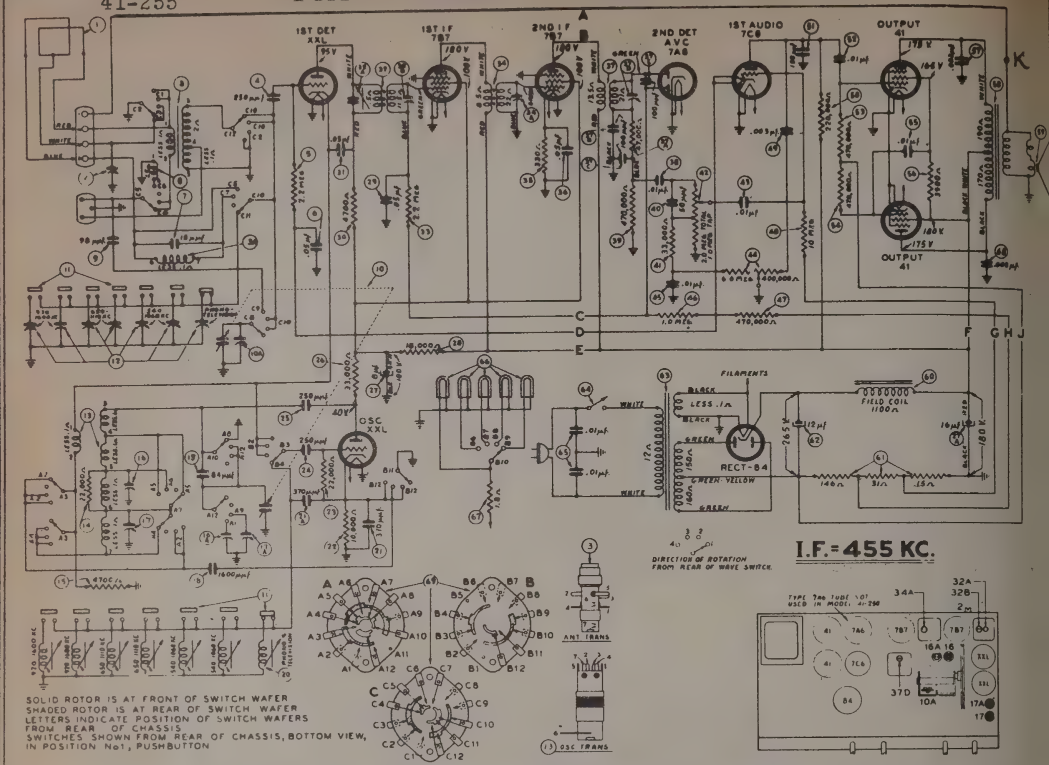
MODEL 41-246

DECEMBER, 1940

©John F. Rider, Publisher

MODELS 41-250
41-255

PHILCO RADIO & TELEVISION CORP.



I.F.=455 KC.

SOLID ROTOR IS AT FRONT OF SWITCH WAFER
SHADED ROTOR IS AT REAR OF SWITCH WAFER
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS
SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No1, PUSHBUTTON

FIG. 1 — SCHEMATIC DIAGRAM — MODELS 41-250, 41-255

The above diagram is the complete electrical circuit for Model 41-255. The same general circuit is also used in Model 41-250 with the exception of the 2nd detector, 1st audio, A. V. C. wiring which is shown in Fig. 4.

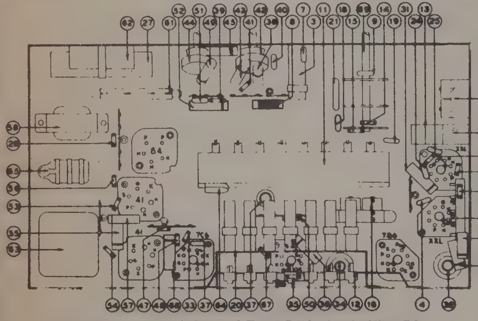
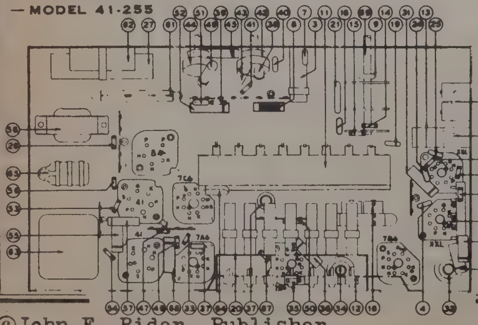


FIG. 2 — LOCATIONS OF PARTS AND TUBES UNDERSIDE OF CHASSIS — MODEL 41-250

— MODEL 41-255



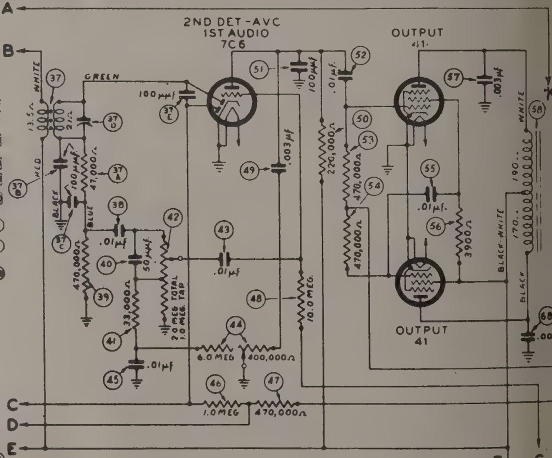
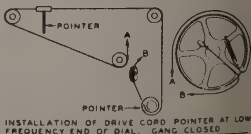


FIG. 4 — 2ND DETECTOR AND AUDIO CIRCUIT MODEL 41-250

FOR ALIGNMENT
AND TUNER
SEE INDEX

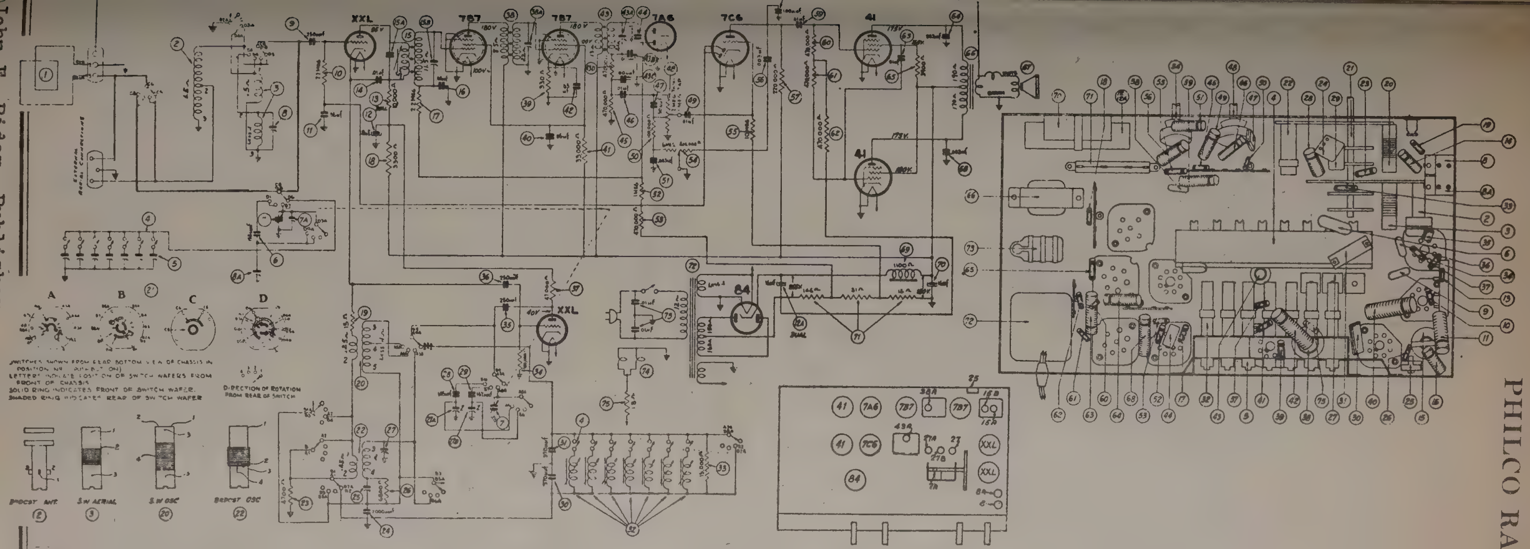
JUNE, 1940



INSTALLATION OF DRIVE CORD POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED

PHILCO RADIO & TELEVISION CORP.

MODEL 41-256
(121)


XXL
7B7
7B7
7A6
7C6
41
41
84
XXL
A
B
C
D
SWITCHES SHOWN FROM REAR BOTTOM VIEW OF CHASSIS IN POSITION No. 1 (NEAREST ON)
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS
SOLID RING INDICATES FRONT OF SWITCH WAFER
SHADED RING INDICATES REAR OF SWITCH WAFER
DIRECTION OF ROTATION FROM REAR OF SWITCH
BRDCST ANT
SW AERIAL
SW OSC
BRDCST OSC

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	High side to No. 3 terminal loop panel	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Positions	15A, 15B 38A, 43A	
2	Use loop on generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	27, 7A	Note A
3	Use loop on generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	25	Roll Tuning Condensers Note B
4	Use loop on generator	Perform operation No. 2 again				
5	Use loop on generator	12 M. C.	12 M. C.	Range Switch "SW-1"	27B, 8A	Note C
6	Use loop on generator	18 M. C.	18 M. C.	Range Switch "SW-2"	27A, 8	Note D

NOTE A—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B—When adjusting the low frequency compensator of the Broadcast or the aerial padders of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

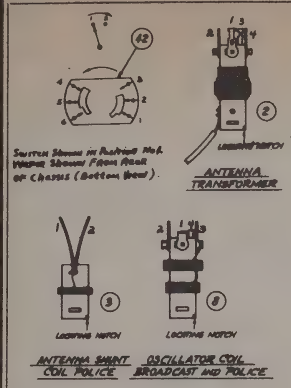
NOTE C—Adjust compensator (27B) to first peak from closed position (maximum capacity). The aerial compensator (8A) must also be adjusted to maximum on the second signal peak by rolling the tuning condenser (See Note B).

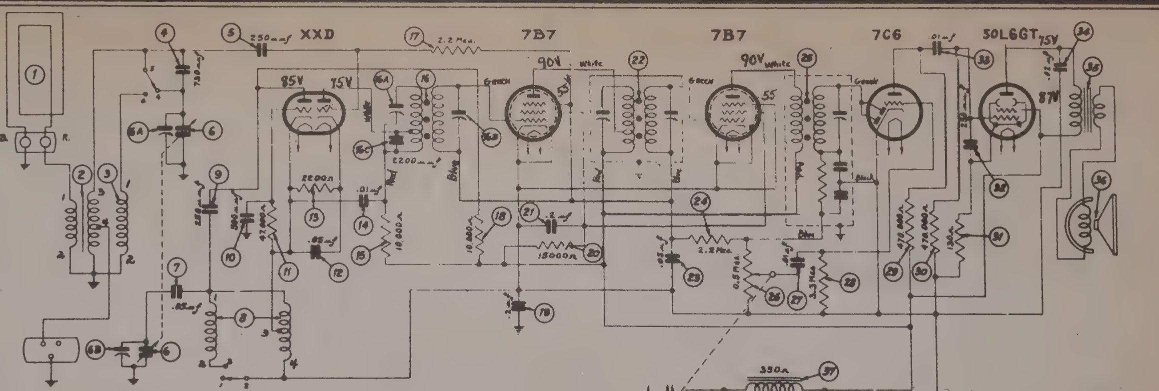
NOTE D—Adjust compensator (27A) to the second signal peak from the closed position (maximum capacity). The aerial compensator (8) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser (See Note B).

FOR TUNER
SEE INDEX

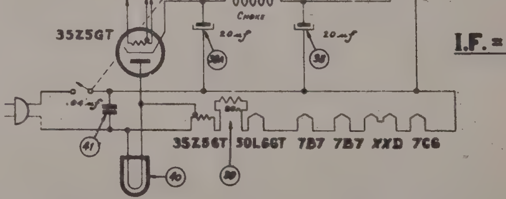
DECEMBER, 1940

MODEL 41-258 (122) PHILCO RADIO & TELEVISION CORP.


42
Switch Shown in Position No. 1 Wafer Shown From Rear of Chassis (Bottom View)
2
Locating Notch
ANTENNA TRANSFORMER
3
Locating Notch
8
Locating Notch
ANTENNA SHUNT COIL POLICE
OSCILLATOR COIL BROADCAST AND POLICE

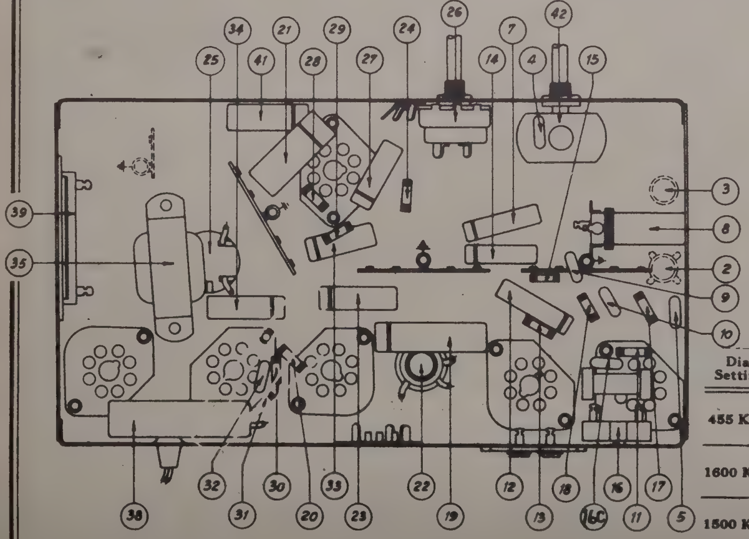


I.F. = 455 KC.



SCHEMATIC DIAGRAM — MODEL 41-258, CODE 122

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

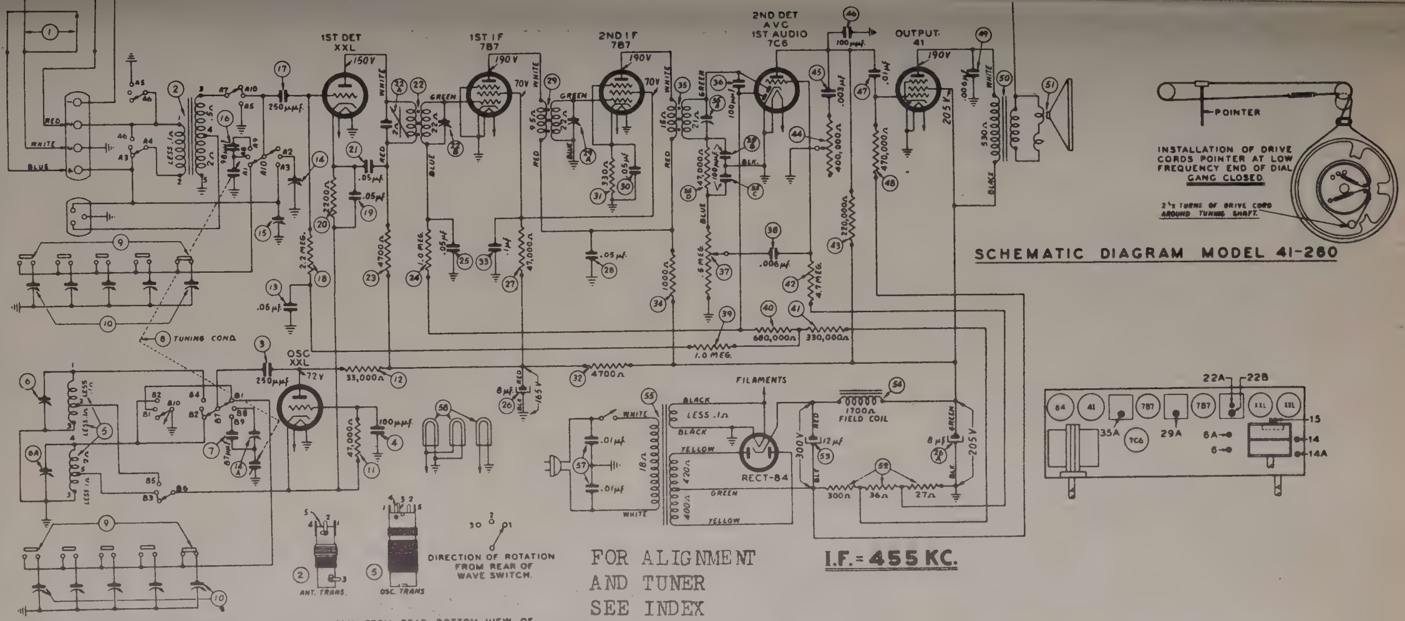


	RECEIVER			SPECIAL INSTRUCTIONS
Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
455 K. C.	540 K. C. Tuning Cond. Closed	Vol Max. Range Switch Brdcst.	16A, 16B, 22A, 22B, 25A	
1600 K. C.	1600 K. C.	Vol Max. Range Switch Brdcst.	6B Tuning Condenser	Note A
1500 K. C.	1500 K. C.	Vol Max. Range Switch Brdcst.	6A Tuning Condenser	Note B

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 55 on the dial.

NOTE B: The police band padding is automatically adjusted by the standard broadcast padders.

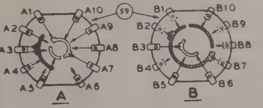
AUGUST, 1940.



SCHEMATIC DIAGRAM MODEL 41-260

I.F. = 455 KC.

FOR ALIGNMENT
AND TUNER
SEE INDEX

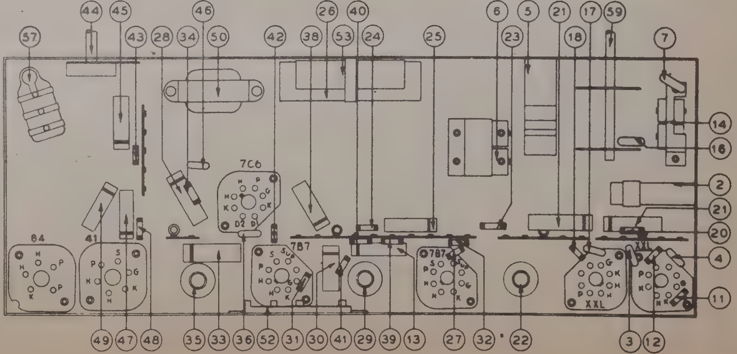


SWITCH SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No1 PUSHBUTTON.
SHADED ROTOR IS AT FRONT OF SWITCH WAFER
SOLID ROTOR IS AT REAR OF SWITCH WAFER
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS

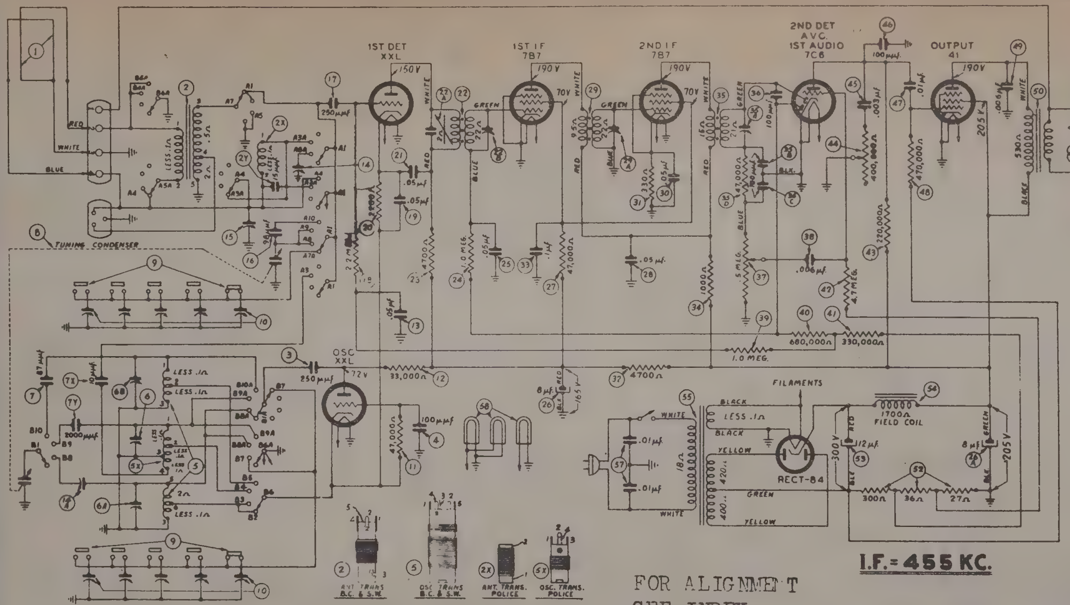
JULY, 1940

Models 41-260 and 41-265 are seven (7) tube alternating current (A. C.) operated superheterodyne radios incorporating electric push button in addition to manual tuning — and the new Philco built-in American and overseas loop aerial system. These models are also designed to receive the sound of a television program tuned in by special type Philco Television Radios.

In general, these models are similar with the exception of the tuning ranges and cabinet design. Model 41-260 has two (2) tuning ranges covering 540 to 1720 K. C. and 9.0 to 12.0 M. C. Model 41-265 consists of three (3) tuning ranges covering 540 to 1720 K. C., 2.0 to 7.0 M. C. and 9.0 to 12 M. C.

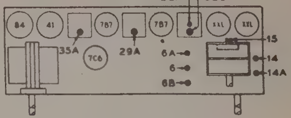


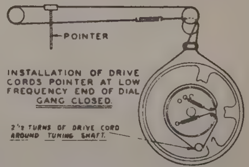
MODEL 41-260 — PART LOCATIONS, UNDERSIDE OF CHASSIS



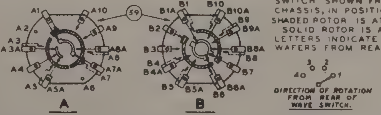
I.F. = 455 KC.

FOR ALIGNMENT SEE INDEX




POINTER
INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED.
2½ TURNS OF DRIVE CORD AROUND TUNING SHAFT.

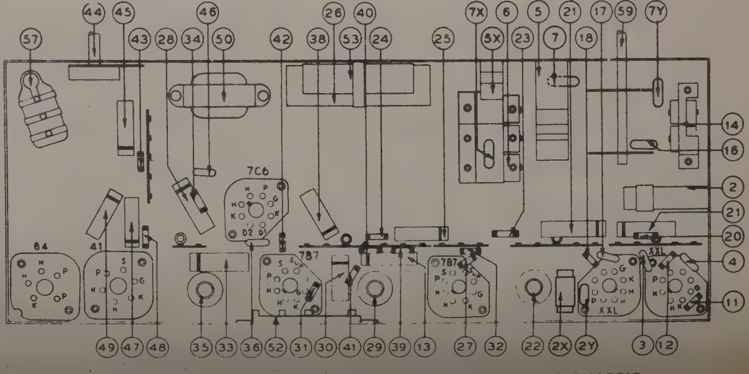
SCHEMATIC DIAGRAM MODEL 41-265



SWITCH SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No 1 PUSHBUTTON.
SHADED ROTOR IS AT FRONT OF SWITCH WAFER
SOLID ROTOR IS AT REAR OF SWITCH WAFER
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS

AERIAL CONNECTIONS: The built-in loop aerial system is designed to operate without an outside aerial or ground, and to give exceptionally high receiving performance of stations on standard and shortwave frequencies. Another feature is its noise-reducing characteristic. The loop can be turned to the position in which it picks up a minimum amount of interference, or to the position where best reception is obtained.

To operate the radio in steel reinforced buildings and other shielded locations, where signal strength is weak, the Philco 1941 Outdoor Aerial, Part No. 45-2817, is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer unit into the socket provided at the rear of the Radio chassis. This aerial can be obtained from your local Philco distributor. A ground connection is not required with either type of installation.



MODEL 41-265 — PART LOCATIONS, UNDERSIDE OF CHASSIS

MODELS 41-260, 41-265

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

The receiver can be adjusted in the cabinet or removed from the cabinet. If adjustments are made outside the cabinet a Service Tuning Scale, Part No. 45-2825, Model 41-260; and Part No. 45-2826, Model 41-265, will be required. This scale is placed underneath the pointer on the metal dial plate.

Model 41-260

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant Section of Tuning Cond.	455 K C	Tuning Cond. Closed	Vol Max. Range Switch "Brdcst"	35A, 29A, 22A, 22B	Note A
2	Loop to Radio Loop See Sig. Gen. Above	1720 K. C.	1720 K. C.	Vol. Max. Range Switch "Brdcst"	6A	Note B
3	Loop to Radio Loop See Sig. Gen. Above	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	14	
4	Loop to Radio Loop See Sig. Gen. Above	580 K. C.	580 K. C.	Vol Max. Range Switch "Brdcst"	14A	Rock Comp. to "Max." Recheck Operations Nos. 2, 3
5	Loop to Radio Loop See Sig. Gen. Above	12 M. C.	12 M. C.	Range Switch S. W.	6, 15	Note C

Model 41-265

1	Ant. Section of Tuning Cond.	455 K. C.	Tuning Cond. Closed	Vol. Max. Range Switch "Brdcst"	35A, 29A, 22A, 22B	Note A
2	Loop to Radio Loop See Sig. Gen. Above	1720 K. C.	1720 K. C.	Vol. Max. Range Switch "Brdcst"	6A	Note B
3	Loop to Radio Loop See Sig Gen. Above	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	14	
4	Loop to Radio Loop See Sig Gen. Above	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	14A	Rock Comp. to "Max." Recheck Operation No 2
5	Loop to Radio Loop See Sig Gen. Above	6 M. C.	6 M. C.	Range Switch Police	6	Rock Comp. to "Max."
6	Loop to Radio Loop See Sig Gen. Above	12 M. C.	12 M. C.	Range Switch S. W.	6B, 15	Note C

NOTE A — Compensator (22A) Model 41-260, must be adjusted before (22B) Model 41-260, and should be done in the following manner: Turn 22A all the way up, then turn down selecting the first I. F. peak, then pad 22B to maximum. This procedure applies also to Model 41-265

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE C — Tune in the first signal peak from the tight position of both padders. Roll padder (15) Model 41 260, (15) Model 41-265, slowly to maximum on the first peak

ADJUSTING ELECTRIC PUSH BUTTON TUNING

MODELS 41-280, 41-285, 41-287, 41-290(121), 41-250, 41-255, 41-256, 41-295, 41-300

To adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and Loktal aligning adapter, Part No. 45-2767, are required. With this equipment at hand proceed as follows:

Select seven of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button on the left and the highest frequency is placed in the eighth push button on the right. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as follows:

Push Button	Frequency Range	Frequency Range
1, 2, 3	540-1060 K. C.	540-1030 K. C.
4, 5	650-1110 K. C.	650-1160 K. C.
6, 7	920-1600 K. C	900-1600 K. C.

Looking at the front of the cabinet, the second button on the left is adjusted by adjusting screw No. 1. The next push button by adjusting screw No. 2 and the remaining push buttons in order.

1. Remove the 7C6 A. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. Press in "Off-On" push button. Turn "Bands" knob to broadcast.

3. Set up the Model 077 Station Setter near the receiver and connect a loop aerial (made from a few turns of wire 12 inch in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."

4. Manually tune in the station to be set up on the first push button. After doing this set the indicator of the 077 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

5. Turn "Bands" knob to push button position. Using the insulated screw driver, turn the "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer. The push button is adjusted properly to the station at this point.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up this receiver for operation with Philco Television Sets or Record Players are supplied with the instruments.

MODELS 41-260, 41-265, 41 246, 41-608, 41-609

PROCEDURE FOR SETTING AND OPERATING THE ELECTRIC PUSH BUTTON TUNING

The automatic tuning mechanism of each model is identical and consists of six (6) electric tuning push buttons, five (5) of the push buttons are used for selecting broadcast stations, and one as the power control (On-Off switch).

Select five of your favorite nearby broadcast stations and remove their call letters from the station call letter tab sheets supplied. Place each call letter tab in the tab space above each button which includes the frequencies of the desired stations. The frequency range of the buttons and corresponding padders is as follows:

Padders (right to left from rear)	Circuit	Buttons (left to right from front)	Frequency Range
		1	On-Off Switch
1 2	Ant Osc	2	540 to 980 kilocycles
3 4	Ant Osc	3	540 to 980 kilocycles
5 6	Ant Osc	4	710 to 1185 kilocycles
7 8	Ant Osc	5	850 to 1600 kilocycles
9 10	Ant Osc	6	1185 to 1720 kilocycles

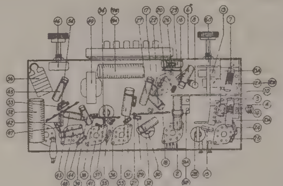
The second button from the left looking at the front of the cabinet corresponds to the two right-hand padder screws looking at the rear and covers the lowest frequency range.

With the "Tuning Range Selector" in broadcast position, tune in the station whose call letters appear above the second button. Then depressing the second button, tune in this station by rotating the No. 2 "OSC" screw (next to the right end of the unit looking at the rear of the chassis). (NOTE: Inherent characteristics of these padders may cause some of them to cover a lower range than required to cover the broadcast band. This may cause the radio to howl or flutter when a station button is depressed. To correct this, loosen the "ANT" padder corresponding to the depressed station button.) Turn the "OSC" screw slowly and listen carefully or the station may be passed without noticing it. After the "OSC" screw has been adjusted for maximum volume, the corresponding "ANT" screw should be adjusted for maximum. For some stations, it may be necessary to readjust the "OSC" screw after the "ANT" screw has been set. Switching the "Tuning Range Selector" from broadcast position to the automatic push button position will enable you to make sure you have the correct station tuned in. When the first station has been set, the same procedure should be followed for the remaining buttons, first tuning in the desired station by means of the Station Selector.

To tune the set with the "Push Buttons", turn "Tuning Range Selector" to push button position and press in the button which corresponds to the call letters of the desired station. The volume of the program may be controlled with the manual volume control.

The lowest frequency station push button labeled "Television" can be adjusted for reception of the sound channel of a television program received by Philco television sets. This push button may also be used in conjunction with a Philco Wireless Record Player.

MODEL 41-246



SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the aerial section (stator plates) of the tuning condenser. Connect the ground or low side of the generator to the chassis.

AUDIO OUTPUT METER: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate of the 7B5 tube to the chassis. Adjust the meter for the (0 to 10) volt scale.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments, adjust the compensators as shown in the tabulation for each model below. Locations of the compensators are shown in the schematic diagram. If the indicating meter pointer goes off scale when adjusting the compensator, reduce the strength of the signal from the generator.

MODEL 41-246

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	Ant. Section of Tuning Condenser	455 K. C.	Tuning Cond. closed	Vol. Max. Range Switch "Brdcst"	34A, 30A 28A, 28B	Note A
2	Loop to Radio Loop See Sig. Gen. above	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	11A, 9B	Note B
3	Loop to Radio Loop See Sig. Gen. above	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	11B	Rock Comp. to "max." Recheck Operation No. 2
4	Loop to Radio Loop See Sig. Gen. above	12 M. C.	12 M. C.	Range Switch "S. W."	12A, 9A	Note C
5	Loop to Radio Loop See Sig. Gen. above	18 M. C.	18 M. C.	Range Switch "S. W."	12B	Note D

NOTE A—Compensator (28A) must be adjusted before (28B), and should be done in the following manner: Turn 28A all the way up, then slowly turn down and select the first I. F. peak. Padder 28B is now adjusted to maximum.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

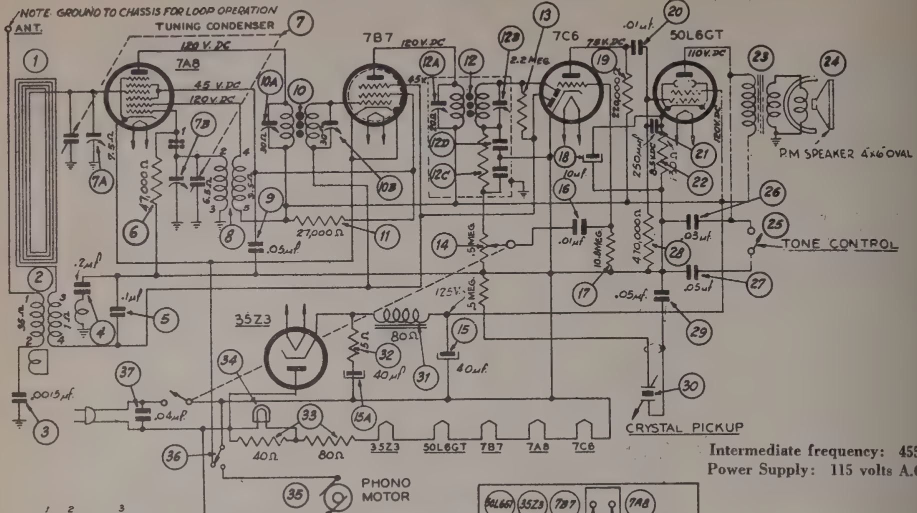
NOTE C Adjust padder (12A) to the first signal peak from the tight position (maximum capacity).

NOTE D—Adjust padder (12B) to the second signal peak from the tight position (maximum capacity).

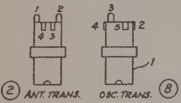
MODEL 41-601 (121)

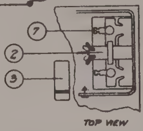
PHILCO RADIO & TELEVISION CORP.

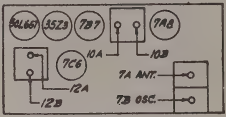
SCHEMATIC DIAGRAM — MODEL 41-601, CODE 121



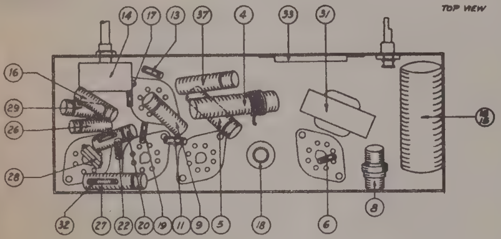
Intermediate frequency: 455 K.C.
Power Supply: 115 volts A.C.







DECEMBER, 1940



The phonograph is automatically started when the pickup is lifted from its rest. A special switch operated by the pickup rest, applies power to the phonograph motor and opens the cathode circuit of the radio. The sound output of the radio and phonograph is controlled by a new type dual volume control which also operates the power switch.

When aligning the R.F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations are shown on Schematic.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I.F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	12A, 12B, 10A, 10B	Note B
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol. Max. Range Switch Brdcst.	(7B, Note C)	Note A
3	Loop see above instructions	1500 K.C.	1500 K.C.	Vol. Max. Range Switch Brdcst.	(7A, Note D)	

NOTE A: DIAL POINTER CALIBRATION—In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side.

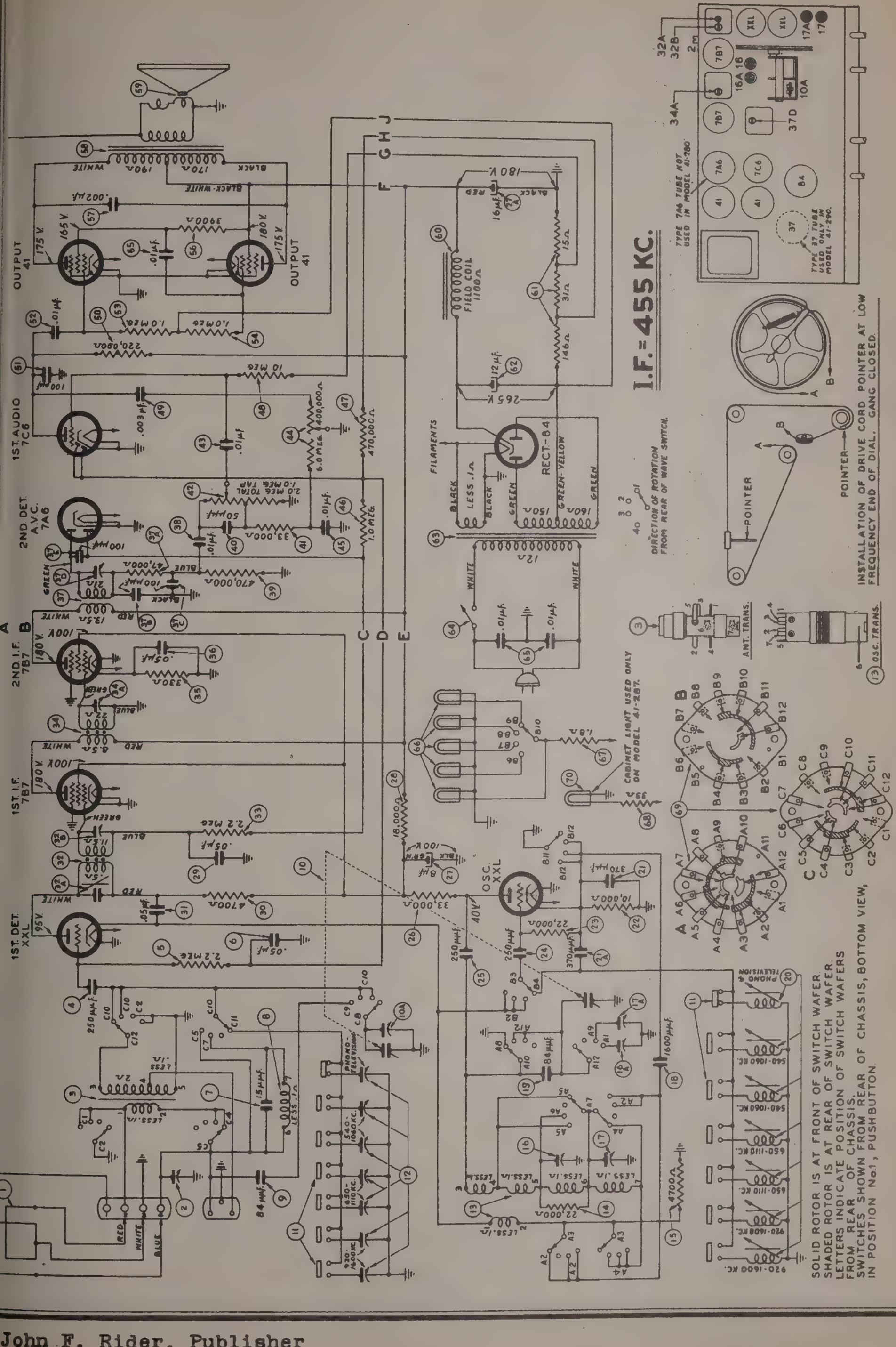
NOTE B—Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

NOTE C—Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (7B) to maximum at this point. If the radio is adjusted in the cabinet, set dial pointer to 1600 K.C.

NOTE D—Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (7A) to maximum at this point.

PHILCO RADIO & TELEVISION CORP.

MODELS 41-280, 41-285, 41-287, 41-290 (121)

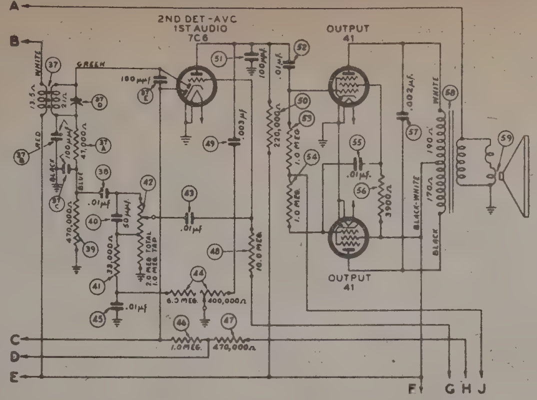


SOLID ROTOR IS AT FRONT OF SWITCH WAFER.
SHADED ROTOR IS AT REAR OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS.
SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No.1, PUSHBUTTON

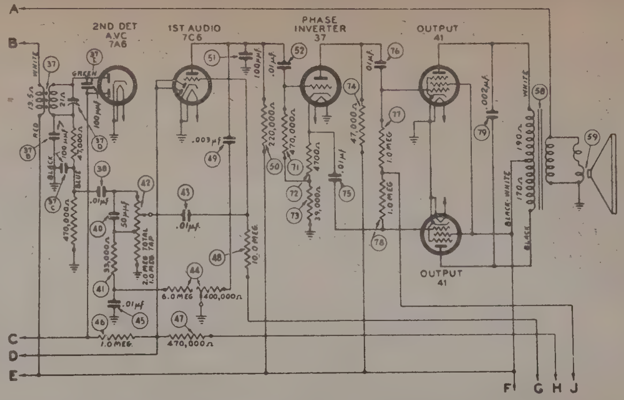
JUNE, 1940

SCHEMATIC DIAGRAM — MODELS 41-280, 41-285, 41-287, 41-290

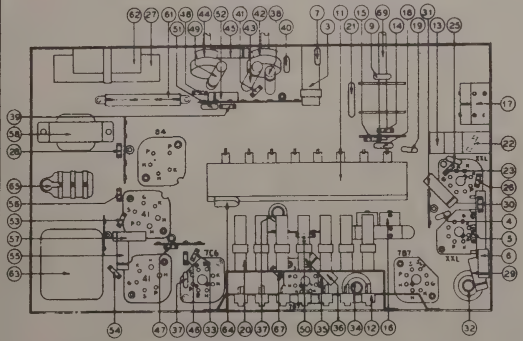
The above diagram is the complete electrical circuit for the Models 41-285, 41-287. The same general circuit is also used in Models 41-280 and 41-290, with the exception of the 2nd detector, 1st audio A. V. C. wiring, Model 41-280 and the audio circuit, Model 41-290.



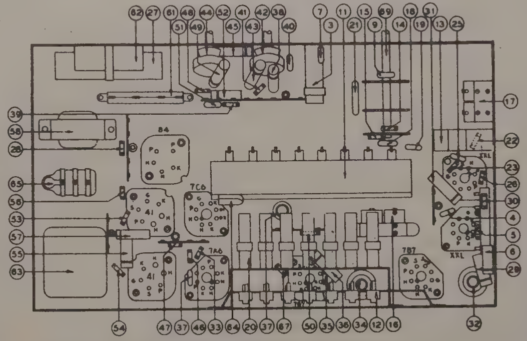
SECOND DETECTOR CIRCUIT — MODEL 41-280



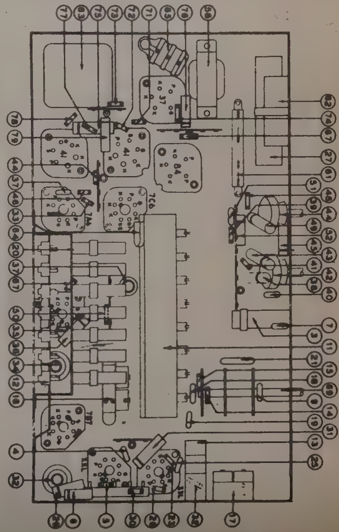
AUDIO CIRCUIT — MODEL 41-290



PART LOCATIONS UNDERSIDE — MODEL 41-280



PART LOCATIONS UNDERSIDE — MODELS 41-285-287



PART LOCATIONS UNDERSIDE — MODEL 41-290

In general, these models are similar with the exception of the **audio circuits, number of tubes** used and **cabinet design.** Model 41-280 is an eight (8) tube radio; Models 41-285 and 41-287 are nine (9) tube radios employing the same chassis but assembled in different cabinets, and Model 41-290 consists of a ten (10) tube chassis. These differences are shown in the schematic diagram and parts lists.

Other features of design included in these models are: Three tuning ranges covering the frequencies listed below: continuously variable tone control; audio bass frequency compensation at low volume; Push-pull pentode audio output circuit with screen Phase inversions; New Type (12) twelve inch speaker and illuminated push button indicators.

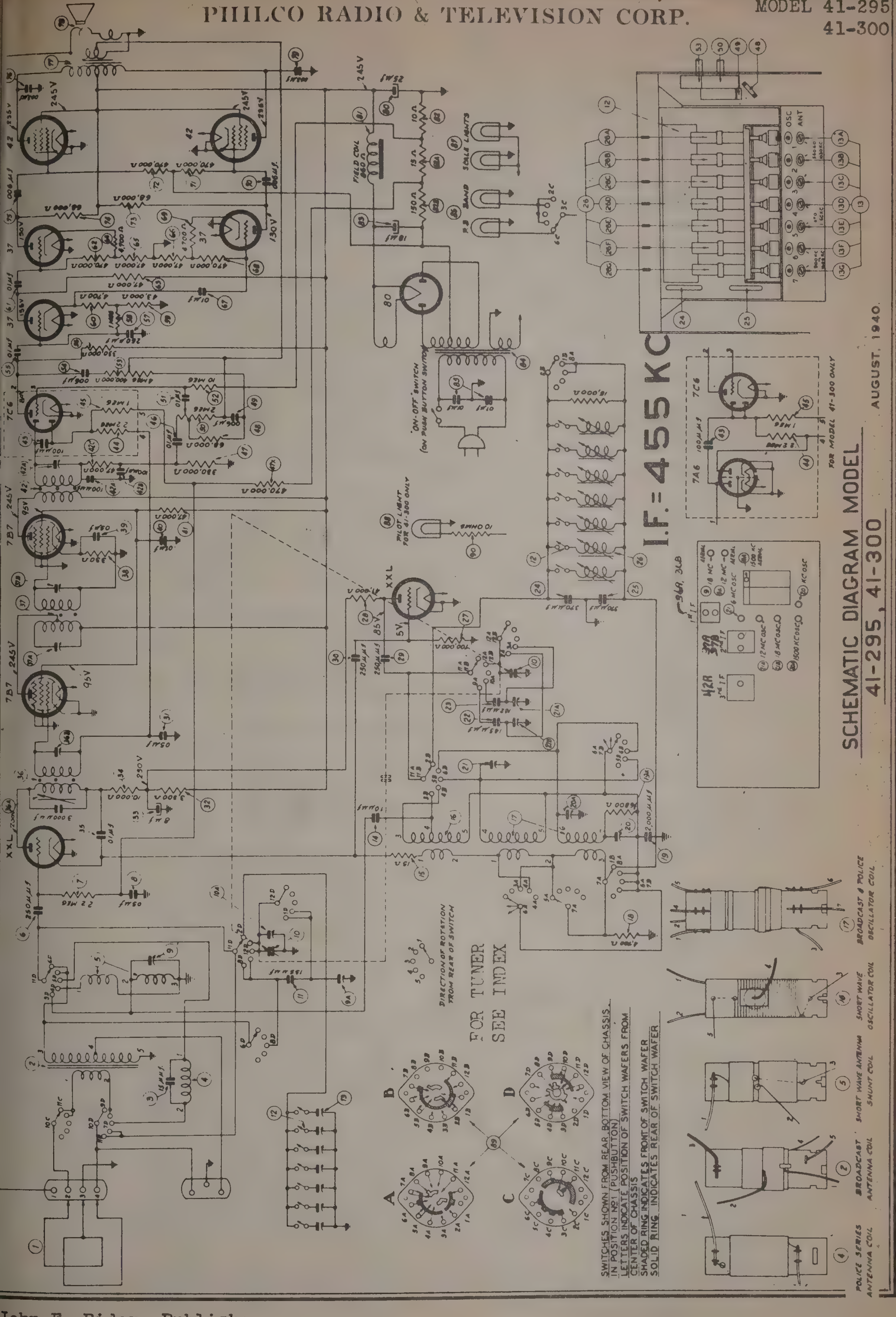
POWER CONSUMPTION: Model 41-280, 41-285-287, 41-290, 60 watts.

FREQUENCY TUNING RANGES: 540 to 1720 K. C.; 2.3 to 7.0 M. C.; 9.0 to 12.0 M. C.

FOR ALIGNMENT
AND TUNER
SEE INDEX

PHILCO RADIO & TELEVISION CORP.

MODEL 41-295
41-300


I.F. = 455 KC
AUGUST, 1940.
FOR MODEL 41-300 ONLY
FIELD COIL 860 Ω
SCALE LIGHTS
BAND
"ON-OFF" SWITCH (ON PUSH BUTTON SWITCH)
PILOT LIGHT FOR 41-300 ONLY
DIRECTION OF ROTATION FROM REAR OF SWITCH
FOR TUNER SEE INDEX
SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS
IN POSITION No1 (PUSHBUTTON)
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM CENTER OF CHASSIS
SHADED RING INDICATES FRONT OF SWITCH WAFER
SOLID RING INDICATES REAR OF SWITCH WAFER
A
B
C
D
POLICE SERIES ANTENNA COIL
BROADCAST ANTENNA COIL
SHORT WAVE ANTENNA SHUNT COIL
SHORT WAVE OSCILLATOR COIL
BROADCAST & POLICE OSCILLATOR COIL
42
37
7C6
7B7
XXL
80
7A6
OSC
ANT

SCHEMATIC DIAGRAM MODEL 41-295, 41-300

MODELS 41-295
41-300

PHILCO RADIO & TELEVISION CORP.

Either a vacuum tube voltmeter or an audio output meter may be used as a signal indicator when adjusting the receiver.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 4 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown on the schematic diagram. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	High Side to No. 4 Terminal Loop Panel	455 K. C.	580 K. C.	Vol. Max. Range Switch "S.W.1" Position	36A, 36B, 37A, 37B, 42A	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	20A, 10A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	20	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat Operation No. 2				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	21	Note C
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W. 1"	21A, 9A	Note D
7	Use Loop on Generator	18 M. C.	18 M. C.	Range Switch "S. W. 2"	21B, 9	Note E

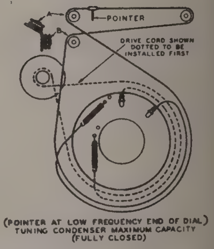
NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B — When adjusting the compensator the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — Adjust compensator (21) to the Second signal peak from the tight (closed) position. The tuning condenser should also be Rolled when the padder is being adjusted on this peak. See Note B on how to Roll the Condenser.

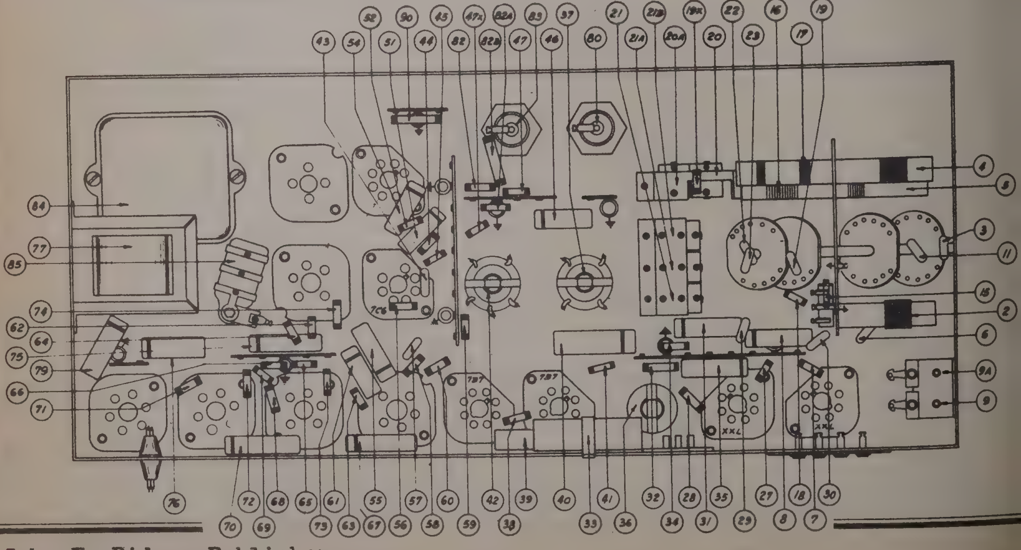
NOTE D — Adjust compensator (21A) to the First signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver dial at 12 M. C. and turning the signal generator to 11.090 M. C.

NOTE E — Adjust compensator (21B) to the Second signal peak from the tight (closed) position. If the compensator is correctly adjusted the image signal will be weakly heard by leaving the receiver at 18 M. C. and turning the signal generator to 18.910 M. C. When adjusting compensator (9) roll the tuning condenser. See Note B on how to roll the condenser.



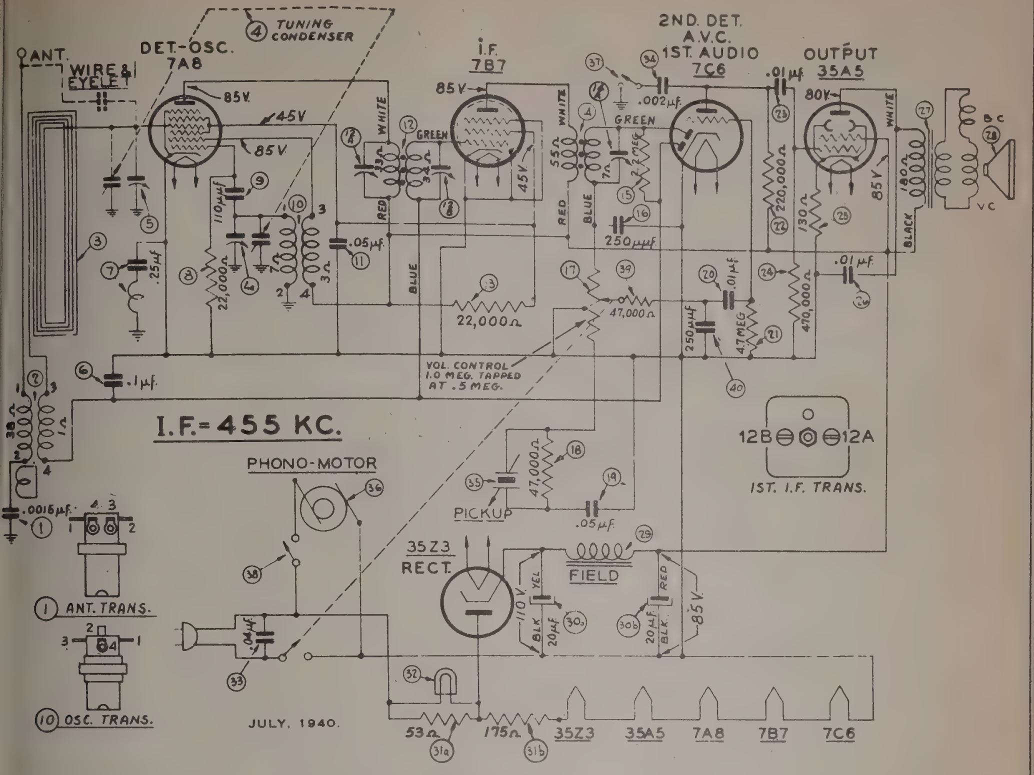
(POINTER AT LOW FREQUENCY END OF DIAL)
TUNING CONDENSER MAXIMUM CAPACITY
(FULLY CLOSED)

INSTALLATION OF DRIVE CORD

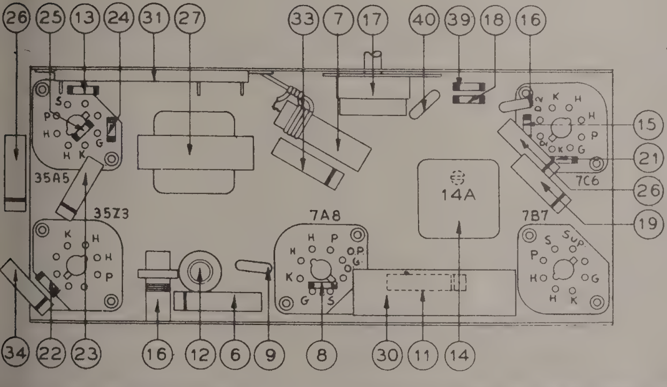


PHILCO RADIO & TELEVISION CORP.

MODEL 41-602



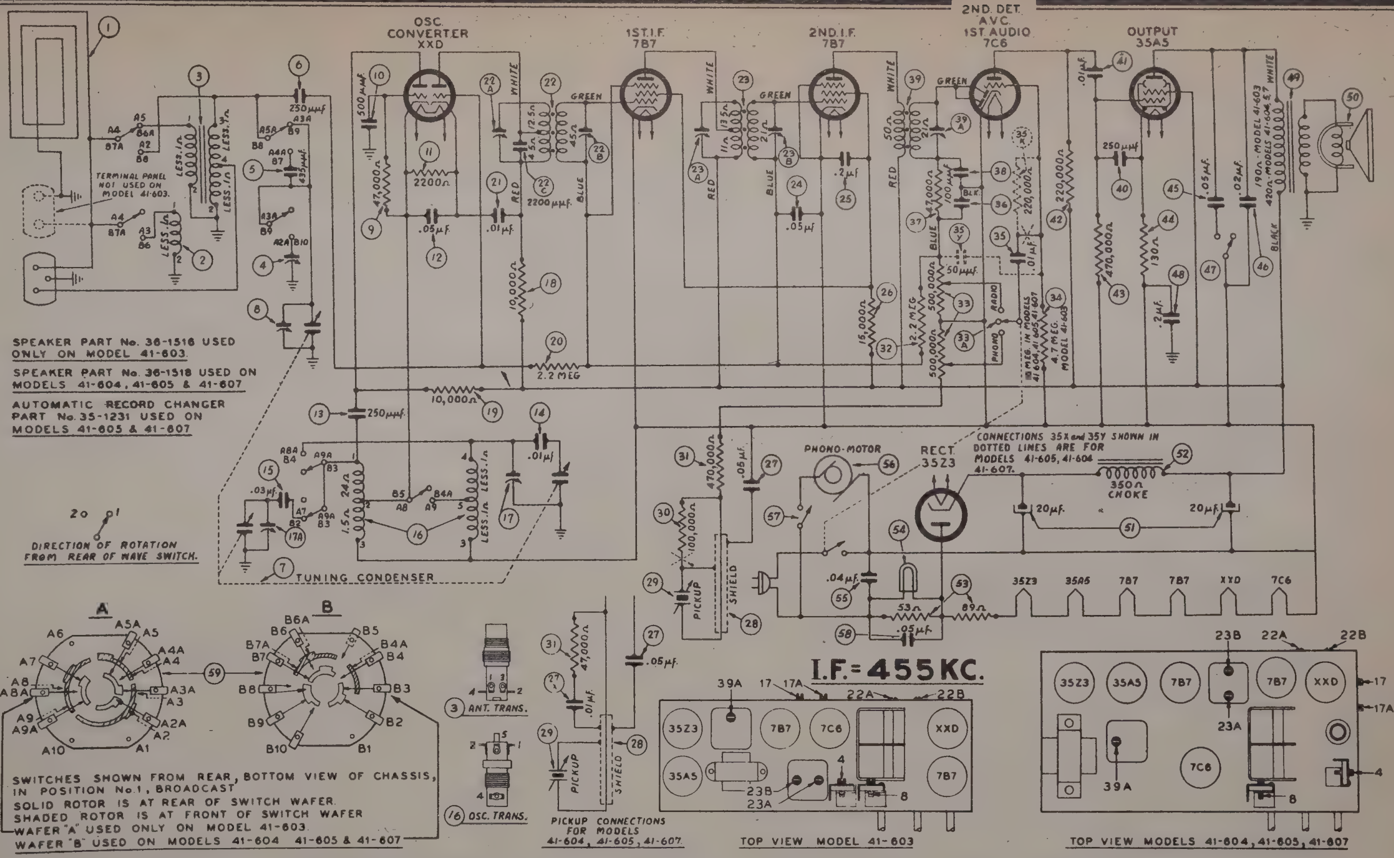
JULY, 1940.



When aligning the R.F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio. After connecting the aligning instruments adjust the compensators as shown in tabulation. Locations of the R.F. compensators are on top of the tuning tuning condenser, oscillator on the front, and aerial on rear. The 1st and 2nd I.F. transformers are on top of the chassis.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol Max. Range Switch Brdcst.	14A, 12A, 12B	
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	4A	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	5	

NOTE A: — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 550 K. C.


OSC. CONVERTER XXD
1ST.I.F. 7B7
2ND.I.F. 7B7
2ND. DET. AVC. 1ST. AUDIO 7C6
OUTPUT 35A5
RECT. 35Z3
PHONO-MOTOR
350Ω CHOKE
TUNING CONDENSER
PICKUP
SHIELD
TERMINAL PANEL NOT USED ON MODEL 41-603.
CONNECTIONS 35X and 35Y SHOWN IN DOTTED LINES ARE FOR MODELS 41-605, 41-604 41-607.
190Ω - MODEL 41-603
420Ω - MODELS 41-604, 5, 7
4.7 MEG. MODEL 41-603
MEG. IN MODELS 41-604, 41-605, 41-607
WHITE
GREEN
BLUE
RED
BLACK
BLK
RADIO
PHONO
35Z3
35A5
7B7
7B7
XXD
7C6
A
B
ANT. TRANS.
OSC. TRANS.
TOP VIEW MODEL 41-603
TOP VIEW MODELS 41-604, 41-605, 41-607
PICKUP CONNECTIONS FOR MODELS 41-604, 41-605, 41-607.

SPEAKER PART No. 36-1516 USED ONLY ON MODEL 41-603.

SPEAKER PART No. 36-1518 USED ON MODELS 41-604, 41-605 & 41-607

AUTOMATIC RECORD CHANGER PART No. 35-1231 USED ON MODELS 41-605 & 41-607

DIRECTION OF ROTATION FROM REAR OF WAVE SWITCH.

SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No. 1, BROADCAST
SOLID ROTOR IS AT REAR OF SWITCH WAFER.
SHADED ROTOR IS AT FRONT OF SWITCH WAFER
WAFER "A" USED ONLY ON MODEL 41-603.
WAFER "B" USED ON MODELS 41-604 41-605 & 41-607

I.F. = 455 KC.

MODELS 41-603 41-604 41-605 & 41-607

PHONOGRAPH SECTION

Models 41-603 and 41-604 use the same type phonograph mechanism. This mechanism consists of a manually operated crystal pickup and 115 volt, 60 cycle turntable motor. In addition an automatic motor starting switch is included which starts the motor when the pickup is lifted from its rest.

The phonograph mechanism of the Models 41-605 and 41-607 consists of an Automatic Record Changer which plays twelve 10-inch records or ten 12-inch records at one loading. The record changer can also be manually operated. A crystal pickup is provided on the changer which operates through the audio system of the radio. The same automatic Record Changer is used in both of these models. The service procedure for adjusting the Automatic Record Changer will be found in Radio Service Bulletin No. 358.

JULY, 1940.

INTERMEDIATE FREQUENCY: 455 K. C.

POWER SUPPLY: 115 Volts, 60 cycle A. C.

POWER CONSUMPTION: 40 watts, Models 41-603, 41-604.
45 watts, Models 41-605, 41-607.

PHILCO RADIO & TELEVISION CORP.

SEE MODELS BELOW

MODELS 41-280, 41-285, 41-287, 41-290(121)

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
1	High side to No. 4 terminal loop panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Positions	32A, 32B 34A, 37D	
2	Use loop on generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	16, 10	Note A
3	Use loop on generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	17	Roll Tuning Condensers Note B
4	Use loop on generator	Perform operation No. 2 again				
5	Use loop on generator	6 M. C.	6 M. C.	Range Switch "Police"	16A	
6	Use loop on generator	12 M. C.	12 M. C.	Range Switch "S. W."	17A, 2	Note C

NOTE A — DIAL CALIBRATION: In order to adjust the receiver rrectly, the dial must be aligned to track properly with the tuning ndenser. To adjust the dial, proceed as follows: With the tuning ndenser closed (maximum capacity), set the dial pointer on the treme left index line at the low frequency end of the broadcast ale. The arrangement of the drive cable in this position is shown the schematic.

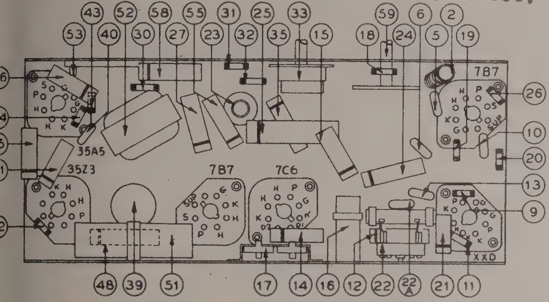
NOTE B — When adjusting the low frequency compensator of Range ne (Broadcast) or the aerial padders of the high frequency tuning nge; the receiver Tuning Condenser must be adjusted (rolled) as llows: First tune the compensator for maximum output, then vary e tuning condenser of the receiver for maximum output. Now turn e compensator slightly to the right or left and again vary the re- iver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (17A) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a first peak is obtained on the output meter. Adjust the compensator for maximum output at this first peak.

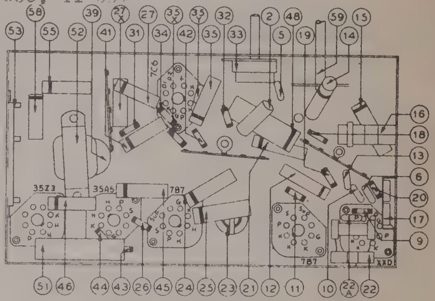
If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. above the frequency being used on any high frequency range.

The aerial padder (2) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust to maximum output on the second signal peak from the tight position (screw all the way down) of the padder.

MODELS 41-603, 41-604, 41-605, 41-607



MODEL 41-603
PART LOCATIONS — UNDERSIDE OF CHASSIS



MODELS 41-604, 41-605, 41-607
PART LOCATIONS — UNDERSIDE OF CHASSIS

Audio Output Meter: If this type of aligning meter is used, nnect it to the voice coil terminals of the speaker or from e plate of the 35A5 tube to the chassis. Adjust the meter r the 0 to 10 volt scale.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter an aligning indicator, make the following connections: ttach the negative (—) terminal of the voltmeter to any int in the circuit where the A. V. C. voltage can be obtained. onnect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Signal Generator: When adjusting the I. F. padders, the gh side of the signal generator is connected through a mfd. condenser to the antenna section of the tuning connser. Connect the ground or low side of the generator to e chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol Max. Range Switch Brdcst.	39A, 23A, 23B, 22A, 22B	
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol Max. Range Switch Brdcst.	17A	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol Max. Range Switch Brdcst.	8	
4	Loop see above instructions	12 M. C.	12 M. C.	Range Switch "S. W."	17, 4	Roll (8) for Max. Note B

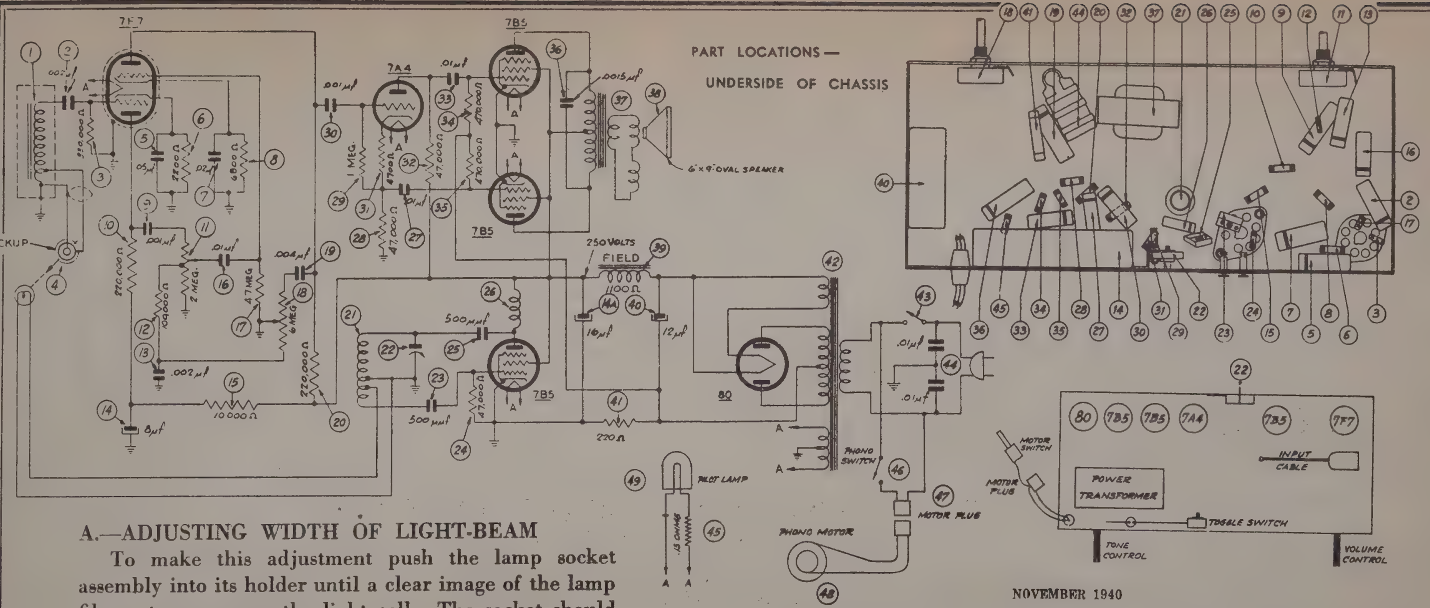
OTE A: — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, t the tuning pointer on the small dot below 550 K. C.

OTE B: — When adjusting oscillator compensator 17A, tune for maximum on the first signal peak from Tight position (compensator closed).

When adjusting the aerial padder 4 of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: rst tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator ightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and en varying the tuning condenser is continued until maximum output reading is obtained.

MODEL 41-620

PHILCO RADIO & TELEVISION CORP.



NOVEMBER 1940

A.—ADJUSTING WIDTH OF LIGHT-BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spot light is vertical.

B.—POSITIONING THE LIGHT-BEAM

To position the light-beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C.—ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by compensator (22) located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

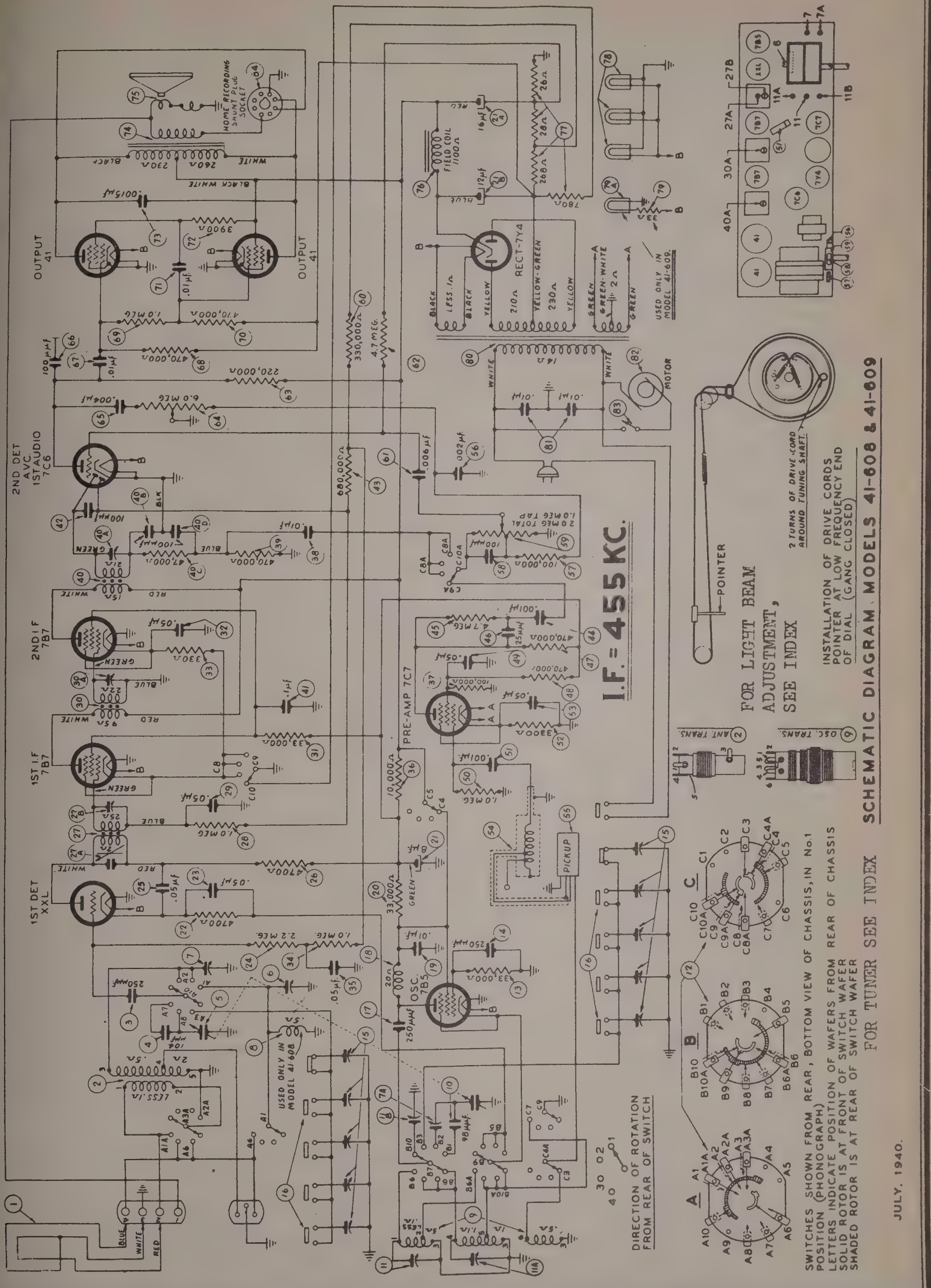
1. Turn volume control on full and play a record.
2. While the record is playing, turn compensator in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D.—INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the

PHILCO RADIO & TELEVISION CORP.

MODELS 41-608, 41-609 (121)



SCHEMATIC DIAGRAM MODELS 41-608 & 41-609

I.F. = 455 KC.

FOR LIGHT BEAM ADJUSTMENT, SEE INDEX

FOR TUNER SEE INDEX

INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL (GANG CLOSED)

2 TURNS OF DRIVE CORD AROUND TUNING SHAFT.

SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN No.1 POSITION (PHONOGRAPH)
LETTERS INDICATE POSITION OF WAFERS FROM REAR OF CHASSIS
SOLID ROTOR IS AT FRONT OF SWITCH WAFER
SHADED ROTOR IS AT REAR OF SWITCH WAFER

DIRECTION OF ROTATION FROM REAR OF SWITCH

USED ONLY IN MODEL 41-608

USED ONLY IN MODEL 41-609.

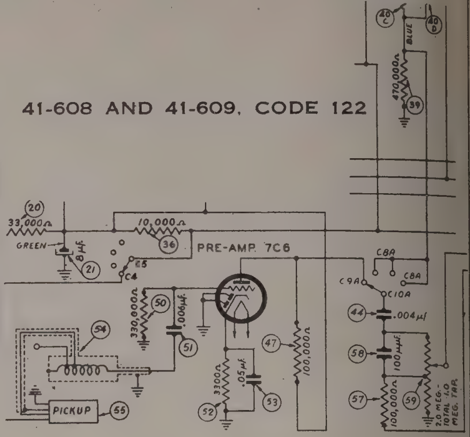
JULY, 1940.

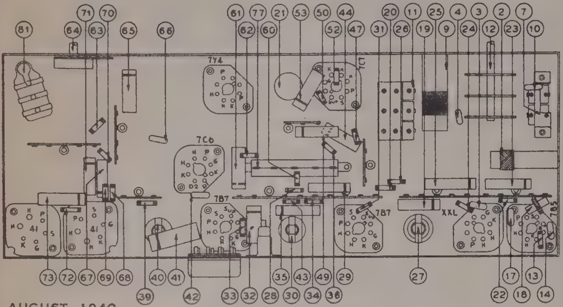
MODELS 41-608, 41-609
Codes 121 and 122

PHILCO RADIO & TELEVISION CORP.

Models 41-608 and 41-609, Code 122, are similar to Models 41-608 and 41,609, Code 121, with the exception of the phonograph amplifier tube and circuit. A type 7C6 tube is used in the phonograph amplifier in the 41-608 and 41-609, Code 122, chassis, whereas a 7C7 tube is used in the Code 121.

The Code 122 "Specifications", "Light-Beam Reproducer Adjustments" and "Aligning R. F. and I. F. Compensators" instructions are the same as those given for Code 121


41-608 AND 41-609, CODE 122



AUGUST, 1940.

PART LOCATIONS — UNDERSIDE OF CHASSIS
MODELS 41-608 AND 41-609, CODE 122
NOTE — PARTS 51, 56, 57, 58 AND 59 LOCATED ON TOP OF CHASSIS

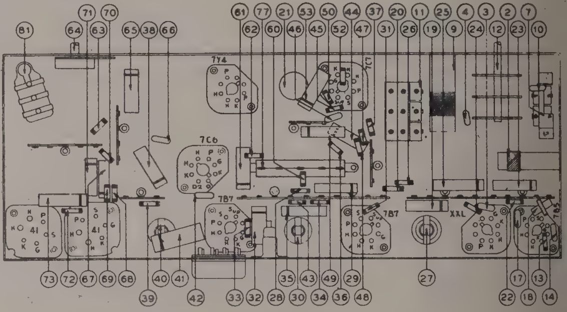
TUBE SOCKET VOLTAGES

D. C. voltages were measured with a 1000 ohms per volt voltmeter, Philco Model 027. Line voltage 120 volts A. C., no signal being received — range switch broadcast.

Tube	Location	Radio Pos. D. C. Volt.	Phono. Pos. D. C. Volt.
7B5 Osc.	Plate	27	185
" "	Screen	27	185
" "	Bias (Grid Leak)	7	47
XXL 1st Det.	Plate	130	180
" " "	Bias (Cathode)	6	8
7B7 st & 2nd I. F.	Plate	227	185
"	Screen	72	185
" 2nd I. F.	Bias (Cathode)	1.5	57
7C6 2nd Det. 1st Audio	Plate	165	140
7C6 Preamp.	Plate	45	125
41 Output Phase Inv.	Plate	222	183
" "	Screen	213	177
41 Output	Plate	222	183
" "	Sceern	227	185
	12 mf. elect. to ground	305	290
	16 mf. elect. to ground	227	185
	8 mf. elect. to ground	137	178

ON CODE 121 ONLY

Tube	Location	Radio Pos. D. C. Volt.	Phono. Pos. D. C. Volt.
7C7 Preamp.	Plate	45	65
" "	Screen	20	28



PART LOCATIONS — UNDERSIDE OF CHASSIS
MODELS 41-608, 41-609
NOTE — PARTS 51, 56, 57, 58 AND 59 LOCATED ON TOP OF CHASSIS

Opera-tions in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
1	Ant. Section of Tuning Cond. with .1 mfd. Cond.	455 K. C.	Tuning Cond. Closed	Vol. Max. Bands Switch S. W.	27A, 27B 30A, 40A	Note A
2	Loop Signal Generator	1500 K. C.	1500 K. C.	Bands Switch "Brdcst"	11A, 7	Note B
3	Loop Signal Generator	580 K. C.	580 K. C.	Bands Switch "Brdcst"	7A	Roll comp. (7A) to "max." Recheck Operation No. 2
4	Loop Signal Generator	12 M. C.	12 M. C.	Bands Switch S. W.	11, 6	Note C

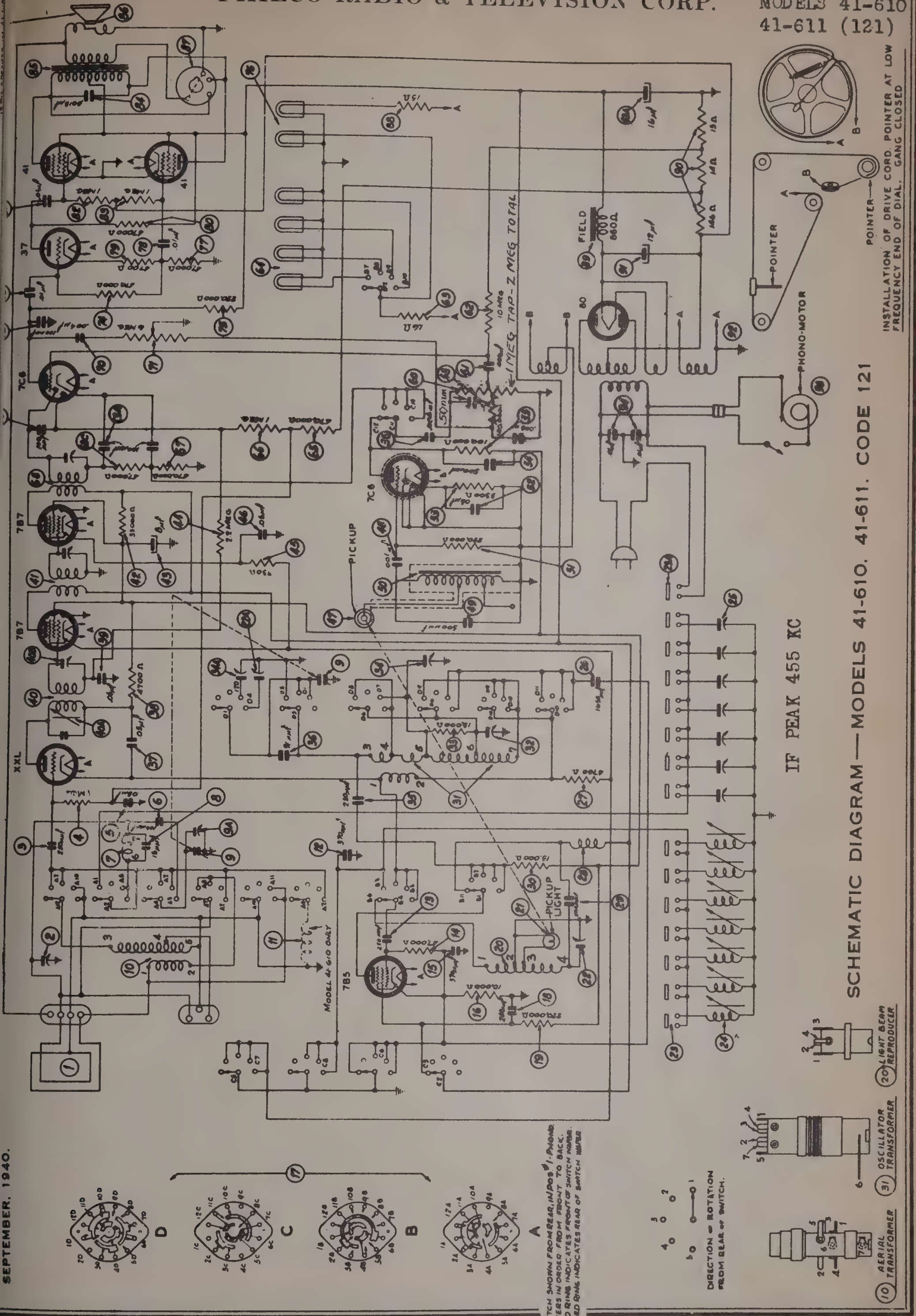
NOTE A — Compensator (27A) must be adjusted before compensator (27B) and should be done in the following manner: Turn (27A) all the way up, then turn down selecting the first I. F. peak, compensator (27B) is now padded to maximum.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE C — Adjust padder (11) to the first signal peak from the tight position. Roll padder (6) slowly to maximum on the second peak from loose position.

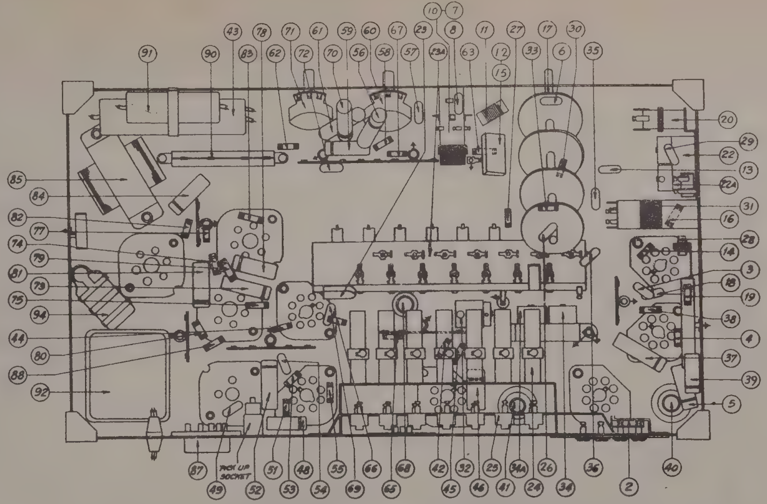
PHILCO RADIO & TELEVISION CORP.

MODELS 41-610
41-611 (121)


41
41
37
7C6
7B7
7B7
XXL
7C6
7B5
80
FIELD 860Ω
1 MEG TAP-2 MEG TOTAL
PICKUP
PICKUP LIGHT
MODEL 41-610 ONLY
PHONO-MOTOR
POINTER
POINTER
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED
IF PEAK 455 KC
SWITCH SHOWN FROM REAR, IN POS. #1. PHONO. LETTERS IN ORDER FROM FRONT TO BACK. SOLID RING INDICATES FRONT OF SWITCH WAFER. SHADED RING INDICATES REAR OF SWITCH WAFER
DIRECTION = ROTATION FROM REAR OF SWITCH
A
B
C
D
(10) AERIAL TRANSFORMER
(31) OSCILLATOR TRANSFORMER
(20) LIGHT BEAM REPRODUCER

SCHEMATIC DIAGRAM—MODELS 41-610. 41-611. CODE 121

PHILCO RADIO & TELEVISION CORP.



PART LOCATIONS — UNDERSIDE OF CHASSIS

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal 4 of the loop aerial terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the ground of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning indicator, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown below. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	High Side to No. 4 Terminal Loop Panel	455 K. C.	580 K. C.	Vol. Max. Range Switch "S. W." Positions	40A, 40B 41A, 68D	
2	Use Loop on Generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	34, 9A	Note A
3	Use Loop on Generator	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	32	Roll Tuning Condenser Note B
4	Use Loop on Generator	Repeat Operation No. 2 Again				
5	Use Loop on Generator	6 M. C.	6 M. C.	Range Switch "Police"	34A	
6	Use Loop on Generator	12 M. C.	12 M. C.	Range Switch "S. W."	22A, 2	Note C

FOR TUNER AND AUTOMATIC RECORD CHANGER DATA, SEE INDEX

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE — These adjustments should be made with the power line voltage at 118 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is $\frac{1}{32}$" in width. The socket assembly is now rotated so that the spot light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

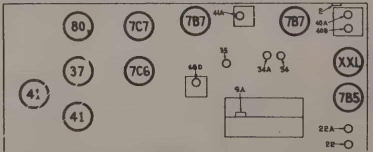
C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 22 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.
2. While the record is playing, turn compensator 22 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.



NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B — When adjusting the low frequency compensator of Range One (Broadcast) or the aerial padders of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

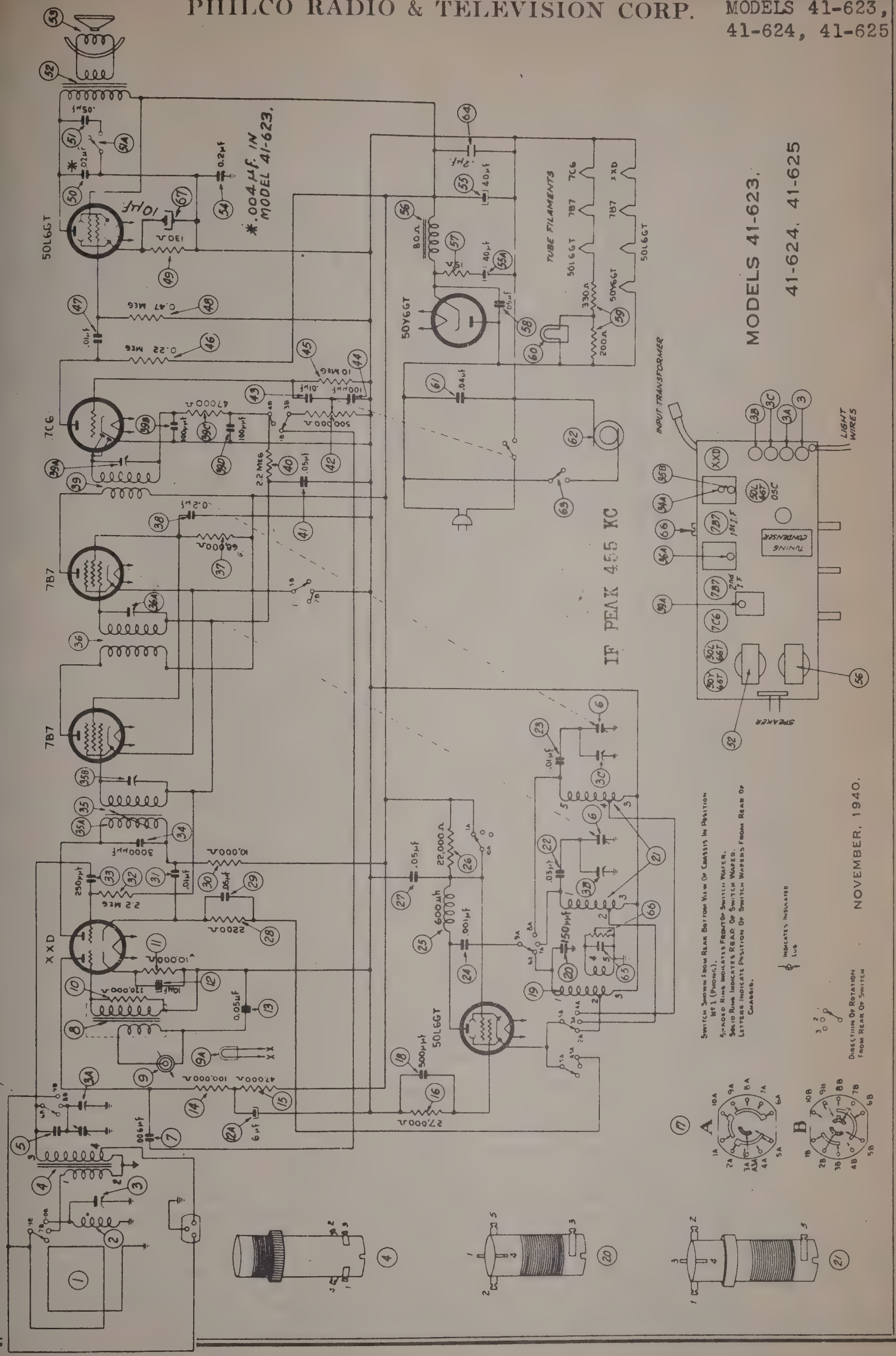
NOTE C — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (22A) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a first peak is obtained on the output meter. Adjust the compensator for maximum output at this first peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. above the frequency being used on any high frequency range.

The aerial padder (2) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust to maximum output on the second signal peak from the tight position (screw all the way down) of the padder.

PHILCO RADIO & TELEVISION CORP.

MODELS 41-623,
41-624, 41-625



MODELS 41-623,
41-624, 41-625

IF PEAK 455 KC

✱ .004 µf. IN MODEL 41-623.

Switch Shown From Rear Bottom View Of Chassis In Position No 1 (Phono).
Shaded Ring Indicates Front Of Switch Wafer.
Solid Ring Indicates Rear Of Switch Wafer.
Letters Indicate Position Of Switch Wafers From Rear Of Chassis.

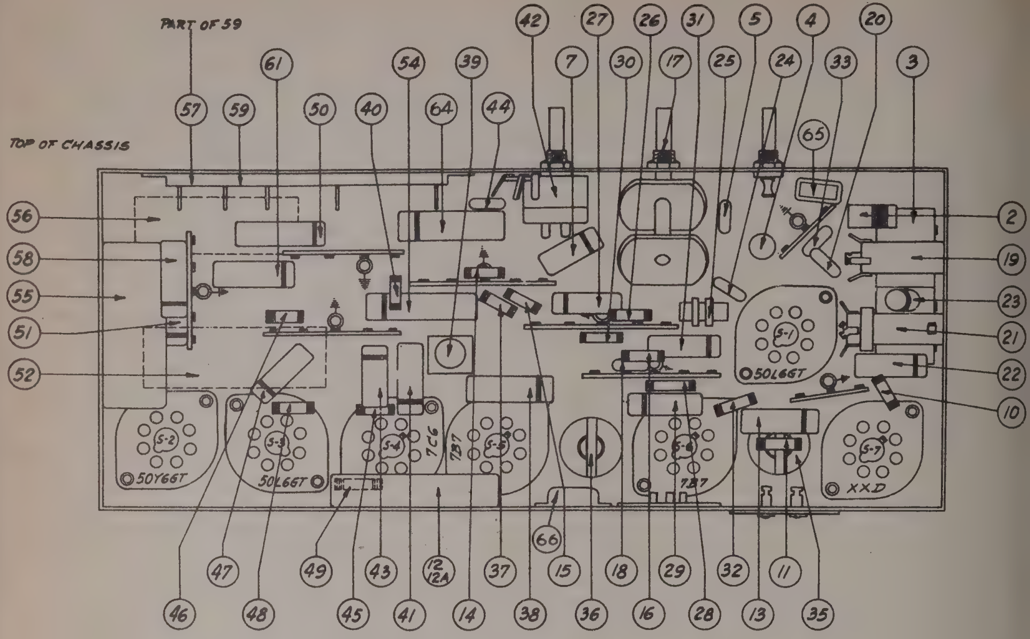
Indicates Insulated Lug

Direction Of Rotation From Rear Of Switch

NOVEMBER, 1940.

MODELS 41-623
41-624, 41-625

PHILCO RADIO & TELEVISION CORP.



PART LOCATIONS — UNDERSIDE OF CHASSIS

Models 41-623, 41-624, 41-625 are radio phonograph combinations which are similar in design with the exception of the cabinets, phonograph mechanism and speaker.

CONNECTING ALIGNING INSTRUMENTS

When aligning the R. F. padders a loop aerial is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

Signal Generator. When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator 66 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.
2. While the record is playing, turn compensator 66 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	39A, 36A, 35A, 35B	Note A
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max. Range Switch Brdcst.	3B	Note B
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	3A	
4	Loop see above instructions	12 M. C.	12 M. C.	Range Switch "S. W."	3C, 3	Roll (3) for Max. Note C

NOTE A: — To adjust the I. F. circuit properly, compensators 36A, 35A and 35B should be depadded first. All compensators are then adjusted to maximum in the order 39A, 36A, 35A and 35B.

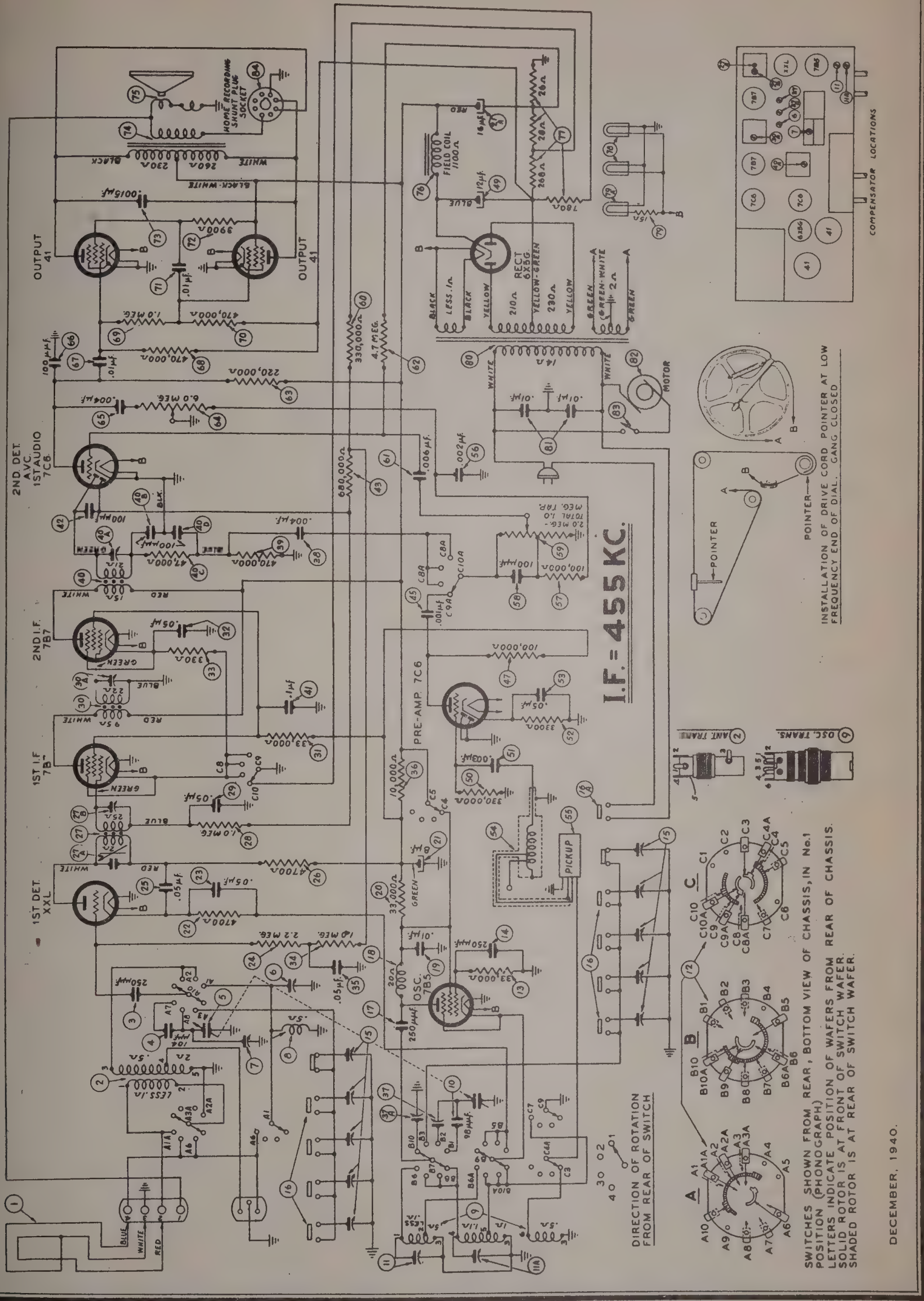
NOTE B: — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 550 K. C.

NOTE C: — When adjusting oscillator compensator 3C, tune for maximum on the first signal peak from Tight position (compensator closed).

When adjusting the aerial padder 3 of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

PHILCO RADIO & TELEVISION CORP.

MODEL 41-629(121)



I.F. = 455 KC

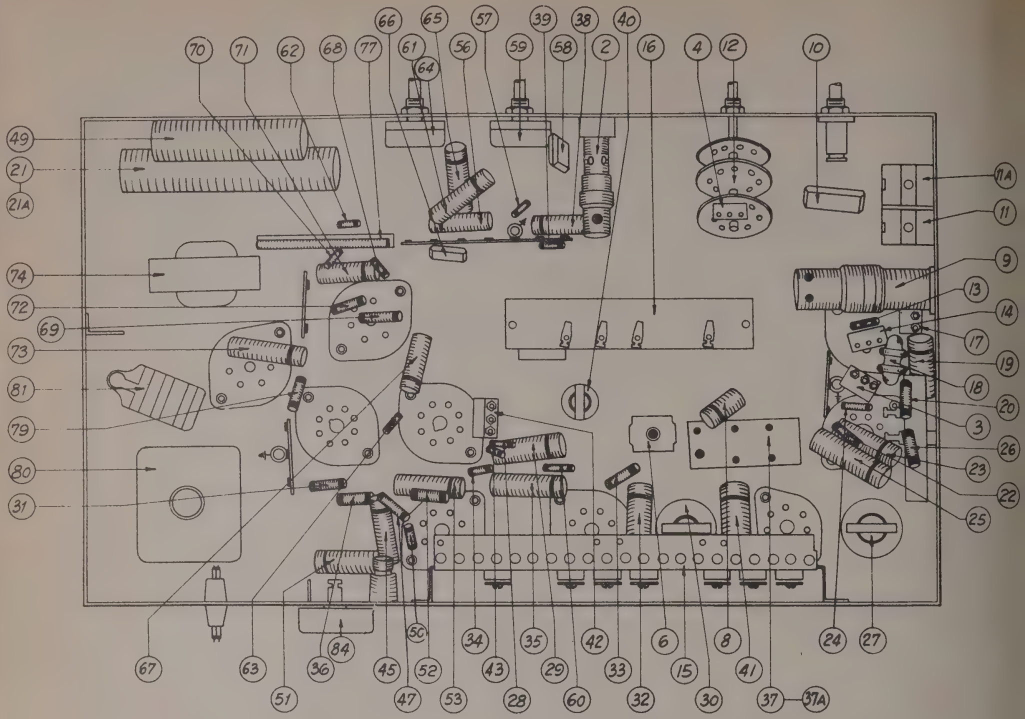
COMPENSATOR LOCATIONS

INSTALLATION OF DRIVE CORD POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED

DIRECTION OF ROTATION FROM REAR OF SWITCH

SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN No.1 POSITION (PHONOGRAPH)
LETTERS INDICATE POSITION OF WAFERS FROM REAR OF CHASSIS.
SOLID ROTOR IS AT FRONT OF SWITCH WAFER.
SHADED ROTOR IS AT REAR OF SWITCH WAFER.

DECEMBER, 1940.



PART LOCATIONS — UNDERSIDE OF CHASSIS

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 37A located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.

2. While the record is playing, turn compensator 37A in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

Signal Generator. When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser Connect the ground or low side of the generator to the chassis

When aligning the R. F. padders a loop aerial is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond. with .1 mfd. Cond.	455 K. C.	Tuning Cond. Closed	Vol. Max. Bands Switch S. W.	27A, 27B 30A, 40A	Note A
2	Loop Signal Generator	1720 K. C.	1720 K. C.	Bands Switch "Brdcst"	11A	Note B
3	Loop Signal Generator	1500 K. C.	1500 K. C.	Bands Switch "Brdcst"	7	
4	Loop Signal Generator	580 K. C.	580 K. C.	Bands Switch "Brdcst"	37	Roll comp. to "max." Recheck Operation No. 2
5	Loop Signal Generator	12 M. C.	12 M. C.	Bands Switch S. W.	11, 6	Note C

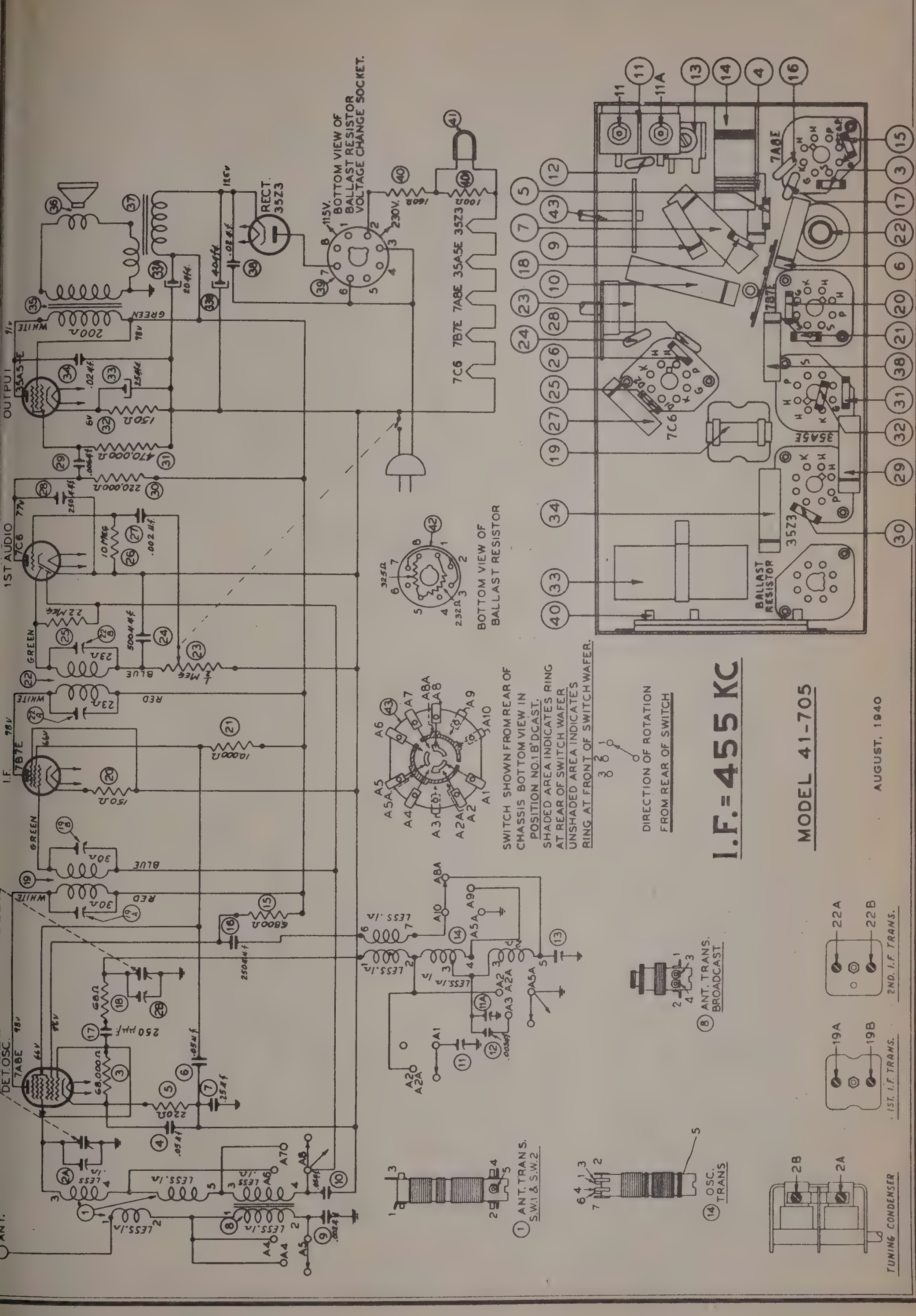
NOTE A — Compensator (27A) must be adjusted before compensator (27B) and should be done in the following manner: Turn (27A) all the way up, then turn down selecting the first I. F. peak, compensator (27B) is now padded to maximum.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the lowest frequency end of the broadcast scale.

NOTE C — Adjust padder (11) to the first signal peak from the tight position. Roll padder (6) slowly to maximum on the second peak from loose position.

PHILCO RADIO & TELEVISION CORP.

MODEL 41-705


DET.OSC. 7A8E
I.F. 7B7E
1ST AUDIO 7C6
OUTPUT 35A5
RECT. 35Z3
BOTTOM VIEW OF BALLAST RESISTOR VOLTAGE CHANGE SOCKET.
115V.
230V.
7C6 7B7E 7A8E 35A5E 35Z3
BOTTOM VIEW OF BALLAST RESISTOR
SWITCH SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION NO.1 B'DCAST.
SHADED AREA INDICATES RING AT REAR OF SWITCH WAFER
UNSHADED AREA INDICATES RING AT FRONT OF SWITCH WAFER.
DIRECTION OF ROTATION FROM REAR OF SWITCH
ANT. TRANS. S.W.1 & S.W.2
OSC. TRANS
ANT. TRANS. BROADCAST
TUNING CONDENSER
1ST. I.F. TRANS.
2ND. I.F. TRANS.
BALLAST RESISTOR
470,000 Ω
220,000 Ω
150 Ω
200 Ω
68,000 Ω
6800 Ω
10,000 Ω
250 μμf
.05 μf
.25 μf
.02 μf
.002 μf
GREEN
WHITE
BLUE
RED
ANT.

I.F.=455 KC

MODEL 41-705

AUGUST, 1940

PHILCO RADIO & TELEVISION CORP.

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A. V. C. voltage can be measured.
2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 35A5E tube, Model 41-705; 7B5E, Model 41-708. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in the schematic diagrams and part locations.

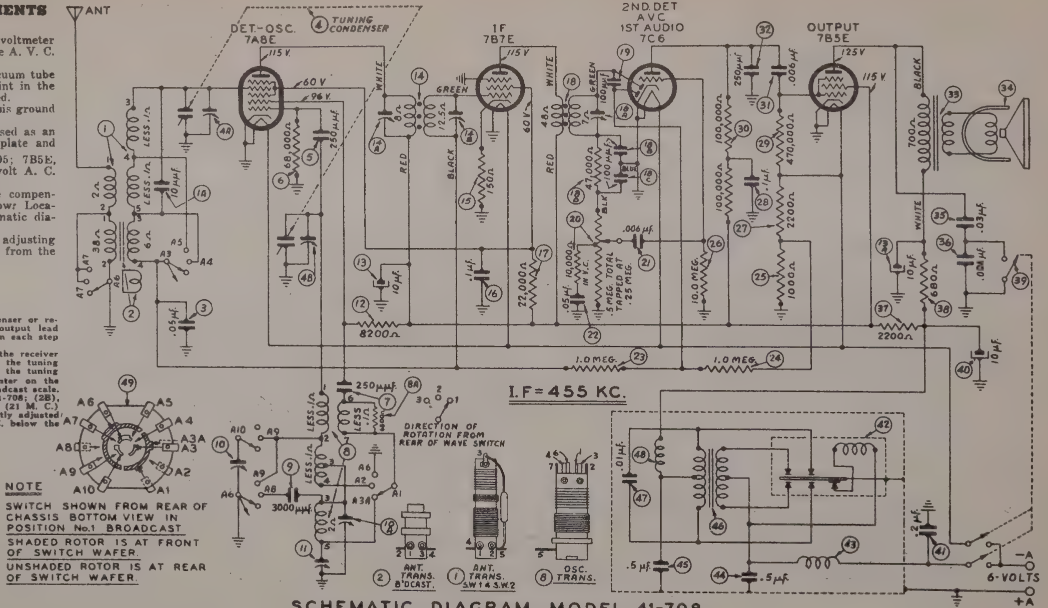
If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

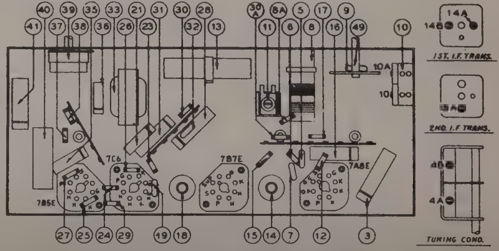
NOTE C — When adjusting compensator (4B), Model 41-708; (2B), Model 41-705 be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20,090 M. C.

Models 41-705,
41-708



NOTE
SWITCH SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION No.1 BROADCAST
SHADED ROTOR IS AT FRONT OF SWITCH WAFER.
UNSHADED ROTOR IS AT REAR OF SWITCH WAFER.

SCHEMATIC DIAGRAM MODEL 41-708



PART LOCATIONS — UNDERSIDE OF CHASSIS MODEL 41-708

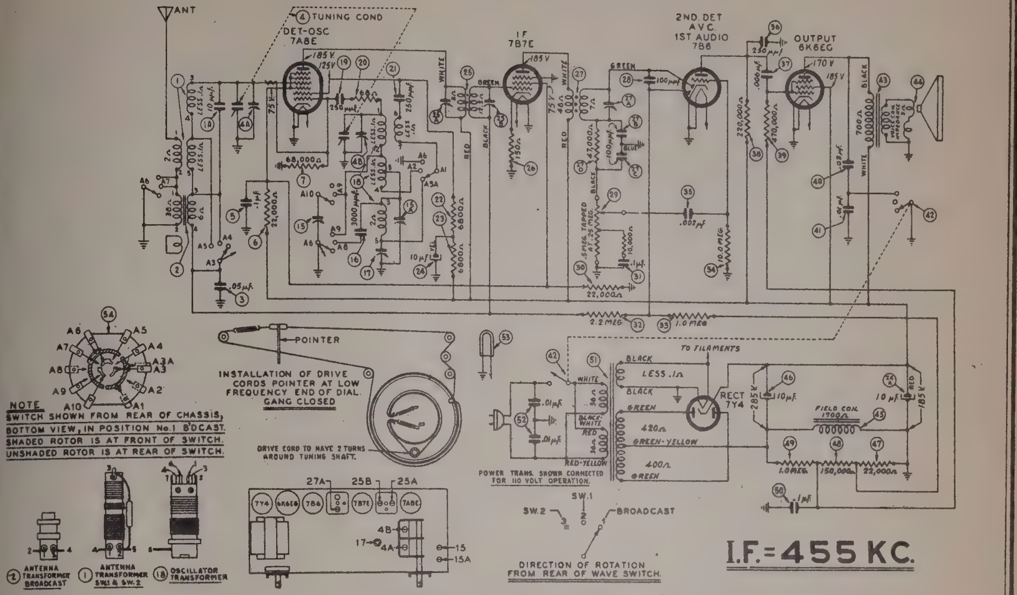
ALIGNING R. F. AND I. F. COMPENSATORS

The procedure is the same for both models.

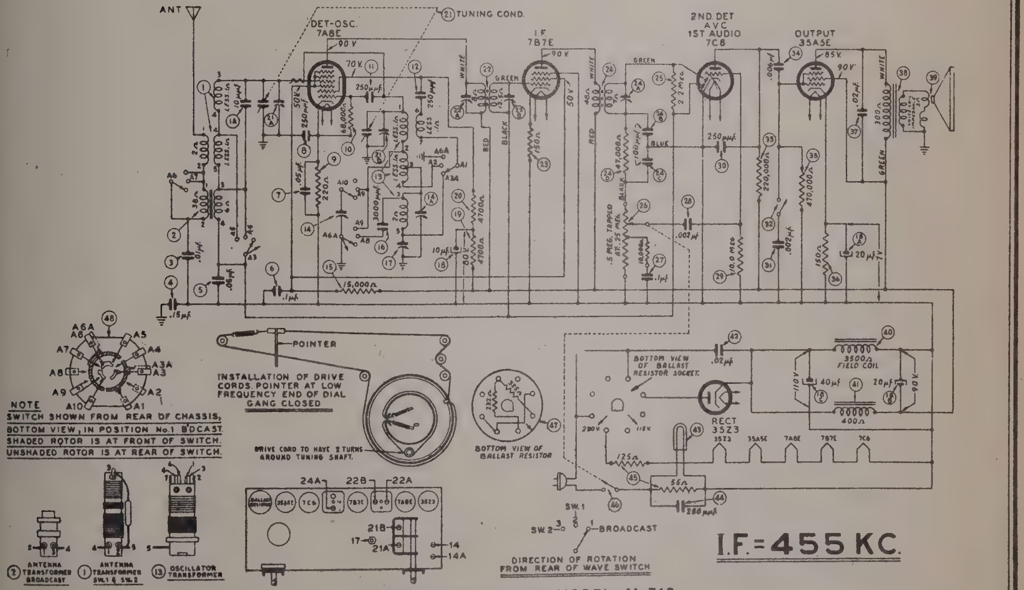
Operations in Order	SIGNAL GENERATOR			RECEIVER				SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators		
						41-705	41-708	
1	Lug of Ant. Tuning Condenser Front Section	.1 mfd.	455 K. C.	580 K. C.	Range Switch Broadcast (Position 1) Vol. Max.	19A, 19B 22A, 22B	14A, 14B 18A	
2	Ant. Lead	400 ohms	21 M. C.	21 M. C.	Range Switch S. W. Position 3	2B, 2A	4B, 4A	Note B Note C
3	Ant. Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch S. W. Position 2	11	10	Roll Gang
4	Ant. Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch Broadcast Position 1	11A	10A	Roll Gang
5	Ant. Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch Broadcast Position 1	13	11	Roll Gang

PHILCO RADIO & TELEVISION CORP.

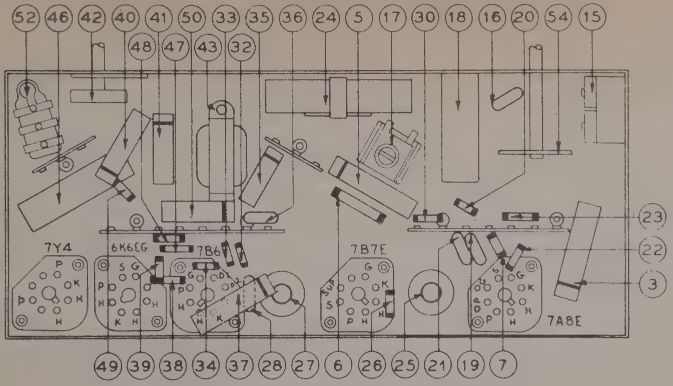
MODEL 41-712
MODEL 41-713


ANT
TUNING COND
DET-OSC
7A8E
I.F
7B7E
2ND. DET
A.V.C.
1ST AUDIO
7B6
OUTPUT
6K6EG
RECT
7Y4
FIELD COIL
1700Ω
TO FILAMENTS
POINTER
INSTALLATION OF DRIVE CORDS POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED
DRIVE CORD TO HAVE 2 TURNS AROUND TUNING SHAFT.
POWER TRANS. SHOWN CONNECTED FOR 110 VOLT OPERATION.
NOTE
SWITCH SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No.1 B'DCAST.
SHADED ROTOR IS AT FRONT OF SWITCH.
UNSHADED ROTOR IS AT REAR OF SWITCH.
ANTENNA TRANSFORMER BROADCAST
ANTENNA TRANSFORMER SW.1 & SW.2
OSCILLATOR TRANSFORMER
SW.1
SW.2
BROADCAST
DIRECTION OF ROTATION FROM REAR OF WAVE SWITCH.
I.F.=455 KC.

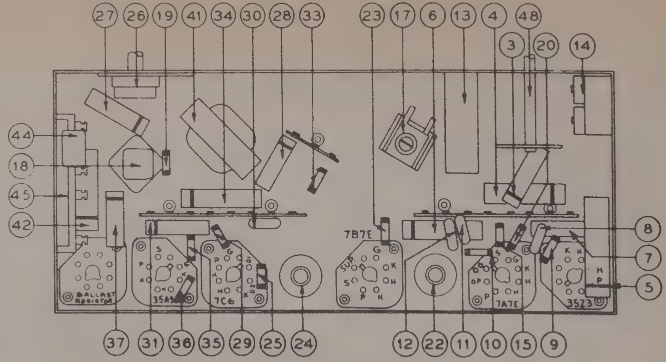
SCHEMATIC DIAGRAM MODEL 41-712


ANT
TUNING COND.
DET-OSC.
7A8E
I.F
7B7E
2ND DET
A.V.C
1ST AUDIO
7C6
OUTPUT
35A5E
RECT
35Z3
BOTTOM VIEW OF BALLAST RESISTOR SOCKET
BOTTOM VIEW OF BALLAST RESISTOR
3500Ω
FIELD COIL
POINTER
INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF DIAL GANG CLOSED
DRIVE CORD TO HAVE 2 TURNS AROUND TUNING SHAFT.
NOTE
SWITCH SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN POSITION No.1 B'DCAST.
SHADED ROTOR IS AT FRONT OF SWITCH.
UNSHADED ROTOR IS AT REAR OF SWITCH.
ANTENNA TRANSFORMER BROADCAST
ANTENNA TRANSFORMER SW.1 & SW.2
OSCILLATOR TRANSFORMER
SW.1
SW.2
BROADCAST
DIRECTION OF ROTATION FROM REAR OF WAVE SWITCH
I.F.=455 KC.

SCHEMATIC DIAGRAM MODEL 41-713



PART LOCATIONS — UNDERSIDE OF 41-712 CHASSIS



PART LOCATIONS — UNDERSIDE OF 41-713 CHASSIS

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A. V. C. voltage can be measured.
2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 6K6EG tube, Model 41-712; 35A5E Model 41-713. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram.

If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Models 41-712, 41-713

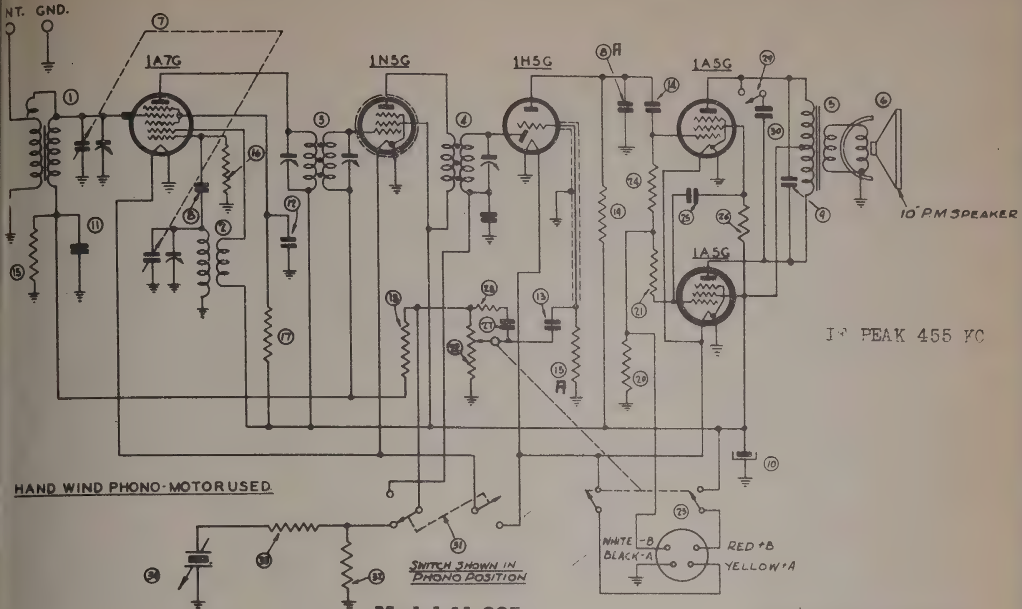
Operations in Order	SIGNAL GENERATOR			RECEIVER				SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators 41-712	Adjust Compensators 41-713	
1	Lug of Ant. Tuning Condenser Front Section	.1 mfd.	455 K. C.	580 K. C.	Range Switch Broadcast (Position 1) Vol. Max.	25A, 25B 27A	22A, 22B 24A	
2	Ant. Lead	400 ohms	21 M. C.	21 M. C.	Range Switch S. W. Position 3	4B, 4A	21B, 21A	Note B Note C
3	Ant. Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch S. W. Position 2	15	14	Roll Gang
4	Ant. Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch Broadcast Position 1	15A	14A	Roll Gang
5	Ant. Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch Broadcast Position 1	17	17	Roll Gang

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (4B) be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning signal generator dial 910 K. C. below the fundamental signal, which will be 20,090 M. C.

AUGUST, 1940



Model 41-695

Model 41-695 is a radio-phonograph combination consisting of a five (5) tube super-heterodyne radio, a manually operated, even-speed, spring-wind Phonograph Motor which uses no current and a crystal pickup.

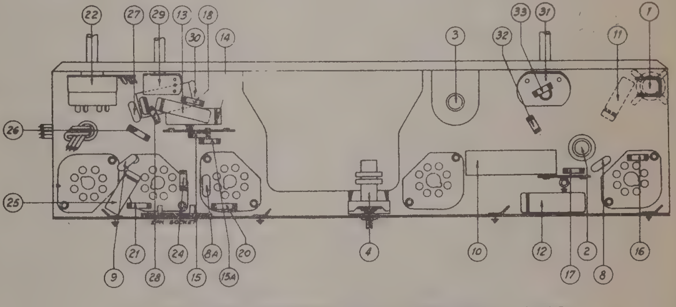
The radio includes: Super-efficient Philco Farm Radio Tubes, designed for low drain, 1½ volt circuit; High Output Permanent Magnet Speaker; Automatic Volume Control; Push-pull Pentode Audio System with screen phase inversion; Automatic "ON-OFF" indicator, and covers a tuning band from 540 to 1720 K. C.

INTERMEDIATE FREQUENCY: 455 K. C.

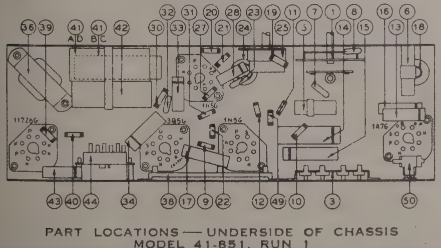
SCHE. No.	DESCRIPTION	PART No.
1	Aerial Transformer	32-3183
2	Oscillator Transformer	32-3184
3	1st I. F. Transformer	32-3198
4	2nd I. F. Transformer	32-3199
5	Output Transformer	32-8107
6	Speaker Cone (For Speaker 36-1522-4)	36-4171
7	Tuning Condenser	31-2457
	Drive Cord (Indicator Drive)	31-2504
	Tuning Shaft	31-2465
	Drive Cord (Pointer Drive)	31-2525
	Drive Drum	76-1176
8	Condenser (100 mmfd.)	60-110157
9	Condenser (730 mmfd.)	60-173127
10	Electrolytic Condenser (10 mfd.)	30-2396
11	Condenser (.05 mfd., 400 volts)	30-4519
12	Condenser (.25 mfd., 100 volts)	61-0112
13	Condenser (.004 mfd., 400 volts)	30-4578
14	Condenser (.01 mfd., 400 volts)	30-4572
15	Resistor (4.7 megohms)	33-547339
16	Resistor (220,000 ohms)	33-422339
17	Resistor (68,000 ohms)	33-368339
18	Resistor (10 megohms)	33-610339
19	Resistor (1 megohm)	33-510339
20	Resistor (560 ohms)	33-156326
21	Resistor (2.2 megohms)	33-522339
22	Volume Control	33-5413
23	Battery Cable	41-3505
24	Resistor (2.2 megohms)	33-522339
25	Condenser (.01 mfd., 400 volts)	30-4572
26	Resistor (10,000 ohms)	33-310339
27	Condenser (50 mmfd.)	60-050157
28	Resistor (100,000 ohms)	33-410339
29	Tone Control Switch	42-1610
30	Condenser (.002 mfd., 400 volts)	30-4579
31	Radio-Phono Switch	42-1609
32	Resistor (10,000 ohms)	33-310339
33	Resistor (47,000 ohms)	33-347339
34	Crystal Pickup and Tone Arm Complete	35-2205

MISCELLANEOUS PARTS

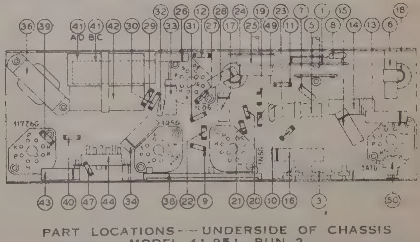
SCHE. No.	DESCRIPTION	PART No.
	Bezel	27-4975
	Glass (Bezel)	27-5610
	Speed Clips (Glass Mounting)	56-1876
	Speed Clips (Bezel Mounting)	56-1827
	Cable (Pickup)	41-3557
	Cable (Speaker)	41-3451
	Clip (Aerial Transformer)	28-5002
	Cabinet	10517A
	Clamp (Crank)	56-1968
	Dial	27-5591
	Pointer	56-1856
	Indicator	76-1122
	Lever (Indicator)	76-1049
	Cam Assembly	38-9861
	Knob	27-4332
	Motor (Phono.)	35-1238
	Turntable	35-2038
	Coupling	35-2074
	Crank	35-2206
	Spindle	56-6110
	Washer (Coupling)	56-1972
	Shield (Tube)	56-1566
	Shield Clip	56-1567
	Screw (Brake Mounting)	W-647
	Screw (Motor Mounting)	W-2002
	Screw (Chassis Mounting)	W-2030
	Socket (6 prong)	27-6133
	Socket (Speaker)	27-6115
	Spindle (Motor)	56-6110
	Washer (Chassis Mounting)	W-410



PART LOCATIONS — UNDERSIDE OF CHASSIS MODEL 41-695



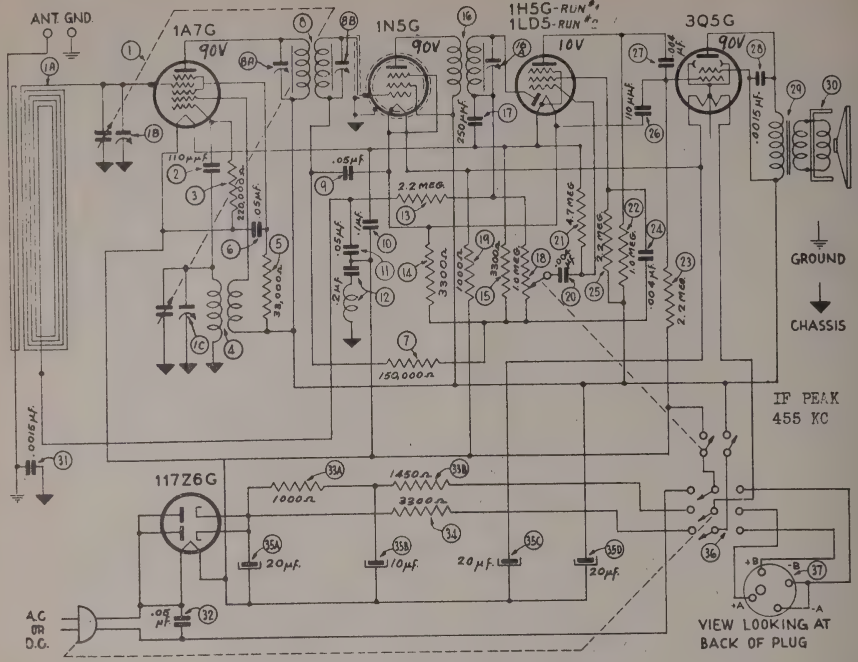
PART LOCATIONS — UNDERSIDE OF CHASSIS MODEL 41-851, RUN 1



PART LOCATIONS — UNDERSIDE OF CHASSIS MODEL 41-851, RUN 2

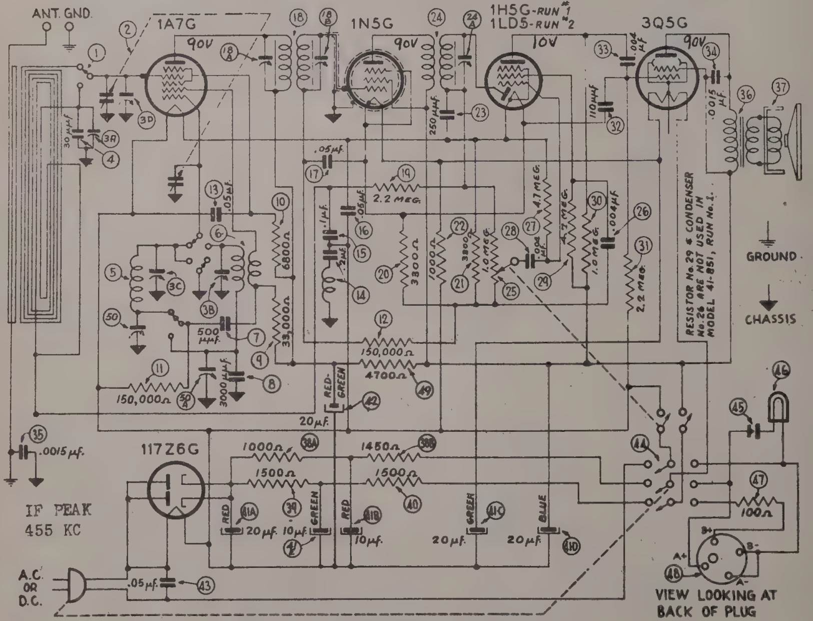
MODEL 41-841
Code 121, Runs 1,2
MODEL 41-851
Code 121, Runs 1.2

PHILCO RADIO & TELEVISION CORP.



Model 41-841, Code 121, Runs 1 and 2

SEPTEMBER, 1940.



Model 41-851, Code 121, Runs 1 and 2

PHILCO RADIO & TELEVISION CORP.

MODELS 41-841,
41-695, 41-851

Vacuum Tube Voltmeter: If a vacuum tube voltmeter is used as an aligning indicator, the negative (—) terminal is connected to the A. V. C. circuit of the receiver through a 2 megohm resistor. The positive (+) terminal is connected to the chassis or ground.

Signal Generator: When adjusting the "I. F." padders the high side of the signal generator is connected through a .1 mfd. condenser to the loop tuning condenser stator lug which connects to the grid of the first detector oscillator tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders of the portable models a loop aerial is made from a few turns of wire and connected to the signal generator output terminals. The signal generator is then placed a few feet from the set. The loop aerial of the receiver should be assembled in the cabinet together with the battery when adjusting the R. F. padders.

To align the R. F. padders of the 41-695, connect the signal generator to the aerial through a 225 mmfd. condenser.

Models 41-841, 41-695

The Model 41-841 may be adjusted when operated by battery or 115 volts A. C.-D. C. power.

Operations in Order	SIGNAL GENERATOR		RECEIVER				SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators		
					41-841	41-395	
1	See Paragraph on Signal Generator above	455 K. C.	540 K. C.	Vol. Max.	8A, 8B 16A	3A, 3B 4A	Note A
2	Use Loop on Generator as above	1500 K. C.	1500 K. C.	Vol. Max.	1C, 1B	7B, 7A	

Model 41-851

Operations in Order	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	SPECIAL INSTRUCTIONS
1	Stator Plate Lug Loop Tuning Condenser	455 K. C.	540 K. C.	Vol. Max.	18A, 18B, 24A	Note A
2	Loop on Generatcr	1500 K. C.	1500 K. C.	Range Switch "Brdcst" Vol. Max.	3C, 3D	
3	Loop on Generator	580 K. C.	580 K. C.	Range Switch "Brdcst" Vol. Max.	50	
4	Recheck operation No. "2"					
5	Loop on Generator	6 M. C.	6 M. C.	Range Switch "S. W."	50A	
6	Loop on Generator	15 M. C.	15 M. C.	Range Switch "S. W."	3B, 3A	Note B

NOTE A: DIAL CALIBRATION: Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity) set the dial pointer on the small dot below 550 K. C.

NOTE B: When adjusting compensator be sure to tune in the fundamental signal (15 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 14,090 M. C.

Replacement Parts — Model 41-841, Code 121

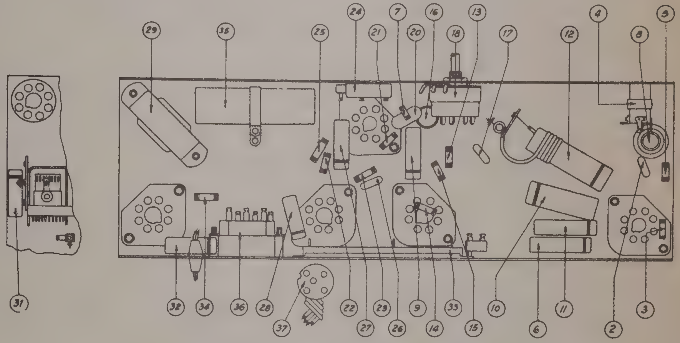
IN RUN 1 RADIOS WHICH USE A 1H5G IN THE SECOND DETECTOR CIRCUIT, PARTS 24 AND 25 ARE NOT REQUIRED.

SCHE. No.	DESCRIPTION	PART No.
1	Tuning Condenser	31-2509
	Tuning Shaft	56-6080
	"C" Washer	57-0127
	Drive Cord	31-2380
	Spring	28-8882
1A	Loop Aerial (Part of Cabinet 10473A)	
1B	Comp. (Aerial Adjustment, Part of 1)	
1C	Comp. (Oscillator Adjustment, Part of 1)	
2	Mica Condenser (110 mmfd.)	60-110157
3	Resistor (220,000 ohms, ½ watt)	33-422339
4	Oscillator Transformer	32-3424
5	Resistor (33,000 ohms, ½ watt)	33-333339
6	Condenser (.05 mfd., 400 volts)	30-4444
7	Resistor (150,000 ohms, ½ watt)	33-415339
8	1st I. F. Transformer	32-3583
9	Condenser (.05 mfd., 200 volts)	30-4519
10	Condenser (.1 mfd., 400 volts)	30-4455
11	Condenser (.05 mfd., 200 volts)	30-4519
12	Condenser and R. F. Choke .2 mfd.)	76-1034
13	Resistor (2.2 megohms)	33-522339
14	Resistor (3300 ohms, ½ watt)	33-233339
15	Resistor (3300 ohms, ½ watt)	33-233339
16	2nd I. F. Transformer	32-3266
17	Mica Condenser (250 mmfd.)	60-125157
18	Volume Control	33-5390
	Palnut	W-2157
19	Resistor (1000 ohms, ½ watt)	33-210339
20	Condenser (.004 mfd., 400 volts)	30-4578
21	Resistor (4.7 megohms)	33-547339
22	Resistor (1 megohm)	33-510339
23	Resistor (2.2 megohms)	33-522339
24	Condenser (.004 mfd., 400 volts)	30-4456
25	Resistor (2.2 megohms)	33-522339
26	Mica Condenser (110 mmfd.)	60-110157
27	Condenser (.004 mfd.)	30-4578
28	Condenser (.0015 mfd., 200 volts)	30-4555
29	Output Transformer	32-8139
30	Cone Assem. (For Speaker 36-1526-3)	36-4175
31	Condenser (.0015 mfd., 200 volts)	30-4555
32	Condenser (.05 mfd., 400 volts)	30-4518
33A	Resistor (1000 ohms)	33-3400
33B	Resistor (1450 ohms) Part of 33A	
34	Resistor (3300 ohms, ½ watt)	33-233339
35A	Electrolytic Condenser (20 mfd.)	30-2492
35B	Electrolytic Cond. (10 mfd.) Part of 35A	
35C	Elec. Cond. (20 mfd., 25 v.) Part of 35A	
35D	Electrolytic Cond. (20 mfd.) Part of 35A	
36	Automatic Power Changeover Switch	42-1553
37	Battery Cable	41-3592

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cord (Power)	L-3199
Clip (Oscillating Coil Mounting)	28-5002
Cabinet	10473A

SCHE. No.	DESCRIPTION	PART No.
	Dial	27-5579
	Dial Pointer	27-4868
	Knobs	27-4970
	Speaker	36-1526
	Socket (Tubes, R. F., I. F., Audio)	27-6133
	Socket (Tubes, Rectifier)	27-6137
	Socket (Tubes, 1LD5 Tube, Run 2)	27-6151
	Rubber Grommet (Socket 1LD5 Tube)	54-4020
	Rubber Washer (Socket 1LD5 Tube)	27-4112
	Eyelet (Socket 1LD5 Tube)	W-792
	Screw (Chassis Mounting)	W-2030
	Washer (Chassis Mounting)	W-410



PART LOCATIONS — UNDERSIDE OF CHASSIS MODEL 41-841, CODE 121, RUNS 1 AND 2

Replacement Parts — Model 41-851, Runs 1 and 2

PARTS 26 AND 29 ARE NOT USED IN EARLY PRODUCTION RUN 1 RADIOS.

SCHE. No.	DESCRIPTION	PART No.
1	Band Switch	42-1570
1A	Loop Aerial (Run Two)	76-1175
	Loop Aerial (Run One)	76-1156
2	Tuning Condenser	31-2459
	Drive Cord	31-2380
	Tuning Shaft	56-6080
	"C" Washer	57-0127
3A	Compensator (Short Wave Aerial)	31-6347
3B	Compensator (S. W. Oscillator) Part of 3A	
3C	Comp. (Brdcst. Oscillator) Part of 3A	
3D	Compensator (Brdcst. Aerial) Part of 3A	
4	Mica Condenser (50 mmfd., Mounted on Loop, Run 2)	60-050127
5	Oscillator Transformer (Broadcast)	32-3431
6	Oscillator Transformer (Short Wave)	32-3577
7	Mica Condenser (500 mmfd.)	60-150137
8	Mica Condenser (3000 mmfd.)	60-230334
9	Resistor (33,000 ohms)	33-333339
10	Resistor (6800 ohms)	33-268339
11	Resistor (150,000 ohms)	33-415339
12	Resistor (150,000 ohms)	33-415339
13	Condenser (.05 mfd., 400 volts)	30-4518
14	Condenser (.2 mfd.) and R. F. Choke	76-1161
15	Condenser (.1 mfd., 400 volts)	30-4455
16	Condenser (.05 mfd., 400 volts)	30-4518
17	Condenser (.05 mfd., 200 volts)	30-4519
18	1st I. F. Transformer	32-3583
19	Resistor (2.2 megohms)	33-522339
20	Resistor (3300 ohms, ½ watt)	33-233339
21	Resistor (3300 ohms, ½ watt)	33-233339
22	Resistor (1000 ohms, ½ watt)	33-210339
23	Mica Condenser (250 mmfd.)	60-125157
24	2nd I. F. Transformer	32-3266
25	Volume Control	33-5390
26	Condenser (.004 mfd., 400 volts)	30-4578
27	Resistor (4.7 megohms)	33-547339
28	Condenser (.004 mfd., 400 volts)	30-4578
29	Resistor (2.2 megohms)	33-522339
30	Resistor (1 megohm)	33-510339
31	Resistor (2.2 megohms)	33-522339
32	Mica Condenser (110 mmfd.)	60-111157
33	Condenser (.01 mfd., 400 volts)	30-4572
34	Condenser (.0015 mfd., 200 volts)	30-4555
35	Condenser (.0015 mfd., 200 volts)	30-4555
36	Output Transformer	32-8139
37	Cone Assembly (For Speaker 36-1506-1)	36-4158
38A	Resistor (Wirewound, 1000 ohms)	33-3387
38B	Resis. (Wirewnd., 1450 ohms) Pt. of 38A	
39	Resistor (1500 ohms)	33-215339
40	Resistor (1500 ohms)	33-215339
41A	Electrolytic Cond. (20 mfd., 150 volts)	30-2452
41B	Electrolytic Cond. (10 mfd., 150 volts)	30-2453
41C	Elec. Cond. (20 mfd., 25 v.) Part of 41B	
41D	Elec. Cond. (10 mfd., 50 v.) Part of 41A	
41E	Elec. Cond. (10 mfd., 150 v.) Part of 41A	
42	Electrolytic Condenser (20 mfd.)	30-2382
43	Condenser (.05 mfd., 400 volts)	30-4518
44	Automatic Power Switch	42-1553
45	Pilot Lamp Switch	56-1487
46	Pilot Lamp	34-2031
47	Resistor (100 ohms, ½ watt)	33-110339
48	Battery Cable	41-3592
49	Resistor (4700 ohms)	33-247339
50	Compensator	31-6100
50A	Compensator (Part of 50)	

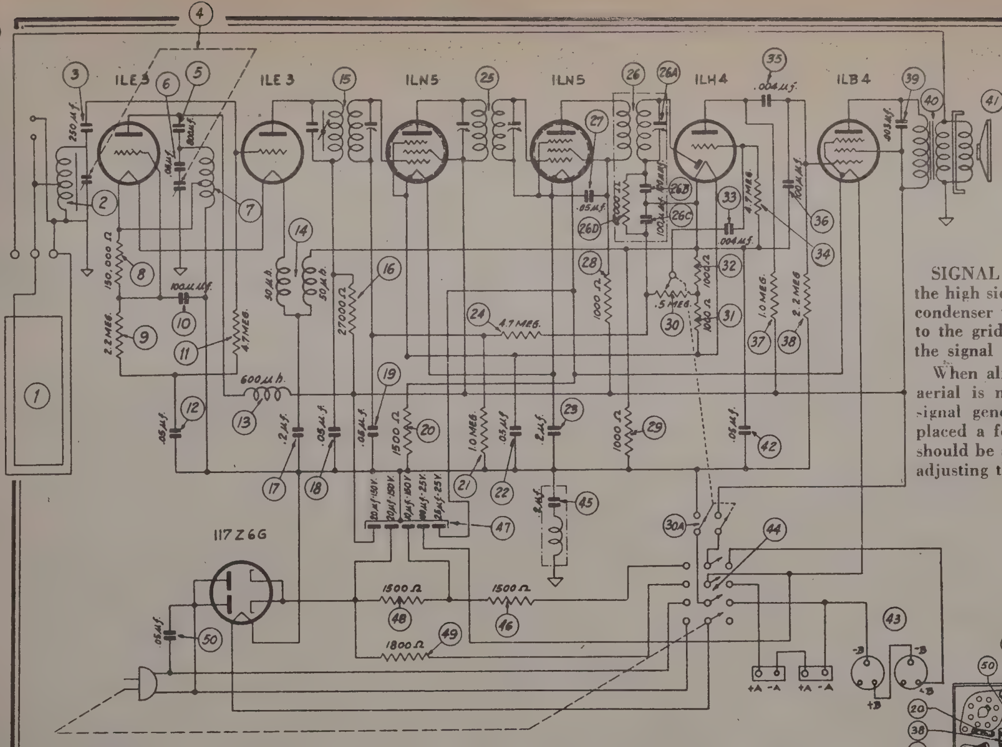
MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cord (Power)	L-3199
Cabinet	10473B
Clip (Coil Mounting)	28-5002
Dial	318-2085
Dial Pointer	27-4868
Indicator Arm Assembly	318-2099
Spring	28-8947
Cam and Hub Assembly	38-9861
Knob (Tuning-Volume)	27-4876
Push-button (Pilot Lamp)	27-4844
Screw (Chassis Mounting)	W-2030
Shield (Tubes)	56-1566
Shield (1N5G Tube)	56-1568
Shield Clip	56-1567
Socket (Loop Terminal)	27-6141
Socket (1LD5 Tube, Run 2)	27-6151
Rubber Grommet	54-4020
Rubber Washer	27-4112
Eyelet	W-792
Socket Assembly (Pilot Lamp)	76-1074
Socket (Tubes)	27-6133
Socket (Rectifier)	27-6137
Snap Fastener (Pilot Lamp)	28-4342
Terminal Panel (Loop)	27-6141
Washer (Chassis Mounting)	W-410

MODELS 41-842,
41-843, 41-844

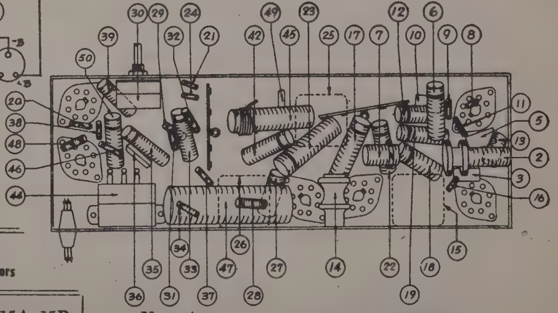
PHILCO RADIO & TELEVISION CORP.

MODELS 41-842, 41-843, 41-844



SIGNAL GENERATOR: When adjusting the "I.F." padders the high side of the signal generator is connected through a .1 mfd. condenser to the loop tuning condenser stator lug which connects to the grid of the first detector tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R.F. padders of the portable models a loop aerial is made from a few turns of wire and connected to the signal generator output terminals. The signal generator is then placed a few feet from the set. The loop aerial of the receiver should be assembled in the cabinet together with the battery when adjusting the R.F. padders.



Note A

UNDERSIDE OF CHASSIS

These models may be adjusted when operated by battery or 115 volts A.C.-D.C. power.

Operations in Order	SIGNAL GENERATOR		RECEIVER		
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators
1	See Paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max.	26A, 25A, 25B, 15A, 15B
2	Use Loop on Generator as above	1500 K.C.	1500 K.C.	Vol. Max.	4B, 4A

NOTE A: DIAL CALIBRATION—Before adjusting the R.F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity), set the dial pointer on the small dot below 540 K.C.

PHILCO 1940 HOME RADIO SPEAKERS

Listed below are the Philco speakers, replacement cones and output transformers used in the 1939 and 1940 Philco home and auto radio line.

In some models two or more different type speakers are used. These speakers, however, are interchangeable and will have the same part number, with the exception of a suffix number -1, -2, etc., added to the part number. The cone assemblies of these speakers are not interchangeable.

It is important when ordering cone assemblies that the correct part number, as indicated on these pages, be specified.

With Replacement Cones and Output Transformers

Speaker	Used In Models	Replacement Cones	Output Transformer
60110	TH-1	36-4130	43118
60112-9	TH-3	36-4119	
36-1266-3	905	36-4146	32-7927
36-1410-1	40-110B	36-4093	32-8066
	39-80B, 39-85B	36-4093	32-7984
36-1426-1	39-17T, 39-19T	36-4083	32-7980
36-1426-3	39-17T, 39-19T	36-4085	32-7980
36-1427-1	905	36-4096	32-7927
36-1435-3	39-70B	36-4090	32-7995
36-1436-1	39-80XF, 39-85XF	36-4094	32-7984
	40-105K, 40-110K	36-4094	32-8066
36-1437-2	39-25XF, 39-30XX	36-4088	32-7978
36-1437-4	39-30XX, 39-25XF	36-4118	32-7978
36-1438-2	39-35	36-4089	32-7978
36-1438-4	39-35XX, 39-31XF, 39-36XX	36-4117	32-7978
36-1439-2	39-25T, 39-30T	36-4087	32-7978
36-1439-8	39-25T, 39-30T	36-4112	32-7978
36-1440-3	39-17F, 39-7CS	36-4086	32-7980
36-1441-2	922 Auto	91-0025	32-8000
36-1442-3	39-70B, 39-75T	36-4090	32-7995
36-1444-1	39-18T	36-4083	32-7986
36-1444-3	39-18T	36-4085	32-7986
36-1445-3	39-18F	36-4086	32-7986
36-1447-3	39-70F, 39-75F	36-4092	32-7995
36-1447-8	39-70F, 39-75F	36-4116	32-7995
36-1449-3	39-19F	36-4086	32-7980
36-1450-2	39-40XX, 39-45XX	36-4089	32-7981
	39-55RX		32-7997
	39-116RX		32-7996
	40-216, 40-205, 40-215RX, 40-516	36-4089	32-7997
	40-510		
	40-195, 40-200	36-4089	32-7981
	40-508, 40-509	36-4089	32-8070
36-1450-4	39-55RX	36-4111	32-7997
	40-508, 40-509		32-8070
	39-116RX		32-7996
36-1451-3	39-71T	36-4090	32-8036
36-1452-2	39-720T	36-4103	32-8018
	40-725T, 40-725, Code 251, 40-2725T		

Speaker	Used In Models	Replacement Cones	Output Transformer
36-1453-4	39-750T	36-4104	32-8019
	40-755T, Code 121		32-8048
36-1455-3	39-744T	36-4107	32-8026
	39-751T		32-8028
	40-748T		32-8026
	40-756T		32-8072
36-1456-3	39-744XX, 39-751XX	36-4108 (39-744)	32-8026
		(39-751)	32-8028
	40-748XX		32-8026
	40-756XX, Code 121		32-8072
36-1459-2	39-770T	36-4106	32-8020
36-1460-3	39-750XX, 39-770XX	36-4105 (39-750XX)	32-8019
		(39-770XX)	32-8020
	40-755XX		32-8048
	40-780XX, 40-755XX, Code 251		32-8058
36-1461-1	TH3-CB, TH3-CB1, 39-7C	36-4114	32-8046
36-1461-2	39-6, 39-7	36-4095	32-8040
36-1469-1	TH-4. TP-4, TP-5, TP-10		
	40-115C, 40-120, 40-124. 40-125, 40-501, 40-502	36-4115	32-8047
36-1469-2	TH-18, TP-20, TP-21, PT-25 PT-26, 27, 29, 31, 33, 35, 36, 39, 41, 43, 45, 46, 47, 49, 50, 53, 55, 57, 59, 61, 65, 67, 69, 40-115, 40-120, 40-124, 40-125, 40-501, 40-502	36-4132	32-8044
36-1469-9	TH-4, TH-5	36-4113	32-8044
	40-115C, 40-120, 40-124, 40-125, 40-501, 40-502		
36-1471-3	39-25CS	36-4086	327978
36-1472-3	39-711	36-4110	32-8033
	40-715T		32-8018
36-1473-3	105	36-4120	32-7980
36-1476-3	40-90	36-4121	32-8051
36-1477-3	40-95, 40-110	36-4121	32-8051
36-1478-2	40-130, 40-140, 40-135, 40-145	36-4126	32-8063
36-1478-3	40-130T, 40-140T, 40-135T	36-4085	32-8063
	40-145T		
36-1478-4	40-130, 40-135, 40-140, 40-145	36-4134	32-8063
36-1479-2	40-180, 40-185, 40-190	36-4089	32-8053
36-1479-4	40-180, 40-185, 40-190	36-4117	
36-1480-3	40-158F	36-4086	32-8056
	40-160, 40-165, 40-170, 40-525	36-4086	32-8063
36-1480-4	40-158, 40-160, 40-165	36-4136	32-8056
	40-170, 40-525, 40-526		32-8063
36-1481-3	40-81, 40-82	36-4121	32-8062
36-1482-3	40-74, 40-88	36-4121	32-8096
36-1483-2	40-150T, 40-155T	36-4127	32-8053
36-1483-3	40-150T, 40-155T	36-4124	32-8053
36-1483-4	40-150, 40-155	36-4135	32-8053
36-1484-2	40-503	36-4126	32-8063
36-1484-3	40-503	36-4137	32-8063
36-1485-2	40-2780T	36-4106	32-8058
36-1486-2	40-710C, 40-2710	36-4126	32-8095
36-1487-2	40-506	36-4088	32-8071
36-1487-3	40-506	36-4128	32-8071
36-1488-3	40-95F, Code 122, 40-100F, Code 122	36-4129	32-8051
36-1489-2	40-507	36-4089	32-8071
36-1491-2	40-527	36-4133	32-8063
36-1491-4	40-527	36-4147	32-8063
	40-165K	36-4147	32-8056

MODELS TH-9, TH-18, TH-22

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer TH-9	32-3235
	TH-18	32-3233
	TH-22	32-3215
2	Tubular Condenser (.0015 mf., 200 v.)	30-45558
3	Tuning Condenser TH-9	31-2385
	TH-18, TH-22	31-2377
4	Wave Switch	42-1497
5	Tubular Condenser (.05 mf., 200 v.)	30-45198
6	Tubular Condenser (.15 mf., 400 v.)	30-4600
7	Tubular Condenser (.05 mf., 200 v.)	30-45198
8	Resistor (220 ohms, ¼ watt)	33-122254
9	Resistor (100,000 ohms, ¼ watt)	33-410154
10	Mica Condenser (250 mmf.)	30-1032
11	Short Wave Oscillator Trans. TH-9	32-3236
	TH-18	32-3234
	TH-22	32-3216
12	BC Oscillator Transformer TH-9	32-3244
	TH-18, TH-22	32-3217
13	Dual Padding Condenser TH-9	31-6304
	TH-18, TH-22	31-6303
14	Mica Condenser (410 mmf.)	30-1089
15	Resistor (4700 ohm, ¼ watt)	33-247134
16	Tubular Condenser (.05 mf., 200 v.)	30-4519
17	1st I. F. Transformer	32-3149
18	2nd I. F. Transformer	32-3150
19	Resistor (2.2 megohms, ¼ watt)	33-522154
20	Mica Condenser (250 mmf.)	30-1032
21	Resistor (8,200 ohm, ¼ watt)	33-282134
22	Volume Control	33-5306
23	Tubular Condenser (.003 mf., 200 v.)	30-4580
24	Resistor (3.9 megohm, ¼ watt)	33-539134
25	Resistor (220,000 ohms, ¼ watt)	33-522154
26	Tubular Condenser (.01 mf., 200 v.)	30-4581
27	Resistor (470,000 ohms, ¼ watt)	33-447154
28	Electrolytic Condenser	30-2402
29	Resistor (130 ohms, 1/3 watt)	33-113336
30	Tubular Condenser (.02 mf., 400 v.)	30-4516
31	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
32	Speaker	36-1469
	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
	(for Speaker 36-1469-9)	36-4113
33	Field Coil — Part of Speaker No.	36-1469
34	Pilot Lamp	34-2068
35	Line Resistor	33-3367
36	Tubular Condenser (.03 mf., 400 v.)	30-4517
37	Mica Condenser (2200 mmf.)	30-1129

MODEL PT-38

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3233
2	Tubular Condenser (.0015 mf., 200 v.)	30-4555
3	Tuning Condenser	31-2431
4	Wave Switch	42-1497
5	Tubular Condenser (.04 mf., 200 v.)	30-4519
6	Tubular Condenser (.15 mf., 400 v.)	30-4600
7	Tubular Condenser (.05 mf., 200 v.)	30-4519
8	Resistor (220 ohms, ½ watt)	33-122336
9	Resistor (100,000 ohms, ¼ watt)	33-410154
10	Mica Condenser (250 mmf.)	61-0033
11	Short Wave Oscillator Trans.	32-3234
12	BC Oscillator Transformer	32-3217
13	Dual Padding Condenser	31-6331
14	Mica Condenser (410 mmf.)	30-1089
15	Resistor (4700 ohms, ¼ watt)	33-247134
16	Tubular Condenser (.05 mf., 200 v.)	30-4519
17	1st I. F. Transformer	32-3327
18	2nd I. F. Transformer	32-3150
19	Resistor (2.2 megohms, ¼ watt)	33-522154
20	Mica Condenser (250 mmf.)	61-0033
21	Resistor (8,200 ohms, ¼ watt	33-282334
22	Volume Control	33-5306
23	Tubular Condenser (.01 mf., 400 v.)	30-4572
24	Resistor (4.7 megohms, ¼ watt)	33-547154
25	Resistor (220,000 ohms, ¼ watt)	33-522154
26	Tubular Condenser (.01 mf., 400 v.)	30-4572
27	Resistor (470,000 ohms, ¼ watt)	33-447154
28	Electrolytic Condenser	30-2402
29	Resistor (130 ohms, ½ watt)	33-113336
30	Tubular Condenser (.04 mf., 400 v.)	30-4119
31	Output Transformer—	
	(for 36-1469-1)	32-8047
	(for 36-1469-9)	32-8044
	(for 36-1469-2)	32-8044
32	Speaker	36-1469
	Cone Assembly—	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-9)	36-4113
	(for Speaker 36-1469-2)	32-4132
33	Field Coil—Part of Speaker No.	36-1469
34	Pilot Lamp	34-2068
35	Line Resistor	33-3367
36	Tubular Condenser (.04 mf., 400 v.)	30-4119

MODEL PT-35

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3164
2	Tubular Condenser (.0015 mf., 200 v.)	30-45558
3	Tuning Condenser	31-2434
4	Switch	42-1406
5	Tubular Condenser (.05 mf., 200 v.)	30-45198
6	Tubular Condenser (.15 mf., 400 v.)	30-45058
7	Resistor (47,000 ohms, ¼ watt)	33-347154
8	Mica Condenser (110 mmf.)	30-1130
9	Oscillator Transformer	32-3152
10	Tubular Condenser (.05 mf., 200 v.)	30-45198
11	1st I. F. Transformer	32-3149
12	2nd I. F. Transformer	32-3150
13	Resistor (2.2 meg., ¼ watt)	33-522154
14	Mica Condenser (250 mmf.)	61-0033
15	Resistor (22,000 ohms, ⅓ watt)	33-322334
16	Volume Control (500,000 ohms)	33-5306
17	Tubular Condenser (.01 mf., 200 v.)	30-44798
18	Resistor (4.7 meg., ¼ watt)	33-547154
19	Resistor (220,000 ohms, ¼ watt)	33-422154
20	Tubular Condenser (.01 mf., 400 v.)	30-45728
21	Resistor (470,000 ohms, ¼ watt)	33-447154
22	Resistor (130 ohms, ⅓ watt)	33-113336
23	Tubular Condenser (.04 mf., 400 v.)	30-41198
24	Output Transformer, Part of	
	Speaker No. 36-1469-1	32-8047
	Speaker No. 36-1469-9	32-8044
	Speaker No. 36-1469-2	32-8044
25	Speaker	36-1469
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil—Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Tubular Condenser (.04 mf., 400 v.)	30-41198

MODEL TP-21

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	38-9937
2	Tuning Condenser	31-2414
3	Tubular Condenser (.05 mf., 200 v.)	40-45198
4	Tubular Condenser (.25 mf., 400 v.)	30-46048
5	Resistor (47,000 ohms, ¼ watt)	33-347154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3152
8	Tubular Condenser (.05 mf., 200 v.)	30-45198
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ¼ watt)	33-327134
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-44798
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-45728
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ½ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-41198
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
	(for Speaker 36-1469-9)	36-4113
25	Tubular Condenser (.04 mf., 400 v.)	30-41198
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil ......Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Push Button Switch	42-1485
31	Padding Condenser Strip	31-6324

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Baffle and Grille Silk	40-6452
Cable (Power)	L-3199
Cabinet	10368A
Cabinet Back	27-4833
Cabinet Feet	27-9337

MODELS PT-49, PT-51

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3168
2	Tubular Condenser (.0015 mf., 200 v.)	30-45558
3	Tuning Condenser	31-2428
4	Switch	42-1406
5	Tubular Condenser (.05 mf., 200 v.)	30-45198
6	Tubular Condenser (.15 mf., 400 v.)	30-45058
7	Resistor (47,000 ohms, ¼ watt)	33-347154
8	Mica Condenser (110 mmf.)	30-1130
9	Oscillator Transformer	32-3167
10	Tubular Condenser (.05 mf., 200 v.)	30-45198
11	1st I. F. Transformer	32-3149
12	2nd I. F. Transformer	32-3150
13	Resistor (2.2 meg., ¼ watt)	33-522154
14	Mica Condenser (250 mmf.)	61-0033
15	Resistor (22,000 ohms, ⅓ watt)	33-322334
16	Volume Control (500,000 ohms)	33-5306
17	Tubular Condenser (.01 mf., 200 v.)	30-44798
18	Resistor (4.7 meg., ¼ watt)	33-547154
19	Resistor (220,000 ohms, ¼ watt)	33-422154
20	Tubular Condenser (.01 mf., 400 v.)	30-45728
21	Resistor (470,000 ohms, ¼ watt)	33-447154
22	Resistor (130 ohms, ⅓ watt)	33-113336
23	Tubular Condenser (.04 mf., 400 v.)	30-41198
24	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
25	Speaker	36-1469
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Tubular Condenser (.04 mf., 400 v.)	30-41198
31	Push Button Switch	42-1485
32	Padding Condenser Strip	31-6293

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cable (Power)	L-3199
Cabinet (PT-49)	10366A
Cabinet Back (PT-49)	27-9314
Cabinet (PT-51)	10366B
Cabinet Back (PT-51)	27-9328

MODEL PT-50

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	32-3179
2	Tuning Condenser	31-2448
3	Tubular Condenser (.05 mf., 200 V.)	30-4519
4	Tubular Condenser (.25 mf., 400 V.)	30-4604
5	Resistor (22,000 ohms, ¼ watt)	33-322154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3182
8	Tubular Condenser (.05 mf., 200 V.)	30-4519
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ⅓ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 V.)	30-4479
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 V.)	30-4572
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ⅓ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 V.)	30-4119
23	Output Transformer	
	(for Speaker 36-1469-1)	32-8047
	(for Speaker 36-1469-2)	32-8044
	(for Speaker 36-1469-9)	32-8044
24	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-2)	36-4132
	(for Speaker 36-1469-9)	36-4113
25	Tubular Condenser (.04 mf., 400 V.)	30-4119
26	Electrolytic Condenser (20-20 mf., 150 V.)	30-2382
27	Field Coil ....Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367

MODELS PT-37, PT-53

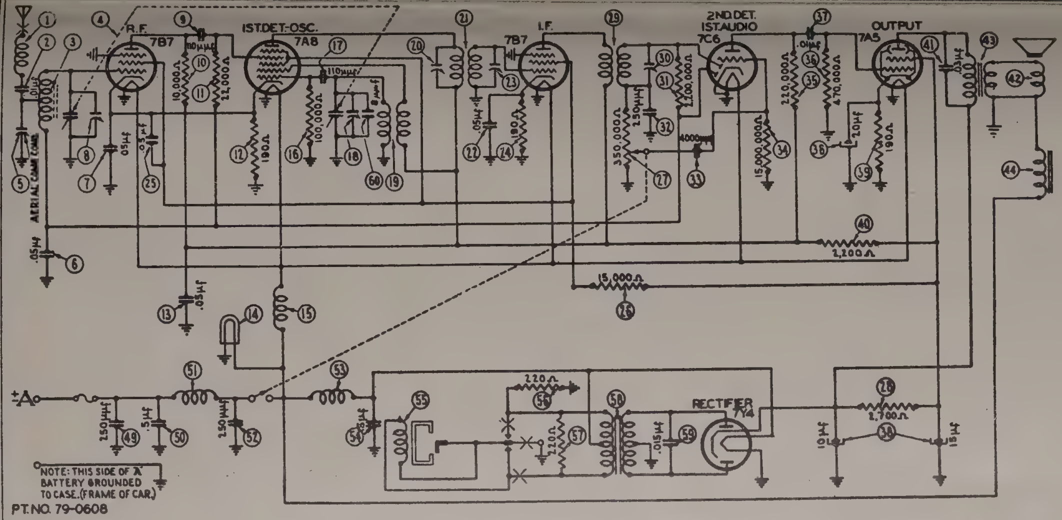
SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer	32-3233
2	Tubular Condenser (.0015 mf., 200 v.)	30-45558
3	Tuning Condenser	31-2431
4	Wave Switch	42-1497
5	Tubular Condenser (.05 mf., 200 v.)	30-45198
6	Tubular Condenser (.15 mf., 400 v.)	30-46008
7	Tubular Condenser (.05 mf., 200 v.)	30-45198
8	Resistor (220 ohms, ½ watt)	33-122336
9	Resistor (100,000 ohms, ¼ watt)	33-410154
10	Mica Condenser (250 mmf.)	61-0033
11	Short Wave Oscillator Trans.	32-3234
12	BC Oscillator Transformer	32-3217
13	Dual Padding Condenser	31-6331
14	Mica Condenser (410 mmf.)	30-1089
15	Resistor (4700 ohms, ¼ watt)	33-247134
16	Tubular Condenser (.05 mf., 200 v.)	30-45198
17	1st I. F. Transformer	32-3327
18	2nd I. F. Transformer	32-3150
19	Resistor (2.2 megohms, ¼ watt)	33-522154
20	Mica Condenser (250 mmf.)	61-0033
21	Resistor (8,200 ohms, ¼ watt)	33-282334
22	Volume Control	33-5306
23	Tubular Condenser (.01 mf., 400 v.)	30-45728
24	Resistor (4.7 megohm, ¼ watt)	33-547154
25	Resistor (220,000 ohms, ¼ watt)	33-522154
26	Tubular Condenser (.01 mf., 200 v.)	30-45818
27	Resistor (470,000 ohms, ¼ watt)	33-447154
28	Electrolytic Condenser	30-2402
29	Resistor (130 ohms, ½ watt)	33-113336
30	Tubular Condenser (.04 mf., 400 v.)	30-41198
31	Output Transformer, Part of	
	Speaker No. 36-1469-1	32-8047
	Speaker No. 36-1469-9	32-8044
	Speaker No. 36-1469-2	32-8044
32	Speaker	36-1469
	Cone Assembly	
	(for Speaker 36-1469-1)	36-4115
	(for Speaker 36-1469-9)	36-4113
	(for Speaker 36-1469-2)	36-4132
33	Field Coil—Part of Speaker No.	36-1469
34	Pilot Lamp	34-2068
35	Line Resistor	33-3367
36	Tubular Condenser (.04 mf., 400 v.)	30-41198

MODEL PT-43

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assembly	
	(Code 121)	38-9936
	PT-43 (Code 122)	32-3402
2	Tuning Condenser	
	(Code 121)	31-2436
	PT-43 (Code 122)	31-2446
3	~~Tubular Condenser (.05~~ mf., 200 v.)	30-45198
4	Tubular Condenser (.25 mf., 400 v.)	30-46048
5	Resistor (47,000 ohms, ¼ watt)	33-347154
6	Mica Condenser (110 mmf.)	30-1130
7	Oscillator Transformer	32-3182
8	Tubular Condenser (.05 mf., 200 v.)	30-45198
9	1st I. F. Transformer	32-3177
10	2nd I. F. Transformer	32-3178
11	Resistor (2.2 megs., ¼ watt)	33-522154
12	Mica Condenser (250 mmf.)	61-0033
13	Resistor (27,000 ohms, ⅓ watt)	33-327334
14	Volume Control (500,000 ohms)	33-5306
15	Tubular Condenser (.01 mf., 200 v.)	30-44798
16	Resistor (4.7 megs., ¼ watt)	33-547154
17	Resistor (220,000 ohms, ¼ watt)	33-422154
18	Tubular Condenser (.01 mf., 400 v.)	30-45728
19	Mica Condenser (250 mmf.)	61-0033
20	Resistor (470,000 ohms, ¼ watt)	33-447154
21	Resistor (130 ohms, ⅓ watt)	33-113336
22	Tubular Condenser (.04 mf., 400 v.)	30-41198
23	Output Transformer	
	(for Speaker No. 36-1469-1)	32-8047
	(for Speaker No. 36-1469-2)	32-8044
	(for Speaker No. 36-1469-9)	32-8044
24	Speaker	36-1469
25	Tubular Condenser (.04 mf., 400 v.)	30-41198
26	Electrolytic Condenser (20-20 mf., 150 v.)	30-2382
27	Field Coil, ...Part of Speaker No.	36-1469
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cable (Power)	L-3199
Cabinet (PT-43, Code 121)	10451A
Cabinet Back (PT-55, Code 121)	27-4907
Cabinet (PT-55, Code 121)	10446B

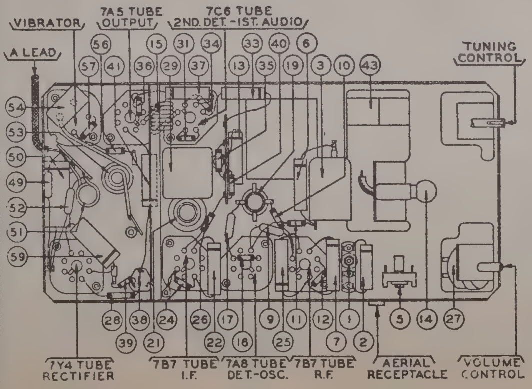


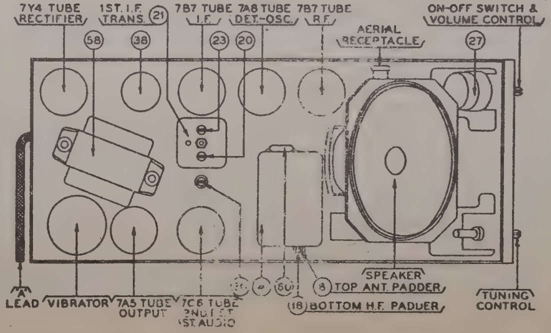
NOTE: THIS SIDE OF 'A' BATTERY GROUNDED TO CASE. (FRAME OF CAR.)

PT. NO. 79-0608

MODEL AR-1 SCHEMATIC

I.F. = 455KC





No.	Description	Part No.
①	Antenna Choke	65-0102
②	Condenser (.01 mfd.)	61-0114
③	Antenna Transformer	65-0195
④	Tuning Condenser	63-0028
⑤	Aerial Compensator	63-0030
⑥	Condenser (.05 mfd.)	61-0101
⑦	Condenser (.05 mfd.)	61-0111
⑧	First Padder (on Tun. Cond.)	
⑨	Condenser (110 mmfd.)	30-1031
⑩	Resistor (10,000 ohms)	33-310154
⑪	Resistor (22,000 ohms)	33-322154
⑫	Resistor (190 ohms)	33-119336
⑬	Condenser (.05 mfd.)	61-0111
⑭	Pilot Lamp	69-0004
⑮	Filament Choke	65-0158
⑯	Resistor (100,000 ohms)	33-410154
⑰	Condenser (110 mmfd.)	30-1031
⑱	Second Padder (on Tun. Cond.)	
⑲	Oscillator Transformer	65-0194
⑳	Padder (Pri. 1st I.F. Trans.)	
㉑	First I. F. Transformer	65-0191
㉒	Condenser (.05 mfd.)	61-0111
㉓	Padder (Sec. 1st I. F. Trans.)	
㉔	Resistor (190 ohms)	33-119336
㉕	Condenser (.05 mfd.)	61-0111
㉖	Resistor (15,000 ohms)	33-315154
㉗	Volume Control (350,000 ohms) in On-Off Switch	67-0020
㉘	Resistor (2700 ohms)	33-227434
㉙	Second I. F. Transformer	65-0192
㉚	Padder (Sec. 2nd I. F. Trans.)	
㉛	Resistor (2,200,000 ohms)	33-522154
㉜	Condenser (250 mmfd.)	61-0033
㉝	Condenser (4000 mmfd.)	61-0128
㉞	Resistor (15,000,000 ohms)	33-615154
㉟	Resistor (220,000 ohms)	33-422154
㊱	Resistor (470,000 ohms)	33-447154
㊲	Condenser (.01 mfd.)	61-0114
㊳	Filter Condenser (10-15-20 mfd.)	61-0089
㊴	Resistor (190 ohms)	33-119336
㊵	Resistor (2200 ohms)	33-222334
㊶	Condenser (.03 mfd.)	61-0119
㊷	Cone and Voice Coil (For 73-0027-1) (For 73-0027-2)	 91-0076 91-0077
㊸	Output Transformer	65-0258
㊹	Field Coil	not replaceable
㊾	Condenser (250 mmfd.)	61-0033
㊿	Condenser (.5 mfd.)	61-0106
(51)	"A" Choke	32-1644
(52)	Condenser (250 mmfd.)	61-0033
(53)	Vibrator Choke	65-0204
(54)	Condenser (.5 mfd.)	61-0106
(55)	Vibrator	83-0025
(56)	Resistor (220 ohms)	33-122334
(57)	Resistor (220 ohms)	33-122334
(58)	Power Transformer	65-0185
(59)	Condenser (.015 mfd.)	61-0138
(60)	Condenser (8 mmfd.)	30-1106
	Drive Cord (16½")	55-0588
	Drive Cord (5¾")	55-0589
	Drive Cord (13¾")	55-0652
	Drive Cord (7⅝")	55-0653
	Tuning Shaft	57-0802FA3
	Speaker	73-0027
	Tube Side Cover	318-1964
	Wiring Side Cover	77-0337
	Pointer	57-1421
	Dial	77-0526
	Tuning and Volume Knob	55-0547
	Window Crystal	55-0501

ALIGNING PROCEDURE MODEL AR-1

OPERA-TIONS	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	ADJUST THE AERIAL COMPENSATOR ⑥ TWO TURNS FROM TIGHT				
2	455 K.C.	To Aerial Receptacle on Radio	.1 mfd.	Note 1	30,23,20 30,23,20
3	1580 K.C.	To Aerial Receptacle on Radio	30 mmfd. See Note 2	Note 1	18
4	1400 K.C.	To Aerial Receptacle on Radio	30 mmfd. See Note 2	Set tuning condenser at 1400 K.C.	⑧ Note 3
5	1200 to 1400 K.C.	Note 4	Note 4	Note 4	⑥

Make all adjustments for maximum reading on the output meter.

NOTE 1—Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 2—Connect the aerial lead, Part No. 41-3191, to the aerial receptacle in the radio. Connect a 30 mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 3—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 4—When installing the radio in the car, follow the instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 K. C. on the control scale. Remove the plug button on the side of the radio and adjust the aerial compensator ⑤ for maximum signal.

MODEL AR-4

Make all adjustments for maximum reading on the output meter.

NOTE 1—Connect the aerial lead, Part No. 41-3191, to the aerial receptacle in the radio. Connect a 10 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2—Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5—When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Adjust the aerial compensator ⑥ for maximum signal.

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	ADJUST THE AERIAL COMPENSATOR ⑥ TWO TURNS FROM TIGHT				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	30,27,23,21 30,27,23,21
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	17
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	④ Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	⑭ Note 3
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	④ Note 4
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	⑮ Note 3
9	1200 to 1400 K.C.	Note 5	Note 5	Note 5	⑥

Model C-1708

Make all adjustments for maximum reading on the output meter unless otherwise specified.

NOTE 1—Turn the tuning control knob clockwise as far as it will go.

NOTE 2—Connect the Chrysler Antenna lead, Part No. 95-0106, to the antenna receptacle on the radio. Connect a 20 mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 3—Rotate the tuning control when adjusting the Low Frequency screw (56). Tune to the signal and adjust the screw for maximum output. Turn the tuning control knob slightly, first one way then the other, for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the Antenna Stage adjustment is made with the Radio installed in the car, the Radio Antenna lead must be connected to the Cowl Antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna lead but not connected to it and adjust padder ④ for maximum signal at 1400 K. C.

MODEL AR-9

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE BLACK DOT APPEARS IN THE BAND INDICATOR WINDOW AND STATIONS CAN BE TUNED IN BY MANUAL TUNING.				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	㊶㊴ [illegible] ㊶㊴ [illegible]
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	(68)
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	(55) Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	㉑ Note 3
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	(55) Note 4
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	㉑ Note 3

INSTRUCTIONS FOR ADJUSTING SHORT WAVE PADDERS

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE "RED" DOT APPEARS IN THE BAND INDICATOR WINDOW				
1	10 M.C.	To Aerial Receptacle on Radio	Note 1	Note 2	① OSC. 10 M.C.
2	9.5 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 9.5 M.C. Signal	⑤ ANT. 9.5 M.C.
3	6 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 6 M.C. Signal	③ ANT. 6 M.C.
	PUSH IN THE RIGHT HAND KNOB ON THE CONTROL UNTIL THE "WHITE" DOT APPEARS IN THE BAND INDICATOR WINDOW				
1	12.1 M.C.	To Aerial Receptacle on Radio	Note 1	Note 2	② OSC. 12.1 M.C.
2	11.9 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 11.9 M.C. Signal	⑥ ANT. 11.9 M.C.
3	11.7 M.C.	To Aerial Receptacle on Radio	Note 1	Rotate Tuning Condenser to 11.7 M.C. Signal	④ ANT. 11.7 M.C.
4	OPERATIONS 2 AND 3 ARE IMPORTANT AND MUST BE REPEATED UNTIL MAXIMUM SIGNAL IS RECEIVED				

Make all adjustments for maximum reading on the output meter.

NOTE 1—Connect the aerial lead, Part No. 41-3191, to the aerial receptacle in the radio. Connect a 10 mmfd. Condenser in series between the signal generator and the aerial lead.

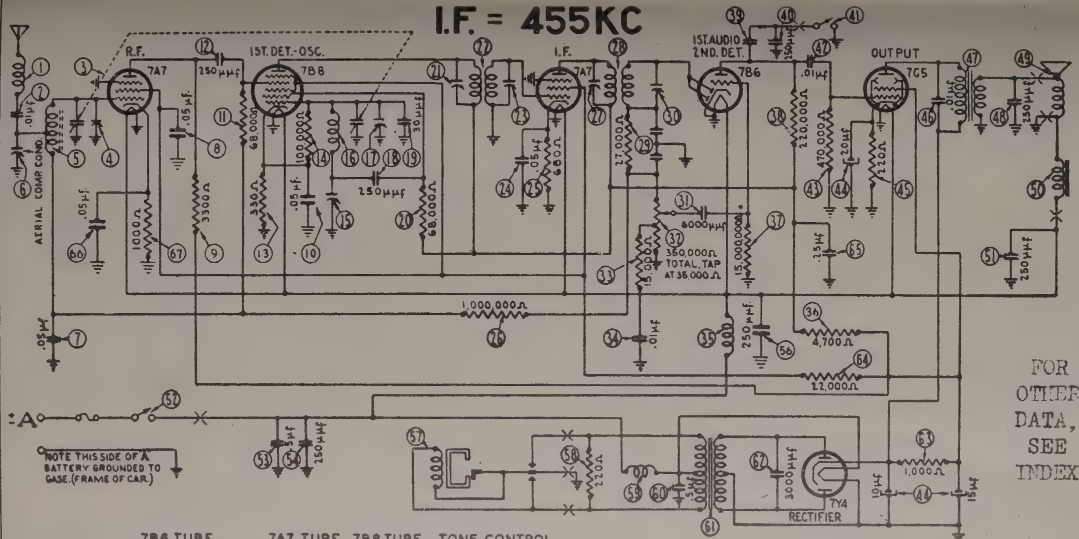
NOTE 2—Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

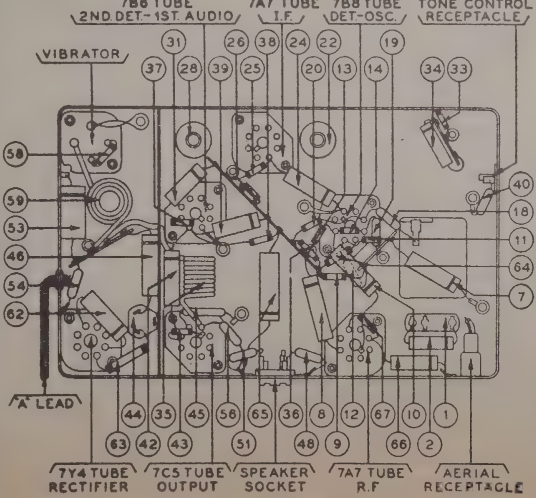
NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

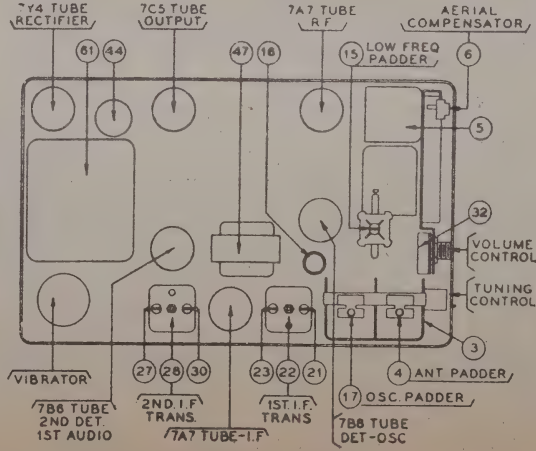
MODEL C-1708

OPERA-TIONS	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
	Press the "DIAL" button and stations can be tuned in by "DIAL" tuning				
1	455 K. C.	To Antenna Receptacle on Radio	.1 mfd.	Note 1	㉗ ㉕ ⑱ ⑯ ㉗ ㉕ ⑱ ⑯
2	455 K. C.	To Antenna Receptacle on Radio	.1 mfd.	Note 1	⑫ minimum
3	1400 K. C.	To Antenna Receptacle on Radio	20 mmfd. Note 2	Set tuning control at 1400 K. C.	④
4	580 K. C.	To Antenna Receptacle on Radio	20 mmfd. Note 2	Set tuning control at 580 K. C.	(56) Note 3
5	1400 K. C.	To Antenna Receptacle on Radio	20 mmfd. Note 2	Set tuning control at 1400 K. C.	④ Note 4



FOR OTHER DATA, SEE INDEX

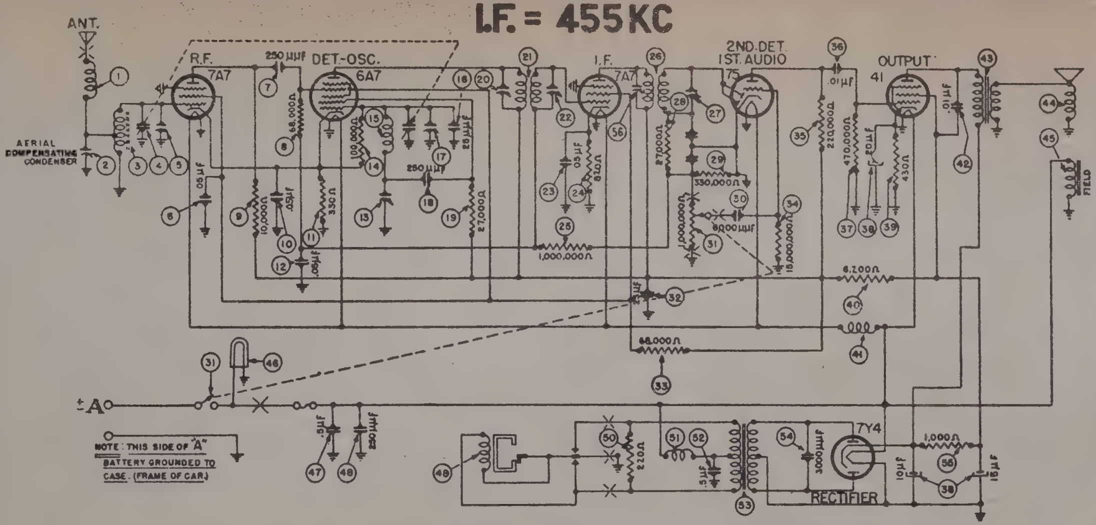




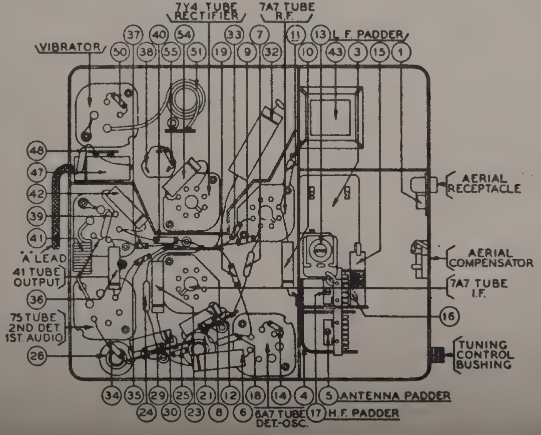
No.	Description	Part No.
①	Antenna Choke	65-0102
②	Condenser (.01 Mfd.)	61-0014
③	Tuning Condenser	63-0047
④	Antenna Padder (on Tun. Cond.)	
⑤	Antenna Transformer	65-0323
⑥	Aerial Compensator	77-0545
⑦	Condenser (.05 Mfd.)	61-0101
⑧	Condenser (.05 Mfd.)	61-0101
⑨	Resistor (3,300 ohms)	33-233334
⑩	Condenser (.05 Mfd.)	61-0101
⑪	Resistor (68,000 ohms)	33-368154
⑫	Condenser (250 Mmfd.)	61-0033
⑬	Resistor (330 ohms)	33-133336
⑭	Resistor (100,000 ohms)	33-410154
⑮	Low Frequency Padder	63-0048
⑯	Oscillator Transformer	65-0052
⑰	Oscillator Padder (on Tun. Cond.)	
⑱	Condenser (250 Mmfd.)	61-0033
⑲	Condenser (30 Mmfd.)	60-030337
⑳	Resistor (68,000 ohms)	33-368334
㉑	Padder (Pri. 1st I. F. Trans.)	
㉒	First I. F. Transformer	65-0319
㉓	Padder (Sec. 1st I. F. Trans.)	
㉔	Condenser (.05 Mfd.)	61-0101
㉕	Resistor (680 ohms)	33-168336
㉖	Resistor (1,000,000 ohms)	33-510154
㉗	Padder (Pri. 2nd I. F. Trans.)	
㉘	Second I. F. Transformer	65-0320
㉙	Resistor (27,000 ohms)	33-327154
㉚	Padder (Sec. 2nd I. F. Trans.)	
㉛	Condenser (6,000 Mmfd.)	61-0103
㉜	Volume Control (350,000 ohms)	67-0032-1
㉝	Resistor (15,000 ohms)	33-315154
㉞	Condenser (.01 Mfd.)	61-0114
㉟	Filament Choke	32-1604
㊱	Resistor (4,700 ohms)	33-247334
㊲	Resistor (15,000,000 ohms)	33-615154
㊳	Resistor (220,000 ohms)	33-422334
㊴	Condenser (4,000 Mmfd.)	61-0129
㊵	Condenser (250 Mmfd.)	61-0033
㊶	Tone Control Switch	85-0111
㊷	Condenser .01 Mfd.)	61-0100
㊸	Resistor (470,000 ohms)	33-447154
㊹	Filter Condenser (10-15-20 Mfd.)	61-0089
㊺	Resistor (220 ohms)	33-122438
㊻	Condenser (.01 Mfd.)	61-0124
㊼	Output Transformer	65-0317
㊽	Condenser (250 Mmfd.)	61-0033
㊾	Replacement Cone (For 73-0045-2 Speaker) (For 73-0045-3 Speaker) (For 73-0047-2 Speaker) (For 73-0047-3 Speaker)	 91-0086 91-0126 91-0086 91-0126
㊿	Field Coil	Not Replaceable
(51)	Condenser (250 Mmfd.)	61-0033
(52)	On-Off Switch	85-0112
(53)	Condenser (.5 Mfd.)	61-0106
(54)	Condenser (250 Mmfd.)	61-0033
(56)	Condenser (250 Mmfd.)	61-0033
(57)	Vibrator	83-0025
(58)	Resistor (220 ohms)	33-122334
(59)	Vibrator Choke	65-0075
(60)	Condenser (.5 Mfd.)	61-0137
(61)	Power Transformer	65-0318
(62)	Condenser (3,000 Mmfd.)	61-0115
(63)	Resistor (1,000 ohms)	33-210434
(64)	Condenser (22,000 ohms)	33-322434
(65)	Condenser .25 Mfd.)	61-0125
(66)	Condenser (.05 Mfd.)	61-0111
(67)	Resistor (1,000 ohms)	33-210336
	Interference Condenser	30-4007
	Distributor Resistor	33-1196

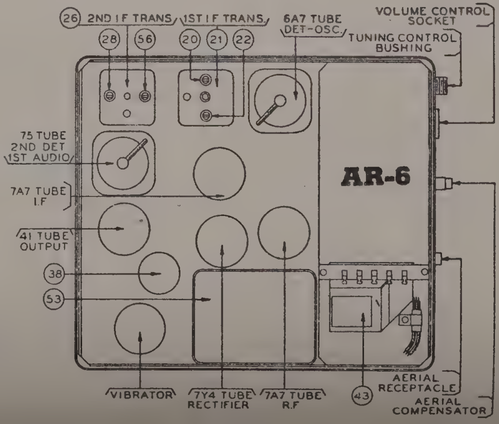
MODEL AR-6

PHILCO RADIO & TELEV. CORP.



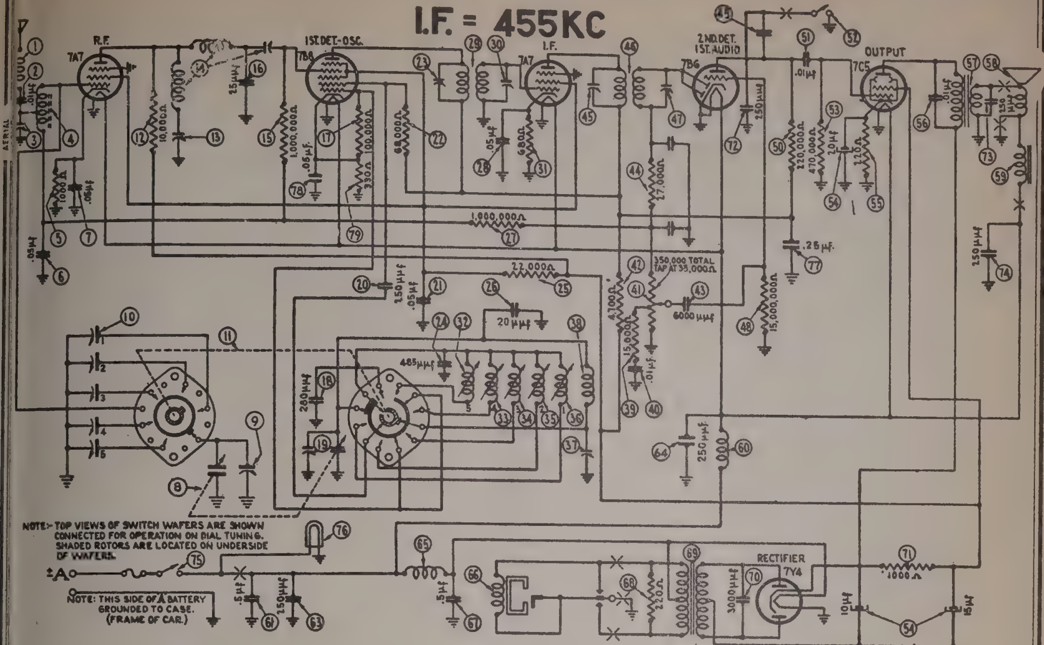
FOR OTHER DATA, SEE INDEX





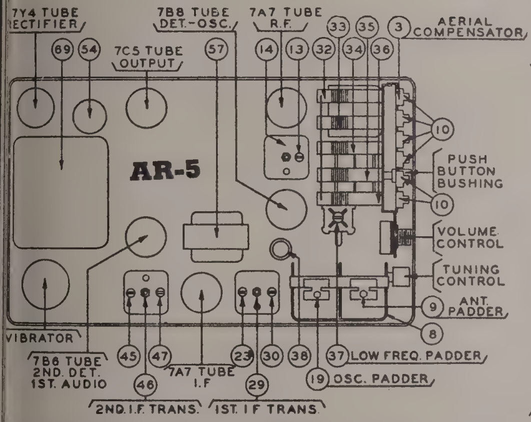
No.	Description	Part No.
①	Aerial Choke	65-0102
②	Aerial Padder	31-6248
③	Antenna Transformer	65-0085
④	Tuning Condenser	63-0016
⑤	Aerial Padder (on Tun. Cond.)	
⑥	Condenser (.05 Mfd.)	61-0101
⑦	Condenser (250 Mmfd.)	61-0033
⑧	Resistor (68,000 ohms)	33-368154
⑨	Resistor (10,000 ohms)	33-310334
⑩	Condenser (.05 Mfd.)	61-0101
⑪	Resistor (330 ohms)	33-133436
⑫	Condenser (.05 Mfd.)	61-0111
⑬	Low Frequency Padder	31-6230
⑭	Resistor (100,000 ohms)	33-410154
⑮	Oscillator Transformer	65-0134
⑯	Condenser (25 Mmfd.)	30-1108
⑰	Oscillator Padder (on Tun. Cond.)	
⑱	Condenser (250 Mmfd.)	61-0033
⑲	Resistor (27,000 ohms)	33-327334
⑳	Padder (Pri. 1st I. F. Trans.)	
㉑	First I. F. Transformer	65-0044
㉒	Padder (Sec. 1st I. F. Trans.)	
㉓	Condenser (.05 Mmfd.)	61-0101
㉔	Resistor (820 ohms)	33-182438
㉕	Resistor (1,000,000 ohms)	33-510154
㉖	Second I. F. Transformer	65-0230
㉗	Padder (Sec. 2nd I. F. Trans.)	
㉘	Resistor (27,000 ohms)	33-327344
㉙	Resistor (330,000 ohms)	33-433154
㉚	Condenser (6,000 Mmfd.)	61-0103
㉛	Volume Control (1,000,000 ohms) & On-Off Switch	33-5268
㉜	Condenser (.25 Mfd.)	61-0125
㉝	Resistor (68,000 ohms)	33-368334
㉞	Resistor (15,000,000 ohms)	33-615154
㉟	Resistor (220,000 ohms)	33-422334
㊱	Condenser (.01 Mfd.)	61-0100
㊲	Resistor (470,000 ohms)	33 447154
㊳	Filter Condenser (10-15-20 Mfd.)	61-0089
㊴	Resistor (430 ohms)	33-143438
㊵	Resistor (6,200 ohms)	33-262434
㊶	Filament Choke	32-1644
㊷	Condenser (.01 Mfd.)	61-0120
㊸	Output Transformer	65-0048
㊹	Cone & Voice Coil	91-0028
㊺	Field Coil	Not Replaceable
㊻	Pilot Lamp	34-2040
㊼	Condenser (.5 Mfd.)	61-0106
㊽	Condenser (250 Mmfd.)	61-0033
㊾	Vibrator	83-0025
㊿	Resistor (220 ohms)	33-122334
(51)	Vibrator Choke	65-0075
(52)	Condenser (.5 Mfd.)	61-0137
(53)	Power Transformer	65-0159
(54)	Condenser (3,000 Mmfd.)	61-0115
(55)	Resistor (1,000 ohms)	33-210334
(56)	Padder (Pri. 1st I. F. Trans.)	
	4 Prong Socket	27-6044
	6 Prong Socket	27-6036
	7 Prong Socket	27-6037
	Loktal Sockets	27-6131
	Volume Control Socket	55-0945
	Radio Housing	77-0520FC45
	Speaker Unit	73-0029
	Front Cover	57-1389FC45
	"T" Bolt (Radio Mtg.)	28-6161FA3
	Nut (Radio Mtg.)	W518FA1
	Washer (Radio Mtg.)	28-2606FA1
	Interference Condenser	30-4007
	Distributor Resistor	33-1196
	Fuse	7227
	Standard Control Assembly	85-0117
	Dial	55-0304
	Flexible Shaft	57-0681

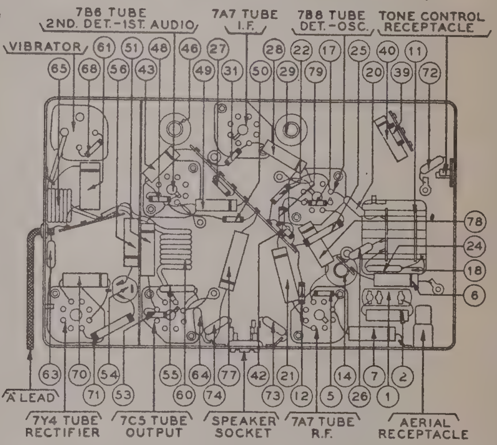
I.F. = 455KC



NOTE:- TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON DIAL TUNING. SHADED ROTORS ARE LOCATED ON UNDERSIDE OF WAFERS.

NOTE: THIS SIDE OF A BATTERY GROUNDED TO CASE. (FRAME OF CAR.)





o.	Description	Part No.
①	Antenna Choke	65-0102
②	Condenser (.01 Mfd.)	61-0114
③	Aerial Compensator	Part of ⑩
④	Antenna Transformer	65-0323
⑤	Resistor (1,000 ohms)	33-210338
⑥	Condenser (.05 Mfd.)	61-0101
⑦	Condenser (.05 Mfd.)	61-0111
⑧	Tuning Condenser	63-0047
⑨	Antenna Padder (on Tun. Cond.)	
⑩	Antenna Padder Assembly	77-0512
⑪	Wafer Switch	77-0506
⑫	Resistor (10,000 ohms)	33-310334
⑬	I. F. Wave Trap Padder	
⑭	R. F. Transformer	65-0321
⑮	Resistor (1,000,000 ohms)	33-510154
⑯	Condenser (25 Mmfd.)	30-1067
⑰	Resistor (100,000 ohms)	33-410154
⑱	Silver Mica Condenser (280 Mmfd.)	61-0043
⑲	Oscillator Padder (on Tun. Cond.)	
⑳	Condenser (250 Mmfd.)	61-0033
㉑	Condenser (.05 Mfd.)	61-0101
㉒	Resistor (68,000 ohms)	33-368334
㉓	Padder (Pri. 1st I. F. Trans.)	
㉔	Silver Mica Condenser (485 Mmfd.)	61-0144
㉕	Resistor (22,000 ohms)	33-325434
㉖	Condenser (15 Mmfd.)	61-0039
㉗	Resistor (1,000,000 ohms)	33-510154
㉘	Condenser (.05 Mfd.)	61-0101
㉙	First I. F. Transformer	65-0319
㉚	Padder (Sec. 1st I. F. Trans.)	
㉛	Resistor (680 ohms)	33-168336
㉜	Oscillator Transformer (550 to 1065 KC)	65-0173
㉝	Oscillator Transformer (600 to 1165 KC)	65-0172
㉞	Oscillator Transformer (660 to 1240 KC)	65-0171
㉟	Oscillator Transformer (750 to 1410 KC)	65-0170
㊱	Oscillator Transformer (855 to 1580 KC)	65-0169
㊲	Low Frequency Padder	63-0048
㊳	Manual Oscillator Transformer	65-0052
㊴	Resistor (15,000 ohms)	33-315154
㊵	Condenser (.01 Mfd.)	61-0114
㊶	Volume Control (350,000 ohms)	67-0032-1
㊷	Resistor (47,000 ohms)	33-247334
㊸	Condenser (6,000 Mmfd.)	61-0103
㊹	Resistor (27,000 ohms)	33-327154
㊺	Padder (Pri. 2nd I. F. Trans.)	
㊻	Second I. F. Transformer	65-0320
㊼	Padder (Sec. 2nd I. F. Trans.)	
㊽	Resistor (15,000,000 ohms)	33-615154
㊾	Condenser (4,000 Mmfd.)	61-0129
㊿	Resistor (220,000 ohms)	33-422334
(51)	Condenser (.01 Mfd.)	61-0100
(52)	Tone Control Switch	85-0111
(53)	Resistor (470,000 ohms)	33-447154
(54)	Filter Condenser (10-15-20 Mfd.)	61-0089
(55)	Resistor (220 ohms)	33-122438
(56)	Condenser (.01 Mfd.)	61-0124
(57)	Output Transformer	65-0317
(58)	Replacement Cone	
	(For 73-0045-2 Speaker)	91-0086
	(For 73-0045-3 Speaker)	91-0126
	(For 73-0047-2 Speaker)	91-0086
	(For 73-0047-3 Speaker)	91-0126
(59)	Field Coil	Not Replaceable
(60)	Filament Choke	32-1604
(61)	Condenser (.5 Mfd.)	61-0106
(63)	Condenser (250 Mmfd.)	61-0033
(64)	Condenser (250 Mmfd.)	61-0033
(65)	Vibrator Choke	65-0075
(66)	Vibrator	83-0025
(67)	Condenser (.5 Mfd.)	61-0137
(68)	Resistor (220 ohms)	33-122334
(69)	Power Transformer	65-0318
(70)	Condenser (3,000 Mmfd.)	61-0115
(71)	Resistor (1,000 ohms)	33-210434
(72)	Condenser (250 Mmfd.)	61-0033
(73)	Condenser (250 Mmfd.)	61-0033
(74)	Condenser (250 Mmfd.)	61-0033
(75)	On-Off Switch	85-0112
(76)	Pilot Lamp	34-2064
(77)	Condenser (.25 Mfd.)	61-0125
(78)	Condenser (.05 Mfd.)	61-0101
(79)	Resistor (330 ohms)	33-133336
	Hook Bolts (Radio Mtg.)	57-1340FA3
	Nut (Radio Mtg.)	W98FA3
	Tube Side Cover	318-1997
	Wiring Side Cover	57-1345FC45
	4 Prong Socket	27-6044

MODEL C-1708

SETTING UP ELECTRIC TUNING

1. With the antenna installed and connected, turn on the radio and allow it to operate for TWENTY minutes before making adjustments.

The Receiver must be adjusted with the Skyway antenna fully extended and it is recommended that adjustments be made with the car in a shielded area such as under a viaduct or in a steel constructed building. However best results may be obtained using the new signal Antennuator. This permits setting up nearby local stations on the buttons without having the car in a shielded area.

2. Push in the dial button and tune with manual control a weak station between 1350 and 1500 kilocycles. Pull push buttons off. Adjust the antenna compensator with a screw driver by turning the adjusting screw either to the left or right until maximum volume is reached. See illustration.

3. If numbers on buttons are not desired, select and remove from the call letter sheet, five call letter tabs of popular stations received in the area in which the receiver is to be operated, selecting stations within the range of each button as shown in illustration, Model C-1708. Reference to programs published in your local newspaper aids in quick selection of stations. Remove metal caps to install the tabs in push buttons.

4. Push dial button and tune in the station you have selected for the No. 1 button, identify the program and push in the No. 1 push button shaft. Using a small screw driver, turn the No. 1 adjusting screw (inner screw) and tune in the station selected for this position by turning the screw driver counter-clockwise to increase frequency and clockwise to decrease frequency.

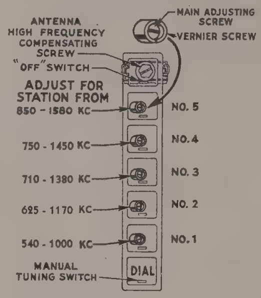
After the station has been tuned in accurately, (see illustration) a finer adjustment can be made by adjusting the vernier screw, which is the outside shell of the adjusting screw. Use a larger screw driver for this operation. Careful adjustment of this screw will insure maximum performance in areas where broadcasting reception is poor.

Proceed in like manner with the adjustment of No. 2, 3, 4 and 5 screws in the order of frequency until all five stations have been tuned in. It is recommended that the above procedure of setting up stations should be repeated in order that accurate adjustments may be insured, for satisfactory reception at some distance from stations.

5. The push buttons may now be replaced on their respective shafts.

The Receiver may be set up before installing in the car, but FINAL adjustments must be made with the radio operating on the antenna in the car. Eight hundred call letter tabs in sheet form are furnished so that at least five popular radio broadcasting stations can be selected.

BE SURE AND SAVE THE UNUSED CALL LETTERS, GIVING THEM TO THE OWNER AS THEY MAY BE NEEDED AT SOME FUTURE TIME IF THE RADIO IS TO BE OPERATED IN A DIFFERENT AREA WHERE THE LOCAL STATIONS ARE NOT THE SAME.



AUTOMATIC ADJUSTING SCREWS

Setting Up Automatic Electric Tuning

MODELS AR-7, AR-8

Turn on the radio and allow it to operate for twenty minutes or longer if possible. During this time, proceed as follows:

1. Remove the plate on the end of the radio which covers the adjusting screws. This is held by snap springs and can easily be pried off.

2. Select and remove from the station call letter sheets, five call letter tabs of the popular stations received in the area where the radio will be operated, selecting stations within the range of each button. Reference to programs published in the local newspaper will aid in the quick selection of the proper stations.

3. In Models 937 and 938 place the call letter tabs in the station selector buttons in the order of the station frequencies, with the call letters of the station of lowest frequency at the left.

Example: Place the call letter tab of station WFIL, whose frequency is 560 K. C., in the left button, and the call letter tab of Station WOR, whose frequency is 710 K. C. in the next button, always progressing from left to right.

In Models 937X, 938KX, AR7 and AR8 insert the numbered station indicating tabs in the station selector buttons. List the highest frequency station as 1, and so on down to the lowest frequency station, which should be 5. The range of each automatic tuning circuit in these models is given below:

850 KC to 1580 KC	850 KC to 1580 KC	750 KC to 1350 KC	550 KC to 1000 KC	550 KC to 1000 KC
1	2	3	4	5

After the station tabs are inserted the following procedure is used in adjusting any of the above models.

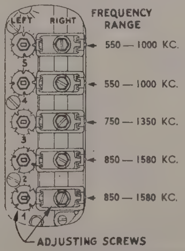
4. Push in the last button — "Dial," This adjusts the Radio so that it can be tuned with the tuning control knob in the conventional manner.

5. Tune in with the dial tuning control knob, the station whose call letters are in the left selector button and note the program. Now push in the selector button corresponding to these call letters.

With a small screw driver, turn the top adjusting screw (number five) in the left column, to the right or left until the same station is tuned in. Then adjust the corresponding screw in the right column, turning right or left until the maximum volume is obtained. If in doubt as to the station, push the "Dial" button and recheck. The adjustment on strong signals can be made best inside a shielded area such as in a reinforced steel building, or under a viaduct.

Continue the above procedure for each push button, working from left to right, and adjusting each pair of corresponding adjusting screws from top to bottom until all five stations are set up and are received correctly when their particular buttons are depressed. It is advisable to repeat the entire adjustment procedure to be sure the settings are correct.

The automatic tuning adjustments may be made before installing the radio in the car, but FINAL adjustments must be made with the radio installed and operating on the antenna in the car.



ADJUSTING SCREWS AND FREQUENCY RANGE

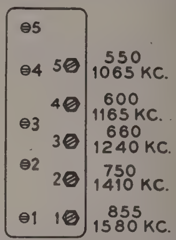
Setting Up Automatic Tuning

MODEL AR-5

Turn on the radio and allow it to operate for twenty minutes or longer if possible. During this time, proceed as follows:

1. Remove the plate on the end of the radio which covers the adjusting screws. This is held by two screws.

2 Select five popular local stations whose frequencies come within the ranges of the five automatic tuning circuits, and list them on the Owner's Reference Label. List the highest frequency station as 1. and so on down to the lowest frequency station, which should be 5.



ADJUSTING SCREWS AND FREQUENCY RANGE

The range of each automatic tuning circuit is given below:

855 KC to 1580 KC	750 KC to 1410 KC	660 KC to 1240 KC	600 KC to 1165 KC	550 KC to 1065 KC
1	2	3	4	5

3. Push in the right knob until "D" appears in the station indicator window. This adjusts the radio so that it can be tuned with the tuning control knob in the conventional manner.

5. Tune in with the dial tuning control knob, the station having the highest frequency, and note the program. Now push in the right hand knob until No. 1 appears in the station indicator window.

With a small screw driver, turn the bottom adjusting screw (number one) in the left column, to the right or left until the same station is tuned in. Then adjust the corresponding screw in the right column, turning right or left until maximum volume is obtained. If in doubt as to the station, push the right knob until "D" appears and recheck. The adjustment on strong signals can be made best inside a shielded area such as in a reinforced steel building, or under a viaduct.

Continue the above procedure for the stations selected for Nos. 2, 3, 4, and 5 position in the given order, working from left to right, and adjusting each pair of corresponding adjusting screws from the bottom to the top until all five stations are set up. It is advisable to repeat the entire adjustment procedure to be sure the settings are correct.

The automatic tuning adjustments may be made before installing the radio in the car, but FINAL adjustments must be made with the radio installed and operating on the aerial in the car.

ALIGNING PROCEDURE MODEL AR-5

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PUSH IN THE RIGHT KNOB ON THE CONTROL UNTIL "D" APPEARS IN THE STATION INDICATOR WINDOW AND STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE AERIAL COMPENSATOR ③ TWO TURNS FROM TIGHT.				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	㊼㊽㊿[illegible] ㊼㊽㊿[illegible]
3	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	⑬ Min.
4	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
5	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	⑨ Note 4
6	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	(57) Note 3
7	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	⑬
8	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	⑨ Note 4
9	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	(57) Note 3
10	1200 to 1400 K.C.	Note 5	Note 5	Note 5	③

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the aerial lead, Part No. 41-3191, to the aerial receptacle in the radio. Connect a 10 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the areial compensator ③ for maximum signal.

NOTE 6 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Adjust the aerial compensator ② for maximum signal.

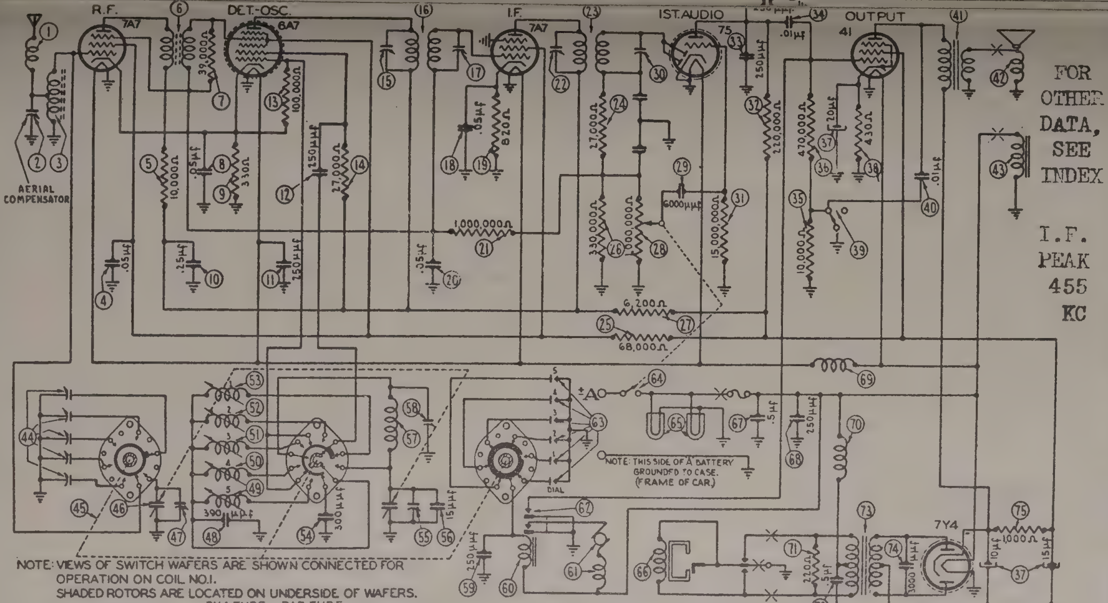
MODEL AR-6

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	ADJUST THE AERIAL COMPENSATOR ② TWO TURNS FROM TIGHT				
2	455 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] [illegible]
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	⑰
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	⑤ Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	⑬ Note 3
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	⑰
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	⑤ Note 4
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	⑬ Note 3
9	1200 to 1400 K.C.	Note 6	Note 6	Note 6	②

SEE NOTES ABOVE

PHILCO RADIO & TELEV. CORP.

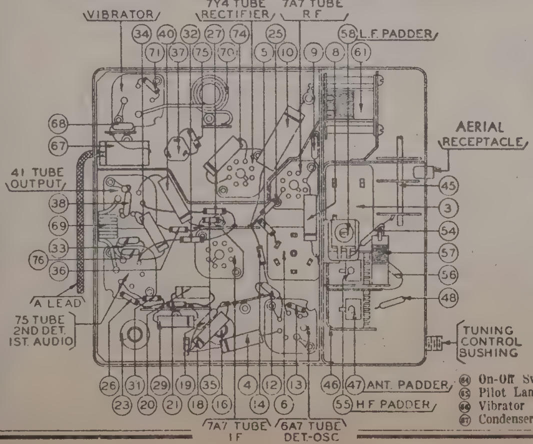
MODEL AR-7

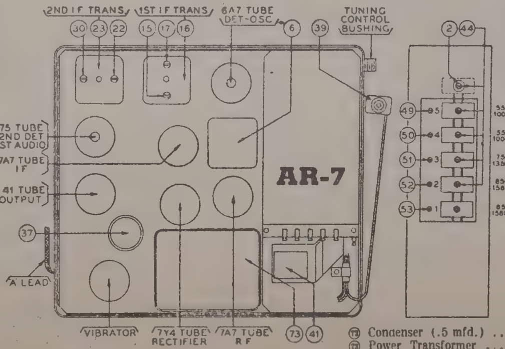


FOR OTHER DATA, SEE INDEX

I.F. PEAK 455 KC

NOTE: VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON COIL NO.1.
SHADED ROTORS ARE LOCATED ON UNDERSIDE OF WAFERS.





①	Antenna Choke	63-0102
②	Aerial Compensator	part of ㊹
③	Antenna Transformer	65-0085
④	Condenser (.05 mfd.)	61-0101
⑤	Resistor (10,000 ohms)	33-310334
⑥	R. F. Transformer	65-0009
⑦	Resistor (39,000 ohms)	33-339154
⑧	Condenser (.05 mfd.)	61-0101
⑨	Resistor (330 ohms)	33-133336
⑩	Condenser (.25 mfd.)	61-0125
⑪	Condenser (250 mmfd.)	61-0033
⑫	Condenser (250 mmfd.)	61-0033
⑬	Resistor (100,000 ohms)	33-410154
⑭	Resistor (27,000 ohms)	33-327334
⑮	Padder (Pri. 1st I.F. Trans.)	
⑯	First I. F. Transformer	65-0044
⑰	Padder (Sec. 1st I.F. Trans.)	
⑱	Condenser (.05 mfd.)	61-0101
⑲	Resistor (820 ohms)	33-182438
⑳	Condenser (.05 mfd.)	61-0111
㉑	Resistor (1,000,000 ohms)	33-510154
㉒	Padder (Pri. 2nd I.F. Trans.)	
㉓	Second I. F. Transformer	65-0230
㉔	Resistor (27,000 ohms)	33-327154
㉕	Resistor (68,000 ohms)	33-368334
㉖	Resistor (330,000 ohms)	33-433154
㉗	Resistor (6200 ohms)	33-262434
㉘	Volume Control (1,000,000 ohms) and On-Off Switch	33-5268
㉙	Condenser (6000 mmfd.)	61-0103
㉚	Padder (Sec. 2nd I.F. Trans.)	
㉛	Resistor (15,000,000 ohms)	33-615154
㉜	Resistor (220,000 ohms)	33-422334
㉝	Condenser (250 mmfd.)	61-0033
㉞	Condenser (.01 mfd.)	61-0120
㉟	Resistor (10,000 ohms)	33-310334
㊱	Resistor (470,000 ohms)	33-447154
㊲	Filter Condenser (10-15-20 mfd.)	61-0089
㊳	Resistor (430 ohms)	33-143438
㊴	Tone Control Switch	85-0102
㊵	Condenser (.01 mfd.)	61-0120
㊶	Output Transformer	65-0048
㊷	Cone and Voice Coil	91-0028
㊸	Field Coil	(Not Replaceable)
㊹	Antenna Padders Assy.	77-0172
㊺	Wafer Switch	77-0207
㊻	Tuning Condenser	63-0016
㊼	Antenna Padder (on Tun. Cond.)	
㊽	Silver Mica Condenser (390 mmfd.)	61-0031
㊾	Oscillator Transformer (550 to 1000 Kc.)	65-0090
㊿	Oscillator Transformer (550 to 1000 Kc.)	65-0090
(51)	Oscillator Transformer (750 to 1350 Kc.)	65-0089
(52)	Oscillator Transformer (850 to 1580 Kc.)	65-0088
(53)	Oscillator Transformer (850 to 1580 Kc.)	65-0088
(54)	Silver Mica Condenser (300 mmfd.)	61-0003
(55)	H. F. Padder (on Tun. Cond)	
(56)	Condenser (15 mmfd.)	61-0038
(57)	Oscillator Transformer (Manual)	65-0134
(58)	Low Frequency Padder	31-6230
(59)	Condenser (250 mmfd.)	61-0033
(60)	Control Magnet	part of (61)
(61)	Motor Assembly	77-0229
(62)	Relay	part of (61)
(63)	Push Button Switch Assy	85-0114
(64)	On-Off Switch	part of ㉘
(65)	Pilot Lamp	34-2040
(66)	Vibrator	83-0025
(67)	Condenser (.5 mfd.)	61-0106
(68)	Condenser (250 mmf	61-0033
(69)	Filament Choke	32-1644
(70)	Vibrator Choke	65-0075
(71)	Resistor (220 ohms)	33-122334
(72)	Condenser (.5 mfd.)	61-0137
(73)	Power Transformer	65-0326
(74)	Condenser (3000 mmf.	61-0115
(75)	Resistor (1000 ohms)	33-210334
(76)	Condenser (250 mmfd	61-0033
	Complete Speaker	73-0014-2

MODEL F-1641

SETTING UP AUTOMATIC TUNING

TURN THE RADIO "ON" AND ALLOW IT TO OPERATE FOR AT LEAST TWENTY MINUTES BEFORE MAKING ADJUSTMENTS.

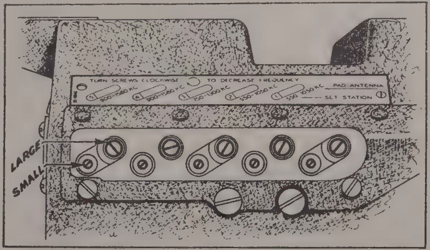
1—Select five popular local stations whose frequencies come within the ranges of the five Automatic Tuning Circuits and list them on the back of the OWNER'S MANUAL under "STATION RECORD," for the Owner's reference, also on the chart above the adjusting screws. List the lowest frequency station as No. "1" and so on down to the highest frequency which should be No. "5." The range of each Automatic Tuning Circuit is given on the chart above each Automatic Adjusting Screw on the Radio and is also reproduced in the Illustration on this page.

2—Remove the cover plate over the Automatic Adjusting Screws from the bottom of the Radio Housing by removing the two snap buttons holding it in place. There are two rows of adjusting screws—the LARGE ones for antenna adjustment and the SMALL ones for setting the stations.

3—Push the Automatic Station Selector, repeating if necessary until the DIAL appears in the dial window. Then tune in with the manual tuning control the selected station having the lowest frequency (No. 1 Station) and note the program so that it can be identified. Push the Automatic Station Selector once and No. "1" will appear in the indicator dial.

4—With a small screw driver turn the SMALL No. 1 adjusting screw until this station is tuned in. Then adjust the LARGE No. 1 screw in the other row until maximum volume is heard. IT IS VERY IMPORTANT THAT THESE ADJUSTING SCREWS BE SET ON A WEAK SIGNAL FROM THE STATION SO THAT THE CIRCUIT WILL BE SHARPLY TUNED TO THE PARTICULAR STATION. BECAUSE OF THE SIGNAL FROM THE STRONG LOCAL STATIONS IT IS NECESSARY THAT THE ANTENNA ROD BE REMOVED FROM THE ANTENNA WHILE THESE ADJUSTMENTS ARE MADE SO THAT A MIMIMUM OF SIGNAL WILL BE RECEIVED AND THUS ASSURE SHARP ADJUSTMENTS OF THE CIRCUITS.

5—Repeat this procedure for the stations selected for the No. 2, 3, 4, and 5 positions in the order given. After all the stations have been adjusted on the Automatic Adjusting Screws this procedure MUST be repeated. This is necessary in order to insure the stations being accurately set up on the adjusting screws.



BOTTOM VIEW OF RADIO SHOWING LOCATION OF ADJUSTING SCREWS

ALIGNMENT NOTES FOR MODEL F-1641
NOTE 1 - CONNECT 30 MMFD COND. IN SERIES BETWEEN SIG. GEN. & ANT. LEAD.
NOTE 2 - TURN COND. ROTOR PLATES COMPLETELY OUT OF MESH AS FAR AS THEY WILL GO.
NOTE 3 - ROCK TUNING COND. BACK & FORTH WHILE ADJUSTING LOW-FREQ. PADDER (45).
NOTE 4 - WHEN THE ANT-STAGE ADJUSTMENT IS MADE WITH THE RADIO INSTALLED IN THE CAR, THE RADIO-ANT. LEAD MUST BE CONNECTED TO THE CAR ANTENNA IN THE USUAL MANNER. CONNECT SIGNAL-GEN. OUTPUT-LEAD TO A WIRE PLACED NEAR THE CAR-ANTENNA, BUT NOT CONNECTED DIRECTLY TO IT.

ALIGNING PROCEDURE MODEL AR-7

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE AERIAL COMPENSATOR ② TWO TURNS FROM TIGHT.				
2	455 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] [illegible] ⑰ [illegible] [illegible] [illegible] ⑰ [illegible]
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	⑰ Note 4
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
9	1200 to 1400 K.C.	Note 5	Note 5	Note 5	②

Make all adjustments for maximum reading on the output meter.

NOTE 1—Connect the aerial lead, Part No. 41-3191, to the aerial receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2—Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3—Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5—When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator ② (See Figure 3) for maximum signal.

NOTE 6—When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator ④ (See Figure 3) for maximum signal.

MODEL AR-8

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE AERIAL COMPENSATOR ④ TWO TURNS FROM TIGHT.				
2	455 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
3	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
8	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
9	1200 to 1400 K.C.	Note 6	Note 6	Note 6	④

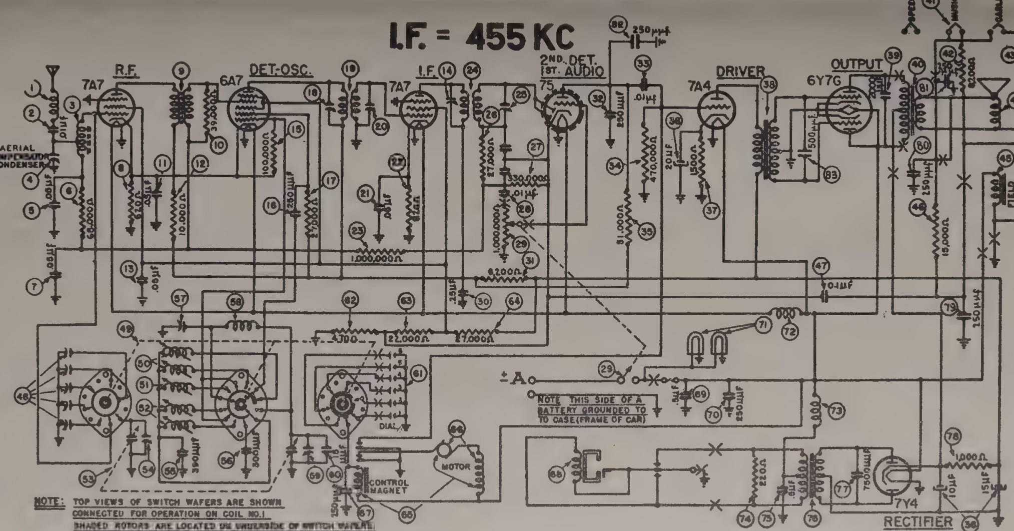
SEE NOTES ABOVE

MODEL F-1641

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning				
2	470 K.C.	To Antenna Receptacle on Radio	.5 Mfd.	Note 2	[illegible] [illegible] ⑰ [illegible] [illegible] [illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Note 2	[illegible] [illegible] Note 4
4	580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	(45) Note 3
5	1580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Note 2	[illegible]

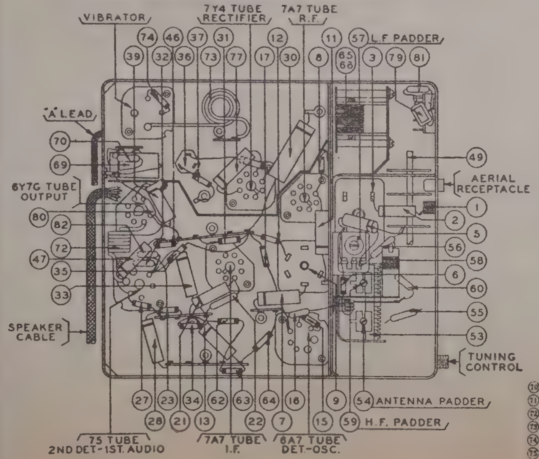
PHILCO RADIO & TELEV. CORP.

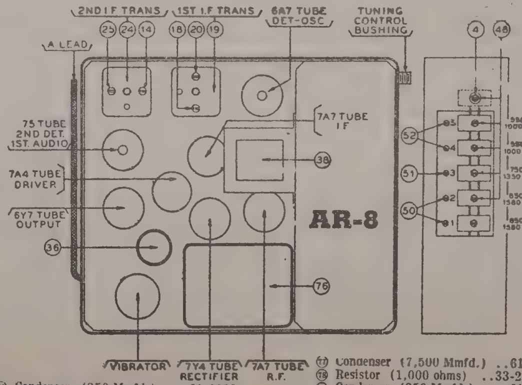
MODEL AR-8



NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON COIL NO.1 SHADED ROTORS ARE LOCATED ON UNDERSIDE OF SWITCH WAFERS.

FOR OTHER DATA, SEE INDEX

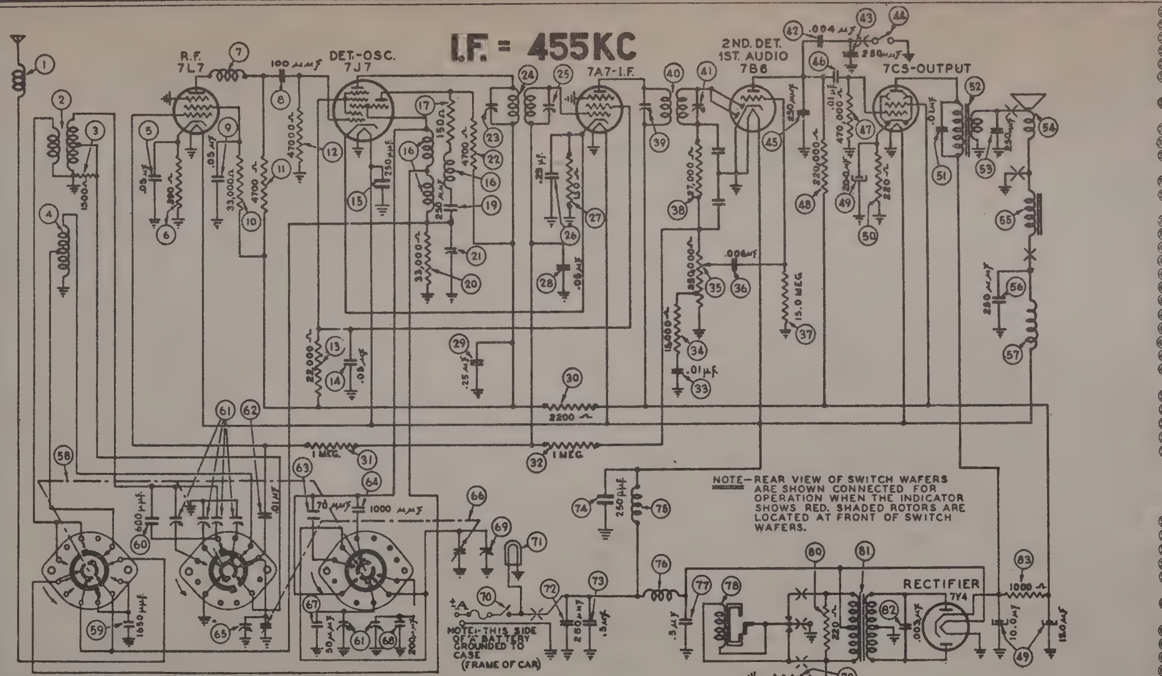




①	Antenna Choke	65-0102
②	Condenser (.01 Mfd.)	61-0110
③	Antenna Transformer	65-0085
④	Aerial Compensator	Part of ㊽
⑤	Condenser (.05 Mfd.)	61-0111
⑥	Resistor (68,000 ohms)	33-368154
⑦	Condenser (.05 Mfd.)	61-0101
⑧	Resistor (620 ohms)	33-162336
⑨	R. F. Transformer	65-0009
⑩	Resistor (39,000 ohms)	33-339154
⑪	Condenser (.05 Mfd.)	61-0101
⑫	Resistor (10,000 ohms)	33-310334
⑬	Condenser (.05 Mfd.)	61-0101
⑭	Padder (Pri. 2nd I. F. Trans.)	
⑮	Resistor (100,000 ohms)	33-410334
⑯	Condenser (250 Mmfd.)	61-0033
⑰	Resistor (27,000 ohms)	33-327334
⑱	Padder (Pri. 1st I. F. Trans.)	
⑲	First I. F. Transformer	65-0044
⑳	Padder (Sec. 1st I. F. Trans.)	
㉑	Condenser (.05 Mfd.)	61-0101
㉒	Resistor (820 ohms)	33-182438
㉓	Resistor (1,000,000 ohms)	33-510154
㉔	Second I. F. Transformer	65-0230
㉕	Padder (Sec. 2nd I. F. Trans.)	
㉖	Resistor (27,000 ohms)	33-327154
㉗	Resistor (330,000 ohms)	33-433154
㉘	Condenser (.01 Mfd.)	61-0114
㉙	Volume Control (1,000,000 ohms) & On-Off Switch	33-5268
㉚	Condenser (.25 Mfd.)	61-0125
㉛	Resistor (6,200 ohms)	33-262434
㉜	Condenser (250 Mmfd.)	61-0033
㉝	Condenser (.01 Mfd.)	61-0100
㉞	Resistor (470,000 ohms)	33-447154
㉟	Resistor (51,000 ohms)	33-351334
㊱	Filter Condenser (10-15-20 Mfd.)	61-0089
㊲	Resistor (1,500 ohms)	33-315334
㊳	Input Transformer	65-0097
㊴	Condenser (2,000 Mmfd.)	61-0123
㊵	Output Transformer	65-0093
㊶	Reception Control	Part of (61)
㊷	Resistor (8,200 ohms)	33-282334
㊸	Resistor (3,300 ohms)	33-222334
㊹	Cone & Voice Coil	45-2653
㊺	Field Coil	Not Replaceable
㊻	Resistor (15,000 ohms)	33-315334
㊼	Condenser (.1 Mfd.)	61-0104
㊽	Antenna Padder Assy.	77-0172
㊾	Wafer Switch	77-0207
㊿	Oscillator Transformers (850 to 1580 KC)	65-0088
(51)	Oscillator Transformer (750 to 1350 KC)	65-0089
(52)	Oscillator Transformers (550 to 1000 KC)	65-0090
(53)	Tuning Condenser	63-0016
(54)	Antenna Padder (on Tun. Cond.)	
(55)	Silver Mica Condenser (390 Mmfd.)	61-0031
(56)	Silver Mica Condenser (300 Mmfd.)	61-0003
(57)	Low Frequency Padder	31-6230
(58)	Oscillator Transformer (Manual)	65-0134
(59)	Oscillator Padder (on Tun. Cond.)	
(60)	Condenser (15 Mmfd.)	61-0038
(61)	Push Button Switch Assy.	77-0539
(62)	Resistor (470 ohms)	33-147336
(63)	Resistor (22,000 ohms)	33-322334
(64)	Resistor (27,000 ohms)	33-327434
(65)	Control Magnet	Part of (66)
(66)	Motor & Relay Assy.	77-0229
(67)	Condenser (250 Mmfd.)	61-0033
(68)	Vibrator	83-0025
(69)	Condenser (.5 Mfd.)	61-0106
(70)	Condenser (250 Mmfd.)	61-0033
(71)	Pilot Lamp	34-2040
(72)	Filament Choke	32-1644
(73)	Vibrator Choke	65-0075
(74)	Resistor (220 ohms)	33-122334
(75)	Condenser (.5 Mfd.)	61-0137
(76)	Power Transformer	65-0095
(77)	Condenser (7,500 Mmfd.)	61-0127
(78)	Resistor (1,000 ohms)	33-210434
(79)	Condenser (250 Mmfd.)	61-0033
(80)	Condenser (250 Mmfd.)	61-0033
(81)	Condenser (250 Mmfd.)	61-0033
(82)	Condenser (250 Mmfd.)	61-0033
(83)	Condenser (500 Mmfd.)	30-1114
	Complete Speaker & Housing	77-0564
	Speaker only	73-0016

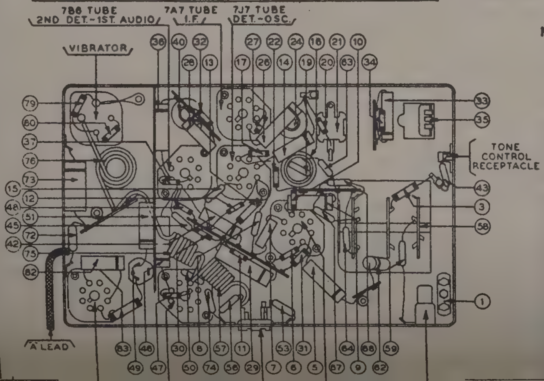
MODEL AR-9

PHILCO RADIO & TELEV. CORP.

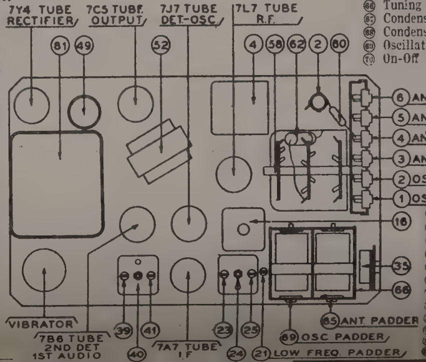


NOTE—REAR VIEW OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION WHEN THE INDICATOR SHOWS RED. SHADED ROTORS ARE LOCATED AT FRONT OF SWITCH WAFERS.

NOTE:—THIS SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)



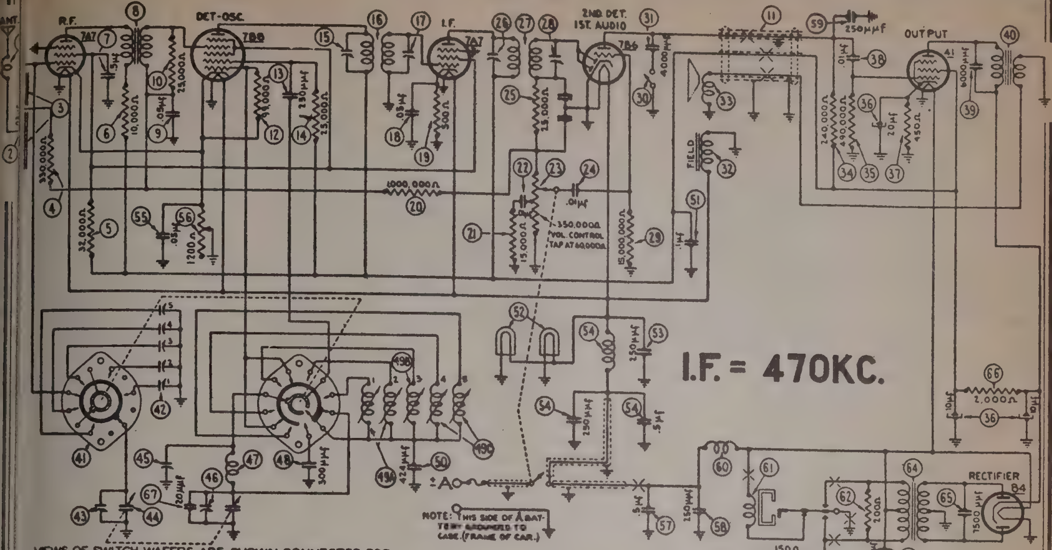
No.	Description	Part No.
①	Antenna Choke	65-0340
②	Short Wave Antenna Transformer	65-0341
③	Resistor (1500 ohms) ..	33-215334
④	Broadcast Antenna Transformer	65-0085
⑤	Condenser (.05 Mfd.)	61-0101
⑥	Resistor (390 ohms) ...	33-139336
⑦	Choke	65-0337
⑧	Condenser (100 Mmfd.) ...	61-0055
⑨	Condenser (.05 Mfd.)	61-0111
⑩	Resistor (33,000 ohms)	33-333334
⑪	Resistor (4700 ohms) ...	33-247334
⑫	Resistor (47,000 ohms)	33-347334
⑬	Resistor (22,000 ohms)	33-322434
⑭	Condenser (.05 Mfd.)	61-0101
⑮	Condenser (250 Mmfd.) ...	61-0033
⑯	Oscillator Transformer	65-0339
⑰	Resistor (150 ohms)	33-115334
⑲	Condenser (250 Mmfd.) ...	61-0033
⑳	Resistor (33,000 ohms)	33-333334
㉑	Low Frequency Padder	63-0048
㉒	Resistor (4,700 ohms) ..	33-247334
㉓	Padder (Pri. 1st I. F. Trans.)	
㉔	First I. F. Transformer ...	65-0338
㉕	Padder (Sec. 1st I. F. Trans.)	
㉖	Condenser (.25 Mfd.)	61-0112
㉗	Resistor (150 ohms) ...	33-115334
㉘	Condenser (.05 Mfd.)	61-0111
㉙	Condenser (.25 Mfd.)	61-0125
㉚	Resistor (2200 ohms) ..	33-222434
㉛	Resistor (1,000,000 ohms) ...	33-510154
㉜	Resistor (1,000,000 ohms) ...	33-510154
㉝	Condenser (.01 Mfd.)	61-0114
㉞	Resistor (15,000 ohms)	33-315154
㉟	Volume Control (350,000 ohms)	67-0032-2
㊱	Condenser (6000 Mmfd.) ..	61-0103
㊲	Resistor (15,000,000 ohms) ..	33-615154
㊳	Resistor (27,000 ohms)	33-327154
㊴	Padder (Pri. 2nd I. F. Trans.)	
㊵	Second I. F. Transformer ..	65-0320
㊶	Padder (Sec. 2nd I. F. Trans.)	
㊷	Condenser (4000 Mmfd.) ..	61-0129
㊸	Condenser (250 Mmfd.) ...	61-0033
㊹	Tone Control Switch	85-0111
㊺	Condenser (250 Mmfd.) ...	61-0033
㊻	Condenser (.01 Mfd.)	61-0100
㊼	Resistor (470,000 ohms)	33-447154
㊽	Resistor (220,000 ohms)	33-422334
㊾	Filter Condenser (10-15-20 Mfd.)	61-0089
㊿	Resistor (220 ohms)	33-122438
(51)	Condenser (.01 Mfd.)	61-0124
(52)	Output Transformer	65-0317
(53)	Condenser (250 Mmfd.) ...	61-0033
(54)	Replacement Cone	
	(For 73-0045-2 Speaker)	91-0086
	(For 73-0045-3 Speaker)	91-0126
	(For 73-0047-2 Speaker)	91-0086
	(For 73-0047-3 Speaker)	91-0126
(55)	Field Coil	Not Replaceable
(56)	Condenser (250 Mmfd.) ...	61-0033
(57)	Choke	32-1644
(58)	Wafer Switch	77-0567
(59)	Silver Mica Condenser (1650 Mmfd.)	5877
(60)	Silver Mica Condenser (600 Mmfd.)	60-160314
(61)	Padder Assembly	77-0560
(62)	Condenser (.01 Mfd.)	61-0110
(63)	Condenser (70 Mmfd.)	61-0146
(64)	Condenser (1000 Mmfd.) ..	61-0079
(65)	Antenna Padder (on Tun. Cond.)	
(66)	Tuning Condenser	63-0050
(67)	Condenser (50 Mmfd.)	61-0140
(68)	Condenser (200 Mmfd.) ...	61-0141
(69)	Oscillator Padder (on Tun. Cond.)	
(70)	On-Off Switch	85-0112
(72)	Condenser (250 Mmfd.) ...	61-0033
(73)	Condenser (.5 Mfd.)	61-0137
(74)	Condenser (250 Mmfd.) ..	61-0033
(75)	"A" Choke	32-1604
(76)	Vibrator Choke	65-0075
(77)	Condenser (.5 Mfd.)	61-0137
(78)	Vibrator	83-0025
(79)	Resistor (150 ohms) ...	33-115334
(80)	Resistor (220 ohms) ...	33-122334
(81)	Power Transformer	65-0318
(82)	Condenser (3000 Mmfd.) ..	61-0115
(83)	Resistor (1000 ohms) ...	33-210434



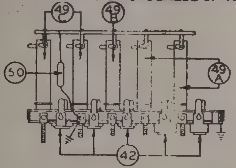
FOR OTHER DATA, SEE INDEX

PHILCO RADIO & TELEV. CORP.

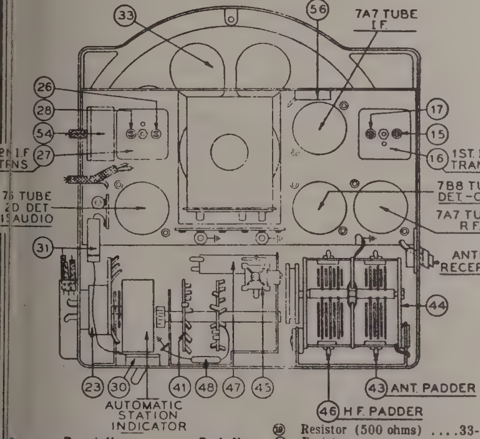
MODEL F-1641

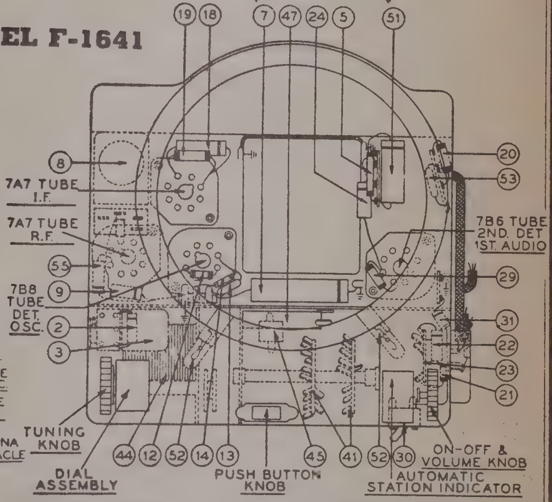

I.F. = 470KC.
ANT.
R.F.
7A7
DET-OSC.
7B8
I.F.
7A7
2ND. DET.
1ST. AUDIO
7B6
OUTPUT
41
RECTIFIER
84
FIELD
350,000Ω VOL. CONTROL TAP AT 60,000Ω
1000,000Ω
NOTE: THIS SIDE OF A BATTERY GROUNDED TO CASE. (FRAME OF CAR.)
A

VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON DIAL TUNING.
SHADED ROTORS ARE LOCATED ON UNDERSIDE OF WAFERS.



MODEL F-1641



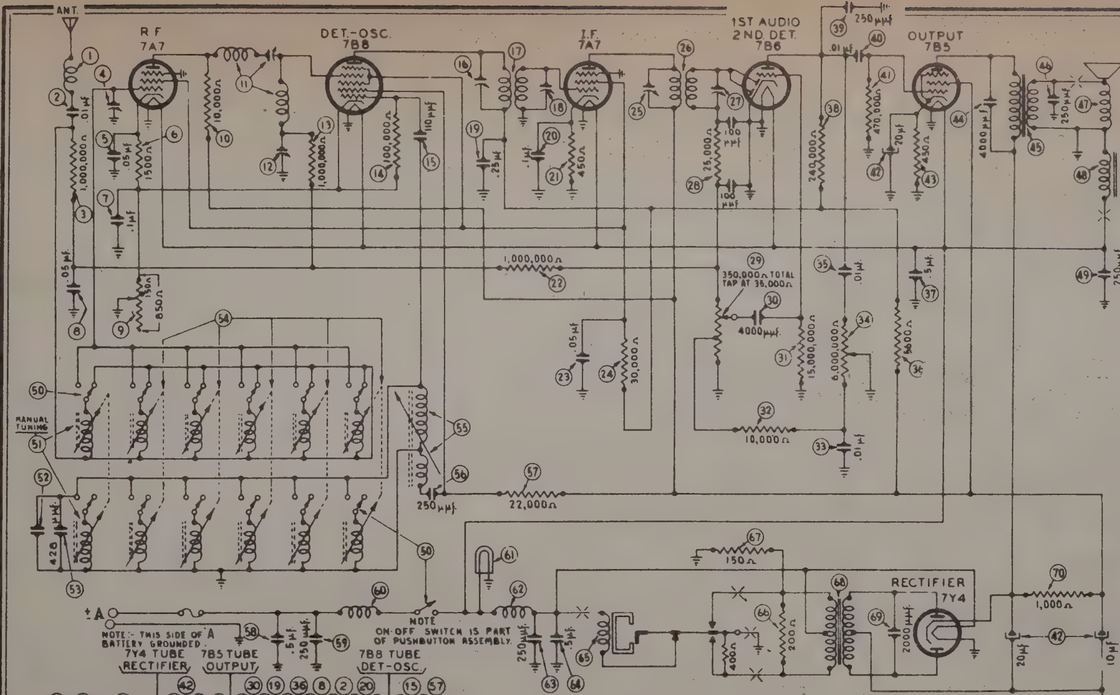


o.	Description	Part No.
①	Antenna Choke	65-0197
②	Condenser (.03 mfd.)	61-0064
③	Antenna Transformer	65-0190
④	Resistor (330,000 ohms)	33-433237
⑤	Resistor (32,000 ohms)	33-332437
⑥	Resistor (10,000 ohms)	33-310237
⑦	Condenser (.5 mfd.)	30-4565
⑧	R. F. Transformer	65-0189
⑨	Condenser (.05 mfd.)	30-4444
⑩	Resistor (25,000 ohms)	33-325244
⑪	Power Cable	95-0091
⑫	Resistor (99,000 ohms)	33-399237
⑬	Condenser (250 mmfd.)	61-0034
⑭	Resistor (25,000 ohms)	33-325347
⑮	Padder (Pri. 1st I. F. Trans.)	
⑯	First I. F. Transformer	65-0177
⑰	Padder (Sec. 1st I. F. Trans.)	
⑱	Condenser (.05 mfd.)	30-4569
⑲	Resistor (500 ohms)	33-150438
⑳	Resistor (1,000,000 ohms)	33-510237
㉑	Resistor (15,000 ohms)	33-315237
㉒	Condenser (.01 mfd.)	30-4479
㉓	Volume Control (350,000 ohms) and on-off switch	67-0018
㉔	Condenser (.01 mfd.)	30-4479
㉕	Resistor (25,000 ohms)	33-325344
㉖	Padder (Pri. 2nd I. F. Trans.)	
㉗	Second I. F. Transformer	65-0178
㉘	Padder (Sec. 2nd I. F. Trans.)	
㉙	Resistor (15,000,000 ohms)	33-615247
㉚	Tone Control Switch	85-0093
㉛	Condenser (4,000 mmfd.)	30-4456
㉜	Field Coil	Not Replacable
㉝	Cone Kit	91-0070
㉞	Resistor (240,000 ohms)	33-424337
㉟	Resistor (490,000 ohms)	33-449247
㊱	Filter Condenser (10-10-20 mfd.)	61-0028
㊲	Resistor (450 ohms)	33-145438
㊳	Condenser (.01 mfd.)	30-4501
㊴	Condenser (6,000 mmfd.)	61-0052
㊵	Output Transformer	65-0180
㊶	Wafer Switch Assembly	77-0363
㊷	Antenna Padder Assembly	77-0292
㊸	First Padder (on Tun. Cond.)	
㊹	Tuning Condenser	63-0026
㊺	Low Frequency Padder	63-0031
㊻	Second Padder (on Tun. Cond.)	
㊼	Oscillator Transformer (Dial)	65-0007
㊽	Silver Mica Condenser (300 mmfd.)	61-0003
㊾a	Oscillator Transformer (1-2)	65-0198
㊾b	Oscillator Transformer (3)	65-0199
㊾c	Oscillator Transformer (4-5)	65-0200
㊿	Silver Mica Condenser (424 mmfd)	61-0067
(51)	Condenser (.1 mfd.)	30-4455
(52)	Pilot Lamp	34-2040
(53)	Condenser (250 mmfd.)	61-0033
(54)	"A" Filter Assembly	77-0333
(55)	Condenser (.05 mfd.)	30-4569
(56)	Sensitivity Control	33-5248
(57)	Condenser (.5 mfd.)	30-4565
(58)	Condenser (250 mmfd.)	61-0033
(59)	Condenser (250 mmfd.)	61-0033
(60)	Vibrator Choke	65-0204
(61)	Vibrator	41-3398
(62)	Resistor (200 ohms)	33-120337
(63)	Condenser (.5 mfd.)	30-4565
(64)	Power Transformer	65-0179
(65)	Condenser (7500 mmfd.)	30-4567
(66)	Resistor (2,000 ohms)	33-220537
(67)	Condenser (20 mmfd.)	30-1038
	Loktal Socket	55-0575
	Socket	55-0431
	Drive Cord	55-0428
	Tuning and Volume Knob	55-0426
	Push Button Knob	55-0196
	Dial Assembly (Manual)	85-0091

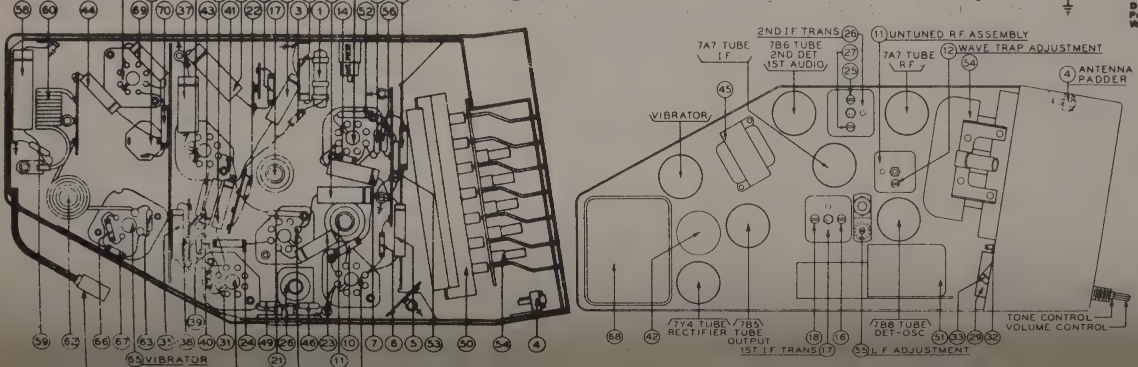
FOR
OTHER DATA,
SEE INDEX

MODEL C-1708

PHILCO RADIO & TELEV. CORP.



SCHE. No.	DESCRIPTION	PART No.
1	Antenna Choke	65-0102
2	Condenser (.01 mfd.)	61-0014
3	Resistor (1,000,000 ohms)	33-510154
4	Antenna Padder	63-0035
5	Condenser (.05 mfd.)	30-4444
6	Resistor (1500 ohms)	33-215334
7	Condenser (.1 mfd.)	30-4499
8	Condenser (.05 mfd.)	30-4444
9	Sensitivity Control (1000 ohms)	67-0025
10	Resistor (10,000 ohms)	33-310454
11	Untuned R. F. Assembly	65-0271
12	I. F. Wave Trap Padder	
13	Resistor (1,000,000 ohms)	33-510154
14	Resistor (100,000 ohms)	33-410154
15	Condenser (110 mmfd.)	30-1031
16	Padder (Pri. 1st I. F. Trans.)	
17	First I. F. Transformer	65-0236
18	Padder (Sec. 1st I. F. Trans.)	
19	Condenser (.25 mfd.)	30-4604
20	Condenser (.1 mfd.)	30-4499
21	Resistor (450 ohms)	33-145438
22	Resistor (1,000,000 ohms)	33-510154
23	Condenser (.05 mfd.)	30-4444
24	Resistor (30,000 ohms)	33-330434
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	65-0237
27	Padder (Sec. 2nd I. F. Trans.)	
28	Resistor (25,000 ohms)	33-325154
29	Volume Control (350,000 ohms)	67-0022
30	Condenser (4000 mmfd.)	30-4334
31	Resistor (15,000,000 ohms)	33-615154
32	Resistor (10,000 ohms)	33-310154
33	Condenser (.01 mfd.)	30-4479
34	Tone Control (6,000,000 ohms)	67-0022
35	Condenser (.01 mfd.)	30-4479
36	Resistor (5600 ohms)	33-256334
37	Condenser (.5 mfd.)	61-0054
38	Resistor (240,000 ohms)	33-424354
39	Condenser (250 mmfd.)	61-0033
40	Condenser (.01 mfd.)	30-4169
41	Resistor (470,000 ohms)	33-447154
42	Filter Condenser (10-20-20 mfd	61-0072
43	Resistor (450 ohms)	33-145438
44	Condenser (4000 mmfd.)	61-0073
45	Output Transformer	65-0235
46	Condenser (250 mmfd.)	61-0033
47	Cone Kit (For 73-0030-2)	91-0086
	Cone Kit (For 73-0030-3)	91-0085
48	Field Coil	Not Replaceable
49	Condenser (250 mmfd.)	61-0033
50	Push-Button and On-Off Switch	85-0097
51	Inductive Tuning Unit	77-0440
52	Thermol Compensator	61-0080
53	Condenser (428 mmfd.)	61-0082
54	Push-Button Switch and Trans.	77-0369
55	Oscillator Tracking Coil	65-0229
56	Condenser (250 mmfd.)	61-0033
57	Resistor (22,000 ohms)	33-322454
58	Condenser (.5 mfd.)	30-4491
59	Condenser (250 mmfd.)	61-0033
60	"A" Choke	65-0248
61	Pilot Lamp	34-2039
62	Vibrator Choke	65-0222
63	Condenser (250 mmfd.)	61-0033
64	Condenser (.5 mfd.)	30-4565
65	Vibrator	83-0017
66	Resistor (200 ohms)	33-120354
67	Resistor (150 ohms)	33-115354
68	Power Transformer	65-0234
69	Condenser (2000 mmfd.)	61-0074
70	Resistor (1000 ohms)	33-210434
	Dial	55-0581
	Drive Cord	55-0688
	Pointer	57-0894
	Window Crystal	55-0679

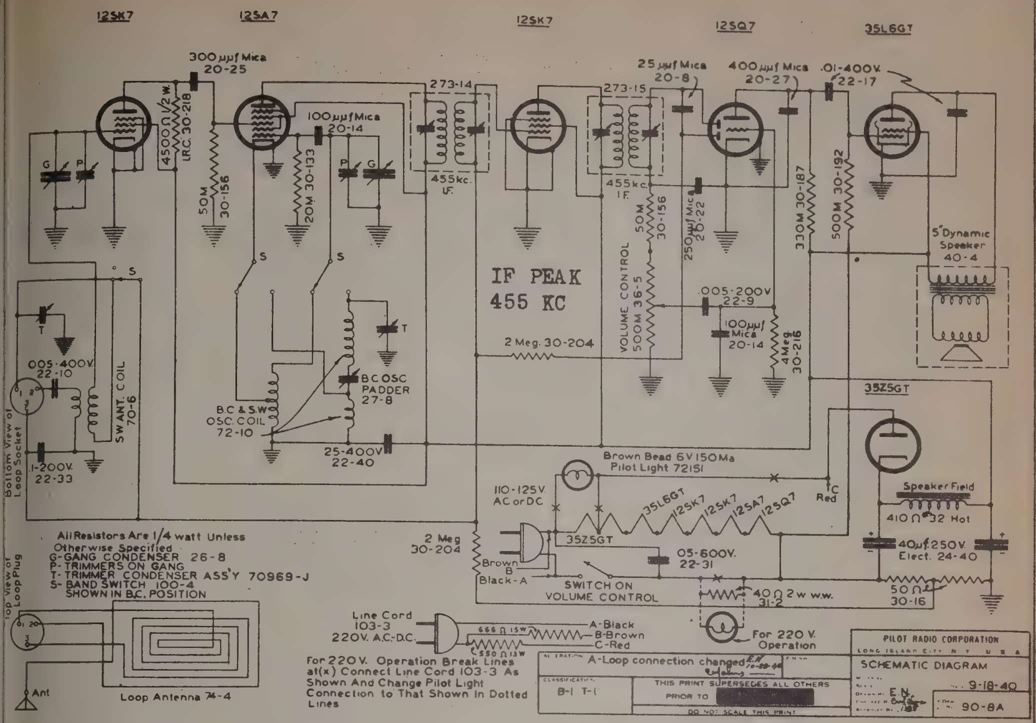


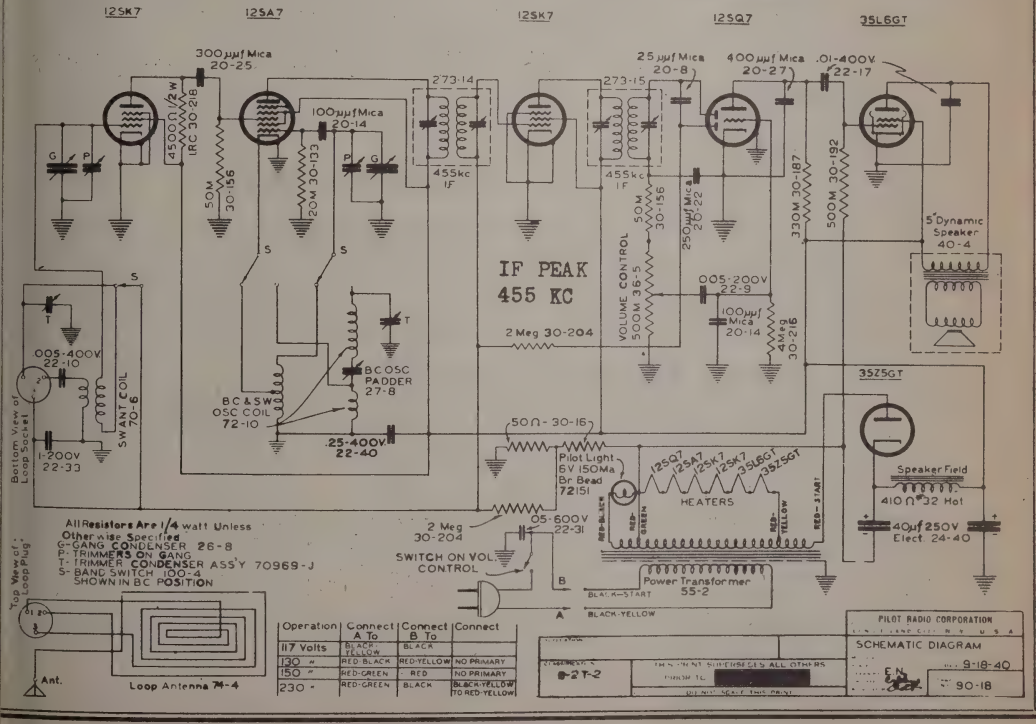
I.F. = 455 KC.

FOR
OTHER DATA,
SEE INDEX

PILOT RADIO CORP.

MODELS B-1, T-1
MODELS B-2, T-2

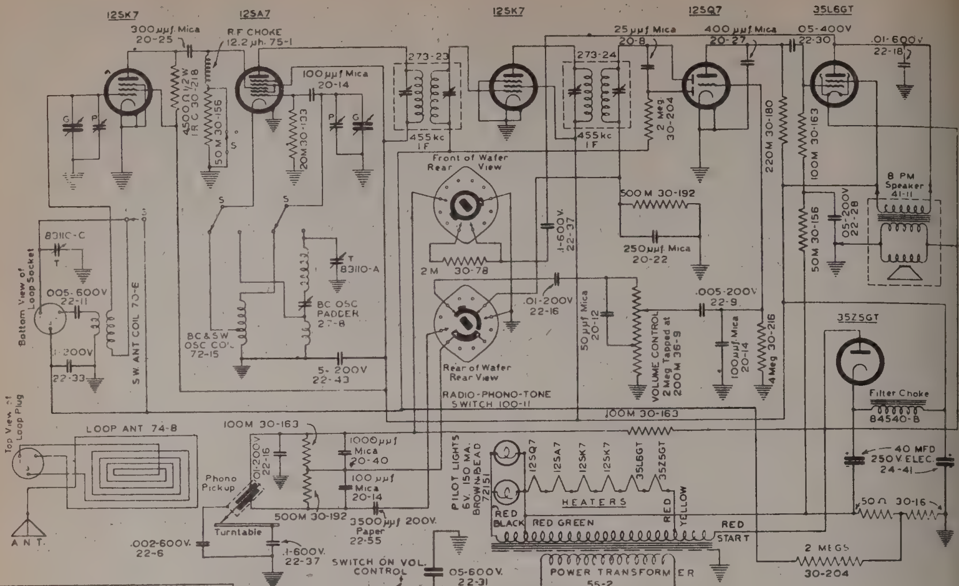


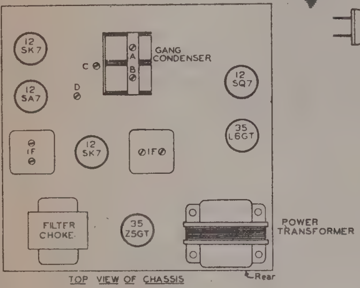


Operation	Connect A To	Connect B To	Connect
117 Volts	BLACK-YELLOW	BLACK	
130 "	RED-BLACK	RED-YELLOW	NO PRIMARY
150 "	RED-GREEN	RED	NO PRIMARY
230 "	RED-GREEN	BLACK	BLACK-YELLOW TO RED-YELLOW

MODEL TP-32

PILOT RADIO CORP.





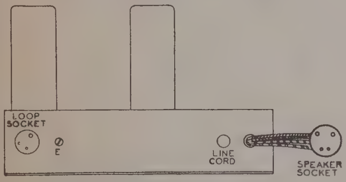
TOP VIEW OF CHASSIS

IF PEAK 455 KC

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED
G- GANG CONDENSER 26-9
P- TRIMMERS ON GANG
T- TRIMMER CONDENSERS
S- BAND SWITCH 100-10 SHOWN IN SW POSITION
RADIO-PHONO-TONE SWITCH SHOWN IN EXTREME COUNTERCLOCKWISE POSITION (No. 1)
No 1—RADIO VOICE
No. 2— " TREBLE
No. 3— " BASS
No 4—PHONO VOICE
No. 5— " TREBLE
No. 6— " BASS

OPERATION	CONNECT A To	CONNECT B To	CONNECT
117 VOLTS	BLACK-YELLOW	BLACK	
130 "	RED-BLACK	RED-YELLOW	NO PRIMARY
150 "	RED-GREEN	RED	NO PRIMARY
230 "	RED-GREEN	BLACK	BLACK-YELLOW TO RED-YELLOW

PILOT RADIO CORP Long Island City, N.Y., U.S.A
Schematic Diagram Model TP-32
Drawn by CW Date 12-2-40
Checked by Approved by — Drwg No 90-24.



REAR VIEW OF CHASSIS

PHONOGRAPH OPERATION

The motor is controlled by the automatic stop lever which is at the rear right side of the turntable. Volume for both, "Phono" and "Radio" is regulated by the same control on the front of the receiver.

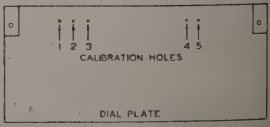
The tone control and phono radio switch must be in either of the three clockwise positions for phonograph operation.

The screws for adjusting both the R.F. and I.F. amplifiers of this receiver, together with the frequencies at which they should be adjusted, are all pictured on the above diagram. When aligning the I.F. amplifier, the generator must be connected to the grid of the 12SK7 R.F. tube through a .1 mfd condenser. When aligning the receiver, first align the shortwave band connecting the generator to the antenna post with a 400 ohm resistor. Then align the broadcast band using a .0002 mfd. condenser.

When aligning the loop, the receiver should be in the cabinet with the back in place. The adjusting condenser can be reached through the slot in the lower left hand side of the back.

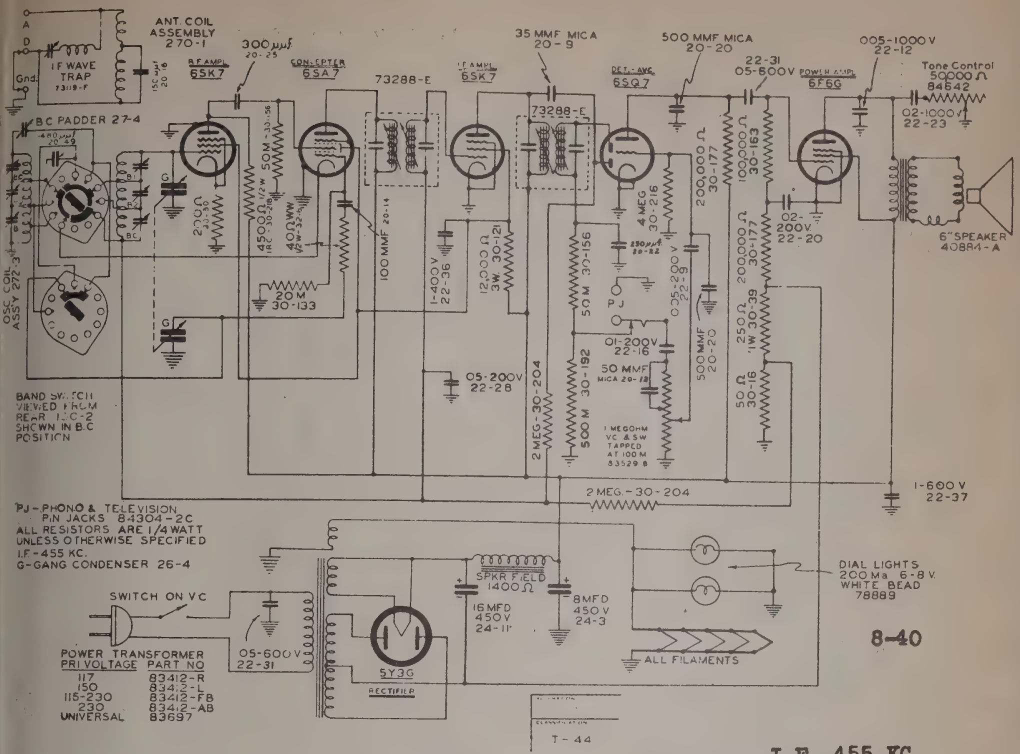
TRIMMERS
I.F. ADJUSTED AT 455 KC
A - ANTENNA S.W. 21.0 MC.
B - OSCILLATOR SW 24.0 MC
C - OSCILLATOR BC 1400 KC
D - OSCILLATOR PADDER 600 KC
E - LOOP ANTENNA 1400 KC

DIAL PLATE CALIBRATION HOLES
1-START 535 KC.
2- ------- 6.0MC.
3- -------600 KC
4- -------1400KC
5- ------- 21.0MC



PILOT RADIO CORP.

MODEL T-44



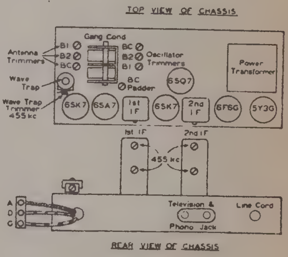
I.F. 455 KC

TUNING RANGE

Broadcast Band 535 to 1720 kc.; or 561 to 174.0 meters

Band II 1.98 to 7.05 mc. or 152 to 42.5 meters

Band I 6.95 to 24.75 mc. or 43.2 to 12.1 meters



SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

OSC. TRIMMERS
BC- 1720 KC
B1- 24 MC
B2- 6 MC

PHONOGRAPH AND TELEVISION JACKS

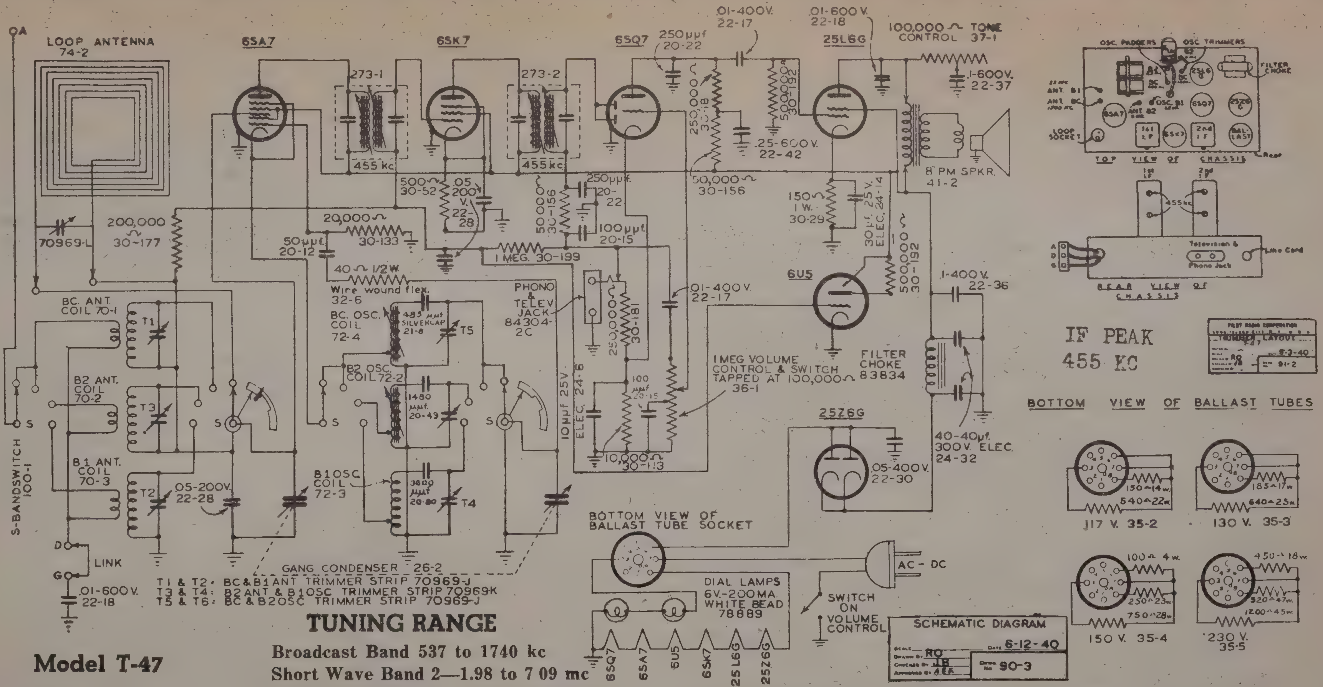
On the rear of the chassis is a set of "Pin" jacks. They are intended to be employed for connection with an electrical phonograph, or with the sound outlet of a television receiver.

ANT. TRIMMERS
BC- 1400 KC
B1- 18 MC
B2- 6 MC

BC Padder- 600 KC

MODEL T-47

PILOT RADIO CORP.



TUNING RANGE

Broadcast Band 537 to 1740 kc
Short Wave Band 2—1.98 to 7 09 mc
Short Wave Band 1—7.2 to 24.5 mc

Model T-47

A.C.-D.C. Receiver

ANTENNA

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G"

POWER SUPPLY

This receiver is equipped with an interchangeable plug-in Resistor. To be sure of using the correct Resistor for the voltage of your particular house current, see the label attached to the back of the cabinet. This Resistor may be changed as easily as a radio tube.

When operating on direct current, if the receiver does not work about

PHONOGRAPH AND TELEVISION JACKS

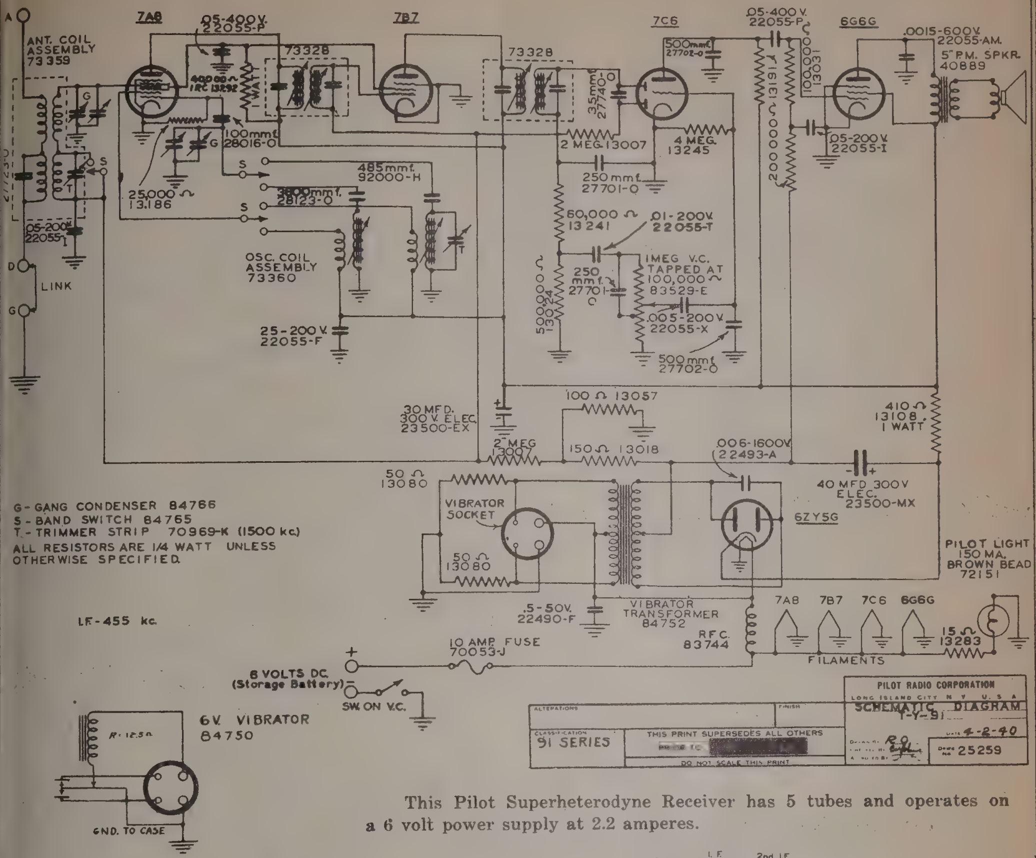
On the rear of the chassis is a set of "Pin" jacks. They are intended to be employed for connection with an electrical phonograph, or with the sound outlet of a television receiver.

SERVICE NOTES

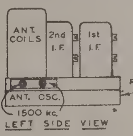
The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

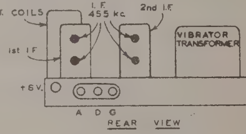
When aligning the I. F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .002 mfd condenser, and on the two short wave bands use a 400 ohm carbon resistor.

PILOT RADIO CORP.

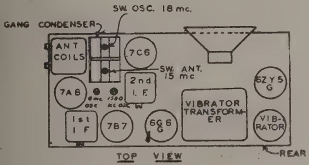


This Pilot Superheterodyne Receiver has 5 tubes and operates on a 6 volt power supply at 2.2 amperes.





PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
TRIMMER LAYOUT
T-Y-91
4-2-40
25260



SERVICE NOTES

When aligning the I. F. amplifier, the generator must be connected to the grid of the 7A8 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

ANTENNA

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G"

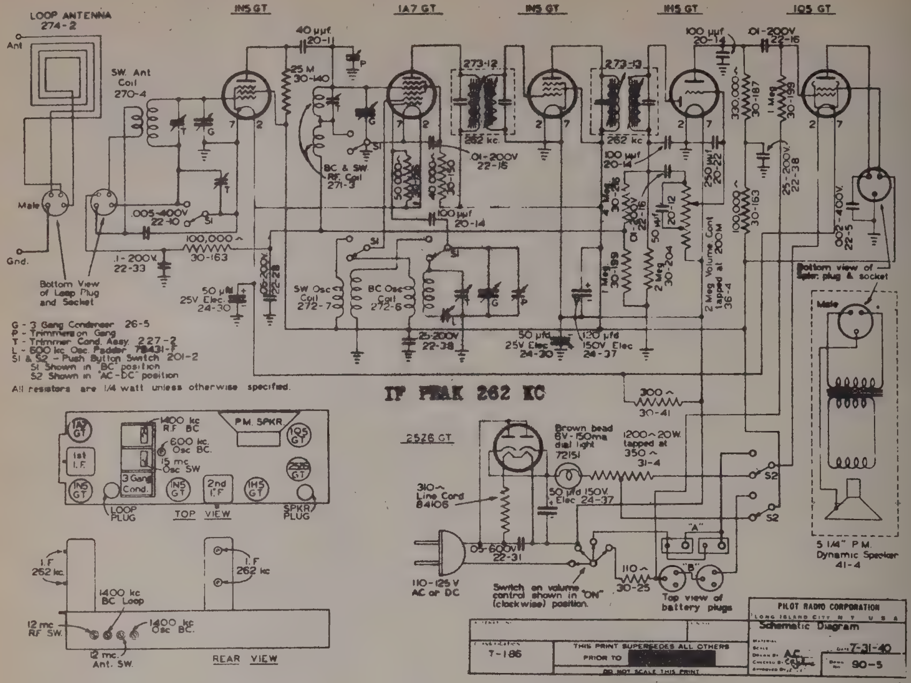
Model 91
6 Volt D.C. Receiver

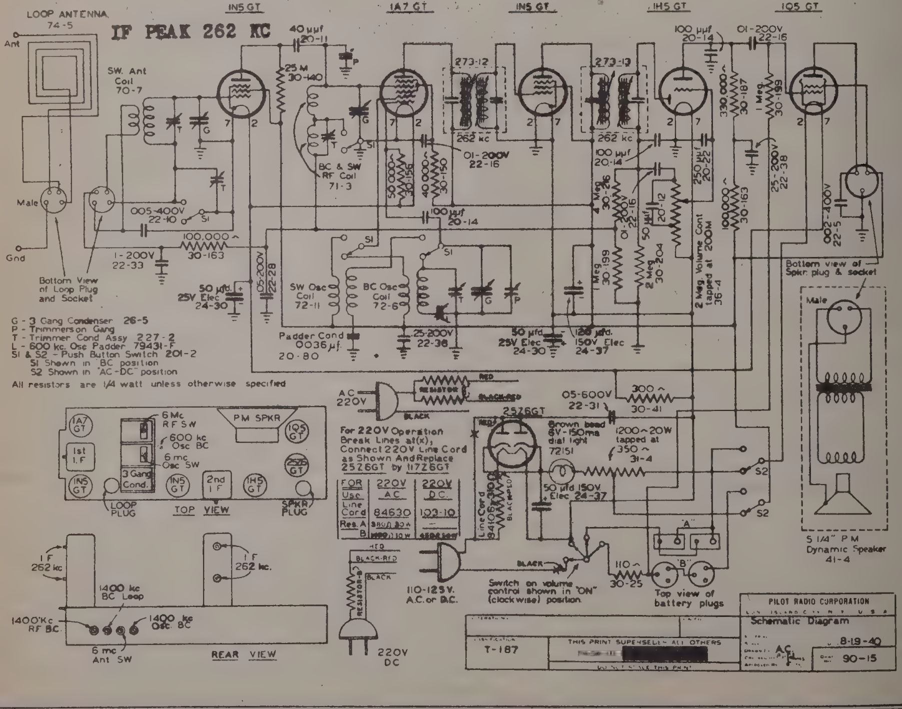
TUNING RANGE

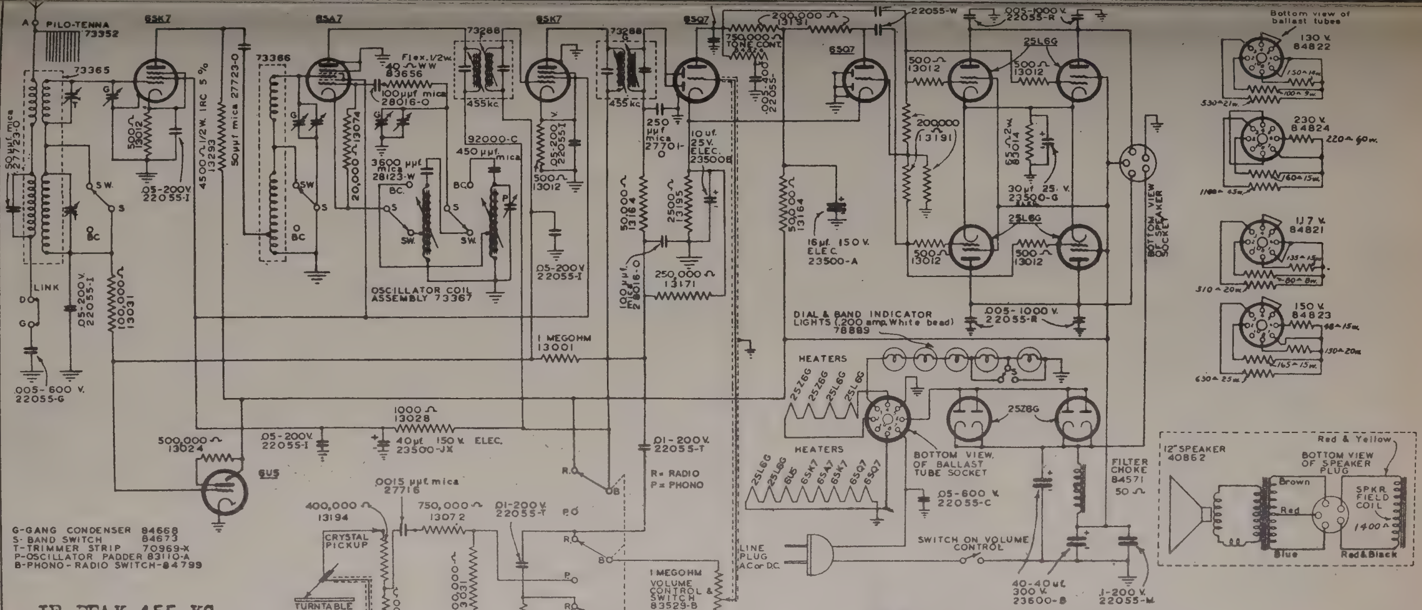
Broadcast Band 535 to 1720 kc.
Short Wave Band 5.6 to19.8 kc.

MODEL T-186
MODEL T-187

PILOT RADIO CORP.







IF PEAK 455 KC

Model 191

A.C.-D.C. Receiver

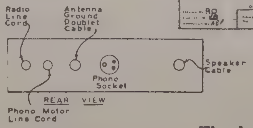
TUNING RANGE

Broadcast Band 535 to 1720 kc.
Short Wave Band 5.6 to 19.8 kc.

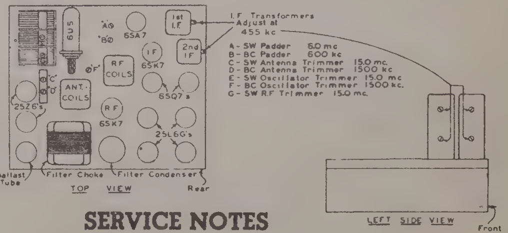
PILOT RADIO CORP.
Long Island City, N.Y., U.S.A.
Schematic Diagram
Model 191
Drawn by R.O. Date 5-15-40
Checked by
Approved by
Drwg. No. 90-2

ANTENNA

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G".



PILOT RADIO CORPORATION
Long Island City, N.Y., U.S.A.
TRIMMER LAYOUT
5-17-40
R.O.
91-1


6U5
A
B
6SA7
1st I.F.
I.F.
6SK7
2nd I.F.
F
RF COILS
C
D
ANT. COILS
6SQ7's
25Z6's
RF
6SK7
25L6G's
Ballast Tube
Filter Choke
Filter Condenser
TOP VIEW
Rear
I.F. Transformers Adjust at 455 kc
A - SW Padder 6.0 mc
B - BC Padder 600 kc
C - SW Antenna Trimmer 15.0 mc.
D - BC Antenna Trimmer 1500 kc
E - SW Oscillator Trimmer 15.0 mc
F - BC Oscillator Trimmer 1500 kc.
G - SW R.F. Trimmer 15.0 mc.
LEFT SIDE VIEW
Front

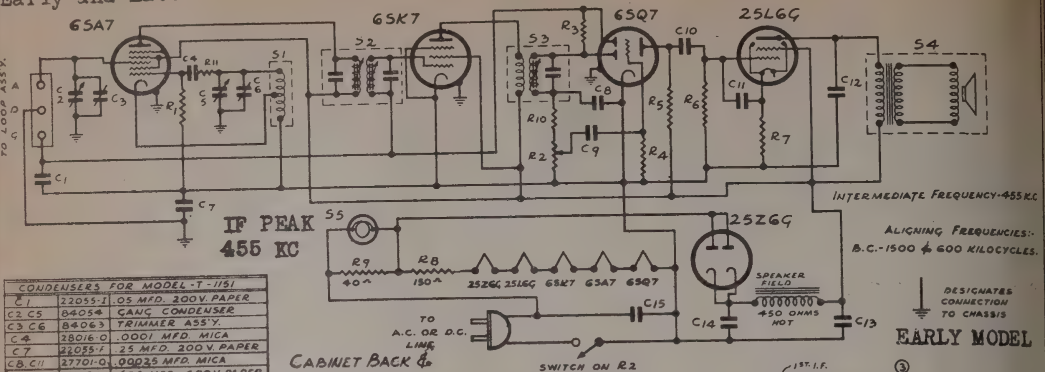
SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band use a 400 ohm carbon resistor.

MODEL T-1151
Early and Late

PILOT RADIO CORP.



IF PEAK 455 KC

INTERMEDIATE FREQUENCY-455 K.C

ALIGNING FREQUENCIES:- B.C.-1500 & 600 KILOCYCLES.

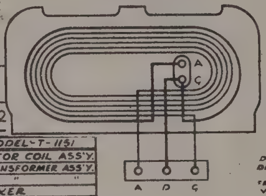
DESIGNATES CONNECTION TO CHASSIS

EARLY MODEL

CONDENSERS FOR MODEL-T-1151		
C1	22055-I	.05 MFD. 200V. PAPER
C2 C5	84054	GANG CONDENSER
C3 C6	84063	TRIMMER ASS'Y.
C4	28016-0	.0001 MFD. MICA
C7	22055-F	.25 MFD. 200 V. PAPER
C8.C11	27701-0	.00025 MFD. MICA
C9	22055-AU	.005 MFD. 400 V. PAPER
C10.C12	22055-W	.01 MFD. 400 V. PAPER
C13 C14	23500-J	40MFDS. 150V. MIDGET ELECT
C15	22055-U	.01 MFD. 1000V. PAPER

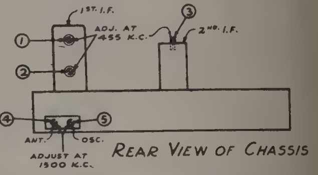
RESISTORS FOR MODEL-T-1151		
R1	13074	20,000 OHMS 1/4 WATT
R2	79429-B	500,000 OHMS VOLUME CONTROL & SWITCH
R3	13007	2 MEGOHMS 1/4 WATT
R4	13245	4 MEGOHMS 1/4 WATT
R5	13224	330,000 OHMS 1/4 WATT
R6	13028	500 000 OHMS 1/4 WATT
R7	13018	150 OHMS 1/4 WATT
R8, R9	84049	WIRE WOUND RESISTOR 190 OHMS TAPPED @ 40^
R10	13225	47,000 OHMS 1/4 WATT
R11	13220	470 OHMS 1/4 WATT

CABINET BACK & ANTENNA LOOP ASS'Y.

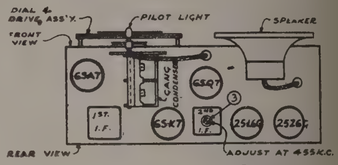


SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-T-1151
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 3-24-39
DWG. NO. 25220-2

MISCELLANEOUS FOR MODEL-T-1151		
S1	73265	OSCILLATOR COIL ASS'Y.
S2	73192-D	1ST. I.F. TRANSFORMER ASS'Y.
S3	73267	2ND. I.F. " "
S4	40869	5" SPEAKER
S5	72151	PILOT LIGHT



REAR VIEW OF CHASSIS

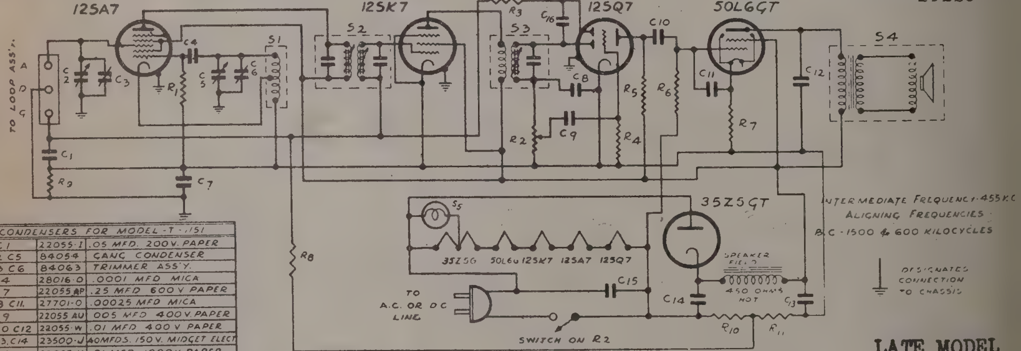


TOP VIEW OF CHASSIS

ALTERATIONS ② REVISED TUBES - C13.C14 WAS 16 MFD. 150V. . R8,R9 WAS 190^ TAP 40^ - ADDED R-10-R11. BR. - 8-10 39
FINISH
CLASSIFICATION MODEL T - 1151
THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

The screws for adjusting both the R.F. and I.F. amplifiers of this receiver, together with the frequencies at which they should be adjusted, are all pictured on the wiring diagram. WHEN ALIGNING THIS RECEIVER, IT MUST BE IN THE CABINET WITH THE LOOP ANTENNA CONNECTED AND THE BACK OF THE CABINET SCREWED ON. The adjusting condensers are reached through the hole in the lower left hand corner of the back, looking at the back. The I.F. amplifier can be aligned with the chassis out of the cabinet, but with the loop antenna connected.

25220-5



INTERMEDIATE FREQUENCY-455 K.C

ALIGNING FREQUENCIES

B.C.-1500 & 600 KILOCYCLES

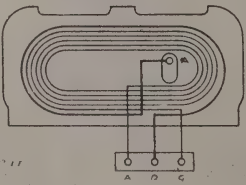
DESIGNATES CONNECTION TO CHASSIS

LATE MODEL

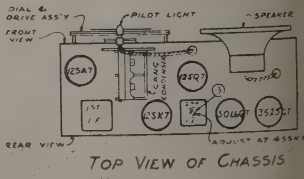
CONDENSERS FOR MODEL-T-1151		
C1	22055-I	.05 MFD. 200V. PAPER
C2 C5	84054	GANG CONDENSER
C3 C6	84063	TRIMMER ASS'Y.
C4	28016-0	.0001 MFD MICA
C7	22055 AP	.25 MFD 600V PAPER
C8 C11.	27701-0	.00025 MFD MICA
C9	22055 AU	.005 MFD 400V. PAPER
C10 C12	22055-W	.01 MFD 400 V PAPER
C13.C14	23500-J	40MFDS. 150V. MIDGET ELECT
C15	22055-U	.01 MFD. 1000V PAPER
C16	27736-0	25 MMFD MICA.

IF PEAK 455 KC

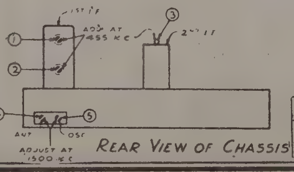
CABINET BACK & ANTENNA LOOP ASS'Y



RESISTORS FOR MODEL-T-1151		
R1	13074	20,000 OHMS 1/4 WATT
R2	79429-B	500 000 OHMS VOLUME CONTROL & SWITCH
R3, R8	13007	2 MEGOHMS 1/4 WATT
R4	13245	4 MEGOHMS 1/4 WATT
R5	13224	330 000 OHMS 1/4 WATT
R6	13028	500 000 OHMS 1/4 WATT
R7	13018	150 OHMS 1/4 WATT
R10	13284	65 OHMS 1/2 WATT
R11	13283	15 OHMS 1/4 WATT
R12	13043	150,000 OHMS 1/4 WATT



TOP VIEW OF CHASSIS



REAR VIEW OF CHASSIS

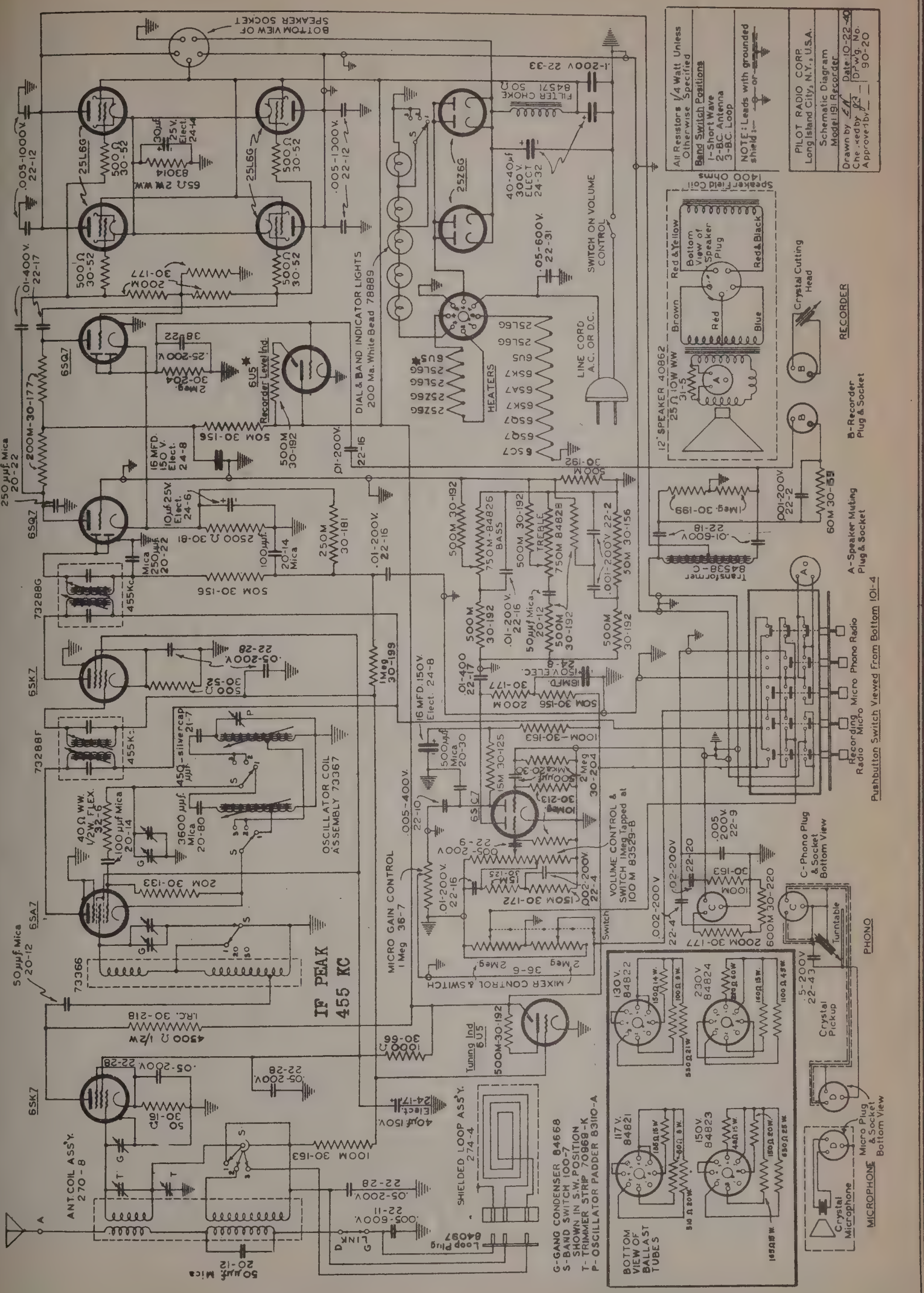
MISCELLANEOUS FOR MODEL-T-1151		
S1	73265	OSCILLATOR COIL ASS'Y
S2	73192-D	1ST I.F TRANSFORMER ASS'Y
S3	73267	2ND I.F
S4	40869	5 SPEAKER
S5	72151	PILOT LIGHT BROWN BEAD. 6V. 150 MA

③ [illegible] 2677 [illegible]
④ C7 WAS .200V, ADDED R12 [illegible] 9 2.39 [illegible] 2741
ALTERATIONS ② REVISED TUBES - C13 C14 WAS 16 MFD 150V R8, R9 WAS 90^ TAP 40^. ADDED R 10-R 11
③ C12 WAS [illegible] 8 31 39 BR - 8 10 39
FINISH
CLASSIFICATION MODEL T - 1151
THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-T-1151
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 3-24-39
DWG. NO. 25220-

PILOT RADIO CORP.

MODEL D-194



MODEL D-194

PILOT RADIO CORP.

This Pilot Superheterodyne Receiver has 12 tubes and a Cathode Ray Tuning Beacon, and operates on an Alternating power supply.

TUNING RANGE

Broadcast Band 535 to 1720 kc.; or 561 to 174 meters
Short Wave Band 5.6 to 19.8 kc.; or 53.6 to 15.2 meters

This radio-phono unit with a combined recorder permits the owner to do the following things:-

1. Operate the receiver for Bc & Sw reception.
2. Play commercial recordings.
3. Record radio programs.
4. Record his voice separately or in conjunction with a radio program.
5. Play these records back
6. Do his own broadcasting by means of the microphone.

OPERATION

For the accomplishment of any of the above six functions, the following operations apply:-

1. To OPERATE RADIO- After the "on-off" power switch has been turned on, simply press down the button marked RADIO. Any of the upper knobs may be used in conjunction with the radio to increase volume, to tune in stations and to obtain the tone you desire.

2. To OPERATE PHONOGRAPH- Simply press down the button marked PHONO and use the upper knobs to adjust volume, bass or treble.

3. To RECORD RADIO PROGRAMS- First tune the radio program to its proper setting. Have the bass control in a middle position. The treble control can be operated to suit the individual taste. When the program is clearly heard, then press the button marked RADIO RECORDING. As soon as this is done, the speaker is muted although the radio program can still be heard.

Be sure the phonograph unit is set on MANUAL. When the button marked RADIO RECORDING is pressed in, the volume control should be turned up until the recorder level indicator on the phonograph panel is nearly closed. Then raise the cutting head and place it on the blank record disc. During the course of recording, the recording level indicator will waver according to the level of the program.

4. To RECORD VOICE-

(A) Separate Voice Recording- To record a voice, press button marked MICRO RECORDING. Be sure the mixer control is set at the off position and proceed as in paragraph #3.

(B) Voice Recording In Conjunction With A Radio Program- Set radio program as instructed in paragraph #3. Advance mixer to the right and speak or sing into the microphone. Adjust the mixer to proper proportion so either voice or radio program will sound loudest, as the case may be. By means of this process, you may, during the course of a radio program recording either (1) completely eliminate the program and insert your voice, (2) bring your voice into the foreground with the program in the background or (3) bring the program into the foreground with your voice in the background.

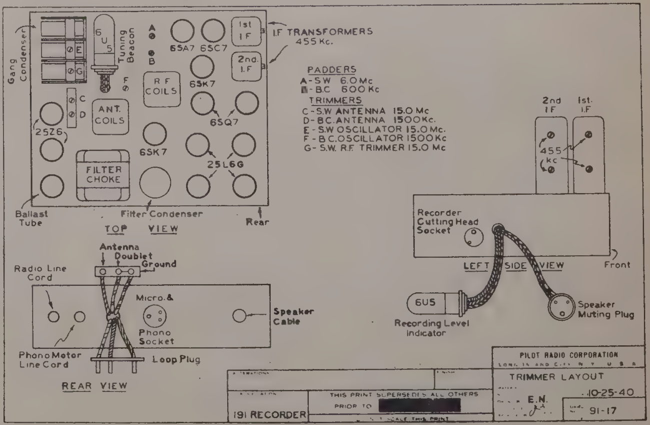
5. To PLAY BACK RECORDING- Proceed as in paragraph #2

6. To OPERATE MICROPHONE WITHOUT RECORDING- Press button marked MICRO in and speak into microphone. Adjust the microphone gain control to the desired level. It is advisable to turn the treble control to the extreme counter-clockwise position in order to cut down acoustic feedback.

SERVICE NOTES

The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I.F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .002 mfd condenser, and on the two short wave bands use a 400 ohm carbon resistor.



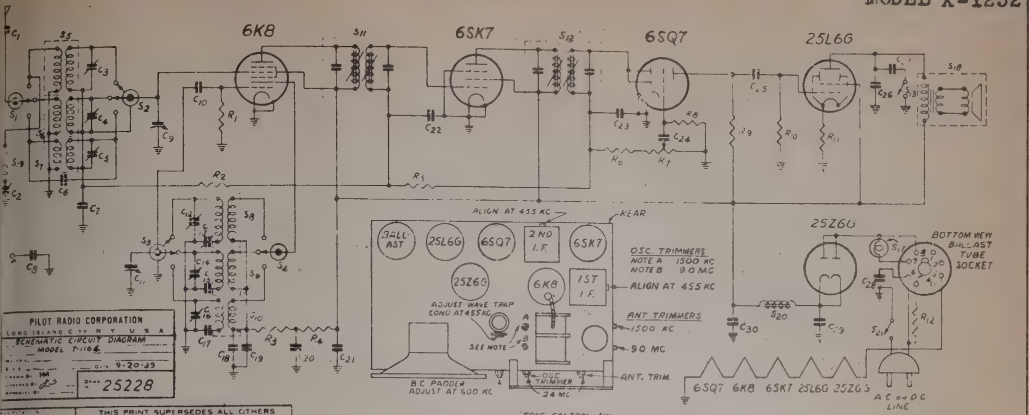
ANTENNA

This receiver contains the latest type of self-contained shielded loop aerial and will give excellent results even in distant localities where the signal from the broadcasting stations are faint. However, it may be necessary to turn the loop antenna located in the rear of the cabinet toward the direction of the incoming signal (since most broadcasting stations use the directional antennas), for the best reception from that particular station. For short wave or distant broadcast band reception, the use of an external antenna is required.

When using a doublet antenna, connect one lead-in wire to terminal "A" at the rear of the chassis, and the other lead-in wire to terminal "D". Remove the connecting link from terminals "D" and "G" and connect terminal "G" to a ground such as a cold water pipe or radiator. If an ordinary single wire antenna is used, connect the lead-in wire to Terminal "A" on the rear of the chassis. Leave the link between "D" and "G" terminals and connect a ground wire under terminal "G". A doublet antenna kit complete with all accessories, can be purchased from your dealer. Ask to see the "Pilot Antenna Kit".

PILOT RADIO CORP.

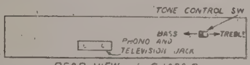
MODEL T-1164
MODEL X-1252



PILOT RADIO CORPORATION
LONG ISLAND CITY N Y U S A
SCHEMATIC CIRCUIT DIAGRAM
MODEL T-1164
DATE 9-20-39
HM
25228

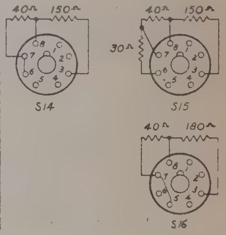
T-1164

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT



REAR VIEW of CHASSIS

IF PEAK 455 KC

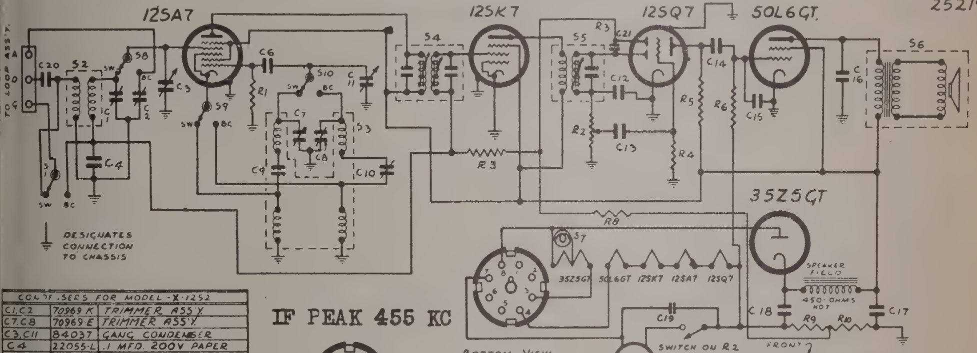


CONDENSERS FOR MODEL T 1164		
C1	22055 AH	.003 MFD 1000 V PAPER
C2	79455	25 125 MMFD WAVE TRAP TR.
C8	22055-R	005 MFD 1000 V. PAPER
5, C16	8311C	TRIMMERS
12 C14	70969-E	TRIMMER ASSY
3, C4	70969-E	TRIMMER ASSY
C13	79431-B	PADDER COND 300-500 MMFD
C15	27704-W	.002 MFD MICA
C17	27734 W	006 MFD MICA
C18	22055-P	05 MFD 400 V PAPER
C21	22055-L	.1 MFD 400 V PAPER
C20	85035	4 4 MFD 200 V. ELEC
9, C11	79664	2 GANG COND
C10	27723-0	50 MMFD MICA
7, C22	22055-I	.05 MFD 200 V PAPER
C23	27701-0	.00025 MFD MICA
24, C25	22055-W	01 MFD 400 V PAPER
C26	22055 AC	.02 MFD 600 V. PAPER

C27	22055-V	.03 MFD 1000 V PAPER
C28	22055-P	05 MFD 400 V PAPER
C29, C30	78689	30-30 MFD 250 V ELEC.
C6	27737-0	.00001 MFD MICA
RESISTORS FOR MODEL T-1164		
R1, R6	13164	50,000 OHMS 1/4 WATT
R2	13031	100,000 OHMS, 1/4 WATT.
R3, R4	13028	1,000 OHMS, 1/4 WATT
R5	13007	2 MEGOHMS, 1/4 WATT
R7	83529-E	1 MEGOHM VOL CONT.
R8	13245	4 MEGOHMS 1/4 WATT
R9	13171	250,000 OHMS. 1/4 WATT
R10	13024	500 000 OHMS. 1/4 WATT
R11	13055	150 OHMS, 1/2 WATT
R.2	84369	240 OHMS LINE CORD FOR 220-240 VOLTS

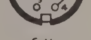
MISCELLANEOUS FOR MODEL T-1164		
S5, S7	73175	ANTENNA COIL ASSY BC · B1
S4	73154	ANTENNA COIL ASS'Y B2
S8 S10	73176	OSC COIL ASS'Y BC · B1
S9	73156-B	OSC COIL ASS'Y B2
S11	73248 B	1ST I.F. TRANS ASS'Y
S12	73289-B	2ND I.F. TRANS ASS'Y
S13	72049	TONE CONTROL SWITCH
S14	81985	BALLAST TUBE 110/125 V.
S15	84147	BALLAST TUBE 130 V.
S16	84364-2	BALLAST TUBE 230 V.
S17	71282	PILOT LIGHT, BLUE BEAD
S20, S18	40879	6 AC DC SPKR, 450^ FIELD
S19	73119	WAVE TRAP COIL ASS'Y
S1, S2, S3	83104	BAND SWITCH
S21	INCLUDED ON VOLUME CONTROL	

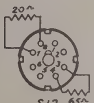
25219-5



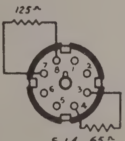
TO A.C OR D.C LINE

IF PEAK 455 KC

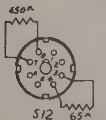

S11



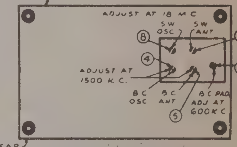
S13



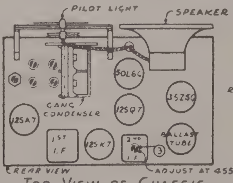
S14



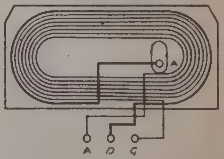
S12



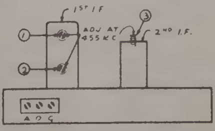
BOTTOM VIEW OF CABINET



TOP VIEW OF CHASSIS



CABINET BACK & ANTENNA LOOP ASS'Y.



REAR VIEW OF CHASSIS

CONDENSERS FOR MODEL -X-1252		
C1, C2	70969 K	TRIMMER ASS'Y.
C7, C8	70969-E	TRIMMER ASS'Y.
C3, C11	84037	GANG CONDENSER
C4	22055-L	.1 MFD. 200V PAPER
C6	28016-0	.0001 MFD. MICA
C9	27794 W	5000 MMFD. MICA
C10	79431 B	385 MMFD PADDER
C12	27701-0	.00025 MFD. MICA
C13	22055-AU	.005 MFD. 400V PAPER
C14	22055-W	.01 MFD. 400 V PAPER
C17 C18	23500 E	30 MFD 300V MIDGET ELEC
C19	22055-AC	.02 MFD 600V PAPER
C20	22055 W	.01 MFD 400V PAPER
C16	22055-A	.01 MFD. 600 V. PAPER
C21	27736-0	25 MMFD MICA
C15	28122-0	.0004 MICA

MISCELLANEOUS FOR MODEL-X-1252		
S1	84060	BAND SWITCH
S2	73263	SW ANTENNA COIL ASS'Y.
S3	73262	BC & S.W. OSCILLATOR COIL ASS'Y
S4	73192-D	1ST I.F TRANSFORMER ASS'Y.
S5	73267	2ND I.F. " "
S6	40869	5" SPEAKER
S7	72151	PILOT LIGHT, BROWN BEAD
S8, S9 S10	84060	BAND SWITCH
S11	84428	BALLAST TUBE 110/125 V
S12	84431	BALLAST TUBE 230 V
S13	84429	BALLAST TUBE 130 V
S14	84430	BALLAST TUBE 150 V

INTERMEDIATE FREQUENCY:-455 K.C.
ALIGNING FREQUENCIES:
B.C.-1500 & 600 KILOCYCLES.
S.W.-{ALIGN AT 18 MEGACYCLES.
CHECK AT 6

RESISTORS FOR MODEL · X-1252		
R1	13074	20 000 OHMS 1/4 WATT
R2	79429 B	500 000 OHMS VOL CONT & SW
R3, R8	13007	2 MEGOHMS 1/4 WATT
R5	13147	300.000 OHMS 1/4 WATT
R6	13024	500 000 OHMS 1/4 WATT
R7	13018	150 OHMS 1/4 WATT
R9	13284	65 OHMS, 1/2 WATT
R10	13283	15 OHMS, 1/4 WATT
R4	13245	4 MEGOHMS, 1/4 WATT

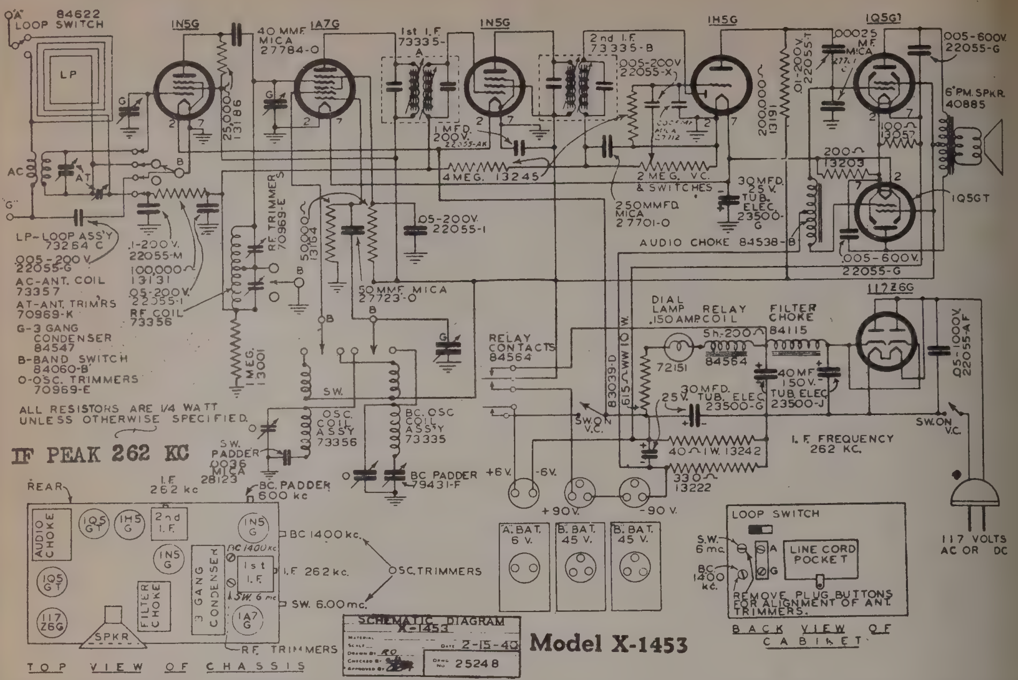
MODEL
X-1252

5 REVISED FOR 150 MIL. TUBES 3/27/39
② C16 WAS .01 MFD 400V PAPER [illegible]
& ADDED S12 BALLAST TUBE.
③ REVISED 3 16 39 [illegible]

PILOT RADIO CORPORATION
LONG ISLAND CITY N Y U S A
SCHEMATIC CIRCUIT DIAGRAM
FOR MODEL X-1252
2-20 39
B R
25219-5

MODELS X-1452, X-1453
MODEL T-1564

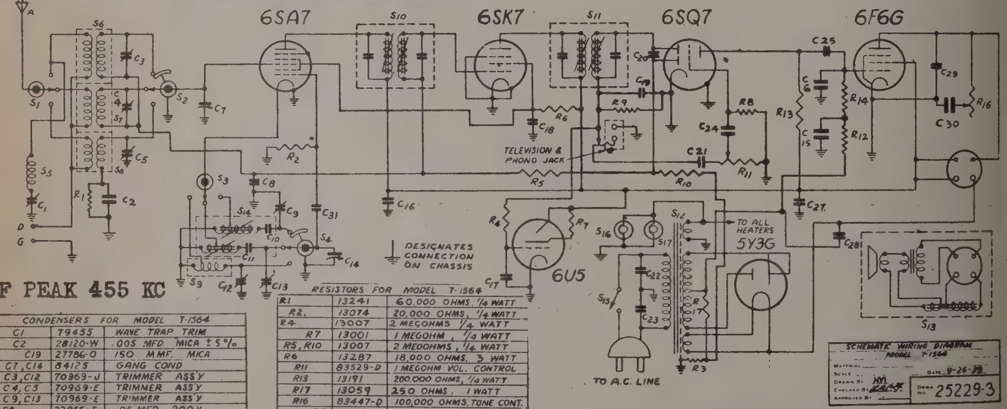
PILOT RADIO CORP.



SCHEMATIC DIAGRAM X-1453
MATERIAL
SCALE
DATE 2-15-40
DRAWN BY RO
CHECKED BY
APPROVED BY
DRWG. NO. 25248

Model X-1453

Model X-1452 is same as X-1453 except: AC ant. Coil is Part No.73346; Osc. coil and BC Osc. coil is one unit, part No. 73338. (S.W. Padder No.28123 is omitted) SW Osc. and Ant. trimmer adjustment is 12 MC.



SCHEMATIC WIRING DIAGRAM MODEL T-1564
MATERIAL
SCALE
DATE 9-26-39
DRAWN BY HM
CHECKED BY
APPROVED BY
DRWG. NO. 25229-3

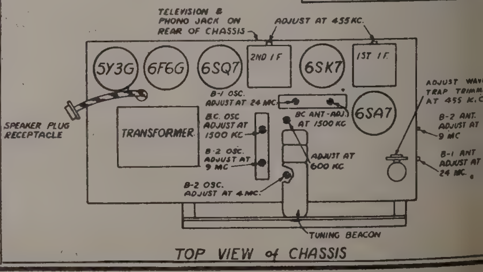
IF PEAK 455 KC

CONDENSERS FOR MODEL T-1564		
C1	79455	WAVE TRAP TRIM
C2	28120-W	.005 MFD MICA ±5%
C19	27786-O	150 MMF. MICA
C7, C14	84125	GANG COND
C3, C12	70969-J	TRIMMER ASS'Y
C4, C5	70969-E	TRIMMER ASS'Y
C9, C13	70969-E	TRIMMER ASS'Y
C8	22055-I	.05 MFD 200 V.
C16	22055-AB	.1 MFD 600 V.
C17, C21	22055-T	.01 MFD 200 V.
C20	27740-O	35 MMF. MICA
C24 C15	22055-X	.005 MFD 200V.
C25	22055-AC	.02 MFD 600 V.
C18	22055-P	.05 MFD. 400 VOLTS
C29	22055-G	.005 MFD 600 V.
C30	22055-AJ	.03 MFD 600 V
C27	23500-D	8 MFD 450 V. ELEC.
C28	23500-C	16 MFD 450 V ELEC.
C22, C23	22055-U	.01 MFD 1000 V
C31	28016-O	.0001 MFD MICA
C11	28103-W	2100 MMF MICA ±2%
C10	92000-C	450 MMF MICA ±5%
C6	27702 O	.0005 MFD. MICA

RESISTORS FOR MODEL T-1564		
R1	13241	60,000 OHMS. 1/4 WATT
R2.	13074	20,000 OHMS, 1/4 WATT
R4	13007	2 MEGOHMS 1/4 WATT
R7	13001	1 MEGOHM, 1/4 WATT
R5, R10	13007	2 MEGOHMS, 1/4 WATT
R6	13287	18,000 OHMS, 3 WATT
R11	83529-D	1 MEGOHM VOL. CONTROL
R13	13191	200,000 OHMS, 1/4 WATT
R17	13059	250 OHMS. 1 WATT
R16	83447-D	100,000 OHMS, TONE CONT.
R3	13189	30 OHMS, 1/4 WATT
R9	13205	650,000 OHMS, 1/4 WATT
R8	13245	4 MEGOHMS 1/4 WATT
R12	13171	250,000 OHMS 1/4 WATT
R14	13031	100,000 OHMS 1/4 WATT

MISCELLANEOUS FOR MODEL T-1564		
S1 TO S4	84246	BAND SWITCH
S5	73119	WAVE TRAP COIL
S6	73306	B.C. ANT. COIL ASS'Y
S7	73307	ANT COIL ASS'Y B-2
S8	73308	ANT. COIL ASS'Y B-1
S14	73309	OSC COIL ASSY, BC., B-2
S9	73310	OSC COIL ASSY, B-1
S10	73288-B	1ST I.F. TRANS. ASS'Y
S11	73288-B	2ND I.F TRANS ASS'Y
S12	83412-R	PWR TRANS, 117V. 50-60 CY.
S12	83412-AB	PWR TRANS, 230V 50-60CY
S12	83412-FB	PWR TRANS, 115-230V 50-60CY
S12	83412-L	PWR TRANS. 150V 50-60CY
S12	83697	PWR TRANS UNIV. 50-60 CY
S13	40850	8" SPEAKER, 1200 FIELD
S15	83529-D	SWITCH ON VOL. CONTROL
S16 - S17	71282	PILOT LIGHTS BLUE BEAD

ALTERATIONS
② DOUBLET ANTENNA CONNECTION ADDED-HM-10-12-39
③ REVISED. BR -10-16-39. SRS.
FINISH
CLASSIFICATION
T-1564
THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]



TOP VIEW of CHASSIS

RCA MFG. CO., INC.

MODEL PRP-1
MODEL PRP-2

The Publishers Service Record Players, Models PRP-1 and PRP-2, consist of a motor-turntable mechanism and a crystal pickup unit, with a volume control and motor switch. These players are adaptable to the audio amplifier system of practically any type radio receiver for the reproduction of records.

The two models are electrically and mechanically similar; they differ in that Model PRP-1 has a molded plastic cabinet, whereas Model PRP-2 has a veneer wood cabinet.

ELECTRICAL SPECIFICATIONS

Motor

Type of Motor........ Synchronous (Manual Starting)
Turntable Speed........................ 78.26 r.p.m.

Crystal Pickup

Impedance.............. 100,000 ohms at 1,000 cycles
Average Output Voltage............1½ Volts across 250,000 ohm load at 1,000 cps

PHONOGRAPH AND MOTOR SERVICE DATA

The synchronous motor used in this instrument is designed to be simple and foolproof. Among its many features are constancy of speed, low power consumption, single moving part, ease of starting, rubber damper, ease of repair and long life. The parts that may require attention are plainly shown in the figures. The motor is started by turning "on" the power switch and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well oiled and cleaned.

The rotor and turntable assembly rests on the ball bearing at the bottom of the vertical bearing, and may be removed by lifting out. Do not turn player upside down without holding turntable.

For rotor adjustment use three 16-mil shims for motors mounted in a solid base or for motors of the "T" hanger type use three 13-mil shims, spaced equally around the gap between rotor and stator. When the rotor is suitably adjusted securely tighten the three screws which hold the rotor to the turntable. The centering operation is very similar to that done with a dynamic speaker.

If the top of rotor lamination assembly is not flush with the top of stator laminations, additional steel washers should be inserted beneath the stator until the two are aligned.

A small amount of hum when starting, decreasing to a negligible amount while running, is normal. If excessive vibration occurs either at starting or running it may be due to one of the following.

1. Insufficient lubrication, or any failure that will cause binding of bearings.
2. Leather washer not oiled. Check to be sure that leather and steel washers are arranged in proper sequence, as indicated in the drawing.
3. Motor not properly fastened in the cabinet. Check for loose mounting bolts.
4. Burrs on poles of rotor and stator.
5. Loose laminations of stator.
6. Slight eccentricity of rotor or spindle.
7. Improper horizontal alignment of rotor and stator. Correct horizontal alignment is as shown in the figure. The position of the stator is raised or lowered by adding or removing washers below the leather washer.

The damper spring must fit without binding or chattering, in the slot in the stator. The stator must be free to deflect and be flexible in either direction between the limits of the damper spring. Any binding in the washers or stator bearing which prevents the movement of the stator may cause speed variations in the motor. The damper spring must exert equal force in restoring the stator to its mid-position when the stator is deflected manually in either direction.

The following lead dress is important:

1. The power cord, stator leads and pickup cable should be dressed away from and not under the motor frame. Hum may be accentuated or rattles occur if this is not followed.
2. A periodic click will be heard when the power cord or stator lead rubs against the rotor. The leads should be dressed into the cabinet away from the rotor.

On high line voltages these players have considerable reserve torque. Any hum accentuated by such a condition may be further reduced at the expense of this reserve by inserting a 300 to 500 ohm 10 watt resistor in series with the line and motor winding.

The turntable is secured to the rotor drive table by means of a retaining ring and washer. In order for the turntable to be free of wobble, the rubber cushions between the drive table and the turntable must be secure in their positions. Slight wobble of the turntable can be eliminated by placing shims on the turntable side of these cushions, using that cushion where the table runs low.

Stock No.	DESCRIPTION
	MOTOR ASSEMBLIES PRP-1 AND PRP-2 (60 cycles—110 volts)
32654	Ball—Steel ball
31045	Base—Motor support, damper and bearing cup assembly
31046	Bearing—Bearing assembly
32472	Cap—PRP-1 rubber spindle cap
31041	Cap—PRP-2 rubber spindle cap
31917	Coil—Motor field coil
31047	Cushion—Rubber cushion for bearing
	MOTOR ASSEMBLIES PRP-1 and PRP-2 (60 cycles—110 volts)
33041	Ring—Retaining ring and metal washer to mount turntable plate
31042	Stator—Stator assembly comprising coils and laminations for 60 cycle operation
32473	Turntable—PRP-1 finished turntable top plate only—less rubber mountings
31039	Turntable—PRP-2 finished turntable top plate only—less rubber mountings
4083	Washer—Leather washer
14231	Washer—Metal spacing washer
33642	Wedge—Coil wedge
	MOTOR ASSEMBLIES (Motor mounted by "T" shaped rubber hanger) (110 volts—60 cycles)
	Note.—For additional motor parts see 60 cycle motor assemblies at top of list.
35724	Cap—Rubber spindle cap for PRP-1
33345	Cap—Rubber spindle cap for PRP-2
33346	Coil—Motor field coil
33350	Frame—Motor support frame and bearing cup
35746	Frame—Rotor frame, laminations and spindle shaft assembled
34480	Hanger—Rubber mounting hanger
35745	Lamination—Stator lamination and bearing—less field coils
33348	Washer—Leather and metal washer for stator bearing
34863	Wedge—Wooden wedge
	MOTOR ASSEMBLIES (110 volts—50 cycles)
	Note.—For additional motor parts see 60 cycle motor assemblies at top of list.
31918	Coil—Motor field coils
33941	Frame—Rotor frame complete with spindle and rotor laminations
33658	Laminations—Rotor laminations
33354	Laminations—Stator laminations
33654	Frame—Rotor frame
33641	Lamination—Rotor lamination
34878	Lamination—Stator lamination
32469	Motor—110 volt, 60 cycle, complete with mounting for PRP-1
9841	Motor—110 volt, 60 cycle, complete with mounting for PRP-2
31040	Mounting—Turntable top rubber mountings sufficient for one turntable—PRP-1
32471	Mounting—Turntable top rubber mountings sufficient for one turntable—PRP-2
	For motors mounted in "T" shaped rubber hanger
34810	Mounting—1 set mounting hardware
33345	Cap—Rubber spindle cap for PRP-1
33353	Cap—Rubber spindle cap for PRP-2
	PICKUP AND ARM ASSEMBLIES
32624	Pickup Arm—less crystal, PRP-1
32474	Pickup Arm—less crystal, PRP-2
31050	Crystal—Pickup crystal and needle screw
31745	Ring—Retaining ring for pickup arm base
12539	Screw—Pickup needle screw
	PICKUPS USING CRYSTALS HAVING VISCALOID DAMPING
33587	Arm—Pickup arm shell only PRP-1
33588	Arm—Pickup arm shell only PRP-2
35720	Pickup pivot arm for PRP-1
35722	Pickup pivot arm for PRP-2
35721	Base—Pickup arm base for PRP-1
35723	Base—Pickup arm base for PRP-2
33217	Crystal—Pickup crystal cartridge
32500	Mounting—Rubber spacer, flat washer and snap ring for mounting pickup arm base
34311	Ring—Retaining ring for pivot arm and base
31160	Screw—Needle screw
	MISCELLANEOUS ASSEMBLIES
31052	Control—Volume control and power switch
14086	Cord—Power cord with male plug
33680	Cup—Needle cup for PRP-2
35717	Decalcomania—"Symphonic De Luxe"
31051	Foot—Rubber foot for cabinet PRP-1
33006	Foot—Rubber mounting foot for cabinet PRP-2
34850	Hinge—Cabinet lid hinge PRP-2
4323	Knob—Volume control knob for PRP-1
3961	Knob—Volume control knob for PRP-2
31053	Mounting—Motor mounting screw assembly complete
35716	Mounting—Pickup arm mounting ring and rubber cushion
31054	Mounting—Pickup arm mounting nuts, washers, and rubber spacer
31048	Plug—Male plug for output cable
32610	Rest—Rubber pickup arm rest for PRP-2
32627	Support—Lid support

GENERAL DESCRIPTION

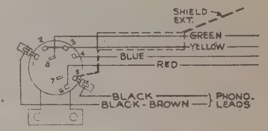
These instruments employ a crystal pickup unit which depends upon torsional vibration to provide the necessary output voltage. The crystal unit is contained in a metal case securely sealed against extremes of climate. An offset mounting for the pickup head gives an ideal tracking angle between the needle and record grooves.

The motor is a manual starting, synchronous type, designed to operate with good regularity of speed at the standard 78.26 r.p.m. Mechanically, the motor consists of a laminated rotor affixed to the turntable having a certain number of salient poles and a stator with a corresponding number of poles. Two field coils installed on the stator furnish the energizing magnetic flux. The rotor, stator and their bearing assembly are mechanically isolated from the turntable, motor mounting, and cabinet by adequate flexible couplings and supports.

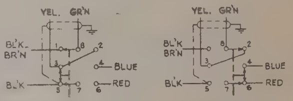
CONNECTING RECORD PLAYER TO RADIO RECEIVER

In connecting this player to a radio receiver care should be exercised to connect it at a point where there is sufficient gain between it and the speaker to yield normal output. Usually two or more stages of audio amplification are required. The radio part must be thoroughly disconnected or killed when playing records, else the radio signals will be heard with the record's music.

DO NOT CONNECT THE RECORD PLAYER INTO A PLATE OR CATHODE CIRCUIT. It must always be connected into a high impedance circuit (100,000 ohms or more). If the player is to be used in connection with an AC-DC receiver it is necessary to insert a capacitor (0.1 mfd.—400 volts) in series with the ground chassis connection.



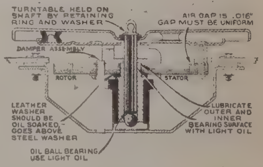
Radio-Phono Switch supplied with Record Player



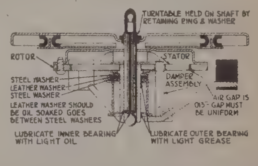
SWITCH IN PHONO. POSITION

SWITCH IN RADIO POSITION

Diagrams showing Switch in Radio and Phono positions


TURNTABLE HELD ON SHAFT BY RETAINING RING AND WASHER
AIR GAP IS .016" GAP MUST BE UNIFORM
DAMPER ASSEMBLY
ROTOR
STATOR
LEATHER WASHER SHOULD BE OIL SOAKED, GOES ABOVE STEEL WASHER
LUBRICATE OUTER AND INNER BEARING SURFACE WITH LIGHT OIL
OIL BALL BEARING USE LIGHT OIL

Motor using Solid Base with Bolts for Mounting


TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
ROTOR
STATOR
STEEL WASHER
LEATHER WASHER
STEEL WASHER
LEATHER WASHER SHOULD BE OIL SOAKED GOES BETWEEN STEEL WASHERS
DAMPER ASSEMBLY
AIR GAP IS .013" GAP MUST BE UNIFORM
LUBRICATE INNER BEARING WITH LIGHT OIL
LUBRICATE OUTER BEARING WITH LIGHT GREASE

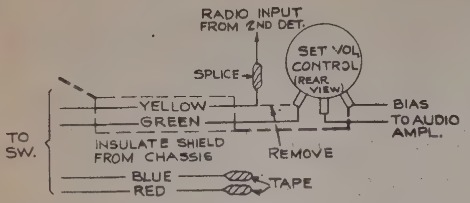
Motor using "T" Shaped Rubber Hanger Mounting

Models PRP-1 (Regular) and PRP-2 (DeLuxe)

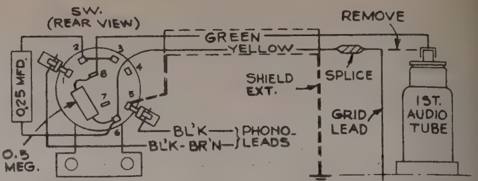
MODEL PRP-1
MODEL PRP-2

RCA MFG. CO., INC.

TYPICAL CONNECTION DIAGRAMS

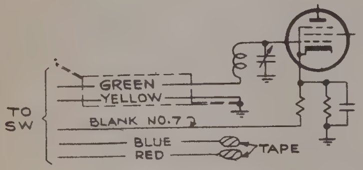

RADIO INPUT FROM 2ND DET.
SET VOL CONTROL (REAR VIEW)
SPLICE
YELLOW
GREEN
BIAS
TO AUDIO AMPL.
TO SW.
INSULATE SHIELD FROM CHASSIS
REMOVE
BLUE
RED
TAPE

Radio Receivers where Receiver Volume Control is in Audio Input Circuit

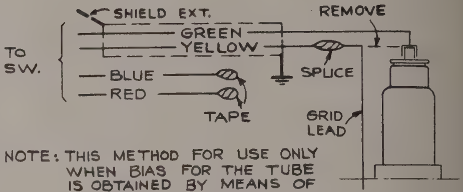


NOTE: REMOVE BLUE AND RED LEADS. CONNECT YELLOW LEAD TO TERMINAL NO. 6. ADD 0.5 MEG. RESISTOR AND 0.25 MFD. CAPACITOR AS SHOWN.

Radio Receivers where First Audio Tube is of the Grid Cap Type, and Fixed Bias for Tube is Obtained Through Grid Lead

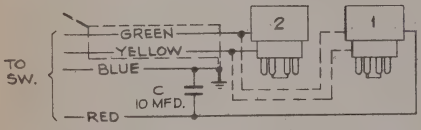


Radio Receivers using Biased-Type Detector



NOTE: THIS METHOD FOR USE ONLY WHEN BIAS FOR THE TUBE IS OBTAINED BY MEANS OF CATHODE RESISTOR.

Radio Receivers whose First Audio Amplifier Tube is of the Grid Cap Type



NOTE: WHEN NO. 1 IS USED AND TUBE IS OF "G" TYPE CARE MUST BE TAKEN TO SEE THAT SHIELD TERMINAL NO. 1 IS GROUNDED ON TUBE SOCKET.
WHEN NO. 2 IS USED TAPE RED LEAD, AND OMIT CAPACITOR.

No. 1—Adaptor opens grid circuit and inserts a 2,700 ohm resistor in cathode of 6C5 or 6J5 tubes for bias on phono reproduction. Applies when bias is obtained through grid return.

No. 2—Adaptor opens grid circuit of 6C5 or 6J5 tube. Applies when bias is obtained through cathode resistor.

Radio Receivers using 6C5 or 6J5, 6C5G or 6J5G, Tube for First Audio Amplifier

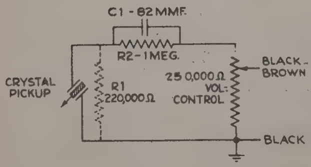
TONE COMPENSATION

Because of the widely varying frequency characteristics of various types of audio amplifiers with which these players may be used, it is desirable in some cases to make refinements in the pickup circuit to compensate for the characteristics of the amplifier.

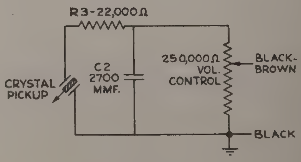
In "A" R1 controls the low frequency response; higher values of R1 give increased lows. For maximum low frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high frequency response; to increase highs increase C1.

Where a decrease in high frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in "B" is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high frequency response Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high frequency reduction; increasing R3 decreases highs.

The suggested values shown in "A" and "B" should serve as a basis from which slight alterations may be made to suit individual cases.



"A"

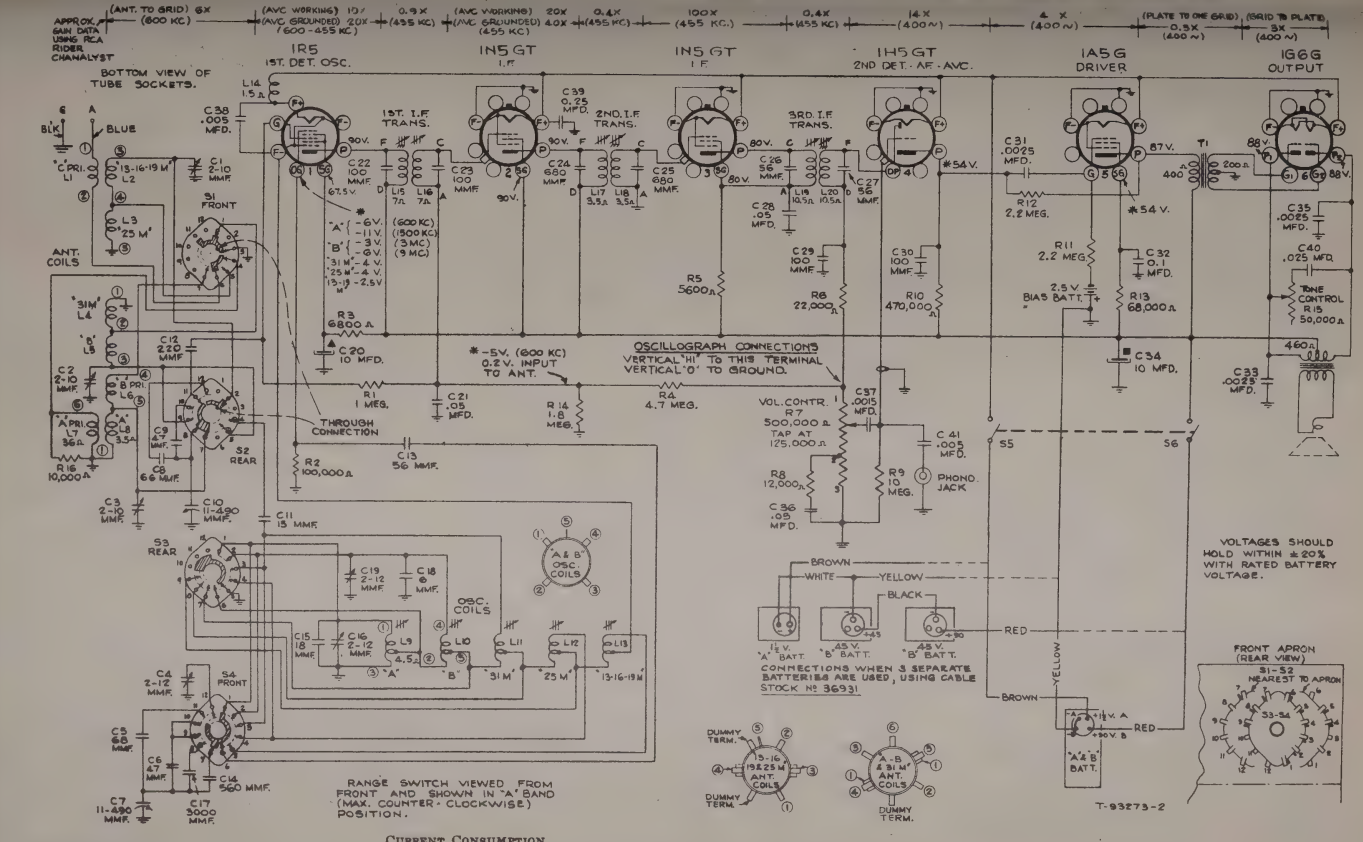


"B"

©John F. Rider, Publisher

RCA MFG. CO., INC.

MODEL QB2
Ch. RC-529



VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY VOLTAGE.

CONNECTIONS WHEN 3 SEPARATE BATTERIES ARE USED, USING CABLE STOCK № 36931

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER-CLOCKWISE) POSITION.

Batteries Required
1—1.5 volt "A" Battery; 2—45 volt "B" Batteries

Current Consumption
"A" 0.35 amperes
"B" 12.6 milliamperes

On some models R5 is 4,700 ohms.

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.5 m)
Short Wave	9.5-11.7 mc (31.5-25.6 m)
Short Wave	11.7-15.1 mc (25.6-19.9 m)
Short Wave	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency 455 kc

Power Output

Undistorted	0.55 watts
Maximum	0.65 watts

Loudspeaker (RL-92-2)

Type	6 inch permanent-magnet dynamic
Voice Coil Impedance	3.4 ohms at 400 cycles

FOR OTHER DATA SEE INDEX

A. C. Power Supply Rating
Using CV-112, A.C. power supply unit
Supply Voltages 105-125 or 210-250 volts; 50-60 cycles
Power consumption at nominal supply voltages 15 watts
"B" current drain....... 13.5 milliamperes at 90 volts dc output
"A" current drain............0.35 amperes at 1.4 volts dc output

MODEL QB2, Ch. RC-529
MODEL CV-112

RCA MFG. CO., INC.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

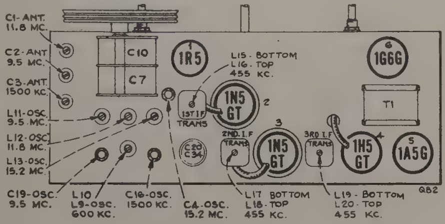
Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.



Tube and Trimmer Locations

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	1N5GT—2nd I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L20, L19 3rd I-F transformer
2	1N5GT—1st I-F grid cap, in series with .01 mfd.				L18, L17 2nd I-F transformer
3	1R5—1st Det. grid, in series with .01 mfd.				L16, L15 1st I-F transformer
4	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L12 (osc.) C1 (ant.)
5		15.2 mc		17°	C4 (osc.)*
6		Repeat steps 4 and 5.			
7		15.2 mc	19-13M	156°	L13 (osc.)**
8		9.5 mc	31M	156°	L11 (osc.)** C2 (ant.)
9		9.5 mc	B	11.5°	C19 (osc.)***
10	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C16 (osc.) C3 (ant.)
11		600 kc		150°	L9 (osc.) (Rock gang)
12		Repeat steps 9 and 10.			

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

** Peak at minimum position of plunger if two peaks can be obtained.

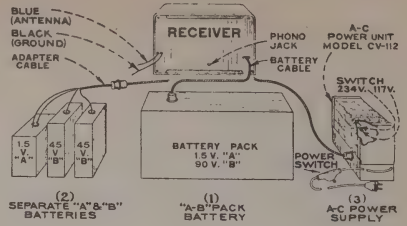
*** Peak at minimum capacity of two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.

RCA TUBE COMPLEMENT

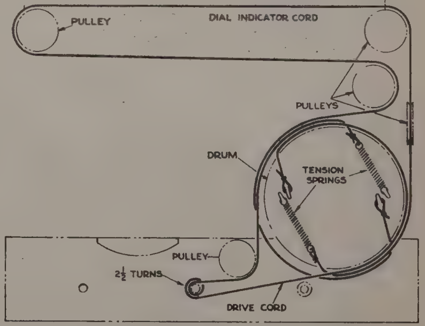
(1)	RCA-1R5	1st Det.,—Osc.
(2)	RCA-1N5-GT	1st I-F Amplifier
(3)	RCA-1N5-GT	2nd I-F Amplifier
(4)	RCA-1H5-GT	2nd Det., A-F, and A.V.C.
(5)	RCA-1A5-G	Audio Driver Amplifier
(6)	RCA-1G6-G	Power Output

Chassis No. RC-529



A-C Power Supply

Model CV-112 is a separate power supply unit. It is used to provide operating voltages for Model QB2 from an a-c supply source.

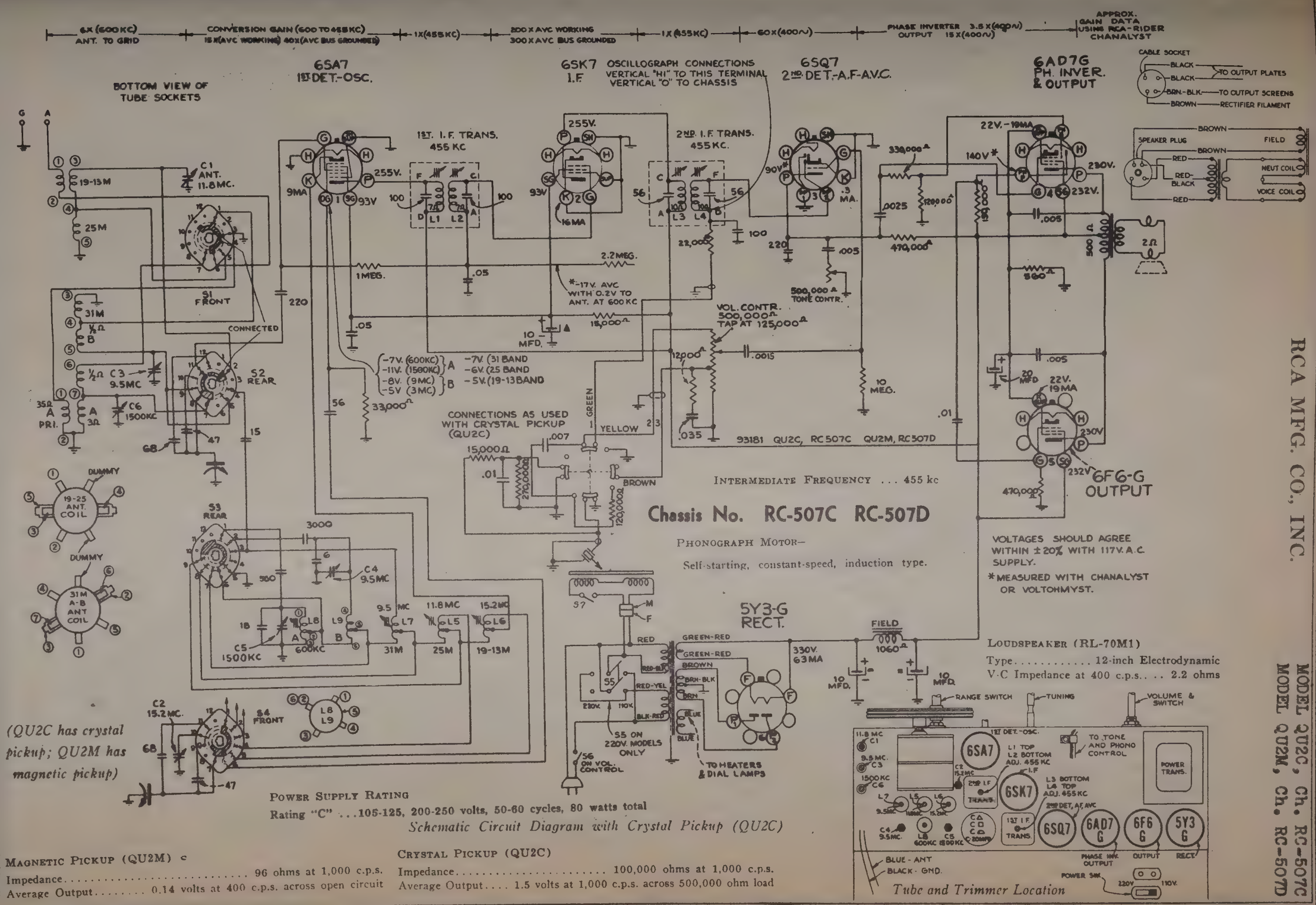


Precautionary Lead Dress:

1. All leads between antenna coil and switch must be as short as possible and kept away from the oscillator coil leads and switches.
2. Tap on 19-13 meter oscillator coil to pin No. 6 on oscillator tube socket must be dressed as far away from the air trimmer as possible.
3. All oscillator coil leads must be kept apart from each other, as well as other leads and parts.
4. Oscillator grid coupling condenser must bear against parts on S3, and be kept away from the shield between S2 and S3.
5. Check for correct bias cell polarity. Do not shunt with voltmeter.
6. The speaker leads must be kept from the volume control and associated parts and leads.
7. The two paper condensers on the sides of the 2nd I-F transformers must be held close to chassis to reduce interstage coupling.

RCA MFG. CO., INC.

MODEL QU2C, Ch. RC-507C
MODEL QU2M, Ch. RC-507D



Schematic Circuit Diagram with Crystal Pickup (QU2C)

Tube and Trimmer Location

INTERMEDIATE FREQUENCY . . . 455 kc

Chassis No. RC-507C RC-507D

PHONOGRAPH MOTOR—

Self-starting, constant-speed, induction type.

VOLTAGES SHOULD AGREE WITHIN ± 20% WITH 117V. A.C. SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST.

LOUDSPEAKER (RL-70M1)

Type. . . . . 12-inch Electrodynamic
V.C Impedance at 400 c.p.s. . . 2.2 ohms

(QU2C has crystal pickup; QU2M has magnetic pickup)

POWER SUPPLY RATING

Rating "C" . . .105-125, 200-250 volts, 50-60 cycles, 80 watts total

MAGNETIC PICKUP (QU2M)

Impedance. . . . . 96 ohms at 1,000 c.p.s.
Average Output. . . . . 0.14 volts at 400 c.p.s. across open circuit

CRYSTAL PICKUP (QU2C)

Impedance. . . . . 100,000 ohms at 1,000 c.p.s.
Average Output . . . . 1.5 volts at 1,000 c.p.s. across 500,000 ohm load

MODEL QU2C, Ch. RC-507C
MODEL QU2M, Ch. RC-507D

RCA MFG. CO., INC.

Alignment

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4*		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)**
7		9.5 mc	31M	156°	L7 (osc.)** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

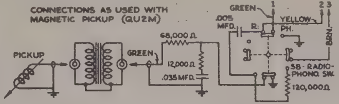
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

The QU2M is equipped with a magnetic pickup, and the QU2C with a crystal pickup. The output of the crystal pickup is fed into the audio end of the receiver through a switch and compensating circuit. On instruments using a magnetic pickup, a transformer and compensating circuit are used between the pickup and the audio input (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the cabinet.



Schematic Showing Magnetic Pickup Connections (QU2M)

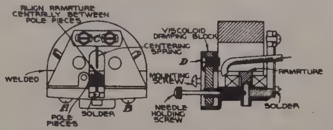
Crystal Pickup:

The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Magnetic Pickup:

The **magnetic pickup** used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.



Magnetic Pickup Detail

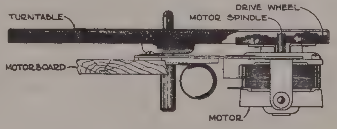
Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

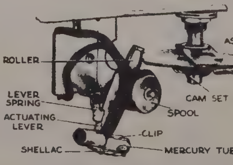
The **phonograph motor** has its bearing filled with oil and sealed at the factory and hence should not require lubrication in the field. However the two rubber tired idler pulleys should have their bearings lubricated occasionally with S.A.E. 10 oil. Care should be taken not to get any oil, grease, or other foreign matter on the rubber tires. These tires and the motor spindle should be cleaned occasionally with quick drying naphtha.

The turntable spindle bearing should also be lubricated occasionally with S.A.E. 10 oil.



Motor Detail

The **motor switch** is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1⅜ inches from the center line of the spindle shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

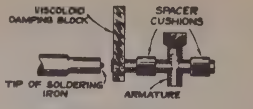


MERCURY SWITCH MECHANISM
(VIEWED FROM FRONT
SHOWN WITH PICKUP IN REST POSITION)

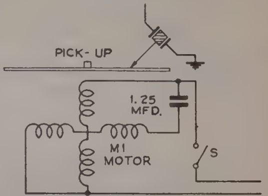
Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.

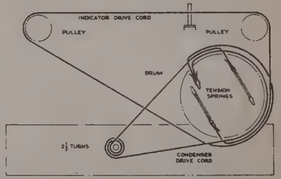
Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.



Attaching Damping Block



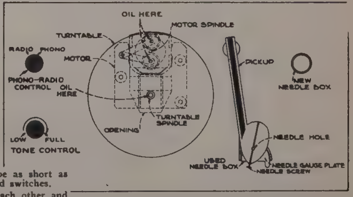
Motor Schematic



Dial-Indicator and Drive Mechanism

Frequency Ranges

Standard Broadcast ("A" band)	..540-1,720 kc (556-174 m)
Medium Wave ("B" band)....	....3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	..9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band......	.11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band....	.15.1-22.5 mc (19.9-13.3 m)



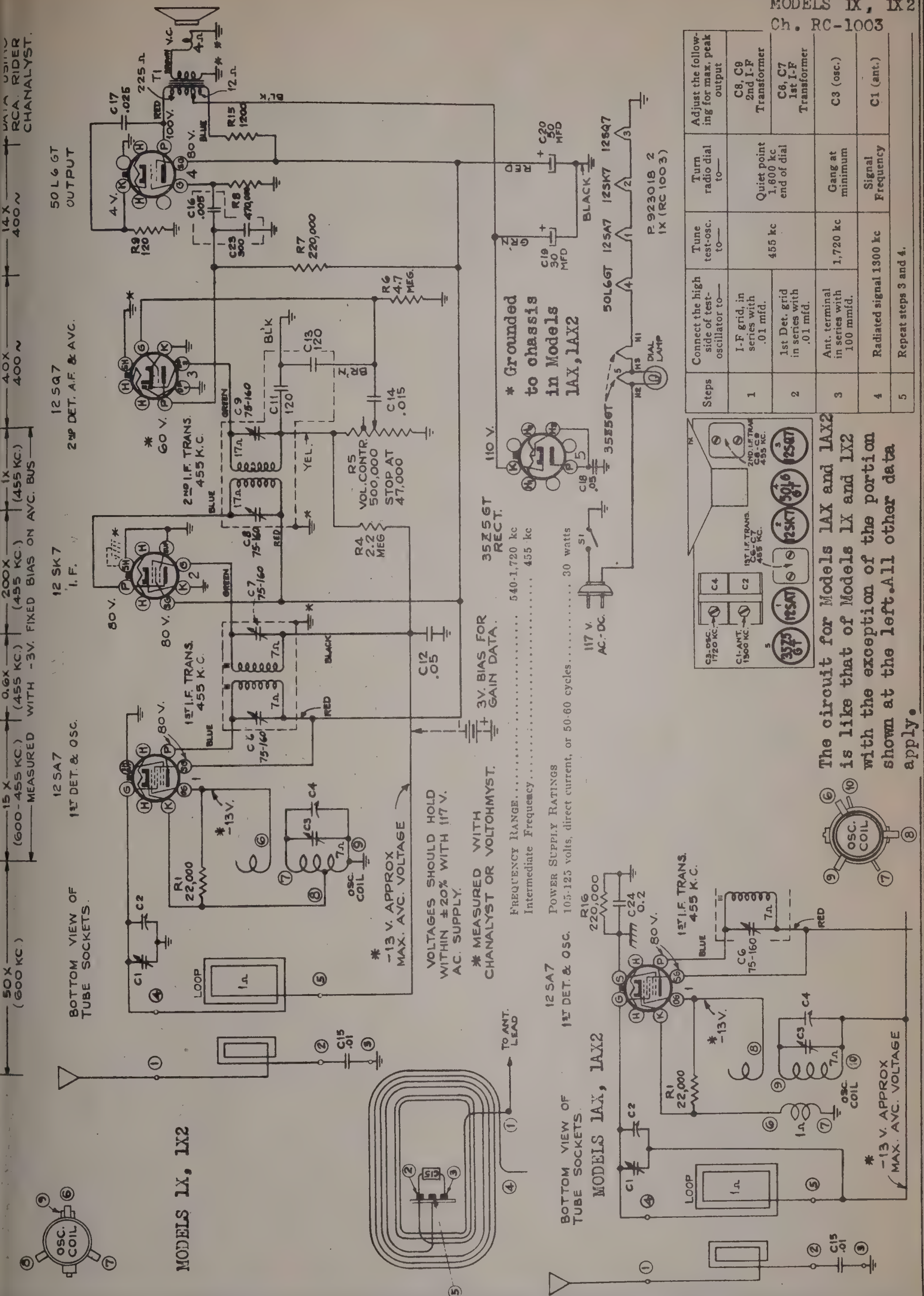
Motorboard and Controls

Power Output

Undistorted............ 3 watts
Maximum........... 3.5 watts

RCA MFG. CO., INC.

MODELS 1AX, 1AX2
Ch. RC1003A
MODELS 1X, 1X2
Ch. RC-1003



MODELS 1X, 1X2

MODELS 1AX, 1AX2

* -13 V. APPROX MAX. AVC. VOLTAGE

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

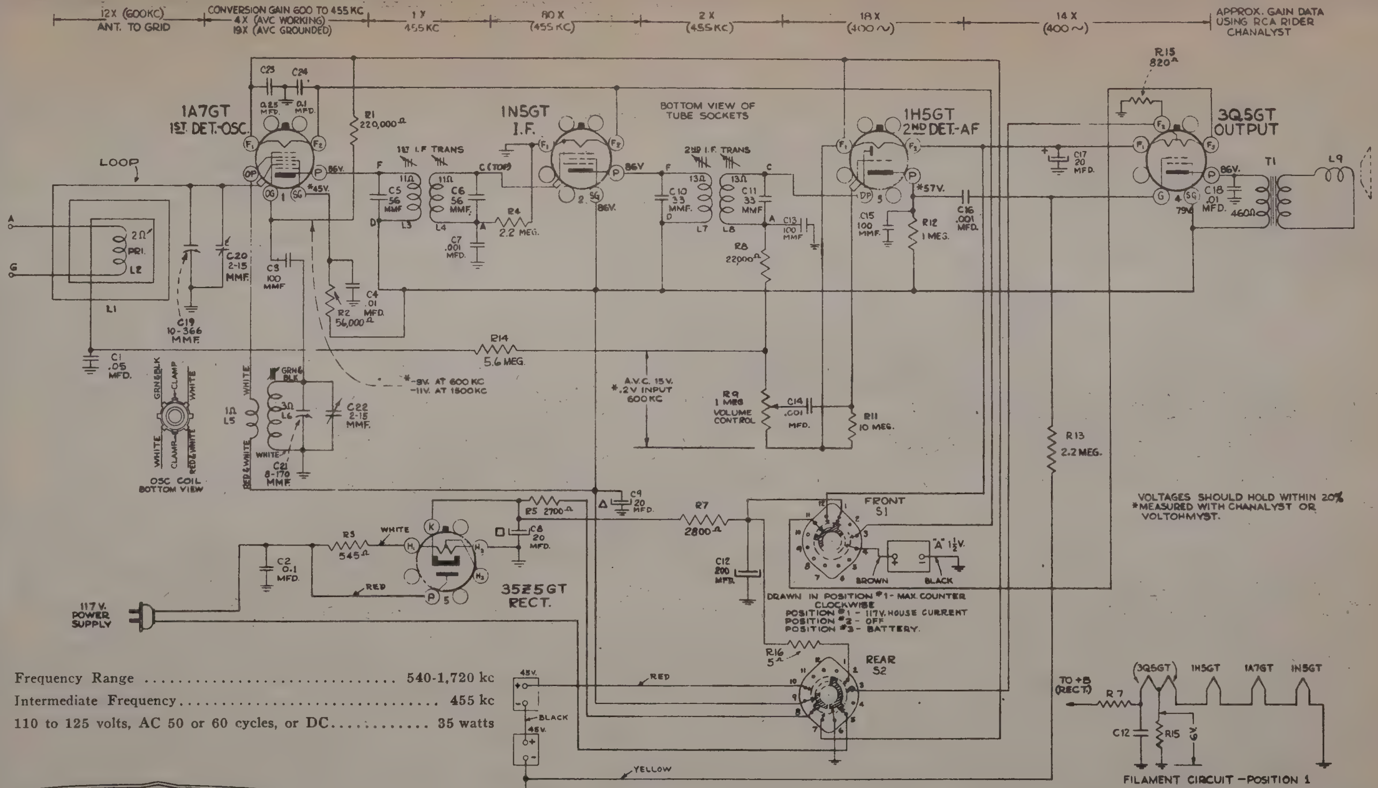
Frequency Range .... 540-1,720 kc
Intermediate Frequency .... 455 kc

Power Supply Ratings
105-125 volts, direct current, or 50-60 cycles .... 30 watts

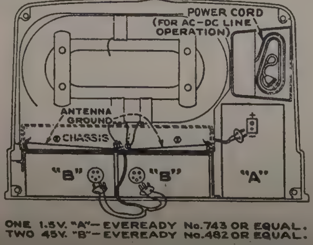
* Grounded to chassis in Models 1AX, 1AX2

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	C8, C9 2nd I-F Transformer
2	1st Det. grid in series with .01 mfd.			C6, C7 1st I-F Transformer
3	Ant. terminal in series with 100 mmfd.	1,720 kc	Gang at minimum	C3 (osc.)
4	Radiated signal 1300 kc		Signal Frequency	C1 (ant.)
5	Repeat steps 3 and 4.			

The circuit for Models 1AX and 1AX2 is like that of Models 1X and 1X2 with the exception of the portion shown at the left. All other data apply.



Frequency Range .... 540-1,720 kc
Intermediate Frequency .... 455 kc
110 to 125 volts, AC 50 or 60 cycles, or DC.............. 35 watts


POWER CORD (FOR AC-DC LINE OPERATION)
ANTENNA
GROUND
CHASSIS
"B"
"B"
"A"
ONE 1.5V. "A"—EVEREADY No.743 OR EQUAL.
TWO 45V. "B"—EVEREADY No.482 OR EQUAL.

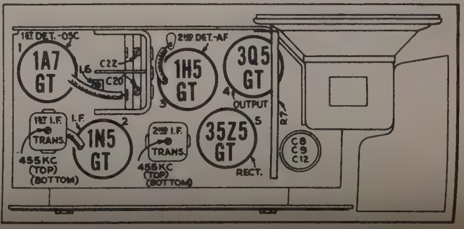
Batteries Required

"A" one 1.5 volt dry plug-in type "A," (Eveready No. 743 or equivalent)

"B" two 45 volt dry plug-in type "B," (Eveready No. 482 or equivalent)

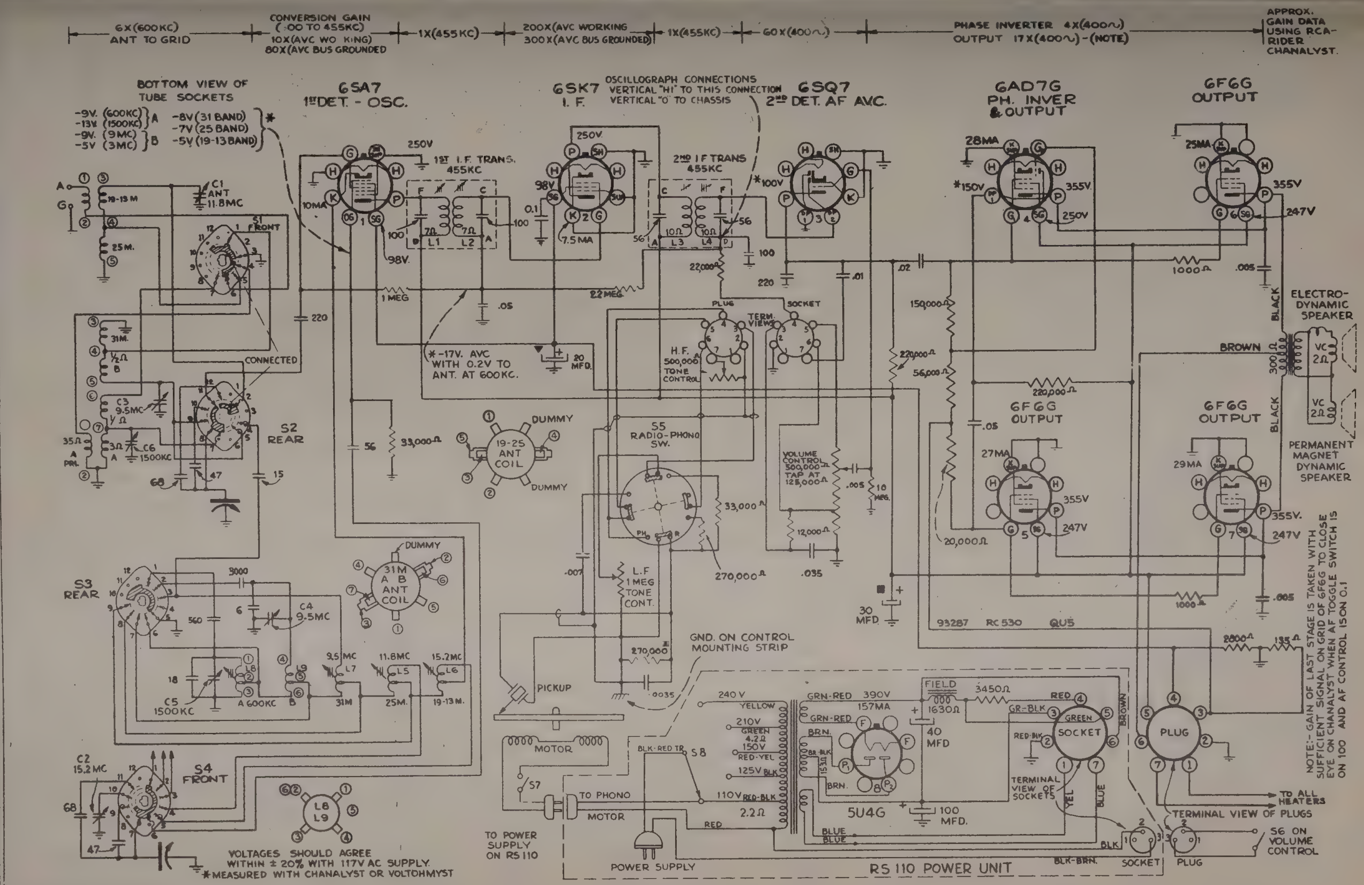
Current Consumption

"A" 0.25 amperes, "B" 11.5 milliamperes........ Battery Operation
Total Rect. "B" (117 volt, 60 cycle).................... 56 mils.



RCA MFG. CO., INC.

MODEL QU5
Ch. RC-530


6X(600KC) ANT TO GRID
CONVERSION GAIN (.00 TO 455KC) 10X(AVC WO KING) 80X(AVC BUS GROUNDED
1X(455KC)
200X(AVC WORKING 300X(AVC BUS GROUNDED)
1X(455KC)
60X(400~)
PHASE INVERTER 4X(400~) OUTPUT 17X(400~)-(NOTE)
APPROX. GAIN DATA USING RCA-RIDER CHANALYST.
BOTTOM VIEW OF TUBE SOCKETS
-9V. (600KC) -13V (1500KC) A -9V. (9MC) -5V (3MC) B -8V (31 BAND) -7V (25 BAND) -5V (19-13 BAND) *
6SA7 1ST DET. - OSC.
6SK7 I. F.
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS CONNECTION VERTICAL "O" TO CHASSIS
6SQ7 2ND DET. AF AVC.
6AD7G PH. INVER & OUTPUT
6F6G OUTPUT
1ST I.F. TRANS. 455KC
2ND I.F TRANS 455KC
C1 ANT 11.8MC
S1 FRONT
S2 REAR
S3 REAR
S4 FRONT
C2 15.2MC
C3 9.5MC
C4 9.5MC
C5 1500KC
C6 1500KC
CONNECTED
*-17V. AVC WITH 0.2V TO ANT. AT 600KC.
19-25 ANT COIL
DUMMY
31M A B ANT COIL
L8 L9
S5 RADIO-PHONO SW.
H.F. 500,000 TONE CONTROL
VOLUME CONTROL 500,000Ω TAP AT 125,000Ω
L.F 1 MEG TONE CONT.
PLUG
SOCKET
TERM. VIEWS
ELECTRO-DYNAMIC SPEAKER
PERMANENT MAGNET DYNAMIC SPEAKER
BROWN
BLACK
VC 2Ω
93287 RC530 QU5
NOTE:- GAIN OF LAST STAGE IS TAKEN WITH SUFFICIENT SIGNAL ON GRID OF 6F6G TO CLOSE EYE ON CHANALYST WHEN AF TOGGLE SWITCH IS ON 100 AND AF CONTROL ISON 0.1
GND. ON CONTROL MOUNTING STRIP
PICKUP
MOTOR
S7
S8
TO PHONO
TO POWER SUPPLY ON RS 110
POWER SUPPLY
5U4G
FIELD
TERMINAL VIEW OF SOCKETS
TERMINAL VIEW OF PLUGS
TO ALL HEATERS
S6 ON VOLUME CONTROL
RS 110 POWER UNIT
VOLTAGES SHOULD AGREE WITHIN ± 20% WITH 117V AC SUPPLY.
*MEASURED WITH CHANALYST OR VOLTOHMYST

Frequency Ranges
Standard Broadcast ("A" Band).. 540-1,720 kc (556-174 m)
Medium Wave ("B" Band)...... 3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band....... 9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band....... 11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band.... 15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency .... 455 kc

Power Supply Rating
105-125, 200-250 volts, 50-60 cycles, 160 watts

Loudspeakers
Model RL-70M-4................ Electrodynamic 12 inch
Model RL-71A-4...... Permanent Magnet Dynamic 12 inch
Voice Coil Impedance (both) at 400 c.p.s. 2.2 ohms

Pilot Lamps { Mazda No. 55, 6.5 volts 0.4 amp.
Mazda No. 51, 7.5 volts 0.2 amp.

Power Output Rating
Undistorted.............................. 20 watts
Maximum.................................. 24 watts

FOR OTHER DATA SEE INDEX

Alignment Procedure

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero beating against standard broadcast stations.

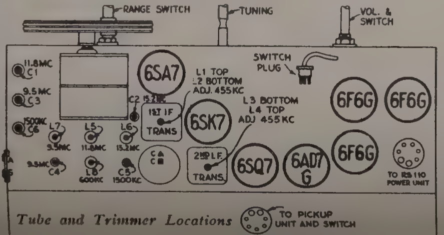
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.

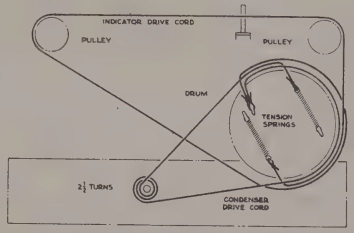


Tube and Trimmer Locations

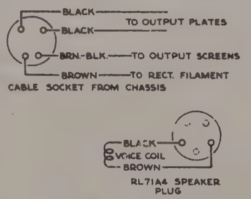
Synchronizing Speakers.—In order to get correct tone quality from the dual speakers used in this model, it is essential that the two speakers be so connected that the diaphragms of both work in unison or synchronism. If the terminals of one speaker are reversed the tone of the set will be flat.

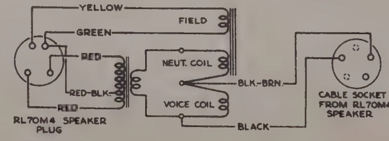
To test for proper connections, turn on receiver with volume down and connect the terminals of a 1½-volt dry cell across the voice coil-terminals of either one of the speakers. If the diaphragms move in or out together at the instant of contact, the speaker connections are O.K. If one moves out and the other moves in, they are bucking, and the voice coil leads of one of the speakers should be reversed.

The movement of the diaphragms may be observed visually or by placing the finger-tips on each cone to feel the movement.



Dial-Indicator and Drive Mechanism



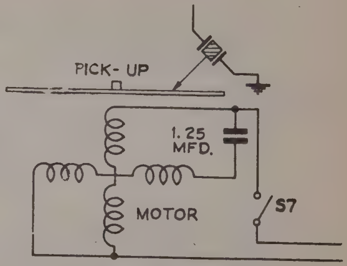


Connections and Colors of Loudspeaker and Cable

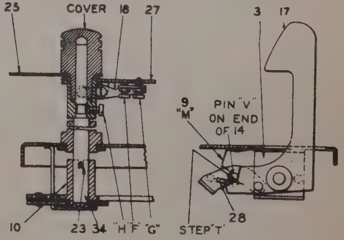
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)**
7		9.5 mc	31M	156°	L7 (osc.)** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

Precautionary Lead Dress.—

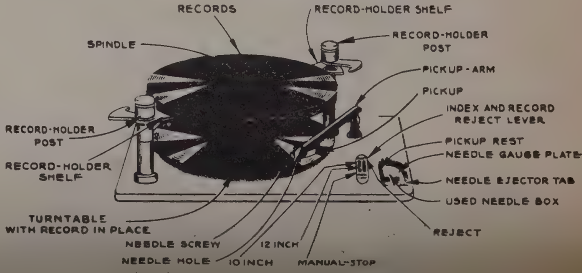
1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.



Motor Schematic



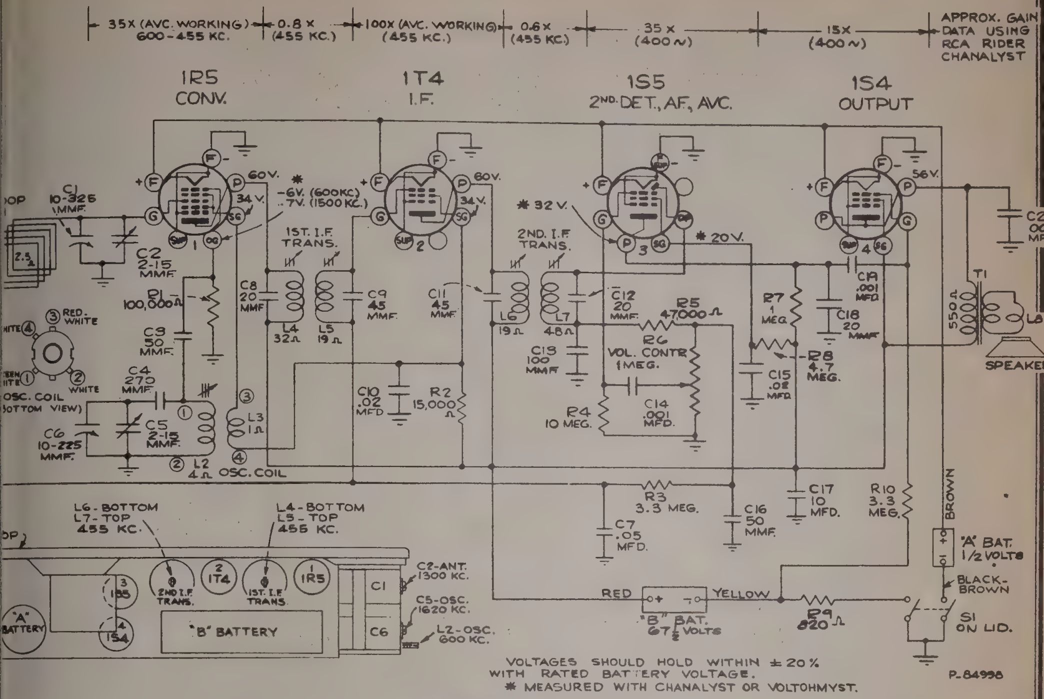
Details of Record Shelf Posts, and Locating Lever Assemblies



Top View of Automatic Record Changer

RCA MFG. CO., INC.

MODEL BP-10
"Personal"

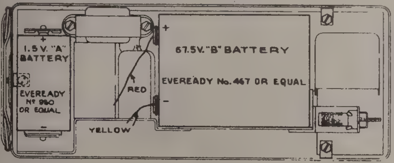


VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY VOLTAGE.
* MEASURED WITH CHANALYST OR VOLTOHMYST.

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.



Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (ant.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	L7, L6, L5, L4 (2nd and 1st I-F transformers)
2	Radiated signal 1,620 kc	1,620 kc	Full clockwise (out of mesh)	C5 (oscillator)
3	Radiated signal 1,300 kc	1,300 kc	1,300 kc	C2 (antenna)
4	Radiated signal 600 kc	600 kc	600 kc	L2 (osc.)
5	Repeat steps 2, 3 and 4.			

Electrical and Mechanical Specifications

FREQUENCY RANGE . . . . 540-1,600 kc

INTERMEDIATE FREQUENCY . . . . 455 kc

RCA TUBE COMPLEMENT
(1) RCA-1R5 . . . . 1st Det.—Osc.
(2) RCA-1T4 . . . . I-F Amplifier
(3) RCA 1S5 . . . . 2nd Det., A-F, and A.V.C.
(4) RCA-1S4 . . . . Power Output

POWER SUPPLY

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt Eveready No. 950	0.25 amperes	3-5 hours
"B"—67.5 volts Eveready No. 467	8.5 milliamperes	25-40 hours

POWER OUTPUT
Undistorted . . . . 0.05 watts
Maximum . . . . 0.12 watts

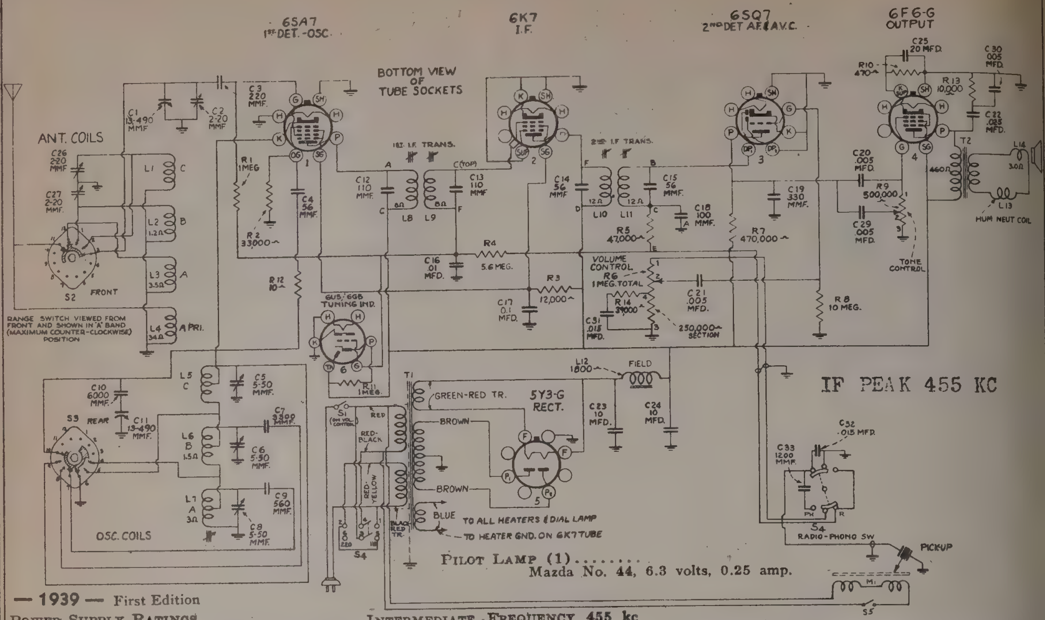
LOUDSPEAKER
Type . . . . 3-inch permanent-magnet dynamic
V.C. Impedance . . . . 3 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (inches)	3	8⅞	3⅞

Weight . . . . 3¾ lbs. (net) 4¾ lbs. (shipping)
Tuning Drive Ratio . . . . 1 to 1

MODEL 6QU
Ch. RC-414

RCA MFG. CO., INC.



IF PEAK 455 KC

PILOT LAMP (1)........
Mazda No. 44, 6.3 volts, 0.25 amp.

— 1939 — First Edition

Power Supply Ratings

Rating A5..	105-125 volts, 60 cycles, 100 watts
Rating A6..	105-125 volts, 50 cycles, 100 watts
Rating C6...........	105-125; 200-250 volts, 60 cycles, 100 watts
Rating C5...........	105-125; 200-250 volts, 50 cycles, 100 watts

Intermediate Frequency 455 kc

Power Output Rating

Undistorted................ 1.5 watts
Maximum................ 3.3 watts

Loudspeaker (RL-79-2)

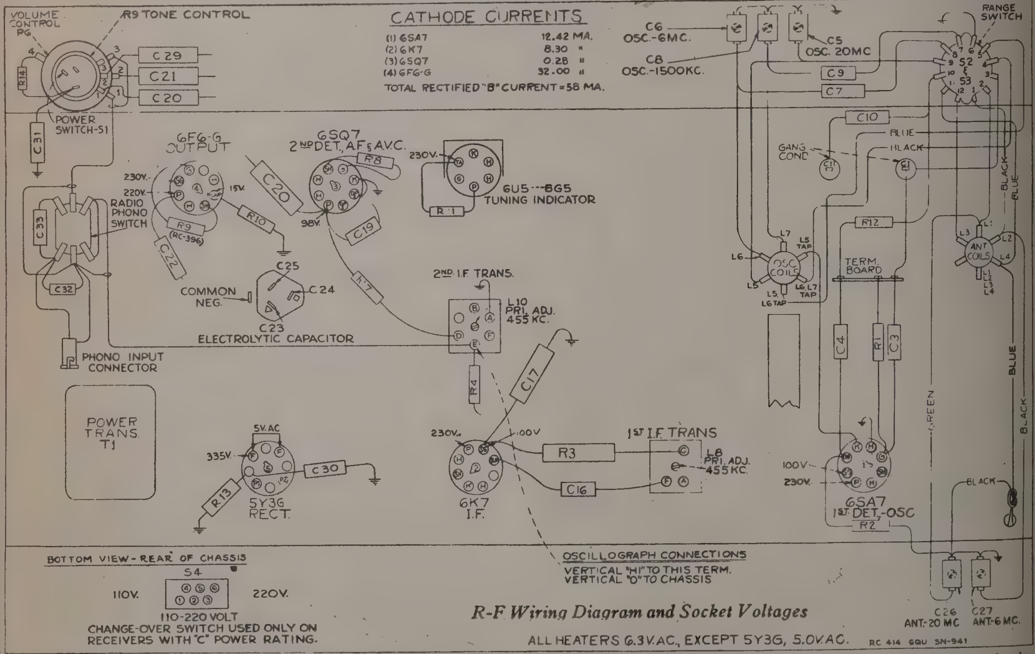
Type........... 6-inch electrodynamic
V.C. Impedance. 3.4 ohms at 400 cycles

Crystal Pickup

Impedance...... 100,000 ohms at 1,000 cycles
Average Output.. 1½ volts at 1,000 cycles with 250,000 ohms load

Phonograph Mechanism

Type...... Manual; 10-inch or 12-inch records
Motor... Self-starting, constant speed induction



CATHODE CURRENTS

(1) 6SA7	12.42 MA.
(2) 6K7	8.30 "
(3) 6SQ7	0.28 "
(4) 6F6-G	32.00 "

TOTAL RECTIFIED "B" CURRENT = 58 MA.

R-F Wiring Diagram and Socket Voltages

ALL HEATERS 6.3V.AC., EXCEPT 5Y3G, 5.0V.AC.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

General Description

Model 6QU is a three-band, table-type, superheterodyne Victrola used in a wood cabinet. The phonograph mechanism is of the anual type, and will play either 10-inch or 12-inch records.

Victrolas having "C5" or "C6" power rating may be made to erate on either 110 or 220 volts, conversion from one voltage to the her being made by means of a switch at the back of the chassis.

Features of design include: New type, single-ended tubes (6SA7 and 6SQ7); magnetite-core I-F transformers; magnetite-core oscillator coil on "A" band; automatic volume control; straight-line, edge-lighted dial; continuously variable tone control; supply-voltage change-over switch (on "C5" and "C6" rating Victrolas).

Miscellaneous Service Data

honograph Mechanism:

The phonograph motor is a self-starting, constant-speed induction pe. It should be lubricated every six months by applying a few ops of light machine oil to the spindle bearing and oil hole.

The motor spindle is tapered, and a conical rubber piece fits ugly on the spindle. The hole in the turntable bushing is tapered fit the rubber. This provides an excellent self-centering floating ounting.

A metal washer is placed on the spindle under the rubber piece. he washer has ears on the under side which fit over a pin that ojects through the spindle.

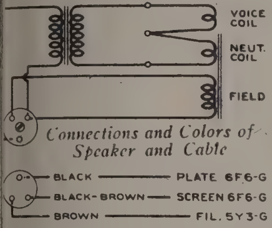
The motor switch is automatic for both starting and stopping, nd when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1⅜ inches from the center line of the spindle shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

Crystal Pickup:

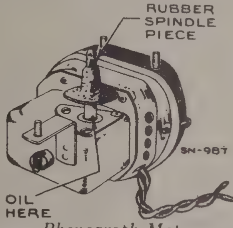
The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Precautionary Lead Dress:

1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against front apron.
2. C-10 should be dressed away from the antenna section of the variable condenser (C-1)



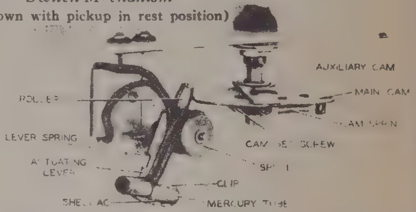
Connections and Colors of Speaker and Cable



Phonograph Motor

Switch Mechanism

(Shown with pickup in rest position)



Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as ow as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

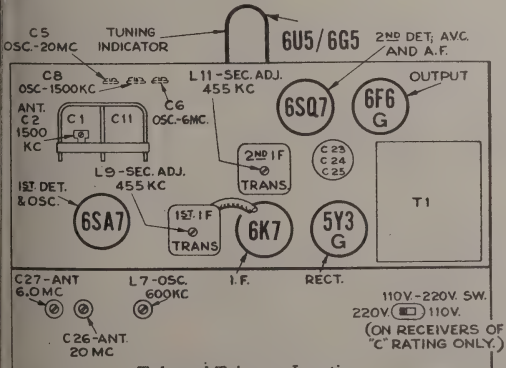
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L10 and L11 (2nd I.F. trans.)
2	Tuning condenser stator (osc.) in series with .01 mfd. **	455 kc		L8 and L9 (1st I.F. trans.)
3	Antenna lead in series with 200 mmfd.	600 kc	600 kc (33°) "A" Band	L7†
4		1,500 kc	1,500 kc (152.4°) "A" Band	C2 (ant.) C8 (osc.)
5	Repeat steps 3 and 4			
6	Antenna lead in series with 400 ohms	20 mc	20 mc (155.4°) "C" Band	C5 (osc.) * C26 (ant.)
7		6 mc	6 mc (149°) "B" Band	C6 (osc.) * C27 (ant.)
8	Antenna lead in series with 200 mmf.	1,500 kc	1,500 kc (152.4°) "A" Band	C8 (osc.)

* Use minimum capacity peak if two peaks can be obtained.

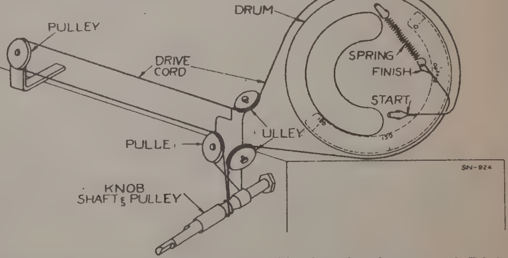
† Rock gang condenser slightly while adjusting L7.

** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

Note.—Oscillator tracks 455 kc above signal on all bands.



Tube and Trimmer Locations

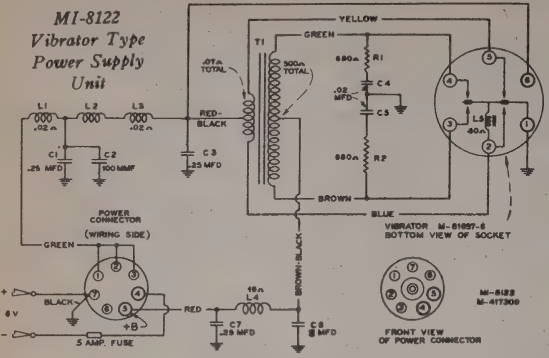


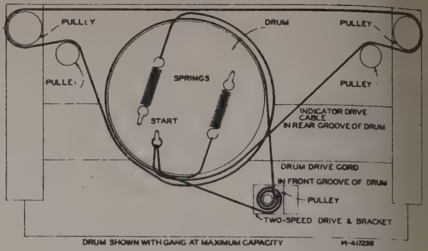
Arrangement of Drive Cord for Tuning Condenser and Dial Indicator. Drum Shown with Gang at Maximum Capacity

MODELS 7QB, 7QBK
Ch. RC-496

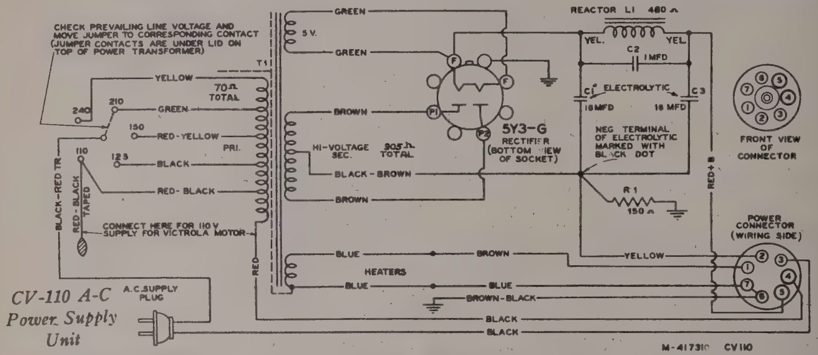
RCA MFG. CO., INC.

MI-8122 Vibrator Type Power Supply Unit

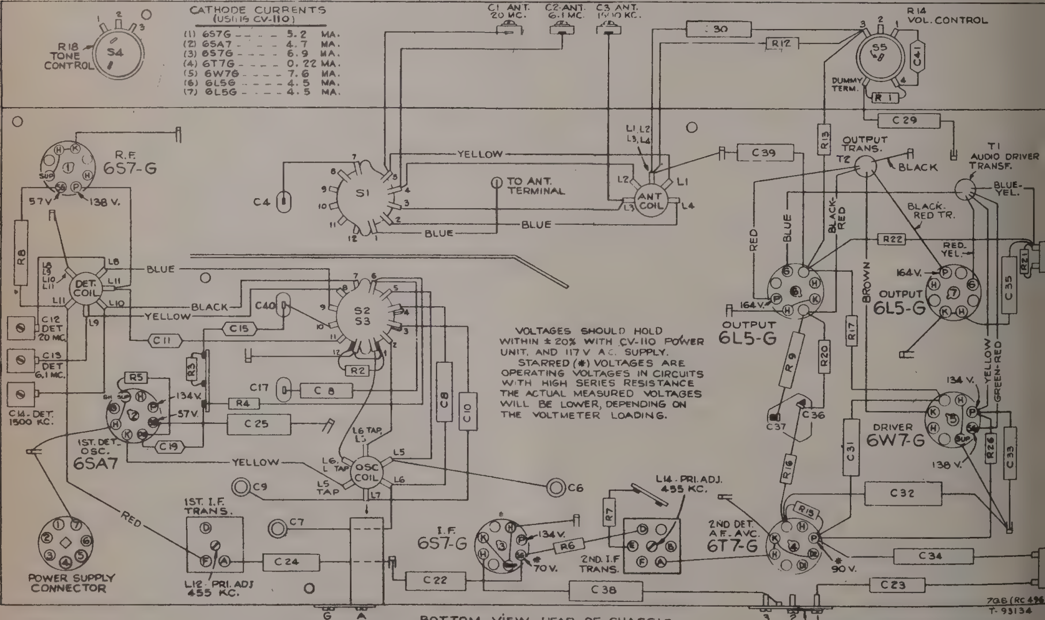



PULLEY
DRUM
PULLEY
PULLEY
SPRINGS
PULLEY
START
INDICATOR DRIVE CABLE IN REAR GROOVE OF DRUM
DRUM DRIVE CORD IN FRONT GROOVE OF DRUM
PULLEY
TWO-SPEED DRIVE & BRACKET
DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY
M-417288

Above—Arrangement of Drive Cords for Tuning Condenser and Dial Indicator



CV-110 A-C Power Supply Unit



CATHODE CURRENTS
(USING CV-110)

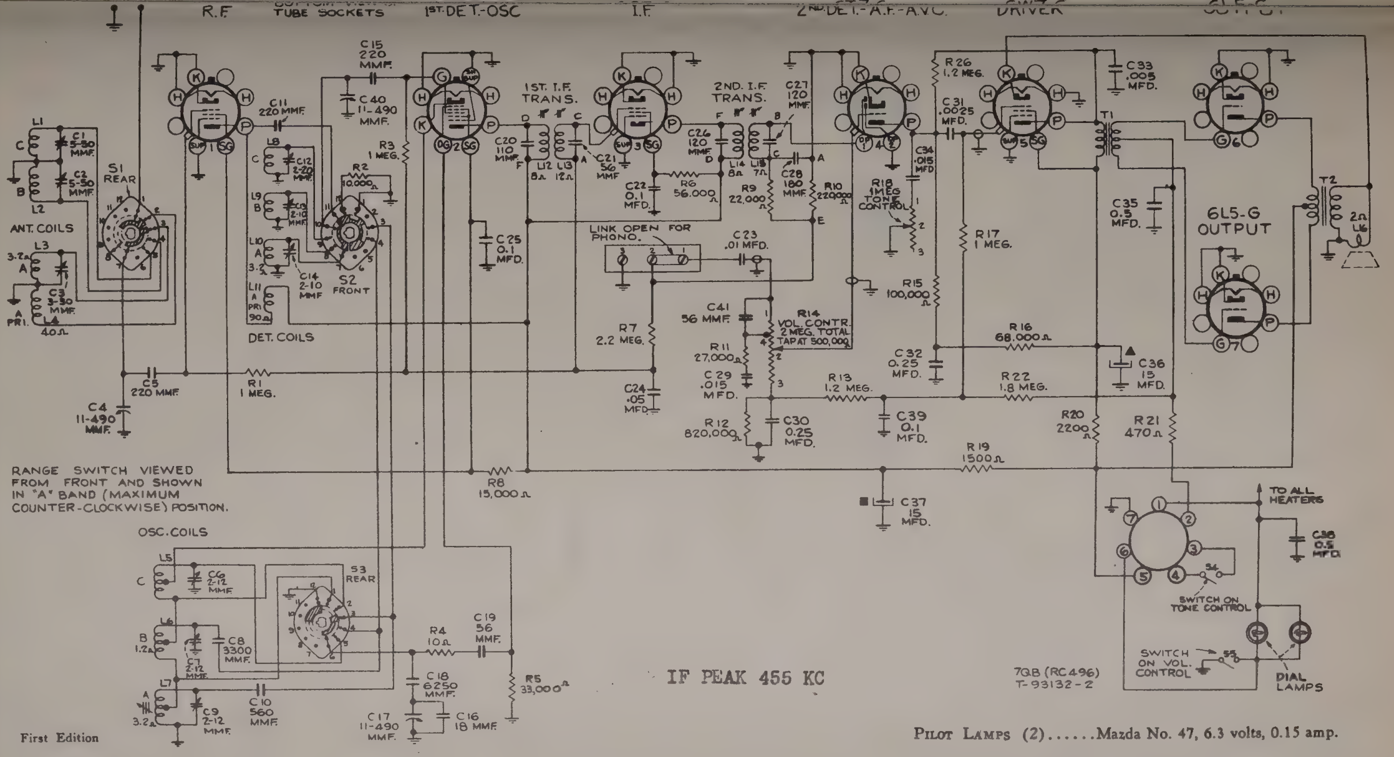
(1)	6S7G	5.2	MA.
(2)	6SA7	4.7	MA.
(3)	6S7G	6.9	MA.
(4)	6T7G	0.22	MA.
(5)	6W7G	7.6	MA.
(6)	6L5G	4.5	MA.
(7)	6L5G	4.5	MA.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH CV-110 POWER UNIT, AND 117 V A.C. SUPPLY.

STARRED (*) VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.

BOTTOM VIEW—REAR OF CHASSIS
R.F. WIRING AND SOCKET VOLTAGES

OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO LINK
VERTICAL "O" TO CHASSIS



RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAXIMUM COUNTER-CLOCKWISE) POSITION.

First Edition

—1939—

Precautionary Lead Dress.—

1. Dress the blue lead from the antenna lug to the No. 1 terminal on the range switch (S-1) close to the chassis and away from the gang for its entire length across the top of the chassis base.

2. Dress the yellow lead from the detector coil to No. 8 terminal on the range switch (S-2), directly away from the detector coil towards the rear apron.

3. Keep the blue lead from the detector coil to No. 9 terminal on the range switch (S-2), isolated from the other leads and parts.

4. Loop the bus wire from oscillator coil to No. 5 terminal on the range switch (S-3), directly away from these terminals and other parts as far as possible, bending the loop towards the center of the chassis.

5. Dress the 3,300 mmfd. capacitor (C8) from the oscillator coil to No. 4 terminal on the range switch (S-3), directly toward the center of the chassis, being sure to clear the bus wire loop mentioned above (4).

6. Pull in the slack on the long yellow wire which runs from the terminal board in the rear corner to the tone control, at the tone control end, making the portion of the lead lying outside the front apron taut, and close to the apron.

Pilot Lamps (2)......Mazda No. 47, 6.3 volts, 0.15 amp.

Power Supply Rating

D-C Rating (with vibrator-type power supply unit MI-8122) —6.3 volts, 3.2 amps.

A-C Rating (with CV-110 A-C power supply unit)— 105-117, 117-130, 140-160, 200-225, 225-250 volts, 25-60 cycles.

Power Output Rating

Maximum .... 2.6 watts
Undistorted .... 2.0 watts

Loudspeakers (Permanent-Magnet Dynamics)

7QB (RL-90-2) 8-inch
7QBK (RL-71-5) 12-inch
Voice-coil impedance at 400 cycles . 2.4 ohms

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

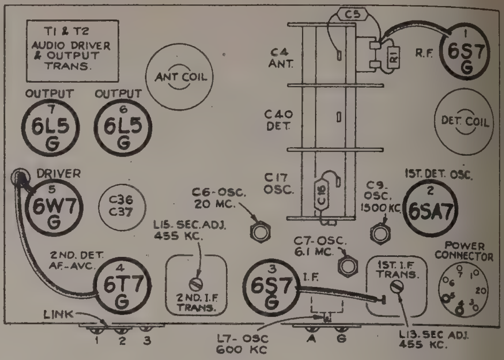
Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-v-c action.

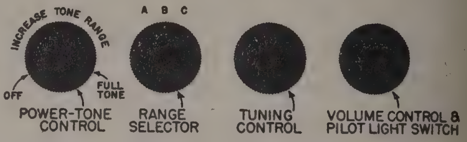
Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The surface of the drum must be flush with the end of the gang-condenser shaft. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark on the dial scales and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.





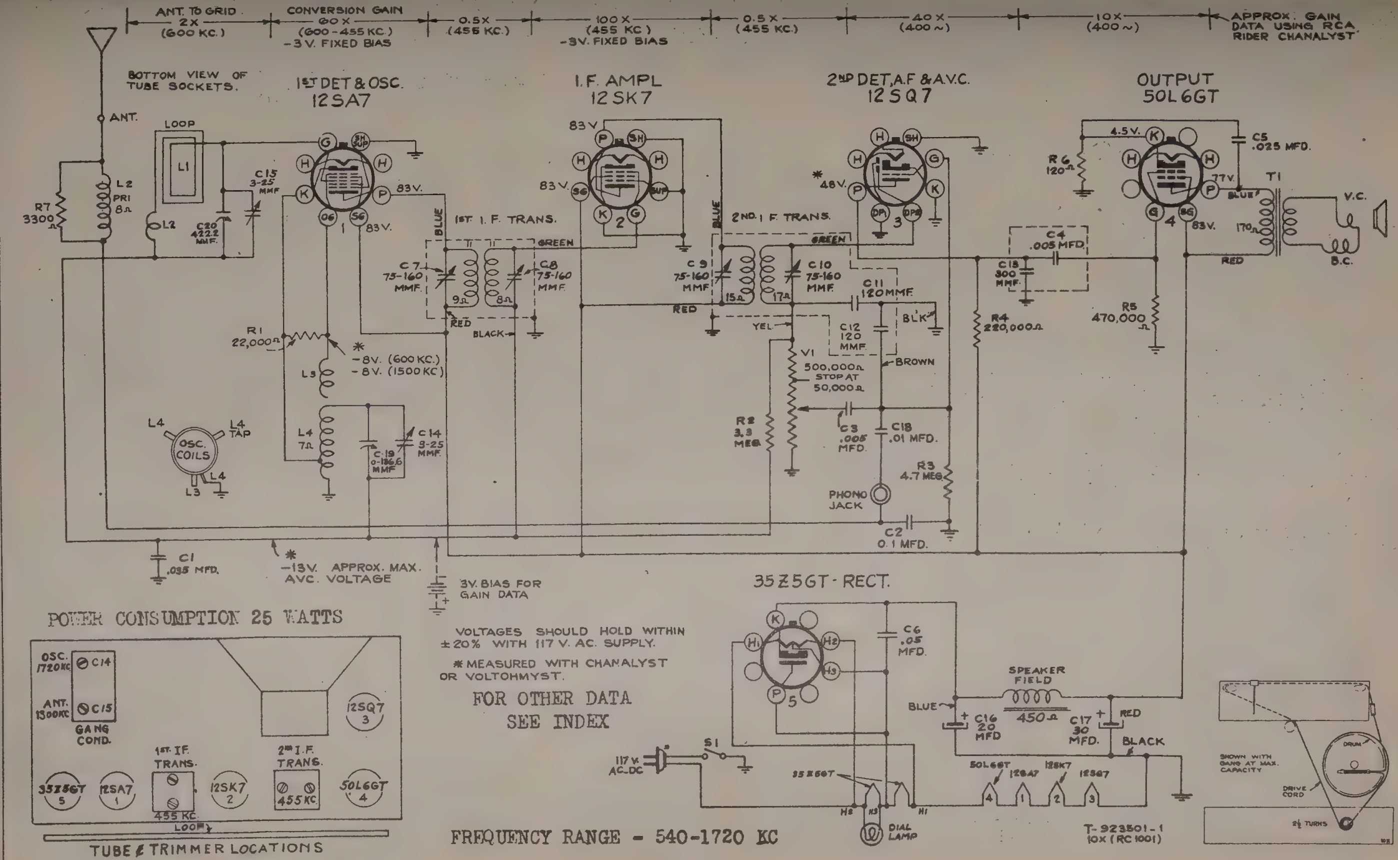
The pilot lights are illuminated by pressing in the volume-control knob. (The pilot lights are not controlled by this action when the receiver is operated with the CV-110 a-c power supply unit.)

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6S7-G I-F grid cap in series with .01 mfd.	455 kc	"A" band Quiet point between 550-750 kc	L14 and L15 (2nd I-F trans.)
2	6SA7 1st det. grid cap in series with .01 mfd.			L12 and L13 (1st I-F trans.)
3	Antenna terminal in series with 300 ohms	20 mc	20 mc (22°) "C" band	C6 (osc.)* C12 (det.) (Rock C1 (ant.) Gang)
4		6.1 mc	6.1 mc (27.9°) "B" band	C7 (osc.)** C13 (det.) C2 (ant.)
5	Antenna terminal in series with 200 mmfd.	600 kc	600 kc (143.5°) "A" band	L7 (osc.) Rock Gang
6		1,500 kc	1,500 kc (27.8°) "A" band	C9 (osc.) C14 (det.) C3 (ant.)
7	Repeat steps 5 and 6			

* Use **minimum** capacity peak (plunger out) if two can be obtained. Check to determine that C6 has been adjusted to the correct peak by turning radio to approximately 19.09 mc where a weaker signal should be received.

** Use **minimum** capacity peak if two can be obtained. Check to determine that C7 has been adjusted to the correct peak by turning radio to approximately 5.19 mc where a weaker signal should be heard.

Note: Oscillator tracks above signal on all bands.



POWER CONSUMPTION 25 WATTS

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

FOR OTHER DATA
SEE INDEX

FREQUENCY RANGE - 540-1720 KC

Precautionary Lead Dress.—

1. Dress the power cable to switch on the volume control close to the chassis and away from all grid and diode leads and condensers.
2. Dress capacitors in the 12SQ7 grid circuit away from all wiring.
3. Green and black phono wires should be twisted and dressed away from other parts and leads.
4. 50L6-GT filament wires should be dressed to rear of chassis and away from the second I-F transformer leads.
5. Dress brown lead from second I-F transformer to 12SQ7 away from power cable.
6. Dress wire to No. 1 grid of the 12SA7 away from pilot lamp leads.
7. Dress wire from loop to variable condenser away from chassis.
8. Dress all capacitors, leads, etc. which come close to oscillator coil rigidly and as far as possible from it.

RCA MFG. CO., INC.

Alignment Procedure

MODELS 10X, 11X-1

Output Meter Alignment.—If this method is used connect the meter across the voice coil, and turn the receiver volume control to maximum.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor. When the electronic voltmeter is used as an alignment indicator the output of the test oscillator should be adjusted to produce several volts of AVC. With the output meter alignment method the oscillator output should be kept as low as possible.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 grid in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 grid in series with 0.1 mfd.			C8, C7 1st I-F Transformer
3	Antenna term. of ant. trans. in series with 200 mmfd.	1,720 kc	1,720 kc	C14 (osc.)
4	Radiated Signal 1,300 kc		Resonance on Signal	C15 (ant.)
5	Repeat steps 3 and 4.			

Replacement Parts

MODELS 10X, 11X-1

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES Model 10X (RC-1001)	
33584	Capacitor—.005 mfd.	.25
37359	Capacitor—1 section of .005 mfd., and 1 section of 300 mmfd.	.25
14393	Capacitor—.01 mfd.	.30
30938	Capacitor—.025 mfd.	.20
5196	Capacitor—.035 mfd.	.20
32787	Capacitor—.05 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
34505	Capacitor—0.2 mfd.	.30
35348	Capacitor—Electrolytic comprising 1 section of 30 mfd., and 1 section of 20 mfd.	.95
37356	Coil—Loop primary coil (Antenna)	.35
36234	Coil—Oscillator coil	.60
37353	Condenser—Tuning condenser	2.75
36584	Control—Volume control and power switch	1.50
32634	Cord—Drive cord (approx. 32-in. overall length)	.10
37068	Indicator—Station selector indicator	.20
37351	Plate—Dial back plate complete with pulleys—less dial	.60
36230	Pulley—Drive cord pulley	.04
37355	Receptacle—Receptacle and terminal board	.20
12312	Resistor—3,300 ohms, ½ watt	.20
13998	Resistor—22,000 ohms, ½ watt	.20
12264	Resistor—220,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
12928	Resistor—3.3 meg., ½ watt	.20
30271	Resistor—4.7 meg., ½ watt	.20
37352	Shaft—Tuning shaft	.15
34449	Socket—Dial lamp socket	.30
31251	Socket—Tube socket (wafer type)	.25
37605	Socket—Tube socket (moulded type)	.25
37357	Spacer—Wood spacer for antenna loop	.10
31418	Spring—Drive cord spring	.05
37350	Transformer—Audio transformer (output)	1.35
36232	Transformer—First I.F. transformer	1.50
36233	Transformer—Second I.F. transformer	1.50
33726	Washer—"C" washer for tuning shaft	.02
37358	Winding—Antenna loop winding only	.55
	SPEAKER ASSEMBLIES (RL-86A1)	
32907	Cap—Dust cap	.02
35570	Cone—Cone complete with voice coil	1.20
37332	Speaker—5-inch dynamic speaker complete with cone and voice coil	3.25
	MISCELLANEOUS ASSEMBLIES	
37360	Back—Cabinet back	.25
35681	Base—Roto base complete	.35
37362	Clamp—Dial clamp (1 set)	.20
37363	Dial—Dial scale	.75
37831	Fastener—Push-on fastener for back	.10
37361	Knob—Volume control or tuning knob	.20
11765	Lamp—Dial lamp	.15
30900	Spring—Retaining spring for knobs	.05

Alignment Procedure

MODEL 45X-18

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that it is horizontal.

Push Button Adjustment.—The push-buttons should be adjusted for five favorite stations after the receiver is operating, and has had a brief warm-up period. Any standard broadcasting stations may be chosen, it being preferable to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Push in each button and loosen the push-button screws in back of the station marker recesses.
2. Accurately tune-in the first station manually.
3. With the station accurately tuned, press in the first push-button and tighten the screw.
4. Place station marker tab in the recess.
5. Adjust four remaining push buttons in a similar manner.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to	Adjust the following for max. peak output
1	12SK7 I-F grid, in series with .01 mfd.	455 kc	Quiet point 1600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 1st Det. grid in series with .01 mfd.			C8, C7 1st I-F Transformer
3	Ant. terminal in series with 100 mmfd.	1600 kc	1600 kc	C3 (osc.)
4	Radiated signal 1300 kc		Signal frequency	C1 (ant.)
5	Repeat steps 3 and 4.			

MODEL 16X-4

Push Button Adjustment:

1. Make a list of the six desired stations, arranged in order from low to high frequencies, and manually tune-in the first station on this list.
2. Push in station button No. 1 (extreme left) and adjust No. 1 oscillator core to receive the station.
3. Adjust antenna trimmer for maximum output. Clockwise core and trimmer adjustment tunes circuits to lower frequencies.
4. Adjust for each of the four remaining stations in a similar manner.
5. Make a final careful re-adjustment of oscillator cores and antenna trimmers.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio to—	Adjust the following for maximum peak output
1	12SK7 I-F grid, in series with 0.1 mfd.	455 kc	Quiet Point at 1,700 kc end of dial	C23, C22 2nd I-F transformer
2	12SA7 1st det. grid, in series with 0.1 mfd.			C21, C20 1st I-F transformer
3	12SK7 R-F grid, in series with 0.1 mfd.	1,720 kc	1,720 kc	C18 (osc.)
4	Radiated signal 1,300 kc		Resonance on signal	C16 (ant.)
5	Repeat steps 3 and 4			

RCA MFG. CO., INC.

MODEL 7Q4, Ch. RC-478A
MODEL 7QK4, Ch. RC-478B
MODEL 7Q4X, Ch. RC-502

Models 7Q4 and 7QK4 are similar to Model 6Q4 except for the addition of a tuning indicator (RCA-6U5/6G5). The QK4 chassis uses an RCA-6F6 output tube, whereas the 7Q4 uses an RCA-6F6-G output tube.

The dial scale of Models 7Q4 and 7QK4, together with a table giving alignment frequencies and calibration degrees, is how below. For additional alignment data, schematic diagram, etc., refer to the service note on Model 6Q4.

UBE COMPLEMENT

1) RCA-6SK7	R-F Amplifier
2) RCA-6SA7	1st Detector-Oscillator
3) RCA-6SK7	I-F Amplifier
4) RCA-6SQ7	2nd Detector, A.V.C., and A-F Amplifier
5) RCA-6F6-G (7Q4) RCA-6F6 (7QK4)	Output
6) RCA-5Y3-G	Rectifier
7) RCA-6U5/6G5	Tuning Indicator

LOUDSPEAKERS

7Q4 (RL-63K-2)	8-inch electrodynamic
7QK4 (RL-70J-4)	12-inch electrodynamic
V. C. Impedance	2.2 ohms at 400 cycles

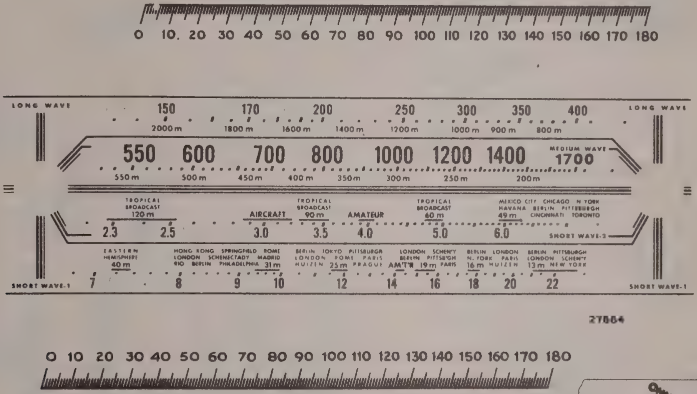
CABINET DIMENSIONS

7Q4	15$\frac{9}{16}$-inches x 20$\frac{5}{8}$-inches x 9$\frac{7}{8}$-inches
7QK4	38-inches x 26-inches x 11$\frac{3}{4}$-inches

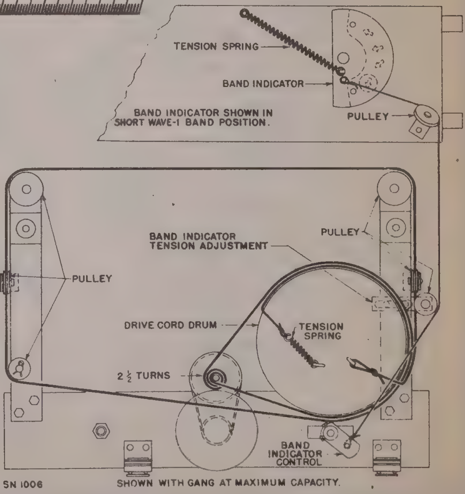
Calibration Scale

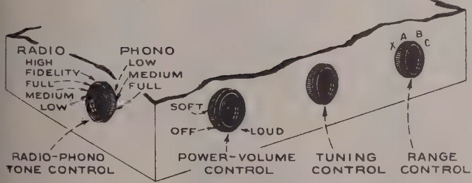
Frequency	Calibration Degrees
175 kc.	52.8
360 kc.	148.5
600 kc.	32.0
1,500 kc.	152.0
6.0 mc.	150.0
20.0 mc.	157.0

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale.


0 10. 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
LONG WAVE
150 170 200 250 300 350 400
2000 m 1800 m 1600 m 1400 m 1200 m 1000 m 900 m 800 m
LONG WAVE
550 600 700 800 1000 1200 1400
MEDIUM WAVE 1700
550 m 500 m 450 m 400 m 350 m 300 m 250 m 200 m
TROPICAL BROADCAST 120 m
AIRCRAFT
TROPICAL BROADCAST 90 m
AMATEUR
TROPICAL BROADCAST 60 m
MEXICO CITY CHICAGO N YORK HAVANA BERLIN PITTSBURGH CINCINNATI TORONTO 49 m
2.3 2.5 3.0 3.5 4.0 5.0 6.0
SHORT WAVE-2
EASTERN HEMISPHERE 40 m
HONG KONG SPRINGFIELD ROME LONDON SCHENECTADY MADRID RIO BERLIN PHILADELPHIA 31 m
BERLIN TOKYO PITTSBURGH LONDON ROME PARIS HUIZEN 25 m PRAGUE
AM'T'R
LONDON SCHEN'Y BERLIN PITTSB'GH 19 m PARIS
BERLIN LONDON N. YORK PARIS 16 m HUIZEN
BERLIN PITTSBURGH LONDON SCHEN'Y 13 m NEW YORK
SHORT WAVE-1
7 8 9 10 12 14 16 18 20 22
SHORT WAVE-1
27884
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

At Right—Dial Drive Mechanism and Band Indicator
Below—Controls


TENSION SPRING
BAND INDICATOR
BAND INDICATOR SHOWN IN SHORT WAVE-1 BAND POSITION.
PULLEY
PULLEY
BAND INDICATOR TENSION ADJUSTMENT
PULLEY
DRIVE CORD DRUM
TENSION SPRING
2½ TURNS
BAND INDICATOR CONTROL
SN 1006
SHOWN WITH GANG AT MAXIMUM CAPACITY.

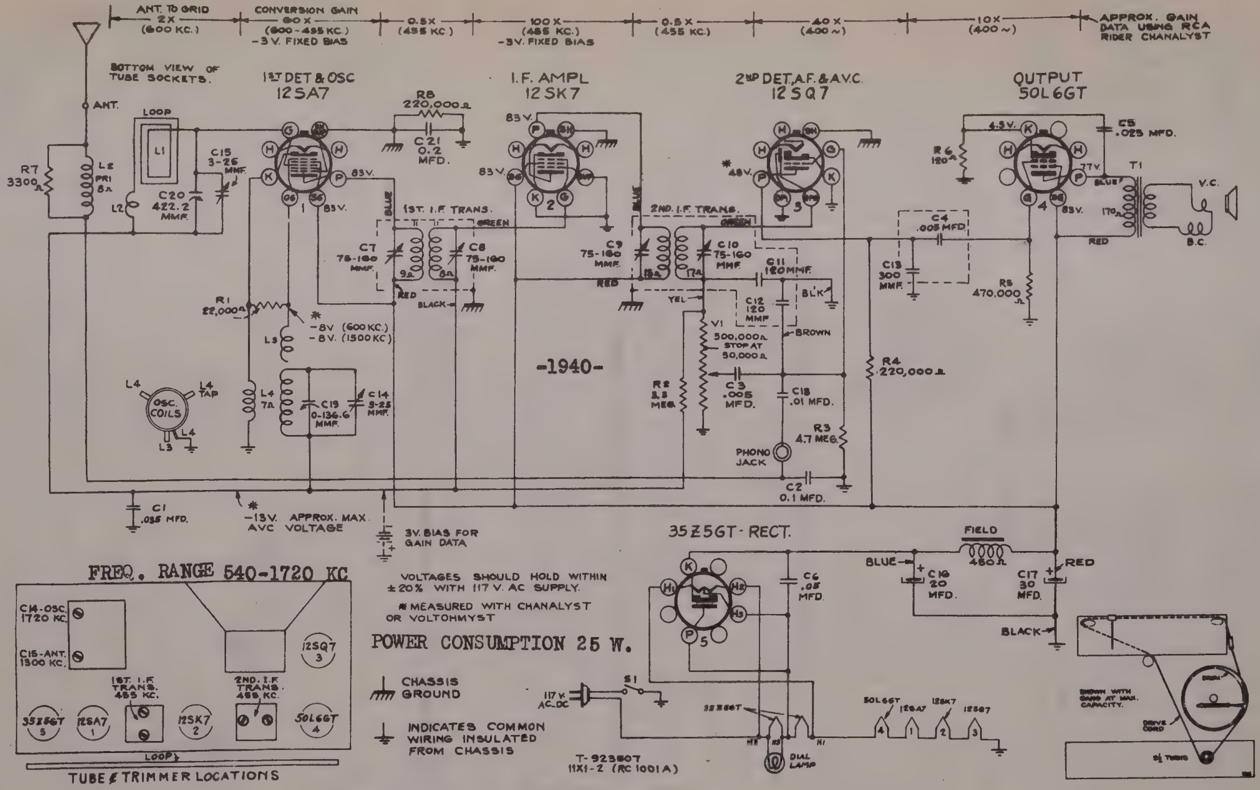


Dial Drive and Controls

for Models 7Q4, 7QK4 and 7Q4X

MODEL 11X-1
Ch. RC-1001-A

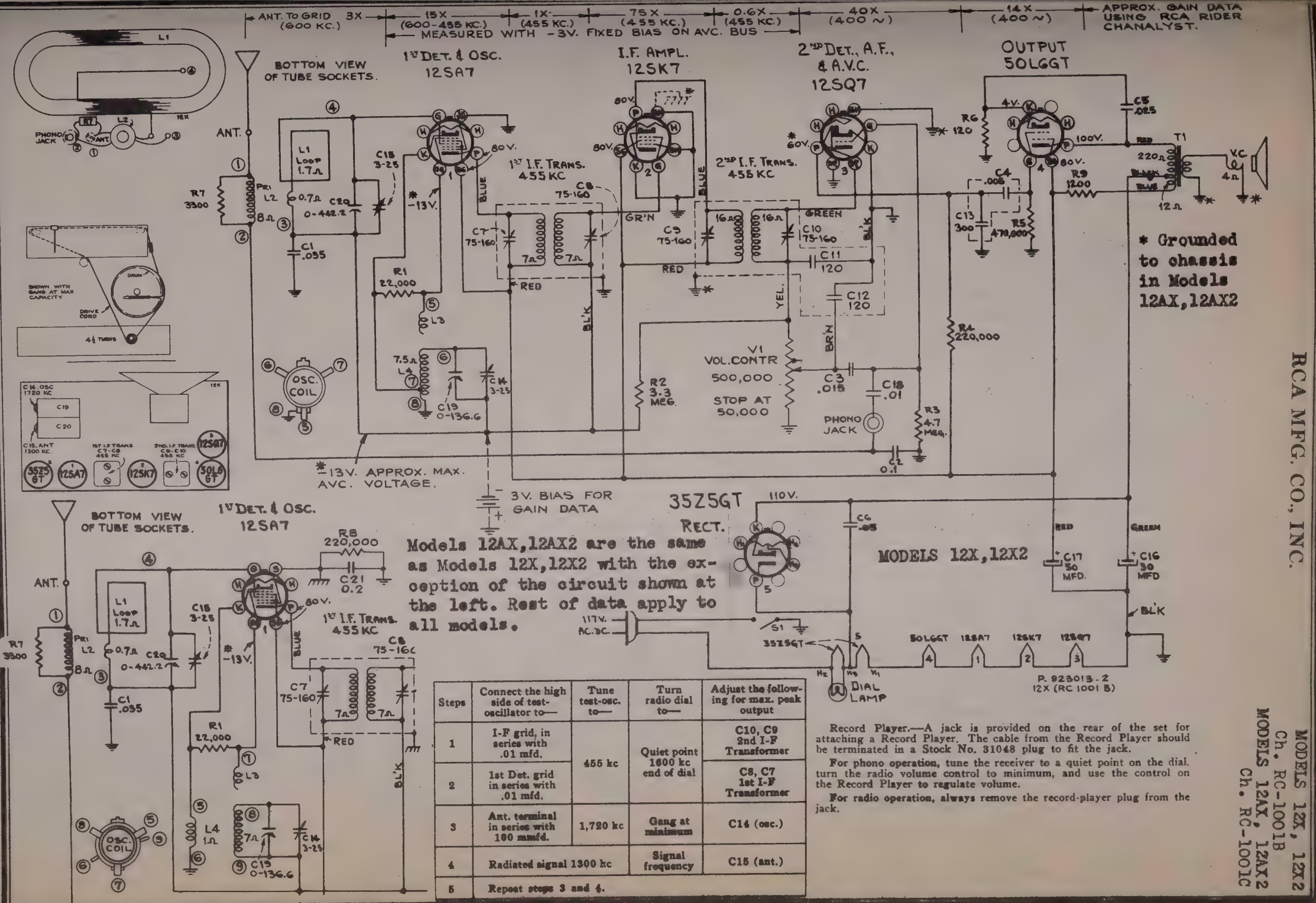
RCA MFG. CO., INC.



FOR OTHER DATA SEE INDEX

Precautionary Lead Dress.—

1. Dress the power cable to switch on the volume control close to the chassis and away from all grid and diode leads and condensers.
2. Dress capacitors in the 12SQ7 grid circuit away from all wiring.
3. Green and black phono wires should be twisted and dressed away from other parts and leads.
4. 50L6-GT filament wires should be dressed to rear of chassis and away from the second I-F transformer leads.
5. Dress brown lead from second I-F transformer to 12SQ7 away from power cable.
6. Dress wire to No. 1 grid of the 12SA7 away from pilot lamp leads.
7. Dress wire from loop to variable condenser away from chassis.
8. Dress all capacitors, leads, etc. which come close to oscillator coil rigidly and as far as possible from it.



*** Grounded to chassis in Models 12AX,12AX2**

Models 12AX,12AX2 are the same as Models 12X,12X2 with the exception of the circuit shown at the left. Rest of data apply to all models.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1600 kc end of dial	C10, C9 2nd I-F Transformer
2	1st Det. grid in series with .01 mfd.			C8, C7 1st I-F Transformer
3	Ant. terminal in series with 100 mmfd.	1,720 kc	Gang at minimum	C14 (osc.)
4	Radiated signal 1300 kc		Signal frequency	C15 (ant.)
5	Repeat steps 3 and 4.			

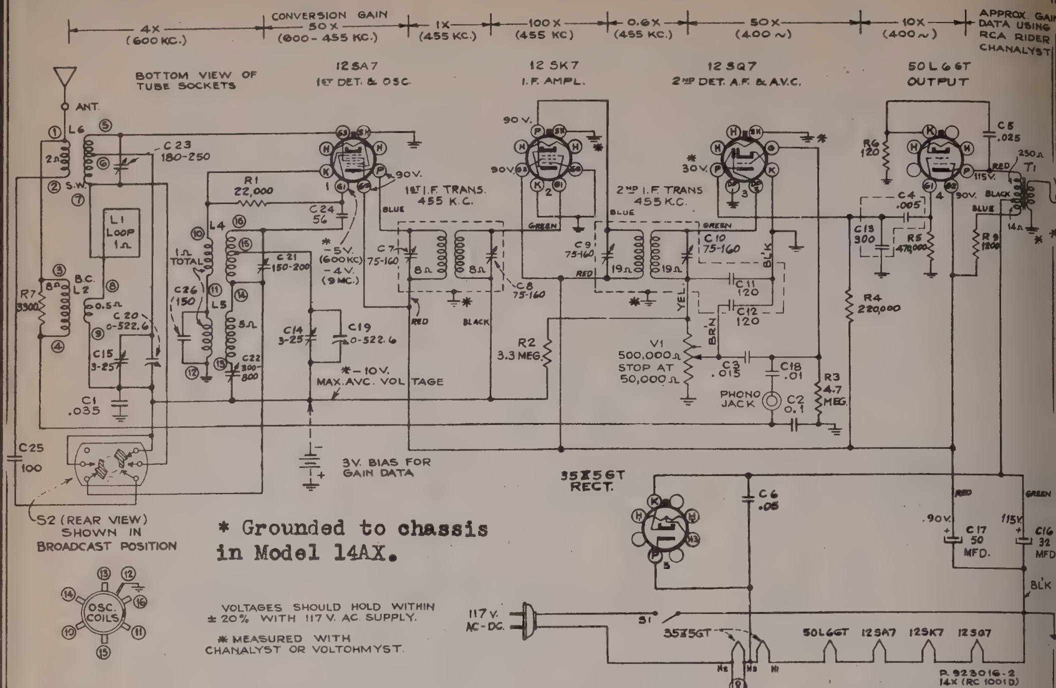
Record Player.—A jack is provided on the rear of the set for attaching a Record Player. The cable from the Record Player should be terminated in a Stock No. 31048 plug to fit the jack.

For phono operation, tune the receiver to a quiet point on the dial, turn the radio volume control to minimum, and use the control on the Record Player to regulate volume.

For radio operation, always remove the record-player plug from the jack.

MODEL 14X, Ch. RC1001D
MODEL 14AX, Ch. RC1001E

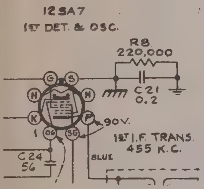
RCA MFG. CO., INC.



*** Grounded to chassis in Model 14AX.**

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.



Model 14AX is the same as Model 14X with the exception of the circuit shown above.

Power Output

Undistorted	.9 watts
Maximum	1.3 watts

Loudspeaker (92161-1)

Type	5-inch permanent-magnet dynamic
V.C. Impedance	3.3 ohms at 400 cycles

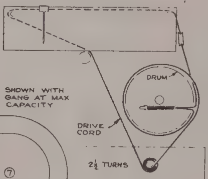
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 grid in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 grid in series with 0.1 mfd.			C8, C7 1st I-F Transformer
3	Antenna term. in series with 47 mmf.	10 mc*	10 mc	C21 (osc.)** C23 (ant.)
4	Antenna term. in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)
5	Radiation Loop	1,300 kc	Resonance on Signal	C15 (ant.)
6	Radiation Loop	600 kc	600 kc	C22 Osc. Rock in

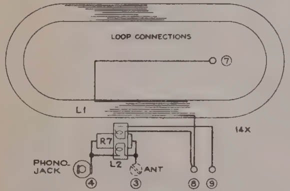
* It is recommended that this step be repeated using a received station of known frequency.

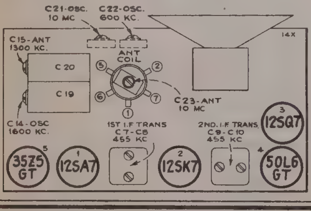
** Use minimum capacity if two peaks can be obtained.

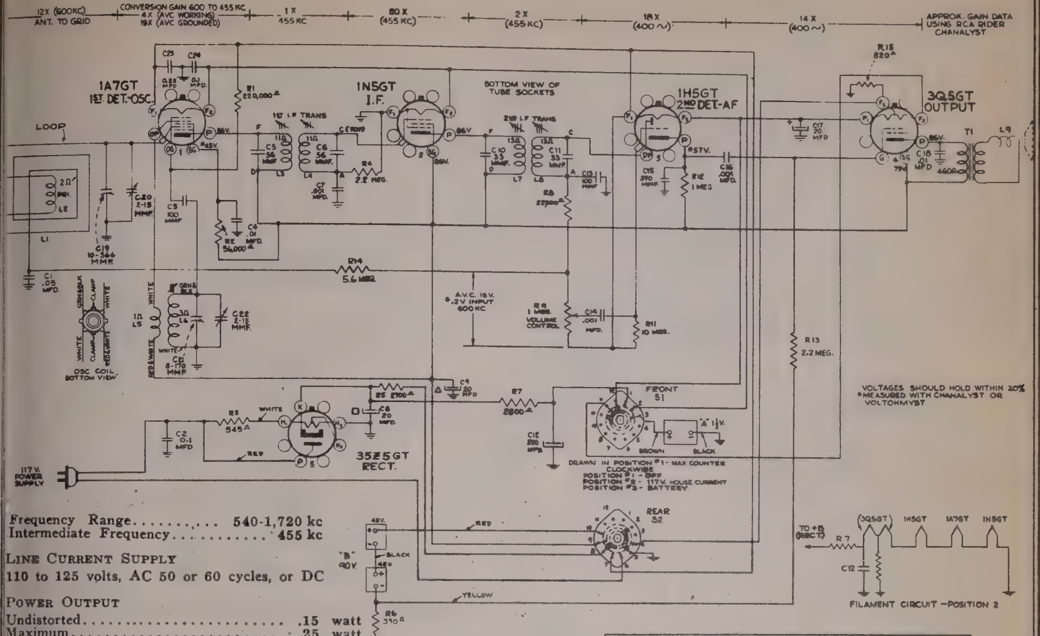
Precautionary Lead Dress.—

1. Dress the power cable to switch on the volume control close to the chassis and away from all grid and diode leads and condensers.
2. Dress capacitors in the 12SQ7 grid circuit away from all wiring.
3. Green and black phono wires should be twisted and dressed away from other parts and leads.
4. 50L6-GT filament wires should be dressed to rear of chassis and away from the second I-F transformer leads.
5. Dress brown lead from second I-F transformer to 12SQ7 away from power cable.
6. Dress wire to No. 1 grid of the 12SA7 away from pilot lamp leads.
7. Dress wire from loop to variable condenser away from chassis.
8. Dress all capacitors, leads, etc. which come close to oscillator coil rigidly and as far as possible from it.









Frequency Range.......... 540-1,720 kc
Intermediate Frequency........... 455 kc

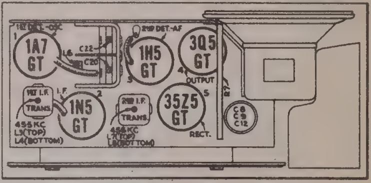
Line Current Supply
110 to 125 volts, AC 50 or 60 cycles, or DC

Power Output
Undistorted.......................... .15 watt
Maximum.............................. .25 watt

Batteries Required
"A" one 1.5 volt dry plug-in type "A," (Eveready No. 743 or equivalent)
"B" two 45 volt dry plug-in type "B," (Eveready No. 482 or equivalent)

Current Consumption
"A" 0.25 amperes
"B" 11.5 milliamperes } .... Battery Operation

Loudspeaker
Type......................... 5-inch permanent-magnet dynamic
Voice-coil Impedance.................. 3.4 ohms at 400 cycles
Identification Number RL-85-A1



Alignment Procedure

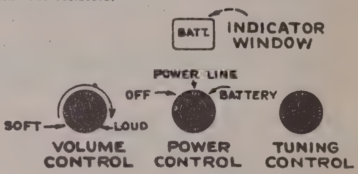
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

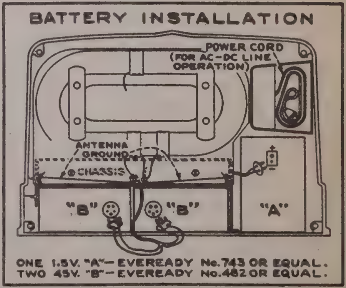
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1N5GT I-F grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	L8, L7 (2nd transformer)
2	1A7GT 1st-Det. grid cap, in series with .01 mfd.			L4, L3 (1st I-F transformer)
3	radiated signal 1,720 kc		signal frequency	C22 (Osc. Trimmer)
4	radiated signal 1,400 kc			C20 (Ant. Trimmer)
5	radiated signal near 600 kc			L6 (Rock in)
6	Repeat steps 3, 4 and 5 until aligned.			

Precautionary Lead Dress.—

1. Lead from I-F tube grid and from the loop to variable capacitor should not be disturbed after receiver has been aligned.
2. Grid lead to the 1N5-GT tube should be kept away from leads to filament resistors.



Model	Type Cabinet
Chassis RC-527	
15BP-1	Plastic
15BP-2	Brown Fabric
15BP-4	Brown Leatherette
15BP-6	Wood
Chassis RC-527A	
15BP-3	Gray Fabric
15BP-5	Blue Leatherette


BATTERY INSTALLATION

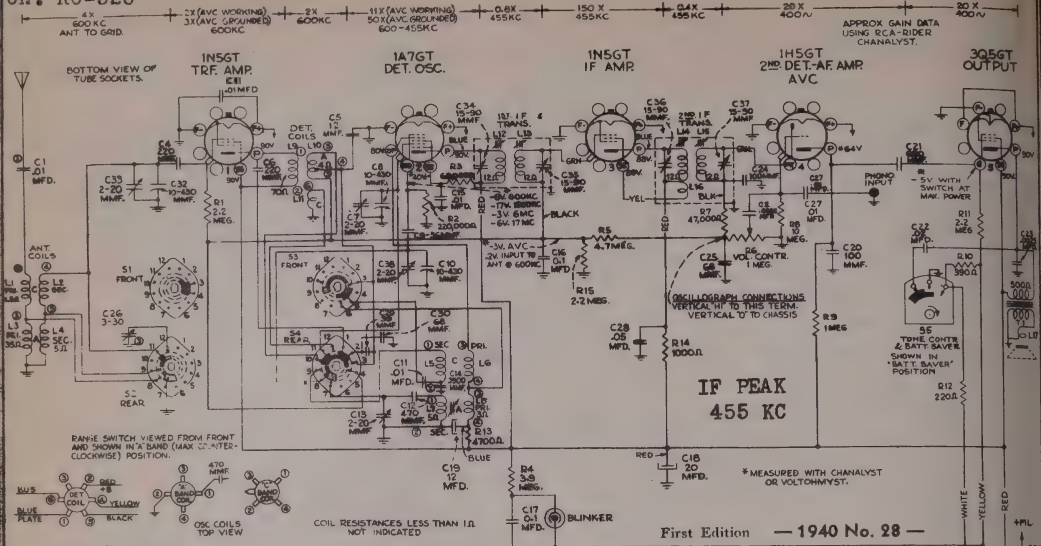
ONE 1.5V. "A"—EVEREADY No.743 OR EQUAL.
TWO 45V. "B"—EVEREADY No.482 OR EQUAL.

—1940 No. 26—

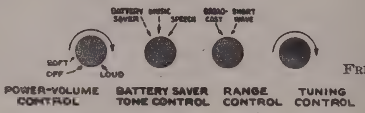
First Edition

MODEL 15BT
Ch. RC-526

RCA MFG. CO., INC.


4X 600KC ANT TO GRID.
2X (AVC WORKING) 3X (AVC GROUNDED) 600KC
2X 600KC
11X (AVC WORKING) 50X (AVC GROUNDED) 600-455KC
0.8X 455KC
150 X 455KC
0.4X 455KC
20 X 400~
20 X 400~
APPROX GAIN DATA USING RCA-RIDER CHANALYST.
BOTTOM VIEW OF TUBE SOCKETS.
1N5GT TRF. AMP.
1A7GT DET. OSC.
1N5GT IF AMP.
1H5GT 2ND DET.-AF. AMP. AVC
3Q5GT OUTPUT
1ST. I F TRANS.
2ND. I F TRANS.
DET. COILS
ANT. COILS
PHONO INPUT
-5V WITH SWITCH AT MAX. POWER
-2V. 600KC -17V. 1500KC -3V. 6MC -6V. 17MC
-3V. AVC -2V. INPUT TO ANT @ 600KC
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS
VOL. CONTR. 1 MEG.
S5 TONE CONTR. & BATT. SAVER SHOWN IN "BATT. SAVER" POSITION
IF PEAK 455 KC
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX COUNTER-CLOCKWISE) POSITION.
OSC COILS TOP VIEW
COIL RESISTANCES LESS THAN 1Ω NOT INDICATED
* MEASURED WITH CHANALYST OR VOLTOHMYST.
BLINKER
WHITE
YELLOW
RED
A- B- B+ A+

First Edition — 1940 No. 28 —



FREQUENCY RANGE
535-1,712 kc
5.9-18.3 mc

CURRENT CONSUMPTION

"A", 0.3 ampere—"B", 13 milliamperes
(In "Battery Saver" position, the "B" drain is reduced approximately 40%)

BATTERIES REQUIRED

"A"—"B" Pack (1.5 volt "A," 90 volt "B.")

POWER OUTPUT

Undistorted	0.14 watts
Maximum	0.25 watts

LOUDSPEAKER

Type	5-inch permanent-magnet dynamic
Voice Coil Impedance	3.4 ohms at 400 cycles
Indentification Number	RL-93-1

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagrams.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or Volt Ohmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment.

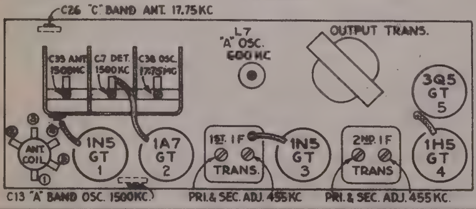
1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

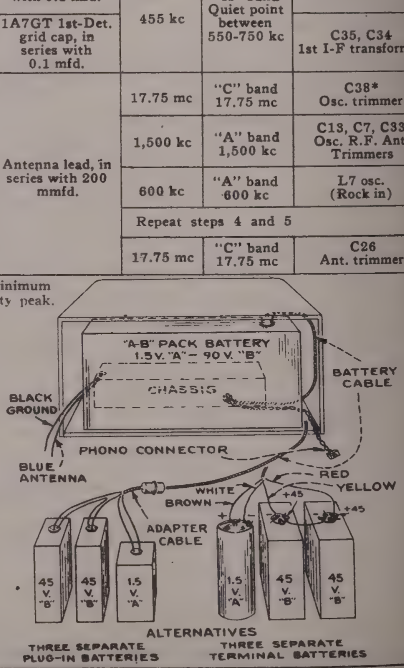
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	1N5GT I-F grid cap in series with 0.1 mfd.	455 kc	"A" band Quiet point between 550-750 kc	C37, C36 2nd I-F transformer
No. 2	1A7GT 1st-Det. grid cap, in series with 0.1 mfd.			C35, C34 1st I-F transformer
No. 3	Antenna lead, in series with 200 mmfd.	17.75 mc	"C" band 17.75 mc	C38* Osc. trimmer
No. 4		1,500 kc	"A" band 1,500 kc	C13, C7, C33 Osc. R.F. Ant. Trimmers
No. 5		600 kc	"A" band 600 kc	L7 osc. (Rock in)
No. 6		Repeat steps 4 and 5		
No. 7		17.75 mc	"C" band 17.75 mc	C26 Ant. trimmer

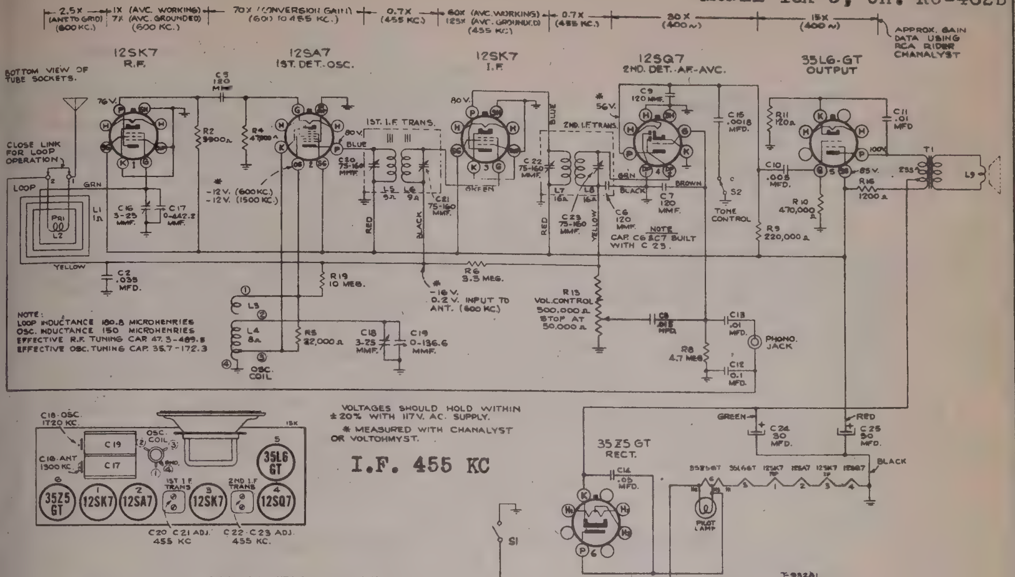
* Use minimum capacity peak.





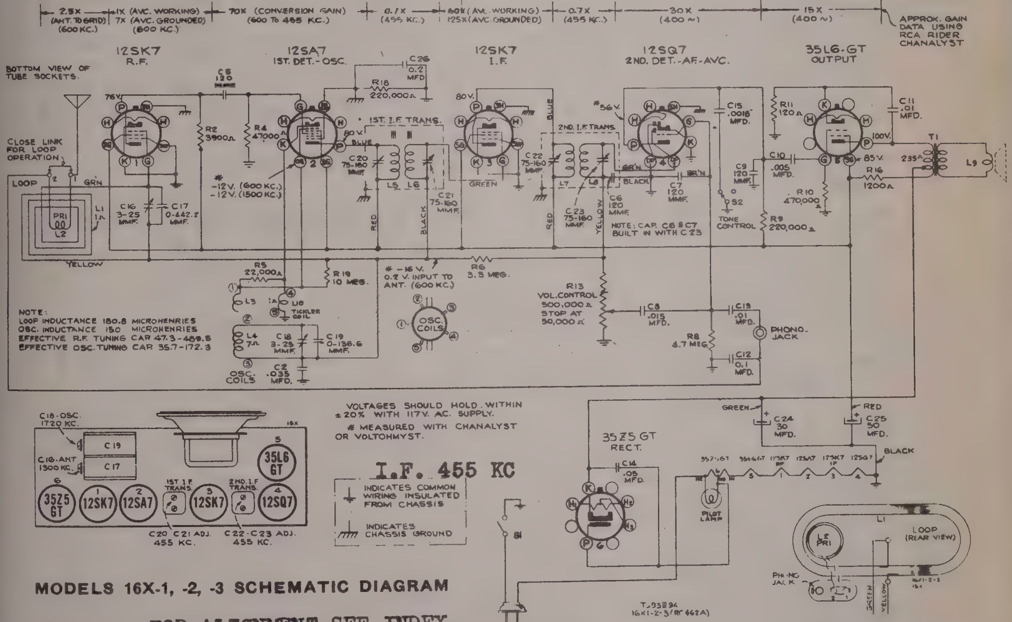
RCA MFG. CO., INC.

MODEL 15X, Ch. RC-462
MODELS 16X-1, 16X-2
Ch. RC-462A
MODEL 16X-3, Ch. RC-462B



MODEL 15X- SCHEMATIC DIAGRAM

FOR ALIGNMENT SEE INDEX



MODELS 16X-1, -2, -3 SCHEMATIC DIAGRAM

FOR ALIGNMENT SEE INDEX

Frequency Range .... 535-1,720 kc

Power Output

Undistorted	0.9 watts
Maximum	1.4 watts

Loudspeaker (RL-81A-5)

Type	5-inch permanent-magnet dynamic
V.C. Impedance	4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC .... 30 watts

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

MODELS 500,501

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 grid in series with .001 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C17, C18 (2nd I-F Trans.)
2	12SA7 grid in series with .001 mfd.			C15, C16 (1st I-F Trans.)
3	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C14 (oscillator)
4		1,500 kc	Resonance on 1,500 kc signal	C12 (antenna)

MODELS 15X, 16X-1, 16X-2, 16X-3

Precautionary Lead Dress:

1. .01 mfd. capacitor from output plate to cathode to be dressed as far as possible away from .015 mfd. 1st audio grid condenser and volume control terminals to eliminate audio howl.
2. Filament lead to pin No. 7 on 35L6-GT socket to be dressed away from 1st audio grid.
3. Dress B+ lead on 12SK7 I.F. socket across bottom of socket between grid and plate contacts to aid reduction of grid plate capacitance.
4. Dress excess lead lengths of I.F. transformer, grid and plate leads into cans to aid shielding.
5. Dress filament leads of 35L6-GT around 12SQ7 socket and into chassis corner to reduce hum.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio to—	Adjust the following for maximum peak output
1	12SK7 I-F grid, in series with 0.1 mfd.	455 kc	Quiet Point at 1,700 kc end of dial	C23, C22 2nd I-F transformer
2	12SA7 1st det. grid, in series with 0.1 mfd.			C21, C20 1st I-F transformer
3	12SK7 R-F grid, in series with 0.1 mfd.	1,720 kc	1,720 kc	C18 (osc.)
4	Radiated signal 1,300 kc		Signal frequency	C16 (ant.)
5	Repeat steps 3 and 4			

Alignment Procedure

MODELS 16X-11, 16X-13, 16X-14

Steps	Connect the high side of test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 I-F grid in series with 0.1 mfd.	455 kc	"A" Band Quiet Point 1,600 kc end of dial	C23, C22 2nd I-F Transformer
2	12SA7 1st Det. grid in series with 0.1 mfd.			C21, C20 1st I-F Transformer
3	Ant. terminal in series with 47 mmfd.	19 mc	"C" Band 19 mc	C18 (osc.)
4	Radiated Signal 18 mc		"C" Band Resonance on Signal	C31 (ant.)
5	Radiated Signal 6.1 mc		Resonance on Signal	Inductance of L12*
6	Ant. terminal in series with 200 mmfd.	1,720 kc	"A" Band 1,720 kc	C35 (osc.)
7	Radiated signal 1,400 kc		"A" Band Resonance on Signal	C33 (ant.)
8	Ant. terminal in series with 200 mmfd.	590 kc	"A" Band 590 kc	C36 (osc.)
9	Repeat steps 6, 7 and 8			

* Adjust by dressing proximity of AVC lead to coil.

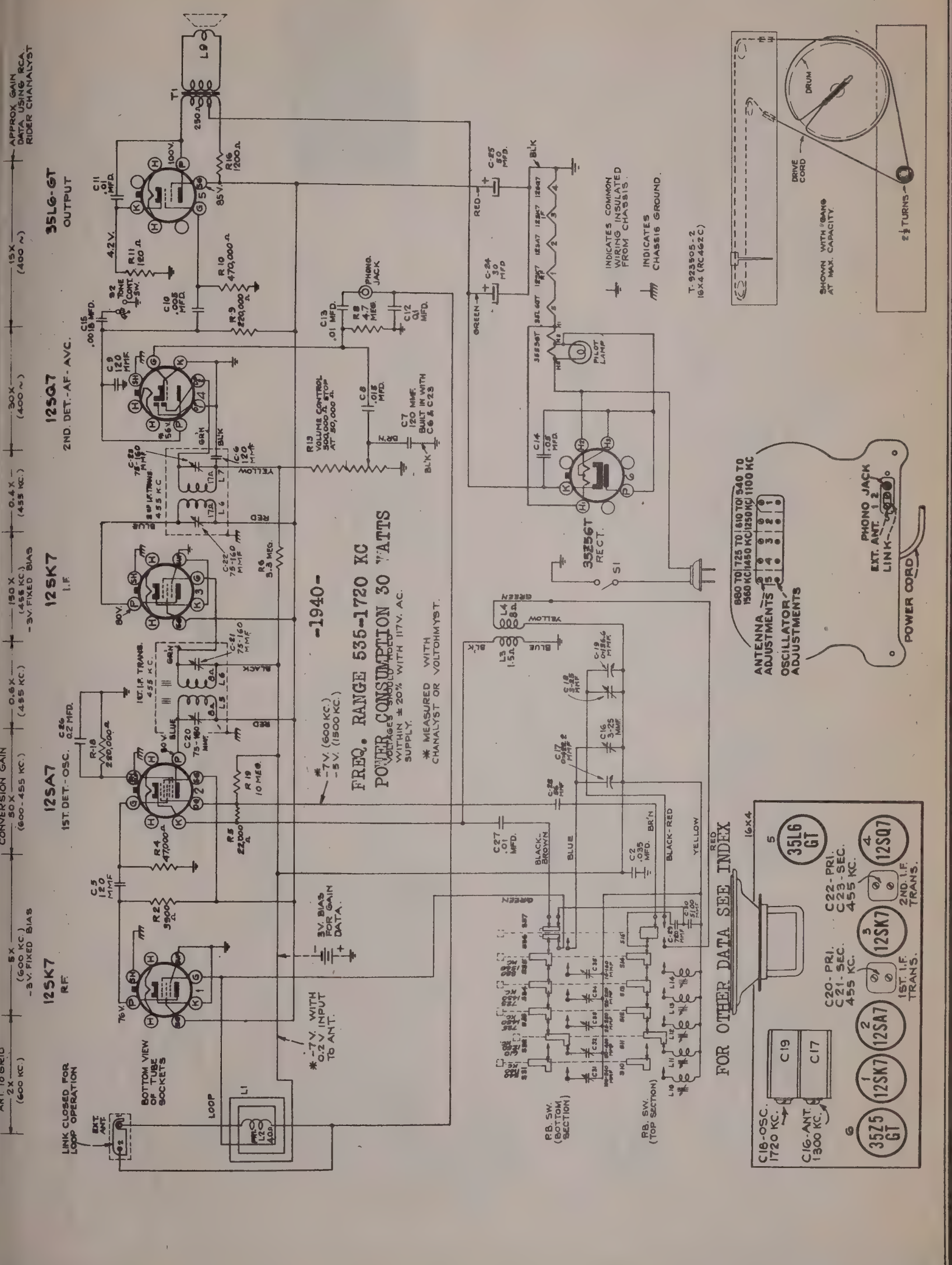
Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

Replacement Parts MODEL BP-10

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-544)	
36717	Capacitor—20 mmfd.	.40
36715	Capacitor—50 mmfd.	.40
36716	Capacitor—100 mmfd.	.40
12488	Capacitor—270 mmfd.	.35
36163	Capacitor—.001 mfd.	.25
33584	Capacitor—.005 mfd.	.25
36248	Capacitor—.02 mfd.	.20
32787	Capacitor—.05 mfd.	.20
36718	Capacitor—Electrolytic, 10 mfd., 60 volts	.40
36497	Coil—Oscillator coil	.70
36496	Condenser—Variable tuning condenser	2.75
36495	Control—Volume control	1.00
36606	Core—Adjustable core and stud for oscillator coil	.15
36503	Holder—Battery holder complete	.40
36501	Knob—Tuning knob	.75
36502	Knob—Volume control knob	.60
30158	Resistor—820 ohms, ¼ watt	.20
36714	Resistor—15,000 ohms, ¼ watt	.20
30787	Resistor—47,000 ohms, ¼ watt	.20
3252	Resistor—100,000 ohms, ¼ watt	.20
30652	Resistor—1 megohm, ¼ watt	.20
31417	Resistor—3.3 megohm, ¼ watt	.20
30931	Resistor—4.7 megohm, ¼ watt	.20
30992	Resistor—10 megohm, ¼ watt	.20
31085	Screw—No. 8-32 x ¼ set screw for knobs	.15
36500	Socket—Tube socket	.15
36069	Socket—1T4 tube socket	.20
36498	Transformer—First I.F. transformer	1.90
36499	Transformer—Second I.F. transformer	1.90
	SPEAKER ASSEMBLIES (84991-501)	
36504	Speaker—3-inch P. M. speaker, complete with cone and voice coil, less output transformer	2.50
36505	Transformer—Output transformer	.75
	MISCELLANEOUS ASSEMBLIES	
36510	Antenna—Antenna loop and cover	1.75
36507	Bottom—Receiver case bottom cover	1.50
36508	Center—Receiver case center strip	2.50
36509	Handle—Carrying handle and bracket	.45
36696	Initials—100 initials to each set comprising 25 groups of the average initials and one tube of cement	2.00
36511	Lid—Receiver case top cover and panel	5.50
36695	Strap—Shoulder strap	.60
36506	Switch—Power switch	.40

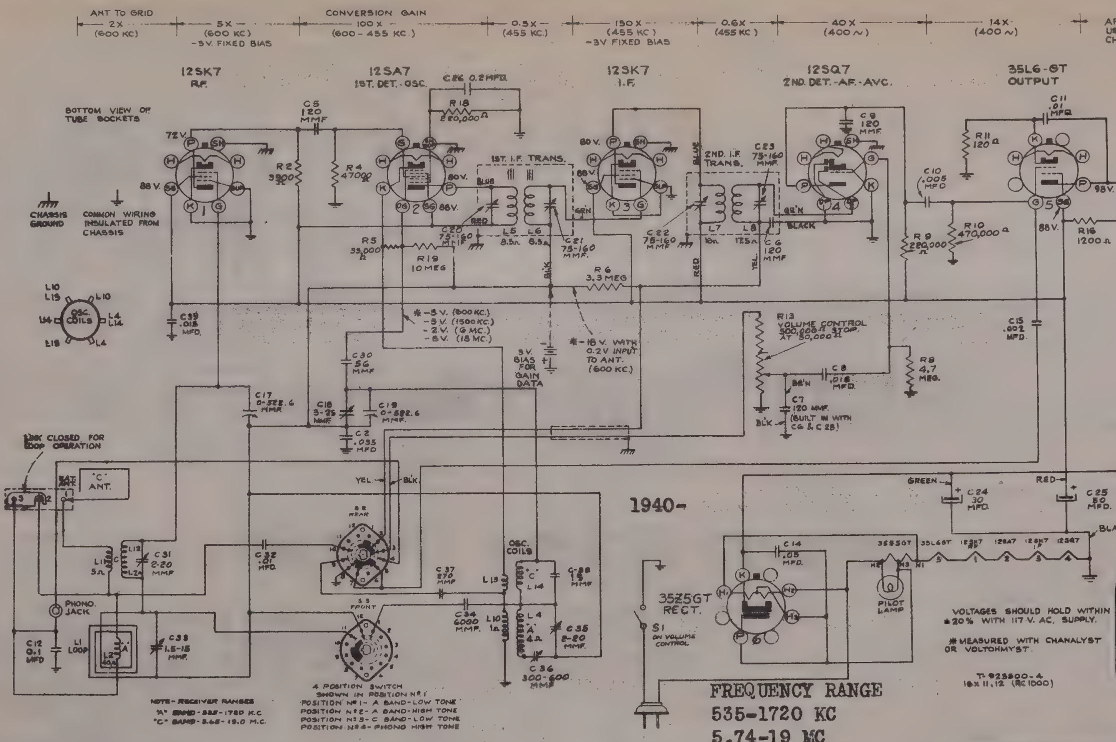
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.


FREQ. RANGE 535-1720 KC
POWER CONSUMPTION 30 WATTS
-1940-
VOLTAGES SHOWN WITHIN ± 20% WITH 117V. AC. SUPPLY.
✱ MEASURED WITH CHANALYST OR VOLTOHMYST.
FOR OTHER DATA SEE INDEX
APPROX GAIN DATA USING RCA RIDER CHANALYST
ANT. TO GRID 2X (600 KC.)
6X (600 KC.) -3V. FIXED BIAS
CONVERSION GAIN 50X (600-455 KC.)
0.6X (455 KC.)
150X (455 KC.) -3V. FIXED BIAS
0.4X (455 KC.)
30X (400 ~)
15X (400 ~)
12SK7 R.F.
12SA7 1ST. DET.-OSC.
12SK7 I.F.
12SQ7 2ND. DET.-AF.-AVC.
35L6-GT OUTPUT
35Z5GT RECT.
BOTTOM VIEW OF TUBE SOCKETS
LINK CLOSED FOR LOOP OPERATION
EXT. ANT.
LOOP
L1
L2 4.0Ω
✱ -7V. WITH 0.2 V INPUT TO ANT.
3V. BIAS FOR GAIN DATA.
✱ -7V. (600 KC.) -5V. (1500 KC.)
C5 120 MMF
R2 3900 Ω
R4 47000 Ω
R5 22,000 Ω
R19 10 MEG.
R18 220,000 Ω
C26 0.2 MFD.
C20 75-160 MMF
1ST. I.F. TRANS. 455 K.C.
C21 75-160 MMF
R6 3.3 MEG.
C22 75-160 MMF
2ND I.F. TRANS. 455 K.C.
C23 75-160 MMF
C6 120 MMF
C9 120 MMF
C15 .0015 MFD.
S2 TONE CONT.
R11 120 Ω
C10 .005 MFD.
R9 220,000 Ω
R10 470,000 Ω
C11 .01 MFD.
R13 VOLUME CONTROL 500,000 Ω TAP AT 50,000 Ω
C8 .015 MFD.
C7 120 MMF. BUILT IN WITH C6 & C23
C13 .01 MFD.
R8 4.7 MEG.
C12 .01 MFD.
PHONO. JACK
R16 1200 Ω
T1
L9
100V.
95V.
4.2V.
90V.
76V.
C-24 30 MFD
C-25 30 MFD
C14 .05 MFD.
PILOT LAMP
S1
C27 .01 MFD.
C2 .035 MFD.
C-28
C16 3-25 MMF
C17
C18 3-25 MMF
C-19
L3 1.5Ω
L4 .8Ω
P.B. SW. (BOTTOM SECTION)
P.B. SW. (TOP SECTION)
L10 L11 L12 L13 L14
RED GREEN YELLOW BLUE BLACK BLK BR'N BLACK-BROWN BLACK-RED GRN
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
INDICATES CHASSIS GROUND.
T-923505-2 16X4 (RC462C)
DRUM
DRIVE CORD
SHOWN WITH GANG AT MAX. CAPACITY.
2½ TURNS
ANTENNA ADJUSTMENTS
OSCILLATOR ADJUSTMENTS
880 TO 1560 KC
725 TO 1450 KC
610 TO 1250 KC
540 TO 1100 KC
PHONO JACK
EXT. ANT. 1 2
LINK
POWER CORD
16X4
C18-OSC. 1720 KC.
C16-ANT. 1300 KC.
C19
C17
6 35Z5 GT
1 12SK7
2 12SA7
3 12SK7
4 12SQ7
5 35L6 GT
C20-PRI. C21-SEC. 455 KC. 1ST. I.F. TRANS.
C22-PRI. C23-SEC. 455 KC. 2ND. I.F. TRANS.

MODEL 16X-11, Ch. RC-1000

MODEL 16X-13,
Ch. RC-1000A

RCA MFG. CO., INC.



4 POSITION SWITCH SHOWN IN POSITION Nº 1
POSITION Nº 1 - A BAND-LOW TONE
POSITION Nº 2 - A BAND-HIGH TONE
POSITION Nº 3 - C BAND-LOW TONE
POSITION Nº 4 - PHONO HIGH TONE

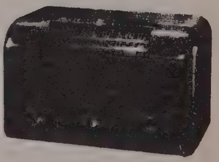
NOTE - RECEIVER RANGES
"A" BAND - 535 - 1720 K.C.
"C" BAND - 5.65 - 19.0 M.C.

1940-

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.

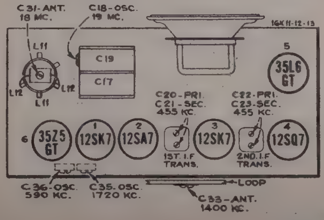
✱ MEASURED WITH CHANALYST OR VOLTOHMYST.

T-923800-4
16X 11,12 (RC 1000)



16X13

FREQUENCY RANGE
535-1720 KC
5.74-19 MC

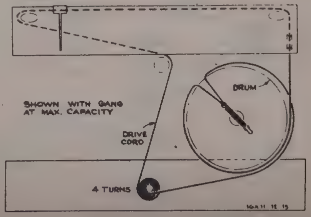


POWER CONSUMPTION 30 WATTS

FOR OTHER DATA SEE INDEX

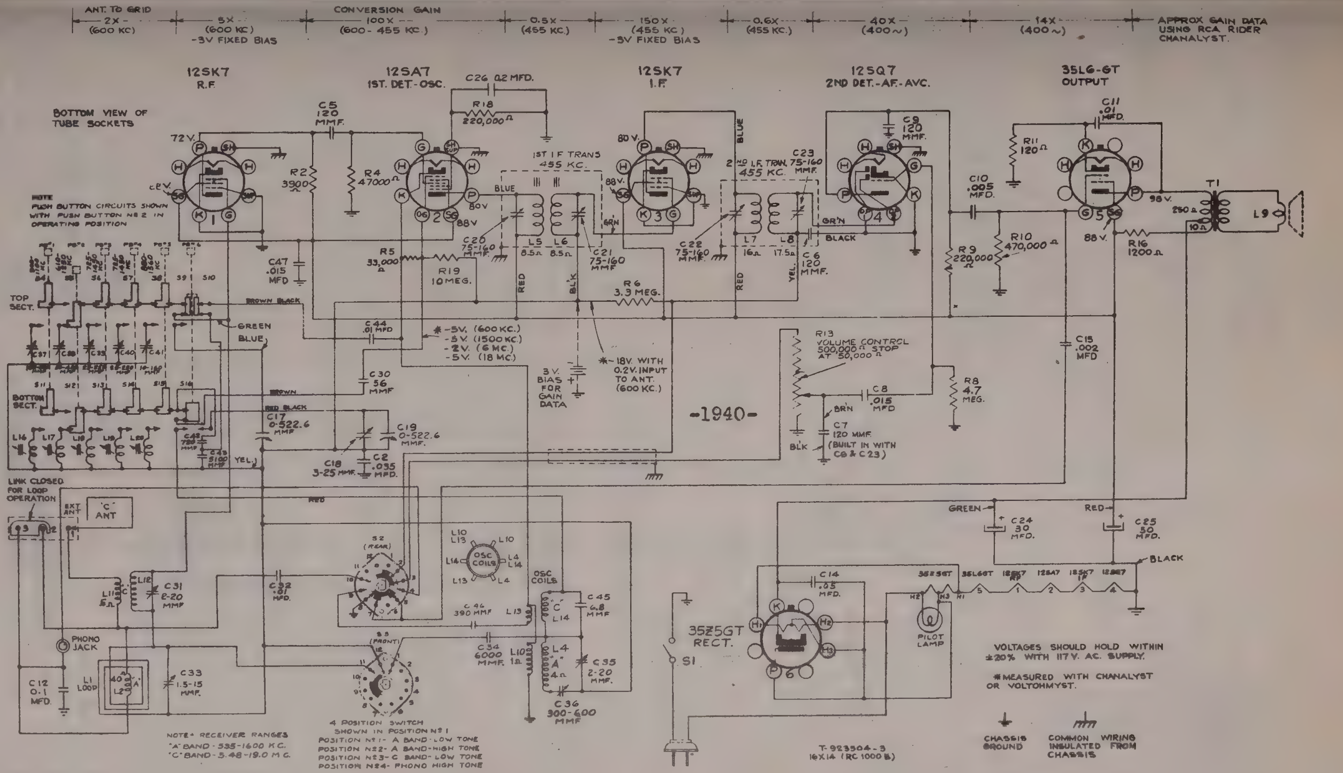
Precautionary Lead Dress.—

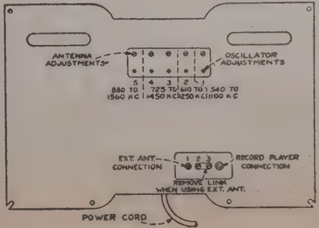
1. Dress all capacitors, leads, etc., coming close to osc. coil rigidly and as far as possible from it.
2. Dress blue lead from loop trimmer against loop and around outside of 35Z5 tube.
3. Dress leads of 120 mmfd. capacitor from terminal board to grid of 12SA7 as short and direct as possible.
4. Dress leads of peaking coil from plate of 12SK7 RF tube to terminal board as short and direct as possible.
5. Dress blue lead from SW ant. coil through same hole in base through which green lead from stator of rear section of the variable condenser passes.



RCA MFG. CO., INC.

MODEL 16X-14
Ch. RC-1000B


ANT. TO GRID 2X (600 KC)
5X (600 KC) -3V FIXED BIAS
CONVERSION GAIN 100X (600-455 KC.)
0.5X (455 KC.)
150X (455 KC) -3V FIXED BIAS
0.6X (455 KC.)
40X (400~)
14X (400~)
APPROX GAIN DATA USING RCA RIDER CHANALYST.
12SK7 R.F.
12SA7 1ST. DET.-OSC.
12SK7 I.F.
12SQ7 2ND DET.-AF.-AVC.
35L6-GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
NOTE PUSH BUTTON CIRCUITS SHOWN WITH PUSH BUTTON NO 2 IN OPERATING POSITION
TOP SECT.
BOTTOM SECT.
1ST I F TRANS 455 KC.
2ND I.F. TRAN. 455 KC.
C26 .02 MFD.
R18 220,000 Ω
C5 120 MMF.
R2 3900 Ω
R4 47000 Ω
R5 33,000 Ω
R19 10 MEG.
R6 3.3 MEG.
C47 .015 MFD
C44 .01 MFD
C20 75-160 MMF
C21 75-160 MMF
C22 75-160 MMF
C23 75-160 MMF
C6 120 MMF.
C9 120 MMF.
C10 .005 MFD.
C11 .01 MFD.
R9 220,000 Ω
R10 470,000 Ω
R11 120 Ω
R16 1200 Ω
T1
L9
* -5V. (600 KC.) -5V. (1500 KC) -2V. (6 MC.) -5V. (18 MC)
3V. BIAS FOR GAIN DATA
* 18V. WITH 0.2V. INPUT TO ANT. (600 KC.)
-1940-
R13 VOLUME CONTROL 500,000 Ω STOP AT 50,000 Ω
C8 .015 MFD
C7 120 MMF. (BUILT IN WITH C8 & C23)
R8 4.7 MEG.
C15 .002 MFD
C30 56 MMF
C17 0-522.6 MMF
C19 0-522.6 MMF.
C18 3-25 MMF.
C2 .035 MFD.
LINK CLOSED FOR LOOP OPERATION
EXT ANT
'C' ANT
C31 2-20 MMF
C32 .01 MFD.
C46 390 MMF
C34 6000 MMF.
C45 6.8 MMF
C35 2-20 MMF.
C36 300-600 MMF
C33 1.5-15 MMF.
C12 0.1 MFD.
L1 LOOP
PHONO JACK
OSC COILS
S2 (REAR)
S3 (FRONT)
C24 30 MFD.
C25 30 MFD.
GREEN
RED
BLACK
C14 .05 MFD.
35Z5GT RECT.
S1
PILOT LAMP
35Z5GT 35L6GT 12SK7 RF 12SA7 12SK7 IF 12SQ7
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. AC. SUPPLY.
*MEASURED WITH CHANALYST OR VOLTOHMYST.
CHASSIS GROUND
COMMON WIRING INSULATED FROM CHASSIS
T-923504-3 16X14 (RC 1000 B)
NOTE - RECEIVER RANGES 'A' BAND - 535-1600 K.C. 'C' BAND - 5.48-19.0 M.C.
4 POSITION SWITCH SHOWN IN POSITION NO 1
POSITION NO 1 - A BAND - LOW TONE
POSITION NO 2 - A BAND - HIGH TONE
POSITION NO 3 - C BAND - LOW TONE
POSITION NO 4 - PHONO HIGH TONE



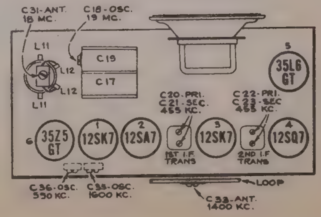
POWER CONSUMPTION 30 WATTS

Push Button Adjustment.—

1. Make a list of the six desired stations, arranged in order from low to high frequencies, and manually tune-in the first station on this list.
2. Push in station button No. 1 (extreme left) and adjust No. 1 oscillator core to receive the station.
3. Adjust antenna trimmer for maximum output. Clockwise core and trimmer adjustment tunes circuits to lower frequencies.
4. Adjust for each of the four remaining stations in a similar manner.
5. Make a final careful re-adjustment of oscillator cores and antenna trimmers.

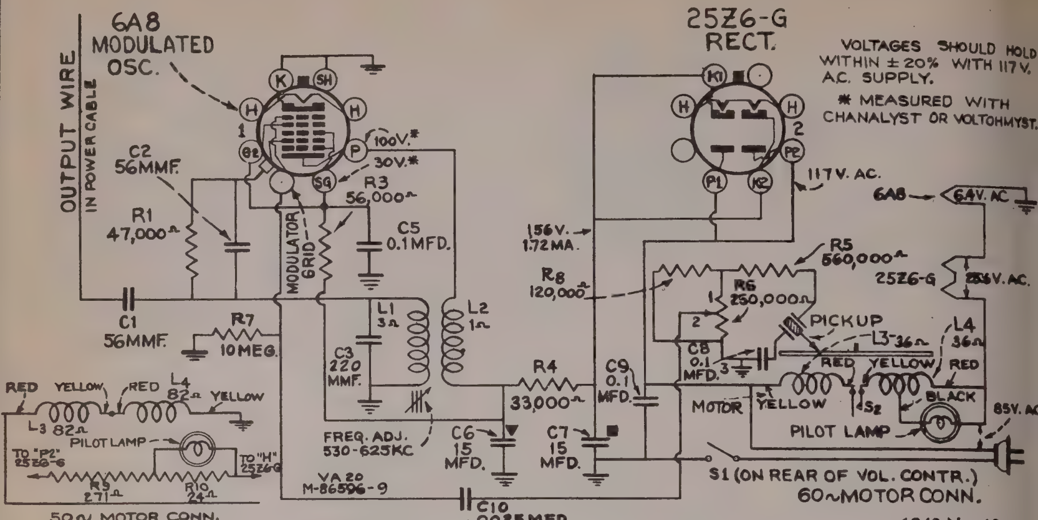
FOR OTHER DATA

SEE INDEX



MODEL VA21

RCA MFG. CO., INC.



— 1940 No. 13 —

First Edition

Electrical and Mechanical Specifications

Frequency Range	530-625 kc
Tube Complement	
(1) RCA-6A8	Modulator-Oscillator
(2) RCA-25Z6-G	Half-Wave Rectifier
Dial Lamp	Mazda 47, 6-8 volts, .15 amp.
Power Supply Ratings	
A-6	105-125 volts, 60 cycles, 50 watts
A-5	105-125 volts, 50 cycles, 50 watts
Motor	
Type	Synchronous (Manual Starting)
Turntable Speed	78 r.p.m.

Pickup	
Type	Crystal
Pickup Impedance	100,000 ohms at 1000 cycles
Average Output Voltage	1½ volts at 1000 cycles with 250,000 ohm load.
Cabinet Dimensions	
Height	3⅞ inches
Width	12⅛ inches
Depth	8¼ inches
Over-All Height	5 inches
Turntable Diameter	7 inches

Weight 7¾ lbs. (net), 9¾ lbs. (shipping)

Set-Up Procedure

1. Insert plug in power supply outlet, and turn the power-switch—volume control knob on top of VA-21 to full clockwise position. Start a record on the VA-21. The motor is a synchronous manual-starting type, and requires a clockwise spin to start.

2. Tune the radio receiving set to a quiet point between 530-625 kc.

3. Tune the oscillator in the VA-21 to this frequency by adjusting the button on the rear of the VA-21 cabinet to obtain peak output on the receiver. Clockwise rotation decreases the frequency; counter-clockwise rotation increases the frequency.

4. Adjust the radio volume control for the highest volume that is likely to be required, and then use the VA-21 volume control for further adjustment.

5. In noisy locations, it may be desirable to leave the VA-21 volume control turned full clockwise, and regulate the radio volume control for the desired level.

6. If there is insufficient volume, or excessive noise, the remedy is to couple the VA-21 to the radio receiver, by running a piece of insulated wire between the two units: Wrap one end (three or four turns) around the antenna lead-in on the radio, and wrap the other end (three or four turns) around the short wire that projects from the plug on the power cord of the VA-21. With an RCA Master Antenna, wrap the wire around the counter-poise lead where it attaches to the receiver (terminal A3) or to the coupling unit (terminal B). With a loop receiver, place the end of the wire close to the loop.

7. If the radio receiver has push-button tuning, one of the buttons may be set up to tune in the VA-21 oscillator frequency. This button should be marked "Record Player."

Precautionary Lead Dress

1. The power supply cord must be dressed between chassis and top of cabinet, away from grid of 6A8, and entirely away from 25Z6-G.

2. All leads to oscillator coil must be as short as possible.

3. All motor leads must be dressed away from rotor.

4. Pickup leads must be dressed away from the top grid of 6A8, and kept away from the 25Z6-G.

Motor Data

Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

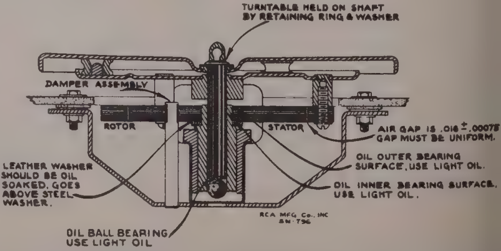
Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

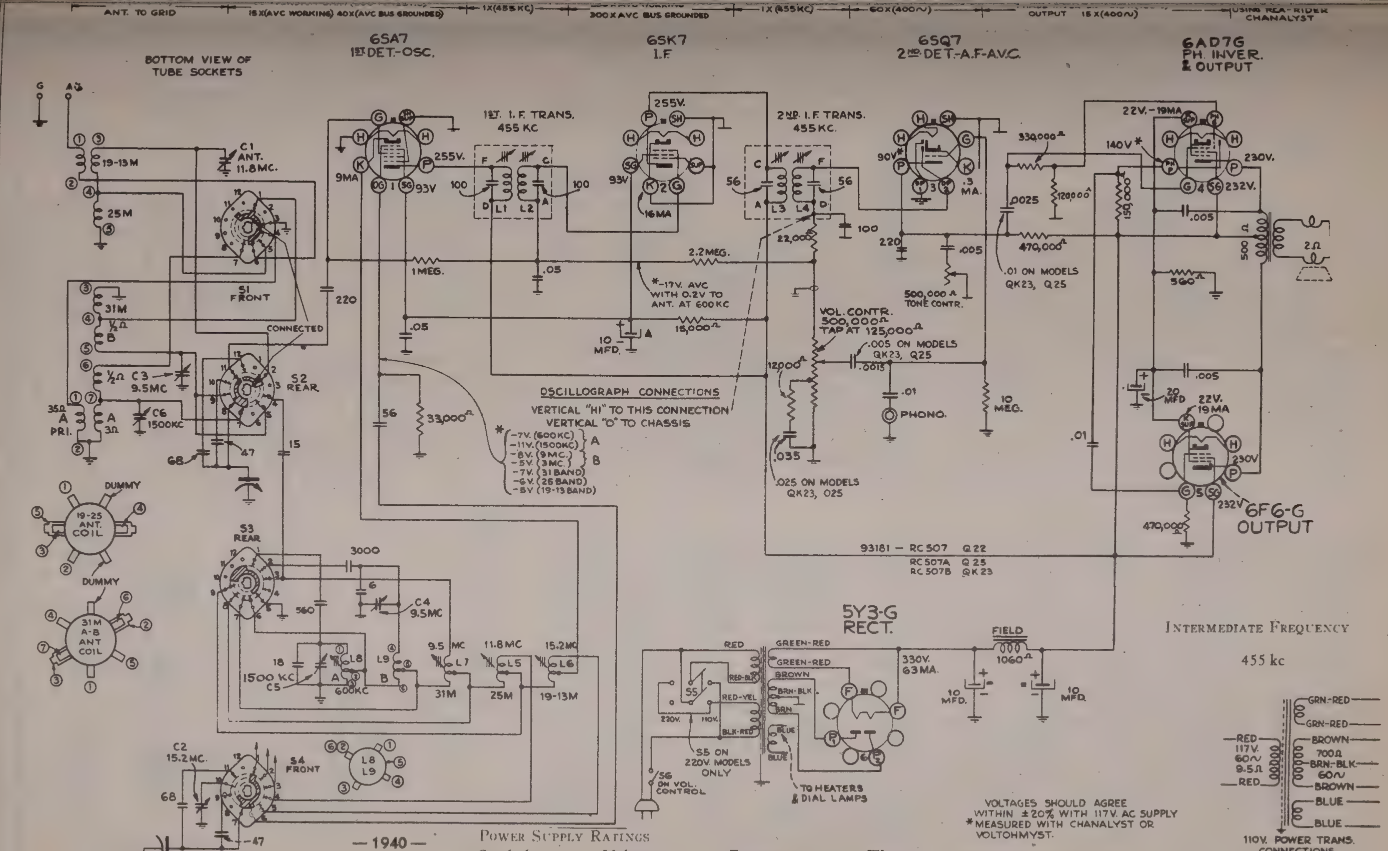
Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting upward.

Rotor Adjustment.—Remove motor from cabinet. Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.


TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
DAMPER ASSEMBLY
ROTOR
STATOR
AIR GAP IS .016 ± .00075 GAP MUST BE UNIFORM.
OIL OUTER BEARING SURFACE, USE LIGHT OIL.
OIL INNER BEARING SURFACE. USE LIGHT OIL.
LEATHER WASHER SHOULD BE OIL SOAKED. GOES ABOVE STEEL WASHER.
OIL BALL BEARING USE LIGHT OIL
RCA MFG. Co., INC
SN-796

RCA MFG. CO., INC.

MODEL Q22, Ch. RC-507
MODEL QK23, Ch. RC-507B
MODEL Q25, Ch. RC-507A



INTERMEDIATE FREQUENCY

455 kc

VOLTAGES SHOULD AGREE WITHIN ±20% WITH 117V. AC SUPPLY
*MEASURED WITH CHANALYST OR VOLTOHMYST.

— 1940 —

First Edition

FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

POWER OUTPUT RATING

Undistorted	3 watts
Maximum	3.5 watts

POWER SUPPLY RATINGS

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	65
Rating B	105-125	25-60	65
Rating C	105-125, 200-250	50-60	65

LOUDSPEAKER

	Q22	QK23	Q25
Model	RL-79A6	RL-70J3	RL-63K5
Type (Electrodynamic)	6-inch	12-inch	8-inch
V-C. Impedance at 400 c.p.s.	2.2 ohms	2.2 ohms	2.2 ohms

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

MODEL Q22, Ch. RC-507
MODEL QK23, Ch. RC-507B
MODEL Q25, Ch. RC-507A

RCA MFG. CO., INC.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

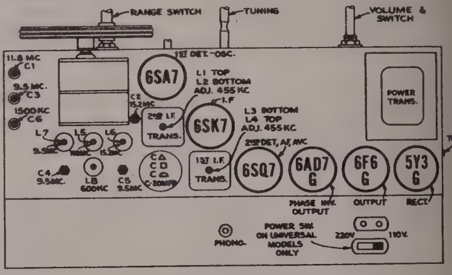
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	12C8 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	12SA7 1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)**
7		9.5 mc	31M	156°	L7 (osc.)** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

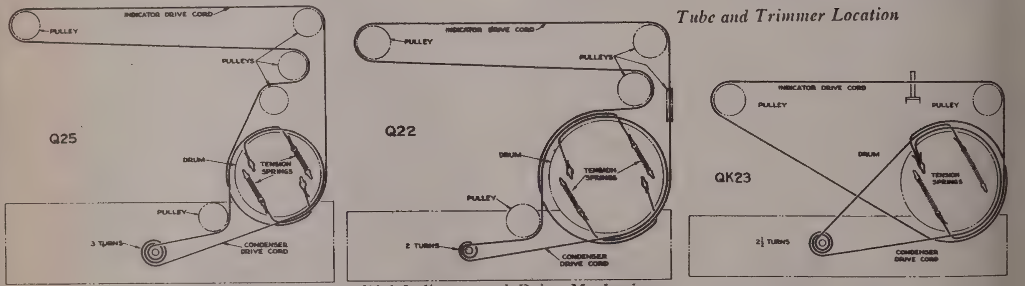
**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

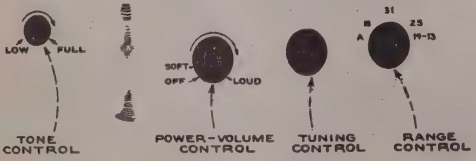
NOTE: Oscillator tracks above signal on all bands.



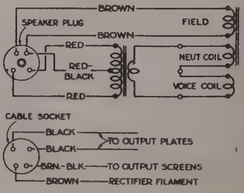
Tube and Trimmer Location



Dial-Indicator and Drive Mechanism



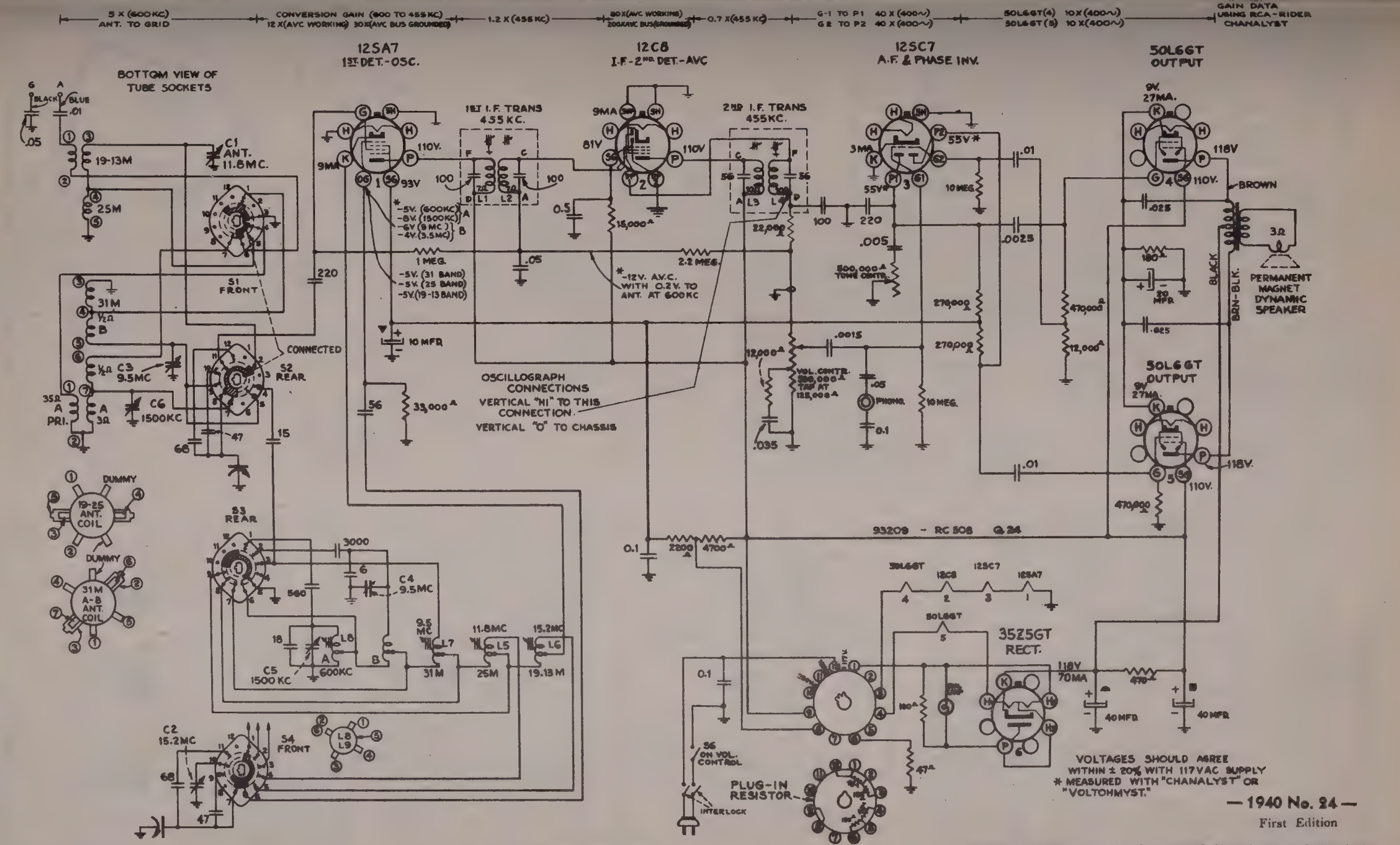
Location of Controls



Connections and Colors of Loudspeaker and Cable

RCA MFG. CO., INC.

MODEL Q24
Ch. RC-508



—1940 No. 24—

First Edition

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency .... 455 kc

Power Supply Ratings

105-125 volts A-C 40-100 cycles or D-C	50 watts
160-180 volts A-C 40-100 cycles or D-C	55 watts
210-250 volts A-C 40-100 cycles or D-C	65 watts

Loudspeaker (RL-92-1)

Type	6-inch permanent magnet dynamic
V. C. Impedance at 400 cycles	3.4 ohms

Power Output

Undistorted	3 watts
Maximum	3.5 watts

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.
4. Filament lead of 50L6GT should be dressed against chassis and away from 12SC7 socket.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

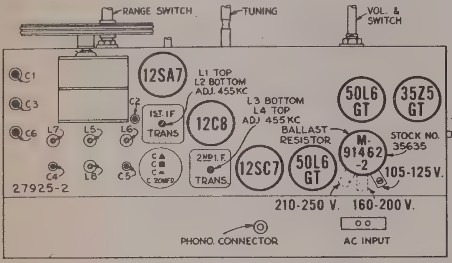
Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.



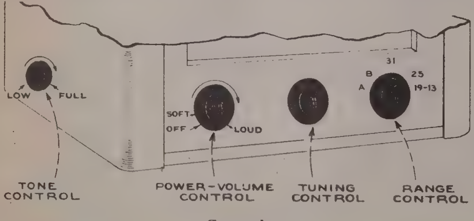
Tube and Trimmer Location

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.



Controls

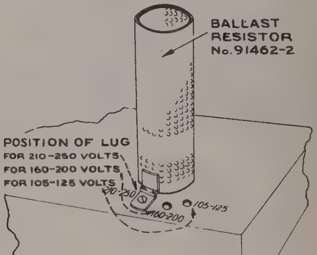
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	12C8 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	12SA7 1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)**
7		9.5 mc	31M	156°	L7 (osc.)** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

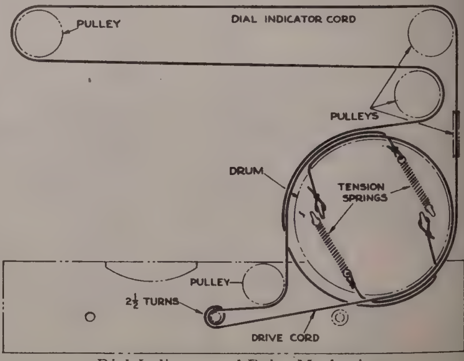
**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.



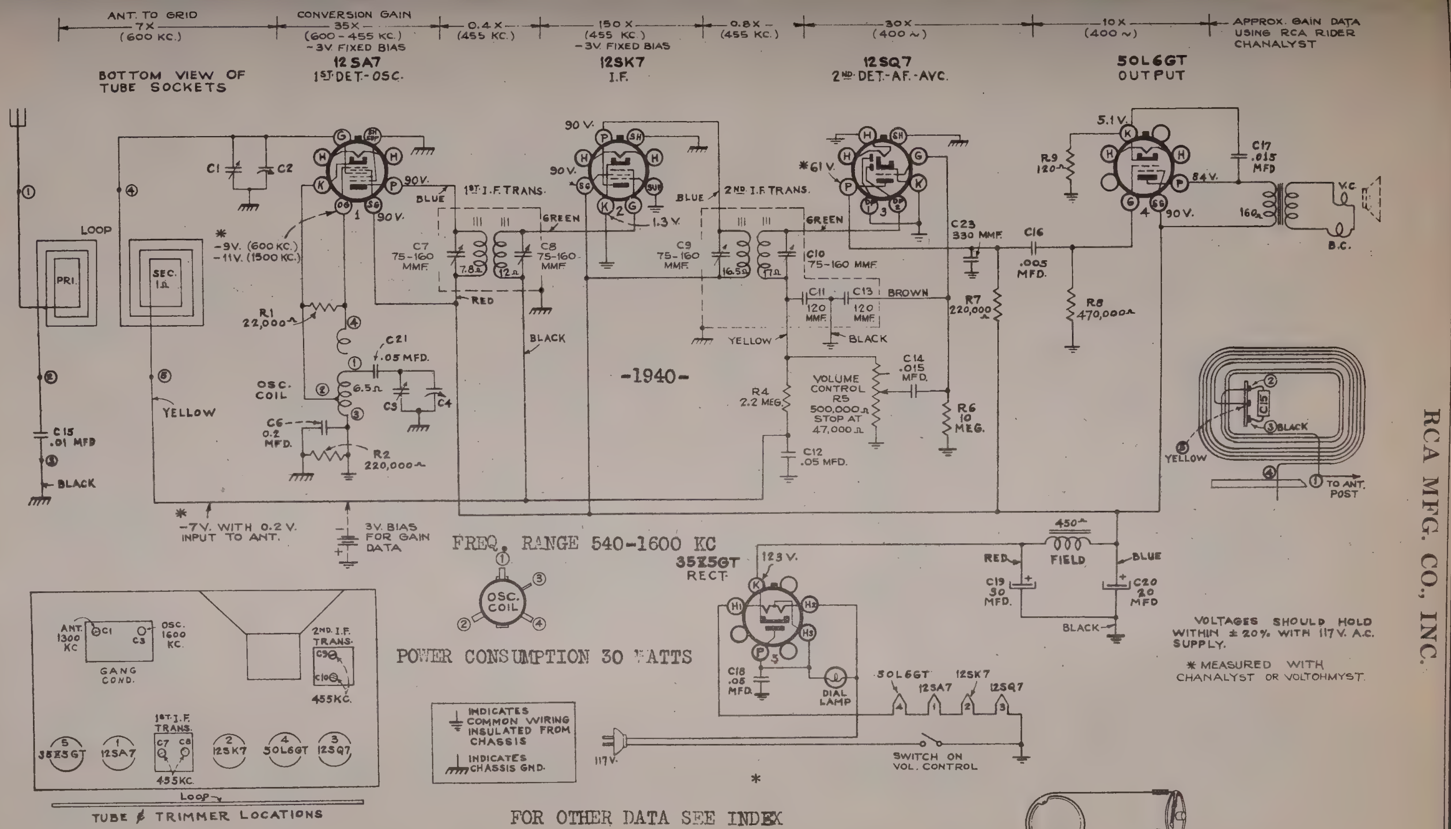
Ballast Resistor



Dial-Indicator and Drive Mechanism

RCA MFG. CO., INC.

MODEL 45X18
Ch. RC-541-C



FREQ. RANGE 540-1600 KC

POWER CONSUMPTION 30 WATTS

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. A.C. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

*

FOR OTHER DATA SEE INDEX

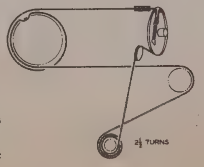
Precautionary Lead Dress:

1. Dress 1st I-F plate and grid leads against chassis and away from each other.
2. Dress plate lead from 12SK7 close to chassis.
3. Dress leads from terminal board on loop support away from loop.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Power Output (125 volts, 60 cycle supply)
Undistorted......0.8 watts Maximum......1.2 watts

Loudspeaker.......................... 5 inch electrodynamic

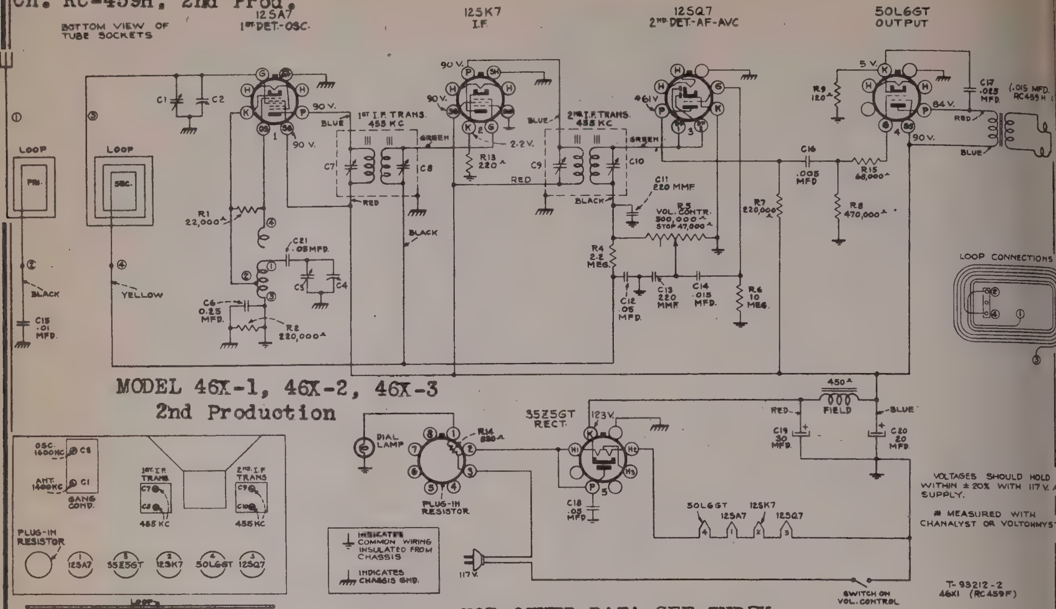


Drive Cord Detail

MODELS 46X-1, 46X-2
Ch. RC-459F, 2nd Prod.
MODEL 46X-3
Ch. RC-459H, 2nd Prod.

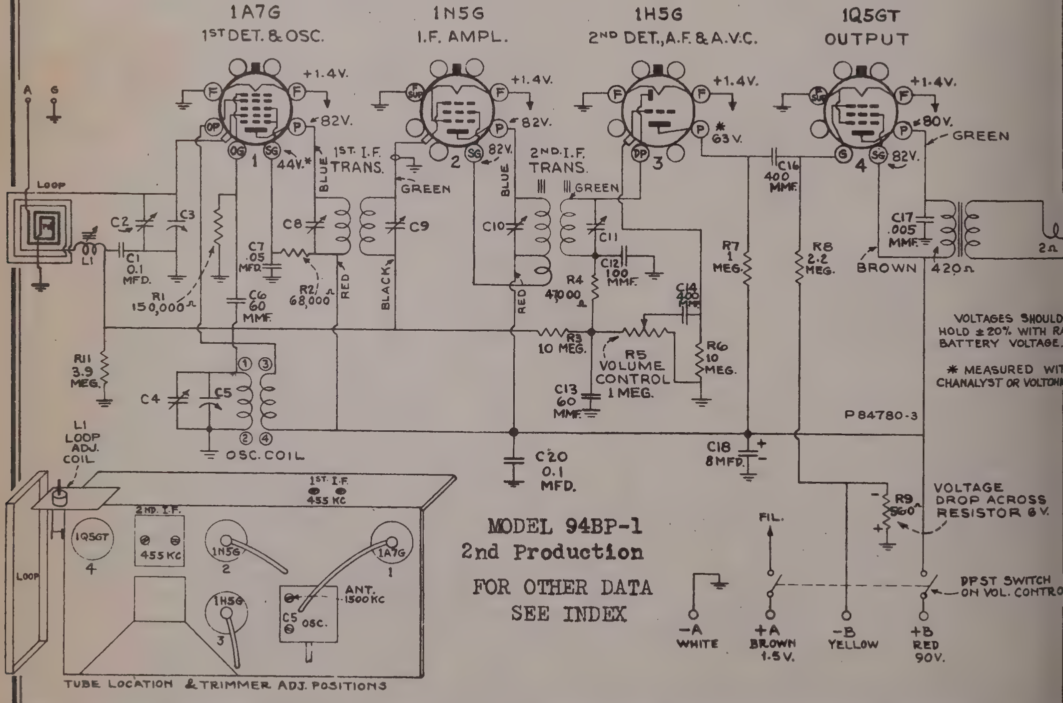
RCA MFG. CO., INC.

MODEL 94BP-1
Ch. RC-407B, 2nd Prod.



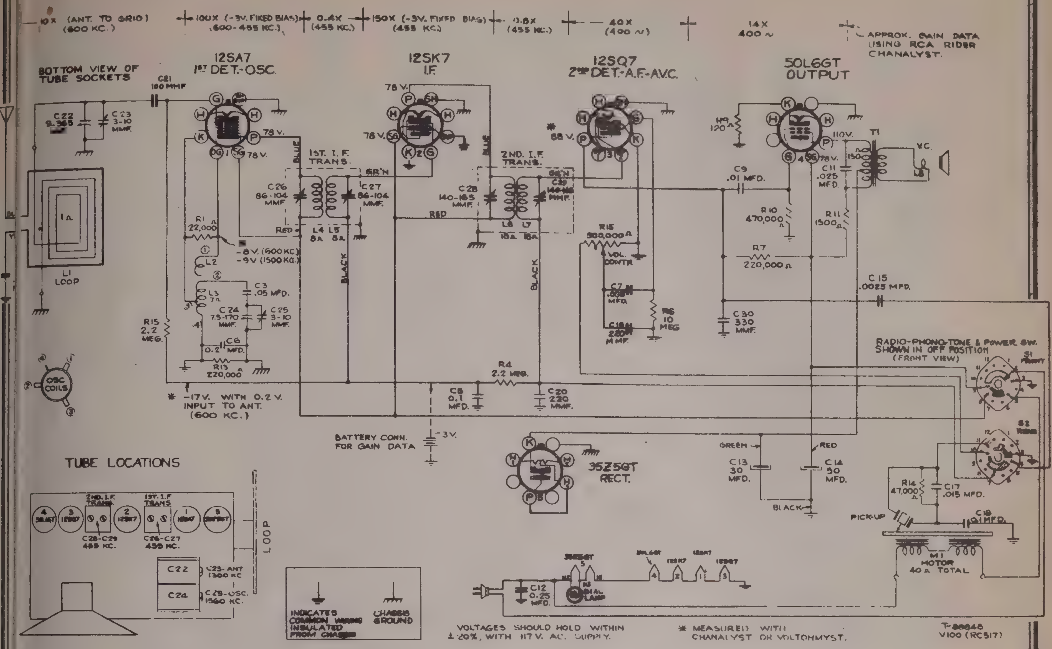
MODEL 46X-1, 46X-2, 46X-3
2nd Production

FOR OTHER DATA SEE INDEX



MODEL 94BP-1
2nd Production

FOR OTHER DATA SEE INDEX

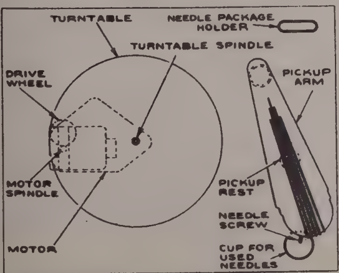


Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 I-F grid in series with 0.1 mfd.	455 kc	Quiet Point 1,500 kc end of dial	C29, C28 2nd I-F transformer
2	12SA7—1st. det. grid in series with 0.1 mfd.			C27, C26 1st I-F transformer
3	radiated signal 1,560 kc		signal frequency	C25 (osc.)
4	radiated signal 1,300 kc			C23 (ant.)
5	Repeat steps 3 and 4.			



Electrical and Mechanical Specifications

Frequency Range	540-1,650 kc
Intermediate Frequency	455 kc

Tube Complement

(1) RCA-12SA7	1st Det.—Osc.
(2) RCA-12SK7	I-F Amplifier
(3) RCA-12SQ7	2nd Det., A.V.C., and A-F Amplifier
(4) RCA-50L6-GT	Power Output
(5) RCA-35Z5-GT	Rectifier

Power Output

Undistorted	0.9 watts
Maximum	1.2 watts

Pilot Lamp .... 1—Mazda No. 51, 6-8 volts, 0.2 amps.

Power Supply Rating

105-125 volts, 50 cycles	55 watts
105-125 volts, 60 cycles	55 watts

Loudspeaker (RL-81A-4)

Type	5-inch permanent-magnet dynamic
V.C. Impedance	4 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (inches)	10 15/16	16 9/16	13 11/32
Weight (net)			19 lbs.
Shipping			23 lbs.
Tuning Drive Ratio			9:1

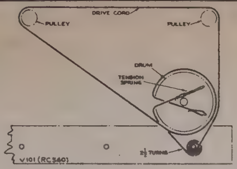
Phonograph Motor Service Data:—

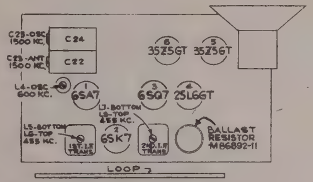
The phonograph motor is of the self starting synchronous type and operates the turntable through friction drive between the motor drive spindle and the rubber tired idler on the rim of the turntable.

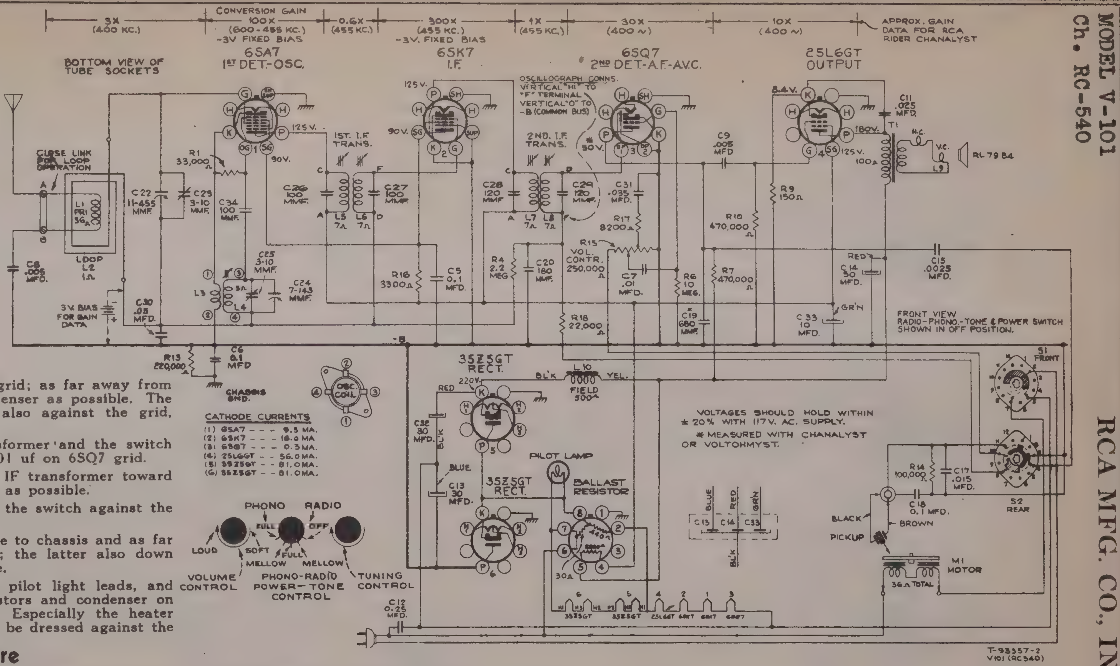
The motor should be lubricated once or twice a year by placing a few drops of S. A. E. 20 (or equivalent) on the turntable spindle and saturating the oil retaining felt pads on the motor shaft with S. A. E. 10 oil. **Caution—The motor drive spindle and the rubber tire on the idler must be kept clean and entirely free from oil and grease at all times.**

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d.c., as this would damage the motor.

RCA MFG. CO., INC.







Precautionary Lead Dress.—

1. Dress the 10 meg. and .01 uf on the 6SQ7 grid; as far away from heater and power leads and the .25 uf condenser as possible. The 10 meg. must be very short and dressed also against the grid, away from the 2nd IF transformer.
2. Dress the yellow lead between 2nd IF transformer and the switch as far away as possible from 10 meg. and .01 uf on 6SQ7 grid.
3. Dress the bus between 6SK7 plate and 2nd IF transformer toward front apron and as far away from the 6SQ7 as possible.
4. Dress the red lead between the rectifier and the switch against the corner of the chassis and front apron.
5. Dress the green 6SA7 control grid lead; close to chassis and as far away from the blue plate lead as possible; the latter also down against the chassis and as short as possible.
6. The brown heater leads, black, and brown pilot light leads, and all power and output leads must clear resistors and condenser on the 2nd IF transformer by at least ¾-in. Especially the heater lead between 25L6GT and 6SK7, which must be dressed against the rear apron.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

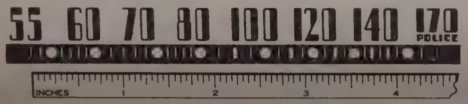
Test-Oscillator.—Connect the low side of the test-oscillator to the Ground Terminal "G," and keep the output as low as possible.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 6-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at the bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

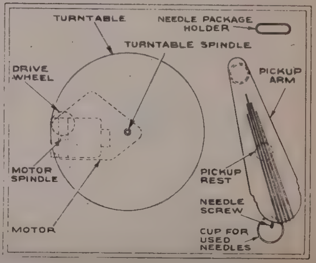


Phonograph Motor Service Data.—

The phonograph motor is of the self starting synchronous type and operates the turntable through friction drive between the motor drive spindle and the rubber tired idler on the rim of the turntable.

The motor should be lubricated once or twice a year by placing a few drops of S. A. E. 20 oil (or equivalent) on the turntable spindle and saturating the oil retaining felt pads on the motor shaft with S. A. E. 10 oil. **Caution—The motor drive spindle and the rubber tire on the idler must be kept clean and entirely free from oil and grease at all times.**

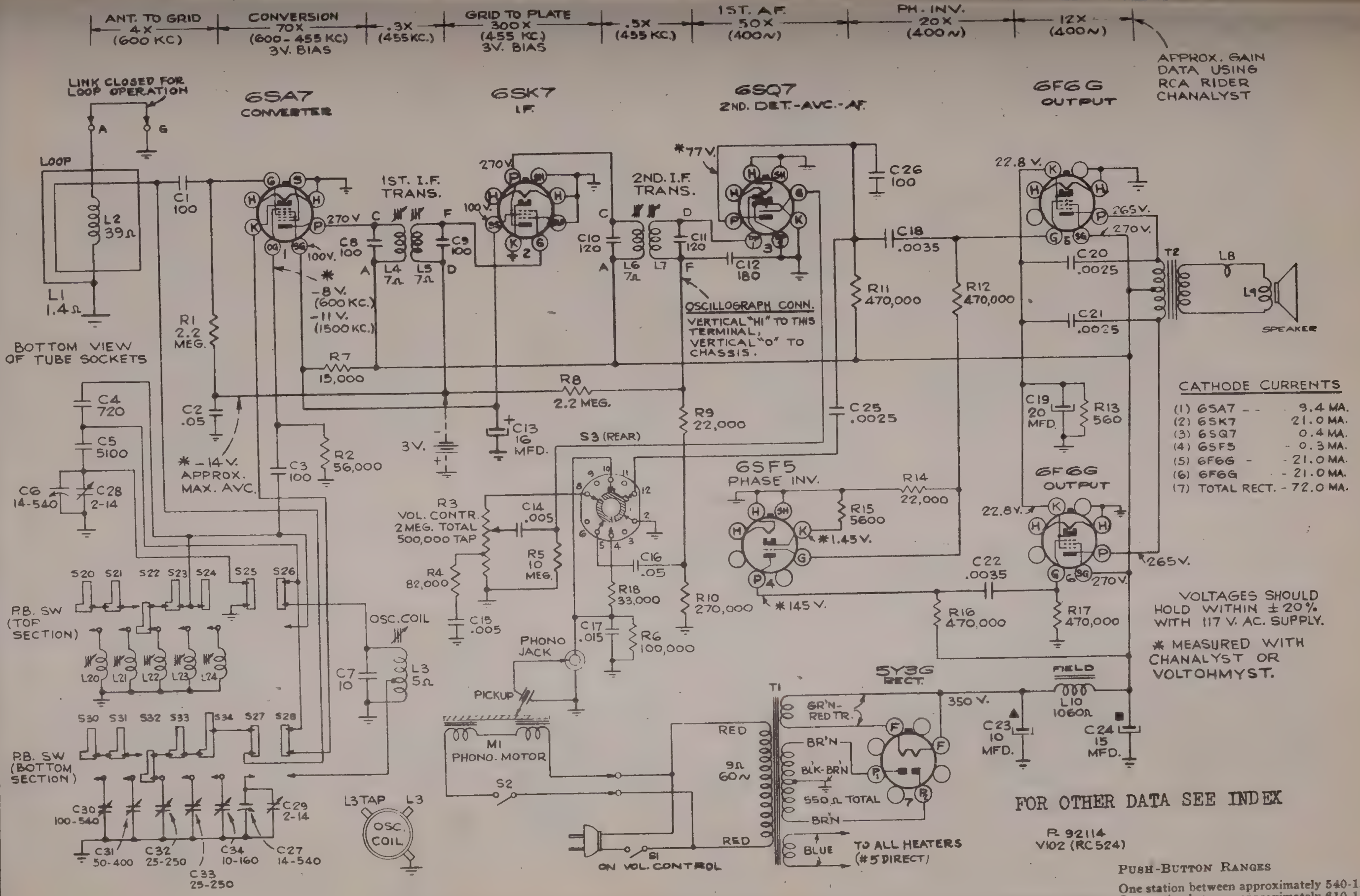
Steps	Connect High Side of Test Oscillator to—	Tune Test Osc. to—	Turn Radio Dial to—	Adjust for max. output—
1	6SK7 Grid Thru 200 mmf.	455 kc	Quiet Point between 550-750 kc	L7, L8 2nd I-F Trans.
2	6SA7 Grid Thru 200 mmf.	455 kc		L5, L6 1st I-F Trans.
3	Radiation Loop	1,500 kc	1,500 kc (See Scale)	C25 osc. C23 ant.
4	Radiation Loop	600 kc	600 kc (See Scale)	L4 osc. Rock In



IMPORTANT.—DO NOT PLUG CHASSIS INTO A DC POWER SUPPLY.

RCA MFG. CO., INC.

MODEL V-102
Ch. RC-524



CATHODE CURRENTS

(1) 6SA7	9.4 MA.
(2) 6SK7	21.0 MA.
(3) 6SQ7	0.4 MA.
(4) 6SF5	0.3 MA.
(5) 6F6G	21.0 MA.
(6) 6F6G	21.0 MA.
(7) TOTAL RECT.	72.0 MA.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

FOR OTHER DATA SEE INDEX

P. 92114
V102 (RC524)

Push-Button Ranges

One station between approximately 540-1,030 kc
One station between approximately 610-1,250 kc
Two stations between approximately 740-1,430 kc
One station between approximately 880-1,550 kc

The R-F and I-F gain measurements were made with a 3-volt bias battery connected from the A.V.C. bus to chassis, as shown in dotted lines.

Frequency Range

Broadcast "A"	540-1,700 kc
Intermediate Frequency	455 kc

Power Output Rating

Undistorted	4 5 watts
Maximum	5.5 watts

Loudspeaker (RL-79-A1)

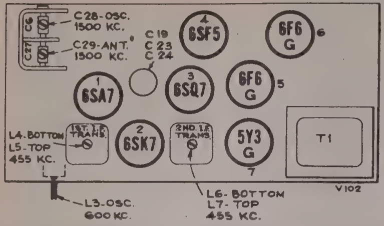
Type	6-inch Electrodynamic
V.C. Impedance	3.4 ohms at 400 cycles

Power Supply Ratings

105-125 volts, 60 cycles	110 watts
105-125 volts, 25 cycles	110 watts

MODEL V-102
Ch. RC-524

Alignment Procedure



Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

4. After completion of alignment, replace the glass dial in cabinet, taking care that the fibre light shields are in correct position at ends of dial.

Using Calibration Scale.—

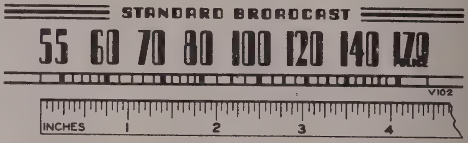
1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

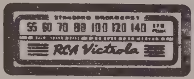
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

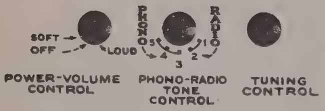
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at bottom.

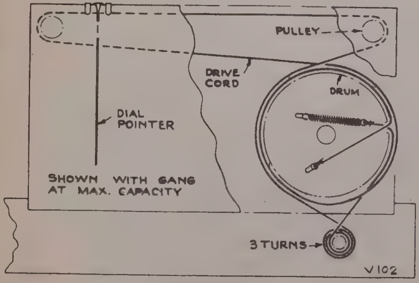
Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid, in series with .01 mfd.	455 kc	Quiet Point at H-F end of dial	L6 and L7 (2nd I.F. Trans.)
2	1st det. grid, in series with .01 mfd.			L4 and L5 (1st I.F. Trans.)
3	Antenna terminal, in series with 200 mmfd. (link open)	1,500 kc	1,500 kc "A" band	C28 (osc.) C29 (ant.)
4		600 kc	600 kc "A" band	L3 (osc.) Rock in
5	Repeat steps 3 and 4.			









Phonograph Motor Service Data:—

The phonograph motor is of the self starting synchronous type and operates the turntable through friction drive between the motor drive spindle and the rubber tired idler on the rim of the turntable.

The motor should be lubricated once or twice a year by placing a few drops of S. A. E. 20 (or equivalent) on the turntable spindle and saturating the oil retaining felt pads on the motor shaft with S. A. E. 10 oil. **Caution—The motor drive spindle and the rubber tire on the idler must be kept clean and entirely free from oil and grease at all times.**

Precautionary Lead Dress.—

1. Dress power leads to AC switch away from terminals of volume control.
2. Dress heater leads to 6SQ7 away from 10 megohm leak.
3. Dress C-14 and C-16 away from all heater and power supply leads.
4. Green lead to loop away from I.F. can.
5. Green lead from C-1 to button assembly away from oscillator.
6. Green phono lead up from chassis and away from C-13.

The Phono-Radio Tone Control.—

The five positions of the knob are:

1. Fully counterclockwise—radio mellow tone with emphasis on lows and reduction of static and high pitched interference.

2. Radio full tone with all sound effects.

3. Phonograph—mellow tone—with reduction of high pitched surface noise and emphasis on lows.

4. Phonograph—full tone—all sound effects from the record.

5. Phonograph—high tone—with reduction of bass resonance and low tones.

Alignment Procedure MODELS 46X-1,46X-2,46X-3 CHASSIS RC-459F,RC-459H 2nd Production

Output Meter Alignment. — Connect the meter across the voice coil. and turn the receiver volume control to maximum.

Test-Oscillator. — For I-F alignment, connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

Antenna. — The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 I-F grid in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C9 and C10 (2nd I-F trans.)
2	Tuning condenser stator (osc.) in series with .01 mfd.			C7 and C8 (1st I-F trans.)
3	Radiation loop consisting of two turns of wire 18 inches in diameter	1,600 kc	Full Clockwise (out of mesh)	C3 (oscillator)
4		1,400 kc	Resonance on 1,400 kc signal	C1 (antenna)

MODEL 94BP-1 series Chassis RC-407B 2nd Production
Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action. Connect low-side of oscillator to the receiver chassis.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Loop-Adjusting Coil.—The second production of 94BP-1 series incorporates a loop inductance adjustment coil (L1) which is adjusted at 600 kc. For best performance, it is recommended that the alignment procedure be followed exactly as given. This will ensure maximum sensitivity over the entire broadcast band.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1A7G 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C11, C10, C9, C8 (1st and 2nd I-F transformers)
2	Antenna terminal, in series with 15 mmfd.	1,650 kc	Full clockwise (out of mesh)	C4 (oscillator)
3		Set antenna trimmer C2 approximately ½ turn from maximum capacity		
4		600 kc	600 kc signal	L1 (ant.)
5		1,500 kc	1,500 kc	C2 (ant.)
6	Repeat steps 4 and 5			

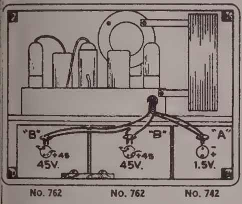


Figure 1.

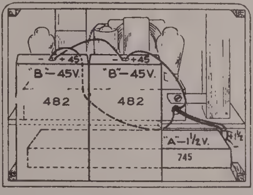


Figure 2.

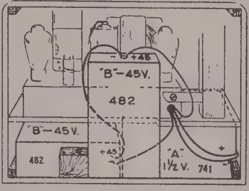
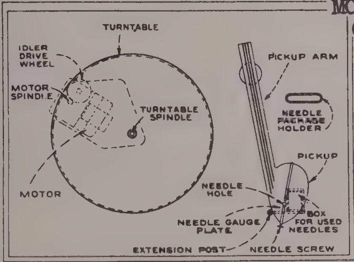


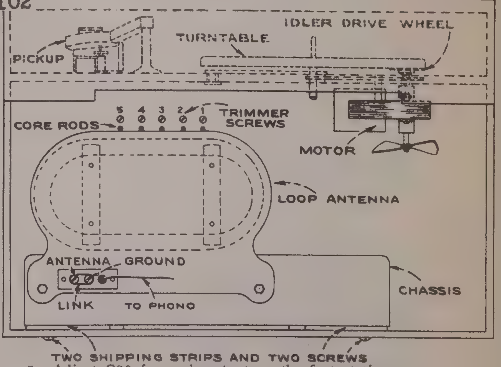
Figure 3.

For your convenience a wide variety of battery complements may be used with this receiver, and Figures 1, 2, and 3 illustrate three different sets of batteries installed in place. The following table gives type numbers of Eveready batteries but any equivalent battery of standard make may be used.

Figure	"A" battery 1½ v.	"B" battery 45 v. ea
1	No. 742	No. 762
2	No. 745	No. 482 or No. 727
3	No. 741, No. 742 or No. 743	No. 482 or No. 727

MODEL V-102
Chassis RC-524





Push Button Adjustments

The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button and manually tune in the first station on the list.
3. Press in the left-hand button.
4. Adjust L20 to receive the first station. To secure the best adjustment, rotate the set for least pickup, and adjust L20 for peak output.
5. Adjust C30 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining four stations.

On the 880 to 1,550 kc push-button, the higher frequency stations may be received with L24 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

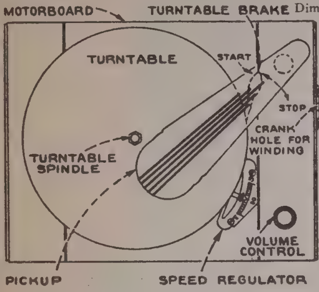
NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

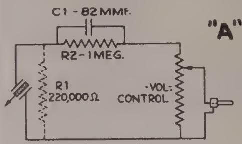
Specifications

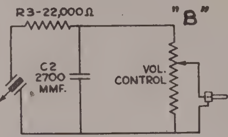
Motor......Spring-wound, Governor Type
Speed.............78 r.p.m. (adjustable)
Record sizes..........10-inch and 12-inch

Crystal Pickup

Impedance...100,000 ohms at 1,000 cycles
Average Output Voltage........1½ Volts at 1,000 cycles across 250,000 ohms load
Dimensions........6-in high, 12½-in. wide, 10-in. deep







SERVICE DATA

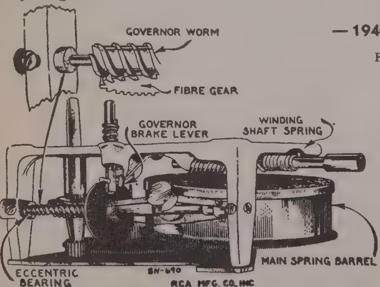
Motor.—The drive motor is of simple design and substantial construction. It should require little or no service if properly maintained. Attention to lubrication of the moving parts and occasional cleaning of the mechanism will go far to prevent faulty operation. Should it become necessary to repair the motor, the following procedure should be applied: **CAUTION.—Allow the motor mechanism to run down completely before attempting adjustment, repairs, or replacements.**

Removing Motor from Cabinet.—Remove the winding key. To dismount the motor, unscrew the spindle cap and remove turntable, slightly tapping the spindle while exerting an upward lift on the turntable. Loosen the screw holding the speed-regulating lever and remove the latter. The three screws holding motor to motor board should then be loosened to permit removal of motor assembly.

Replacing Main Spring Barrel.—In case of main spring failure, the entire spring barrel and gear should be replaced. Remove the spring-barrel spindle screw by **unscrewing to right.** Remove the C washer and two pillar screws holding bottom plate. Remove bottom plate, intermediate spindle shaft, and spring barrel. Reassemble parts in reverse sequence.

Winding Shaft Spring.—This spring functions as a friction ratchet. It may be removed as follows: remove pin holding winding worm on shaft; remove winding shaft; then remove screw holding spring. Replace in reverse sequence.

Governor Adjustments.—The mesh of the worm and fiber gears is adjusted by rotation of the eccentric spindle bearings. The adjustments should be made so that the worm meshes properly with the fiber gear and rotates freely without binding. The bearings should be accurately aligned with each other. The minimum of spindle end-play which permits smooth operation should be used.



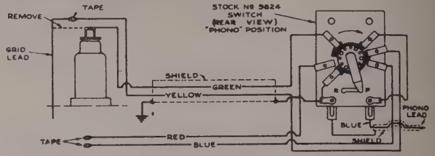
— 1940 No. 20 —

First Edition

Speed Regulator Lever.—After assembly, adjust the speed regulator until the turntable rotates at 78 r. p. m.; loosen the speed regulator screw and set pointer to center of speed indicator scale; tighten screw and re-check turntable speed.

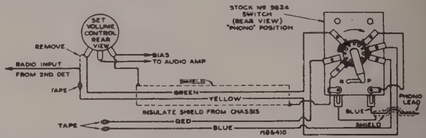
Lubrication.—All moving parts of the motor should be thoroughly cleaned and lubricated every six months to prevent excess wear and to assure proper operation. A small amount of grease should be applied to the worm gear of the governor, the gear of the winding shaft, and on the small pinion gear. All other points, including regulator friction pad, should be lubricated with light oil. All motor parts should be covered with a light film of oil to prevent rusting.

Radio Receivers Whose First Audio Amplifier Tube is of The Grid Cap Type.

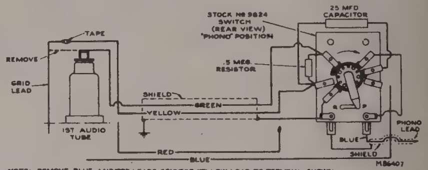


NOTE - THIS METHOD FOR USE ONLY WHEN BIAS FOR THE TUBE IS OBTAINED BY MEANS OF CATHODE RESISTOR

Radio Receivers Where the Volume Control is in the Audio Input Circuit.


STOCK Nº 9824 SWITCH (REAR VIEW) "PHONO" POSITION
SET VOLUME CONTROL REAR VIEW
REMOVE
BIAS
TO AUDIO AMP
RADIO INPUT FROM 2ND DET
TAPE
SHIELD
GREEN
YELLOW
INSULATE SHIELD FROM CHASSIS
PHONO LEAD
BLUE
SHIELD
TAPE
RED
BLUE
M86410

Radio Receivers Whose First Audio Tube is of The Grid Cap Type, and Fixed Bias for Tube is Obtained Through Grid Lead.



NOTE - REMOVE BLUE AND RED LEADS. CONNECT YELLOW LEAD TO TERMINAL SHOWN.

General Description

The R-103-S is designed for use with a battery-operated receiver where a mechanical type unit is required having the characteristics necessary for record fidelity. The motor is of the mechanical, spring wound, variable speed type completely governed to maintain a constant speed. The pickup assembly is of the crystal type housed in a light weight, plastic shell of modern styling. A volume control is placed across the pickup output terminals providing a means of controlling the output voltage.

Connecting Victrola Attachment to Radio Receivers

In general, the Victrola Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Victrola Attachment should be connected to the input of the first audio tube, and at the same time the output of radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Victrola Attachment is in operation.

Methods of connecting the Victrola Attachment to various types of audio systems are given in the accompanying diagrams. The data given requires that an RCA Stock No. 9824 Radio-Phono switch be used for switching from radio to phonograph. For ease in connecting the "phono" lead to the Stock No. 9824 switch, the male plug on the end of the lead should be removed by unsoldering or by cutting it off.

Tone Compensation

Because of the widely varying frequency characteristics of various types of audio amplifiers with which the Victrola Attachment may be used, it may be desirable in some cases to alter the pickup circuit of the Victrola Attachment to compensate for the characteristics of the amplifier. The following circuits show means of making such refinements.

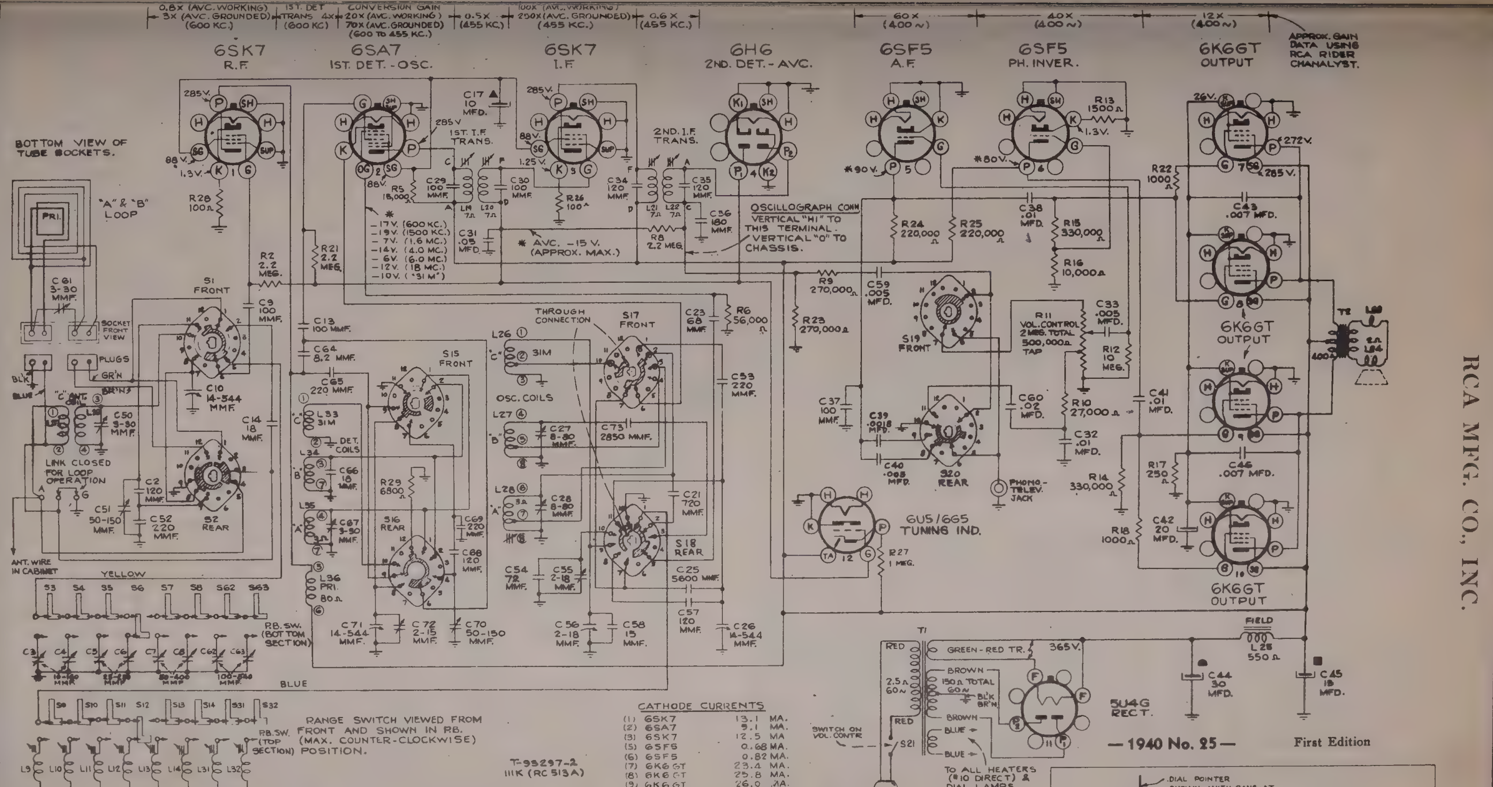
In "A" R1 controls the low-frequency response; larger values of R1 give increased lows. For maximum low-frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high-frequency response; to increase highs, increase C1.

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in "B" is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in "A" and "B" should serve as a basis from which slight alterations may be made to suit individual cases

RCA MFG. CO., INC.

MODEL 111K
Ch. RC-513A



RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN RB. (MAX. COUNTER-CLOCKWISE) POSITION.

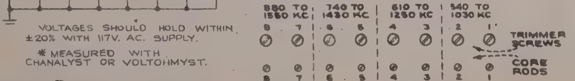
T-95297-2
111K (RC 513A)

—1940 No. 25—

First Edition

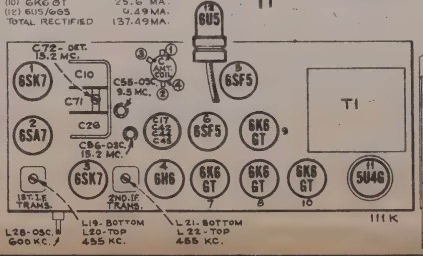
CATHODE CURRENTS

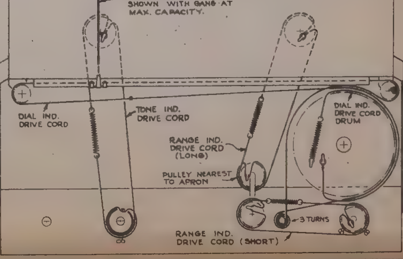
(1)	6SK7	13.1 MA.
(2)	6SA7	9.1 MA.
(3)	6SK7	12.5 MA
(5)	6SF5	0.68 MA.
(6)	6SF5	0.82 MA.
(7)	6K6GT	23.4 MA.
(8)	6K6GT	25.8 MA.
(9)	6K6GT	26.0 MA.
(10)	6K6GT	25.6 MA.
(12)	6U5/6G5	0.49 MA.
TOTAL RECTIFIED		137.49 MA.



VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.




DIAL POINTER SHOWN WITH GANG AT MAX. CAPACITY.
DIAL IND. DRIVE CORD
TONE IND. DRIVE CORD
RANGE IND. DRIVE CORD (LONG)
PULLEY NEAREST TO APRON
DIAL IND. DRIVE CORD DRUM
3 TURNS
RANGE IND. DRIVE CORD (SHORT)

Frequency Ranges

Broadcast "A" . . . . 540-1,600 kc
Medium Wave "B" . . . . 1.6-4.0 mc
Short Wave "C" . . . . 5.8-18.0 mc
Spread Band . . . . 9.35-9.85 mc

Intermediate Frequency . . . . 455 kc

Push-Button Ranges

Two stations between approximately 540-1,030 kc
Two stations between approximately 610-1,250 kc
Two stations between approximately 740-1,430 kc
Two stations between approximately 880-1,550 kc

Power Output Rating

Undistorted . . . . 10 watts
Maximum . . . . 12 watts

Loudspeaker (RL-70L-4)

Type . . . . 12-inch Electrodynamic
V.C. Impedance . . . . 2.2 ohms at 400 cycles

Power Supply Ratings

105-125 volts, 50-60 cycles, 140 watts
105-125 volts, 25-60 cycles, 140 watts

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or Volt Ohmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration for Alignment.—The dial calibration for alignment purposes can be set up in two ways:

1. The dial may be removed from the cabinet by sliding out the two spring pieces which clamp it in its mounting position. The condenser plates should then be turned into full mesh, the pointer adjusted to the scratch at the left end of the dial backing plate, and the dial placed on the frame so that its extreme left calibration mark coincides with the pointer. The dial may be held in place with scotch tape. In this manner the actual receiver dial is used for alignment. When alignment is finished, the scale should be replaced including the fibre light shields which are folded under the ends of the glass scale.
2. A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh.

Pointer for Calibration Scale.—If method (2) is used, improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

Spread-Band Alignment.—Make final adjustment of C56, C72, and C50 "31-meter" trimmers during actual reception of a station of known frequency near 9.5 megacycles.

* Use minimum capacity peak if two peaks can be obtained.
** Use maximum capacity peak if two peaks can be obtained.
NOTE: Oscillator tracks 455 kc above signal on all bands.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"C" band quiet point at 18 mc end of dial	L21 and L22 (2nd I-F trans.)
2	1st det. grid in series with .01 mfd.			L19 and L20 (1st I-F trans.)
3	Antenna terminal (A) in series with 47 mmfd. (link closed)	15.2 mc	15.2 mc (150°) "C" band	C56 (osc.)* C72 (det.)** C50 (ant.)** Rock in C72, C50
4		9.5 mc	9.5 mc (64°) "31M" band	C55 (osc.)* C70 (det.) C51 (ant.) Rock in C70, C51
5	Green lead on loop plug, in series with 300 ohms	2.44 mc	2.44 mc (90.5°) "B" band	C27 (osc.)
6		600 kc	600 kc (30.5°) "A" band	L28 (osc.)
7		1,500 kc	1,500 kc (160°) "A" band	C28 (osc.) C67 (det.)
8	Repeat steps 6 and 7.			
9	Fasten chassis in cabinet, close ant. link, adjust indicator to left-hand end of dial scales with gang closed.			
10	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	1,500 kc	1,500 kc signal "A" band	C61 (ant.) (on loop)
11		600 kc	600 kc "A" band	L28 (osc.) Rock in
12	Repeat steps 10 and 11.			

Push Button Adjustment

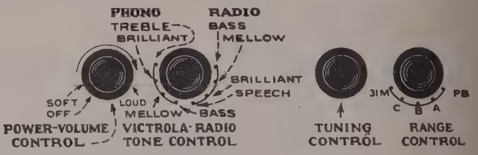
The station push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

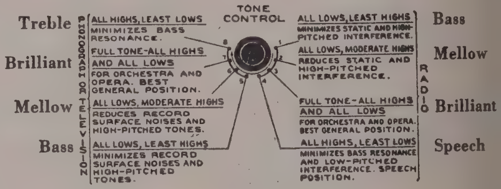
In the event that the receiver is to be used with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across terminals on back of set. In either case the procedure is as follows:

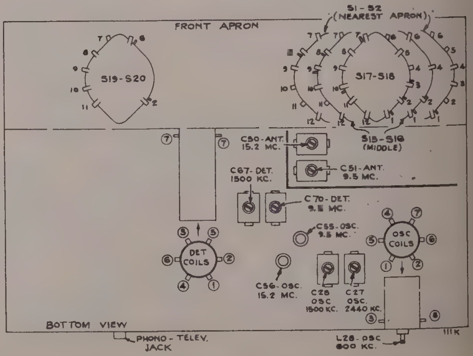
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. Turn range selector to "PB" position, push in station button No. 1 (extreme left). Then adjust the No. 1 oscillator core (L-32) to receive the station.
4. After oscillator core is set correctly, adjust C63 for maximum output.
   Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
5. Adjust for each of the remaining stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Owing to the relatively high r-f gain, it may be found that a given station can be tuned in at several different settings of the magnetite-core oscillator push-button coils. In such cases, it is advisable to unscrew the loop push-button trimmers to minimum capacity before adjusting the magnetite-cores.

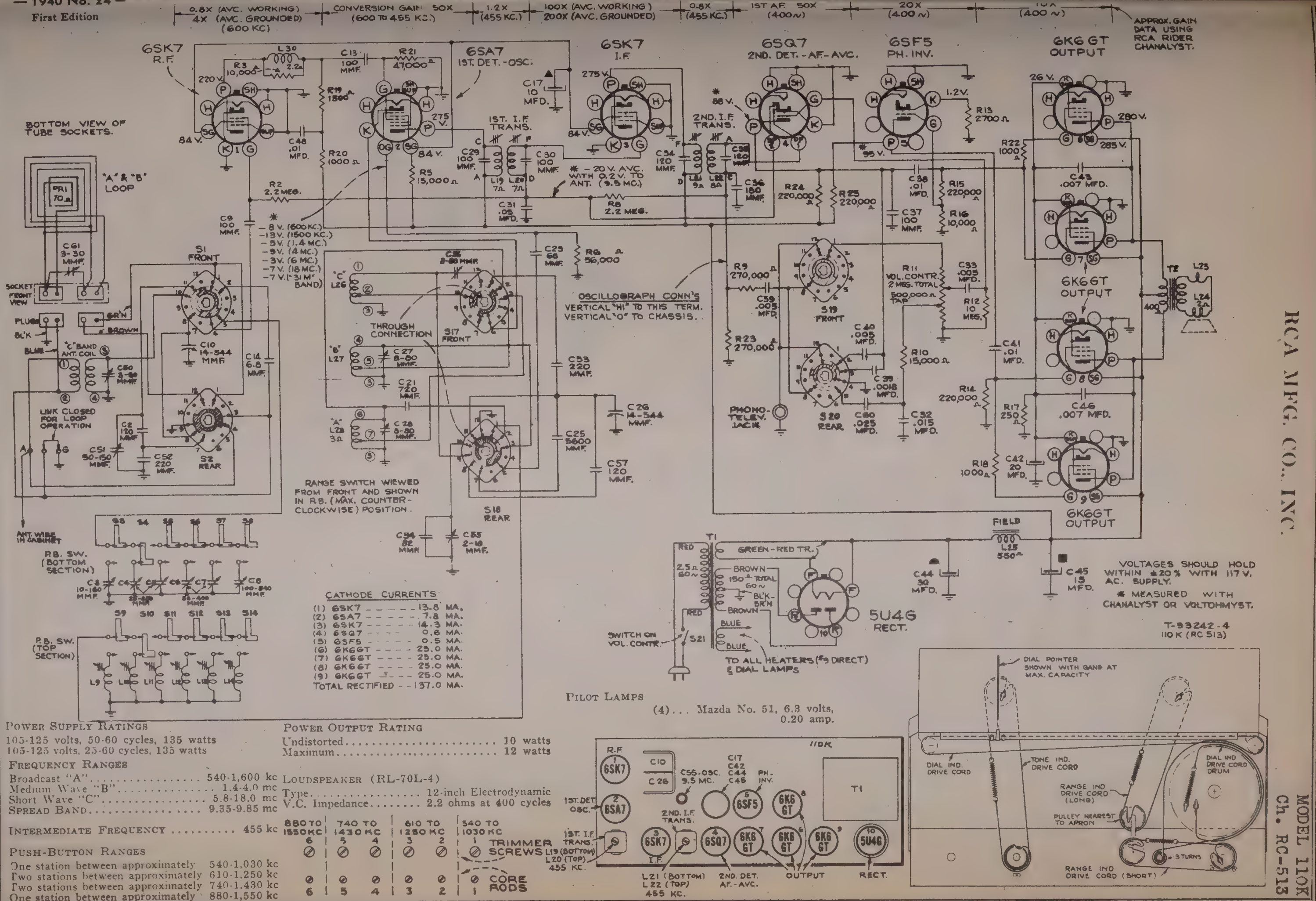
On the 880 to 1,550 kc push-button, the higher frequency stations may be received with L9 or L10 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.




TONE CONTROL
Treble
PHONOGRAPH OR TELEVISION
ALL HIGHS, LEAST LOWS
MINIMIZES BASS RESONANCE.
Brilliant
FULL TONE-ALL HIGHS AND ALL LOWS
FOR ORCHESTRA AND OPERA. BEST GENERAL POSITION.
Mellow
ALL LOWS, MODERATE HIGHS
REDUCES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
Bass
ALL LOWS, LEAST HIGHS
MINIMIZES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
Bass
ALL LOWS, LEAST HIGHS
MINIMIZES STATIC AND HIGH-PITCHED INTERFERENCE.
Mellow
ALL LOWS, MODERATE HIGHS
REDUCES STATIC AND HIGH-PITCHED INTERFERENCE.
RADIO
Brilliant
FULL TONE-ALL HIGHS AND ALL LOWS
FOR ORCHESTRA AND OPERA. BEST GENERAL POSITION.
Speech
ALL HIGHS, LEAST LOWS
MINIMIZES BASS RESONANCE AND LOW-PITCHED INTERFERENCE. SPEECH POSITION.
1
2
3
4
5
6
7
8



— 1940 No. 24 —
First Edition



VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

CATHODE CURRENTS

(1)	6SK7	13.8 MA.
(2)	6SA7	7.8 MA.
(3)	6SK7	14.3 MA.
(4)	6SQ7	0.8 MA.
(5)	6SF5	0.5 MA.
(6)	6K6GT	25.0 MA.
(7)	6K6GT	25.0 MA.
(8)	6K6GT	25.0 MA.
(9)	6K6GT	25.0 MA.
TOTAL RECTIFIED		137.0 MA.

PILOT LAMPS

(4). . . Mazda No. 51, 6.3 volts, 0.20 amp.

POWER SUPPLY RATINGS

105-125 volts, 50-60 cycles, 135 watts
105-125 volts, 25-60 cycles, 135 watts

FREQUENCY RANGES

Broadcast "A"	540-1,600 kc
Medium Wave "B"	1.4-4.0 mc
Short Wave "C"	5.8-18.0 mc
SPREAD BAND	9.35-9.85 mc

INTERMEDIATE FREQUENCY .... 455 kc

PUSH-BUTTON RANGES

One station between approximately	540-1,030 kc
Two stations between approximately	610-1,250 kc
Two stations between approximately	740-1,430 kc
One station between approximately	880-1,550 kc

POWER OUTPUT RATING

Undistorted	10 watts
Maximum	12 watts

LOUDSPEAKER (RL-70L-4)

Type	12-inch Electrodynamic
V.C. Impedance	2.2 ohms at 400 cycles

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or Volt Ohmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration for Alignment.—The dial calibration for alignment purposes can be set up in two ways:

1. The dial may be removed from the cabinet by sliding out the two spring pieces which clamp it in its mounting position. The condenser plates should then be turned into full mesh, the pointer adjusted to the scratch at the left end of the dial backing plate, and the dial placed on the frame so that its extreme left calibration mark coincides with the pointer. The dial may be held in place with scotch tape. In this manner the actual receiver dial is used for alignment. When alignment is finished, the scale should be replaced including the fibre light shields which are folded under the ends of the glass scale.
2. A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh.

Pointer for Calibration Scale.—If method (2) is used, improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

Spread-Band Alignment.—Make final adjustment of C56 and C50 during actual reception of a station of known frequency near 9.5 megacycles.

Steps	Connect the high side of the test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"C" Band Quiet Point at 18 mc end of dial	L21 and L22 (2nd I.F. Trans.)
2	1st-det. grid in series with .01 mfd.			L19 and L20 (1st I.F. Trans.)
3	Antenna terminal (A), in series with 47 mmfd. (link closed)	15.2 mc	15.2 mc (149°) "C" band	C56 (osc.)* C50 (ant.)** Rock in
4		9.5 mc	9.5 mc (65.5°) "31M" band	C55 (osc.)* C51 (ant.)** Rock in
5	Stator of antenna section of gang, in series with 300 ohms	2.44 mc	2.44 mc (97°) "B" band	C27 (osc.)
6		600 kc	600 kc (30.5°) "A" band	L28 (osc.)
7		1,500 kc	1,500 kc (158°) "A" band	C28 (osc.)
8	Repeat steps 6 and 7.			
9	Fasten chassis in cabinet, see that link is closed on antenna terminal board, indicator at left end of dial scales with gang at maximum capacity.			
10	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	1,500 kc	1,500 kc "A" band	C61 (ant.) (mounted on loop)
11		600 kc	600 kc "A" band	L28 (osc.) Rock in
12		Repeat steps 10 and 11		

* Use minimum capacity peak if two peaks can be obtained.

** Use maximum capacity peak if two peaks can be obtained.

NOTE: Oscillator tracks 455 kc above signal on all bands.

Push Button Adjustment

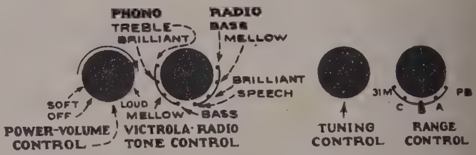
The station push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

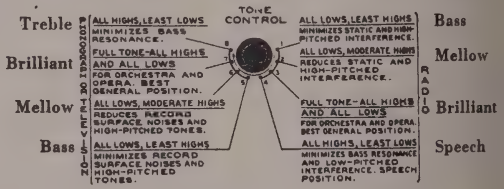
In the event that the receiver is to be used with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across terminals on back of set. In either case the procedure is as follows:

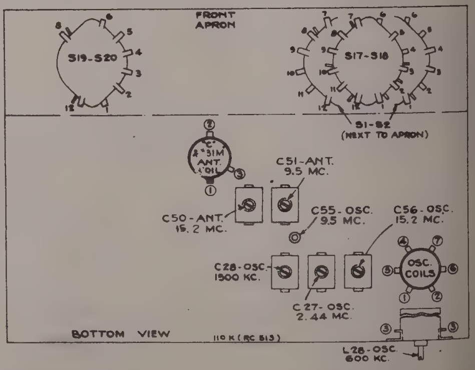
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. Turn range selector to "PB" position, push in station button No. 1 (extreme left). Then adjust the No. 1 oscillator core (L-14) to receive the station.
4. After oscillator core is set correctly, adjust C-8 for maximum output.
   Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
5. Adjust for each of the remaining stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Owing to the relatively high r-f gain, it may be found that a given station can be tuned in at several different settings of the magnetite-core oscillator push-button coils. In such cases, it is advisable to unscrew the loop push-button trimmers to minimum capacity before adjusting the magnetite cores.

On the 880 to 1,550 kc push-button, the higher frequency stations may be received with L-9 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

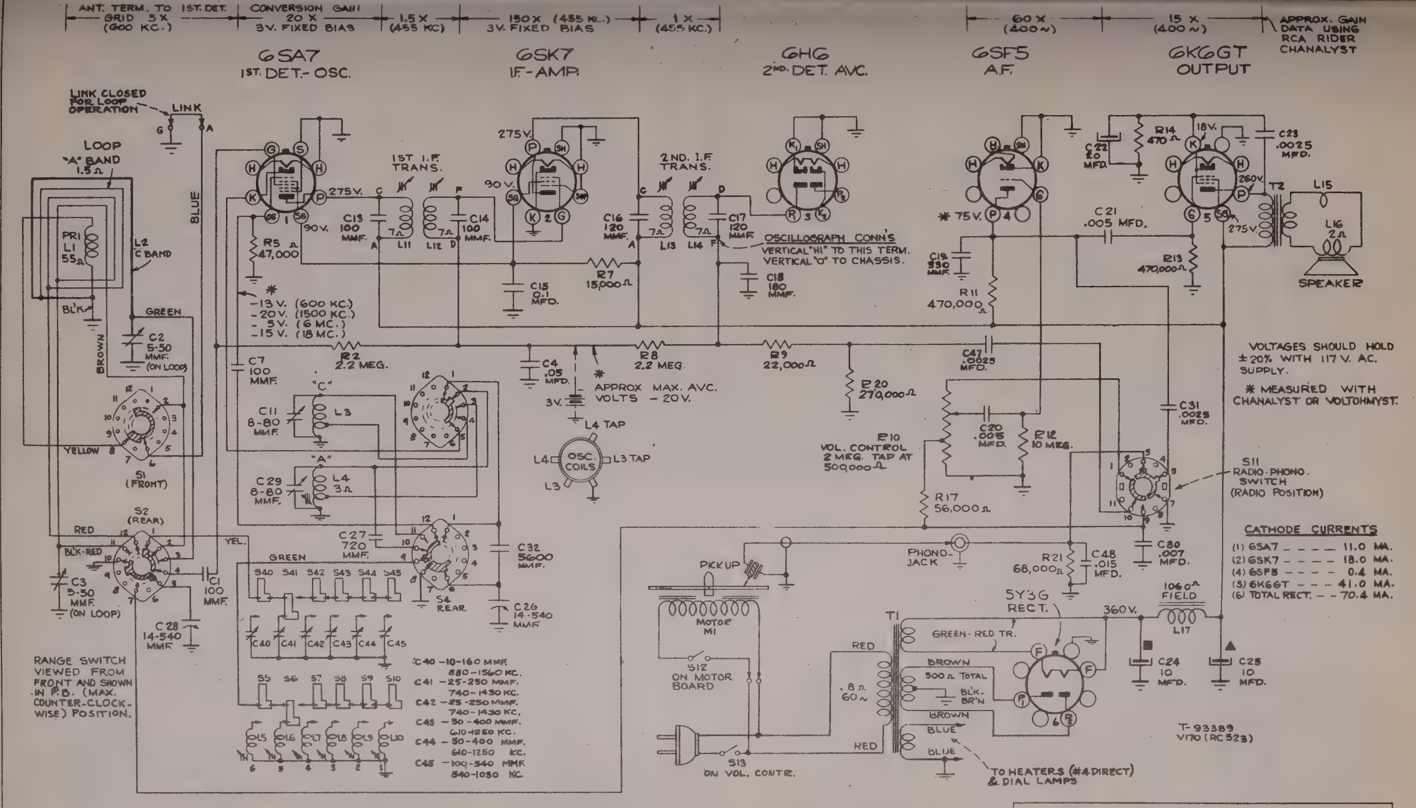



TONE CONTROL
Treble
Brilliant
Mellow
Bass
PHONOGRAPH OR TELEVISION
ALL HIGHS, LEAST LOWS
MINIMIZES BASS RESONANCE.
FULL TONE-ALL HIGHS AND ALL LOWS
FOR ORCHESTRA AND OPERA. BEST GENERAL POSITION.
ALL LOWS, MODERATE HIGHS
REDUCES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
ALL LOWS, LEAST HIGHS
MINIMIZES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
1
2
3
4
5
6
7
8
ALL LOWS, LEAST HIGHS
MINIMIZES STATIC AND HIGH-PITCHED INTERFERENCE.
ALL LOWS, MODERATE HIGHS
REDUCES STATIC AND HIGH-PITCHED INTERFERENCE.
FULL TONE-ALL HIGHS AND ALL LOWS
FOR ORCHESTRA AND OPERA. BEST GENERAL POSITION.
ALL HIGHS, LEAST LOWS
MINIMIZES BASS RESONANCE AND LOW-PITCHED INTERFERENCE. SPEECH POSITION.
RADIO
Bass
Mellow
Brilliant
Speech



RCA MFG. CO., INC.

MODEL V-170
Ch. RC-523



VOLTAGES SHOULD HOLD ±20% WITH 117 V. AC. SUPPLY.

✱ MEASURED WITH CHANALYST OR VOLTOHMYST.

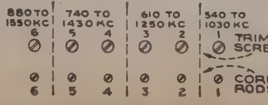
CATHODE CURRENTS

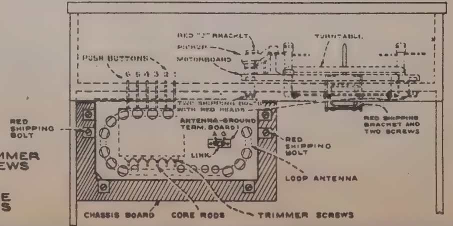
(1) 6SA7 ---- 11.0 MA.
(2) 6SK7 ---- 18.0 MA.
(4) 6SF5 ---- 0.4 MA.
(5) 6K6GT ---- 41.0 MA.
(6) TOTAL RECT. ---- 70.4 MA.

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN P.B. (MAX. COUNTER-CLOCK-WISE) POSITION.

The R-F and I-F gain measurements are made using a 3-volt battery connected from the A.V.C. bus to chassis as shown in dotted lines.

FOR OTHER DATA
SEE INDEX





FREQUENCY RANGES

Broadcast "A"................ 540-1,600 kc
Short Wave "C"................ 6-18.0 mc

POWER OUTPUT RATING

Undistorted........................ 2.5 watts
Maximum........................ 4.5 watts

LOUDSPEAKER (RL-70L-5)

Type................ 12-inch Electrodynamic
V.C. Impedance....... 2.2 ohms at 400 cycles

PHONOGRAPH

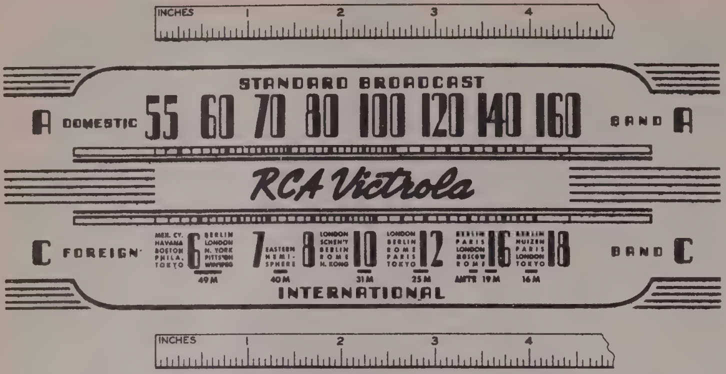
Type........................ Automatic
Record Capacity..Eight 10-inch or Seven 12-inch
Turntable Speed.................. 78 r.p.m.
Type Pickup........................ Crystal
Pickup Impedance. 100,000 ohms at 1,000 cycles
Average Output........ 1½ volts at 1,000 cycles across ½ meg.

POWER SUPPLY RATINGS

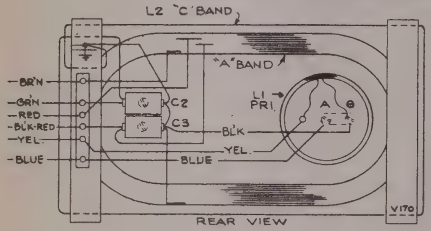
105-125 volts, 60 cycles, 110 watts
105-125 volts, 25 cycles, 110 watts

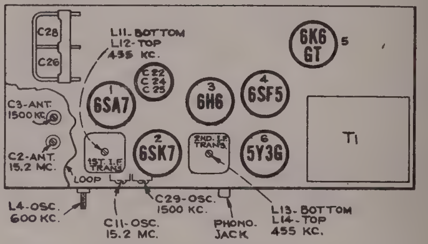
MODEL V-170
Ch. RC-523

Alignment Procedure


INCHES
1
2
3
4
STANDARD BROADCAST
A DOMESTIC 55 60 70 80 100 120 140 160 BAND A
RCA Victrola
C FOREIGN
MEX. CY. HAVANA BOSTON PHILA. TOKYO
6
BERLIN LONDON N. YORK PITTS'GH WINIPEG
49 M
7
EASTERN HEMI-SPHERE
40 M
8
LONDON SCHEN'T BERLIN ROME H. KONG
10
31 M
LONDON BERLIN ROME PARIS TOKYO
12
25 M
BERLIN PARIS LONDON MOSCOW ROME
AMTR 19 M
16
BERLIN HUIZEN PARIS LONDON TOKYO
16 M
18
BAND C
INTERNATIONAL
INCHES
1
2
3
4

Refer to RP-152 Service Data for information on Record-Changer Mechanism.





Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Using Calibration Scale.—

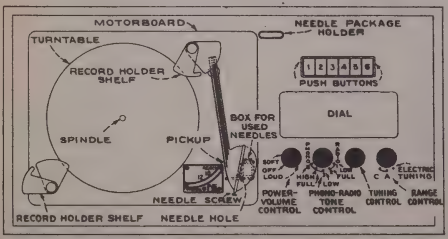
1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

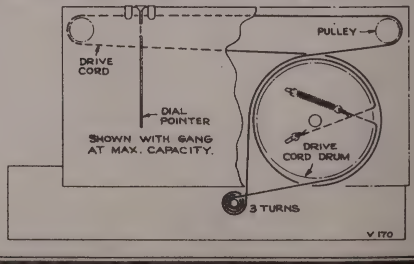
Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid, in series with .01 mfd.	455 kc	"C" band, Quiet Point at H-F end of dial	L13 and L14 (2nd I.F. Trans.)
2	1st. det. grid, in series with .01 mfd.			L11 and L12 (1st I.F. Trans.)
3	Antenna terminal, in series with 300 ohms (link open)	15.2 mc	15.2 mc "C" band	C11 (osc.)* C2 (ant.) Rock in C2
4	Antenna terminal, in series with 200 mmfd. (link open)	1,500 kc	1,500 kc "A" band	C29 (osc.) C3 (ant.)
5		600 kc	600 kc "A" band	L4 (osc.) Rock in
6	Repeat steps 4 and 5.			

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used, by tuning receiver to 14.29 mc, where a weaker signal should be received.

Note: Oscillator tracks above signal on both bands.

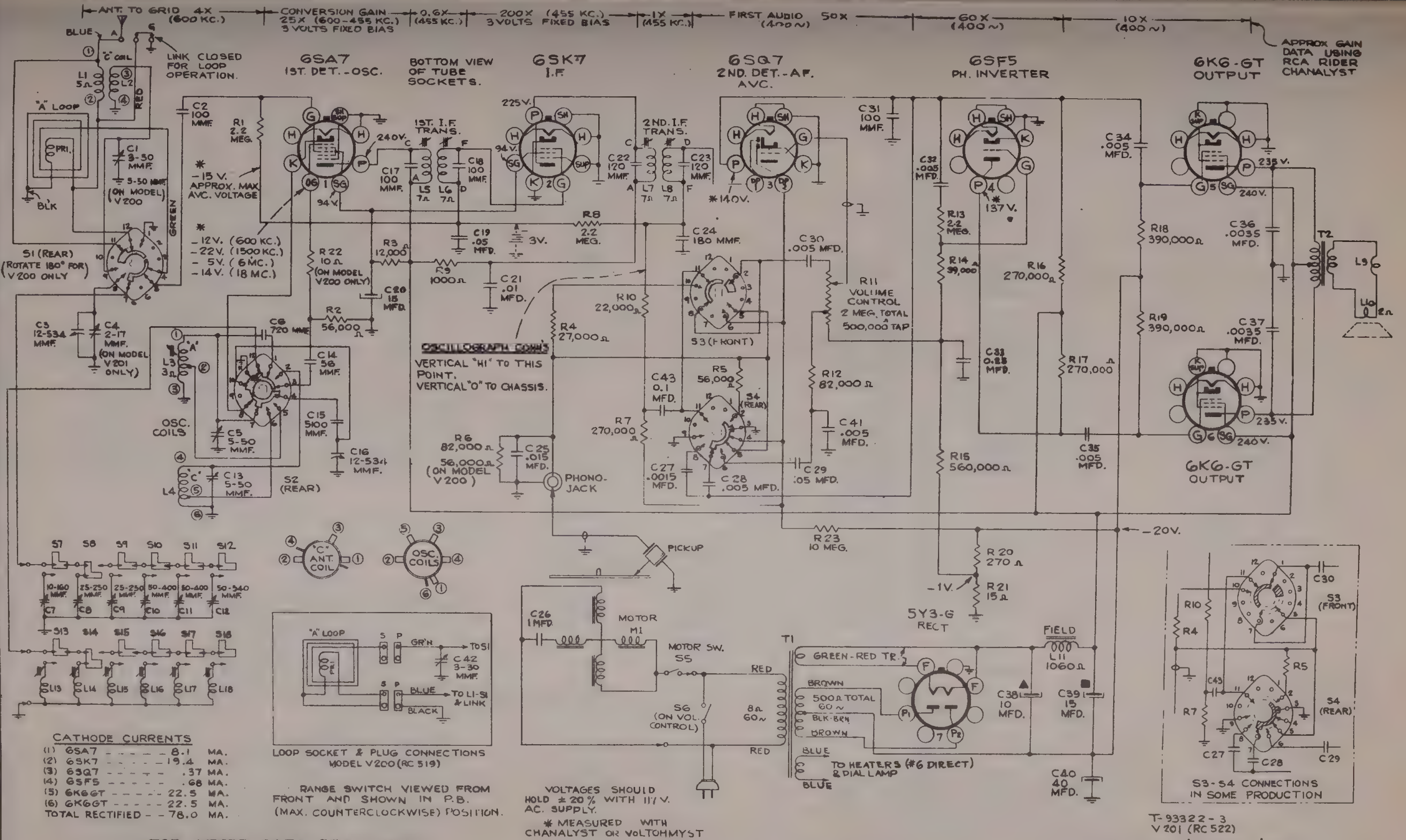




RCA MFG. CO., INC.

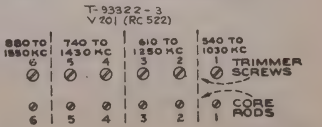
MODEL V-200, Ch. RC-519

MODEL V-201, Ch. RC-522


ANT. TO GRID 4X (600 KC.)
CONVERSION GAIN 25X (600-455 KC.) 3 VOLTS FIXED BIAS
0.6X (455 KC.)
200X (455 KC.) 3 VOLTS FIXED BIAS
1X (455 KC.)
FIRST AUDIO 50X (400 ~)
60X (400 ~)
10X (400 ~)
APPROX GAIN DATA USING RCA RIDER CHANALYST
LINK CLOSED FOR LOOP OPERATION.
6SA7 1ST. DET.-OSC.
BOTTOM VIEW OF TUBE SOCKETS.
6SK7 I.F.
6SQ7 2ND. DET.-AF. AVC.
6SF5 PH. INVERTER
6K6-GT OUTPUT
1ST. I.F. TRANS.
2ND. I.F. TRANS.
* -15 V. APPROX. MAX AVC. VOLTAGE
* -12V. (600 KC.) -22V. (1500 KC.) -5V. (6 MC.) -14V. (18 MC.)
S1 (REAR) (ROTATE 180° FOR V200 ONLY)
"A" LOOP
OSC. COILS
S2 (REAR)
S3 (FRONT)
S4 (REAR)
OSCILLOGRAPH CONN'S
VERTICAL "HI" TO THIS POINT. VERTICAL "O" TO CHASSIS.
R11 VOLUME CONTROL 2 MEG. TOTAL 500,000 TAP
PHONO-JACK
PICKUP
MOTOR M1
MOTOR SW. S5
S6 (ON VOL. CONTROL)
5Y3-G RECT
FIELD L11 1060Ω
TO HEATERS (#6 DIRECT) & DIAL LAMP
-20V.
-1V.
"C" ANT. COIL
LOOP SOCKET & PLUG CONNECTIONS MODEL V200 (RC 519)
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN P.B. (MAX. COUNTERCLOCKWISE) POSITION.
VOLTAGES SHOULD HOLD ± 20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST
S3-S4 CONNECTIONS IN SOME PRODUCTION

CATHODE CURRENTS

(1) 6SA7	8.1	MA.
(2) 6SK7	19.4	MA.
(3) 6SQ7	.37	MA.
(4) 6SF5	.68	MA.
(5) 6K6GT	22.5	MA.
(6) 6K6GT	22.5	MA.
TOTAL RECTIFIED	78.0	MA.



FOR OTHER DATA SEE INDEX

R-F and I-F gain measurements are made using a 3-volt battery connected from the A.V.C. bus to chassis, as shown in dotted lines.

Frequency Ranges

Broadcast	540-1,600 kc
Short Wave	5.8-18 mc

Intermediate Frequency .... 455 kc

Power Output Rating

Undistorted	5 watts
Maximum	5½ watts

Loudspeaker

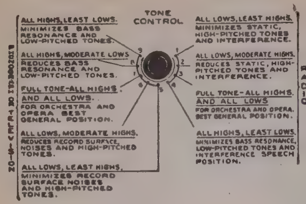
Size	12-inch
V. C. impedance at 400 cycles	2.2 ohms
Identification Number	RL-70L6

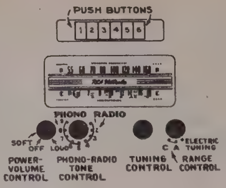
Power Supply Ratings

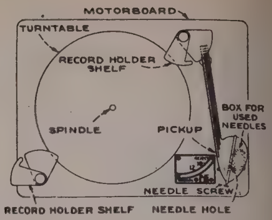
105-125 volts, 60 cycles	110 watts
105-125 volts, 50 cycles	110 watts
105-125 volts, 25 cycles	110 watts

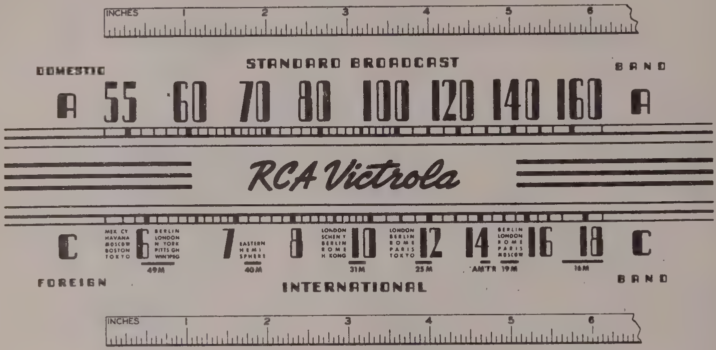
Phonograph

Type	Automatic
Record Capacity	Eight 10-inch or Seven 12-inch
Turntable Speed	78 r.p.m.
Type Pickup	Crystal
Pickup Impedance	100,000 ohms at 1,000 cycles
Average Output	1½ volts at 1,000 cycles across ½ meg.

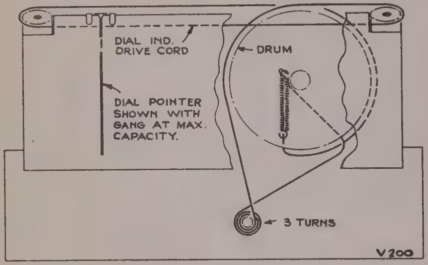

TONE CONTROL
ALL HIGHS, LEAST LOWS. MINIMIZES BASS RESONANCE AND LOW-PITCHED TONES.
ALL HIGHS, MODERATE LOWS REDUCES BASS RESONANCE AND LOW-PITCHED TONES.
FULL TONE-ALL HIGHS AND ALL LOWS. FOR ORCHESTRA AND OPERA BEST GENERAL POSITION.
ALL LOWS, MODERATE HIGHS. REDUCES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
ALL LOWS, LEAST HIGHS. MINIMIZES RECORD SURFACE NOISES AND HIGH-PITCHED TONES.
ALL LOWS, LEAST HIGHS. MINIMIZES STATIC, HIGH-PITCHED TONES AND INTERFERENCE.
ALL LOWS, MODERATE HIGHS. REDUCES STATIC, HIGH-PITCHED TONES AND INTERFERENCE.
FULL TONE-ALL HIGHS. AND ALL LOWS FOR ORCHESTRA AND OPERA. BEST GENERAL POSITION.
ALL HIGHS, LEAST LOWS. MINIMIZES BASS RESONANCE, LOW-PITCHED TONES AND INTERFERENCE SPEECH POSITION.
RADIO
1
2
3
4
5
6
7
8
9



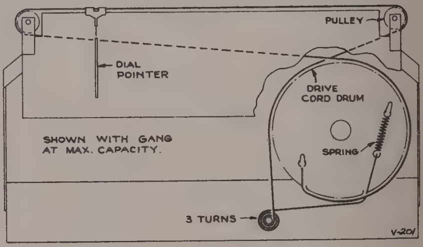




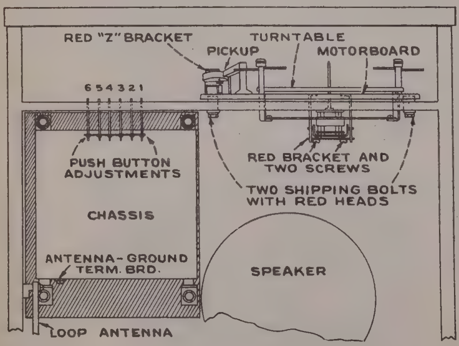
Model V-200 Calibration Scale



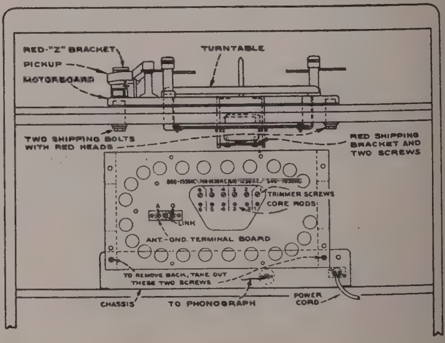
Model V-200



Model V-201



Model V-200



Model V-201

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scales printed in this service note can be used as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate. (1/16-inch to left of this mark in V-201.)
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Using Calibration Scale, Model V-200.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

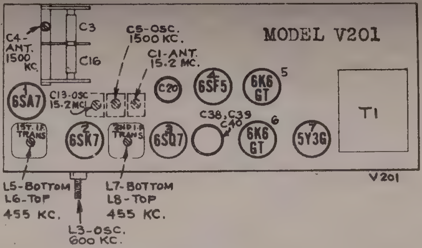
Using Calibration Scale, Model V-201.—

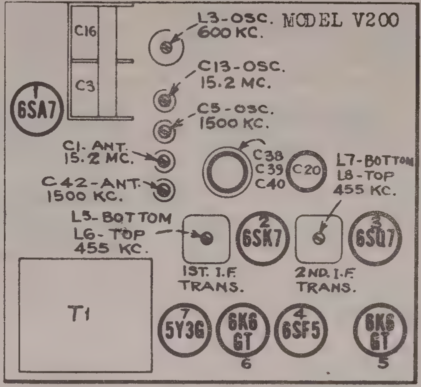
A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh. Improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

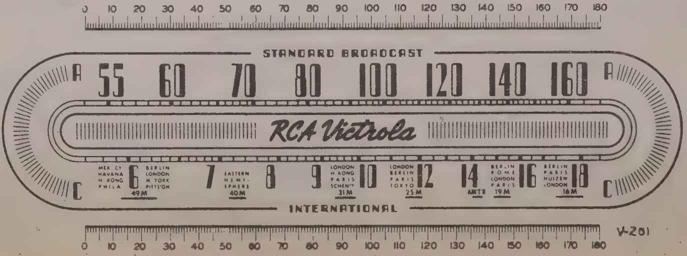
Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid, in series with .01 mfd.	455 kc	"C" band, Quiet Point at HF end of dial	L7 and L8 (2nd I.F. Trans.)
2	1st det. grid, in series with .01 mfd.			L5 and L6 (1st I.F. Trans.)
3	Antenna terminal, in series with 200 mmfd. (link open)	1,500 kc	1,500 kc "A" band 160°	C5 (osc.) C4 (ant. V-201) C42 (ant. V-200)
4		600 kc	600 kc "A" band 30.5°	L3 (osc.) Rock in
5	Repeat steps 3 and 4.			
6	Antenna terminal, in series with 47 mmfd. (link open)	15.2 mc	15.2 mc "C" band 148°	C13 (osc.)* C1 (ant.) Rock in C1

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used, by tuning receiver to 14.29 mc, where a weaker signal should be received.
Note: Oscillator tracks above signal on both bands.






0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
STANDARD BROADCAST
A 55 60 70 80 100 120 140 160 A
RCA Victrola
C 6 7 8 9 10 12 14 16 18 C
MEX CY HAVANA H KONG PHILA
BERLIN LONDON N YORK PITTS'GH
49M
EASTERN HEMI-SPHERE
40M
LONDON H KONG PARIS SCHEN'Y
31M
LONDON BERLIN PARIS TOKYO
25M
AM'T'R
BERLIN ROME LONDON PARIS
19M
BERLIN PARIS HUIZEN LONDON
16M
INTERNATIONAL
V-201

Model V-201 Calibration Scale

MODEL V-170

TUNER DATA

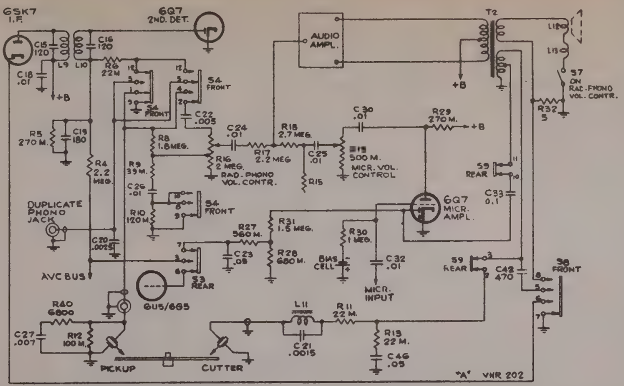
The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

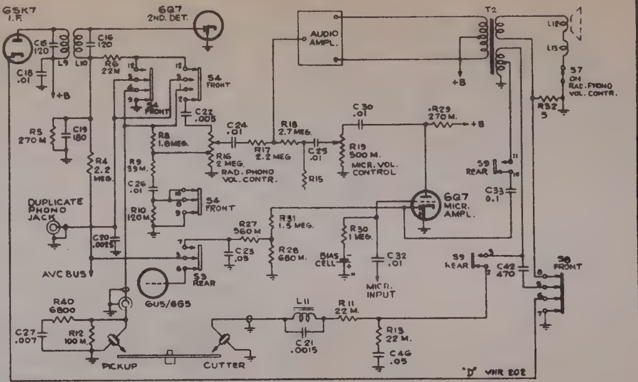
The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust L10 to receive the first station. To secure the best adjustment, rotate the set for least pickup, and adjust L10 for peak output.
5. Adjust C45 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.

On the 880 to 1,560 kc push-button, the higher frequency stations may be received with L5 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.





1—"Recording"

Model VHR-202
Service Selector
Circuits

2—"Victrola"

RECORDING:
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUXILIARY TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

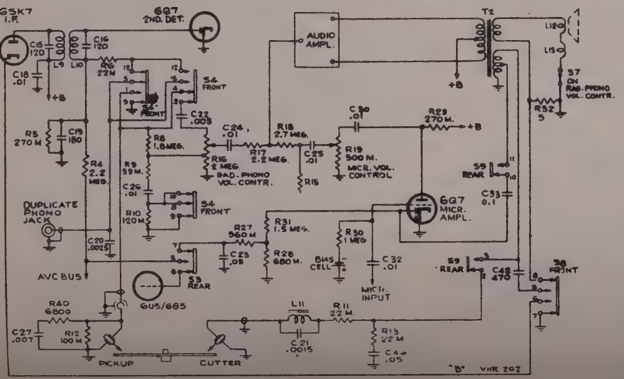
VICTROLA:
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (RA).

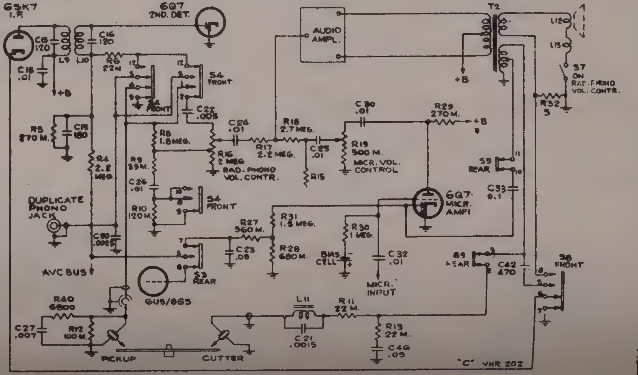
RADIO:
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.

RADIO RECORDING:
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

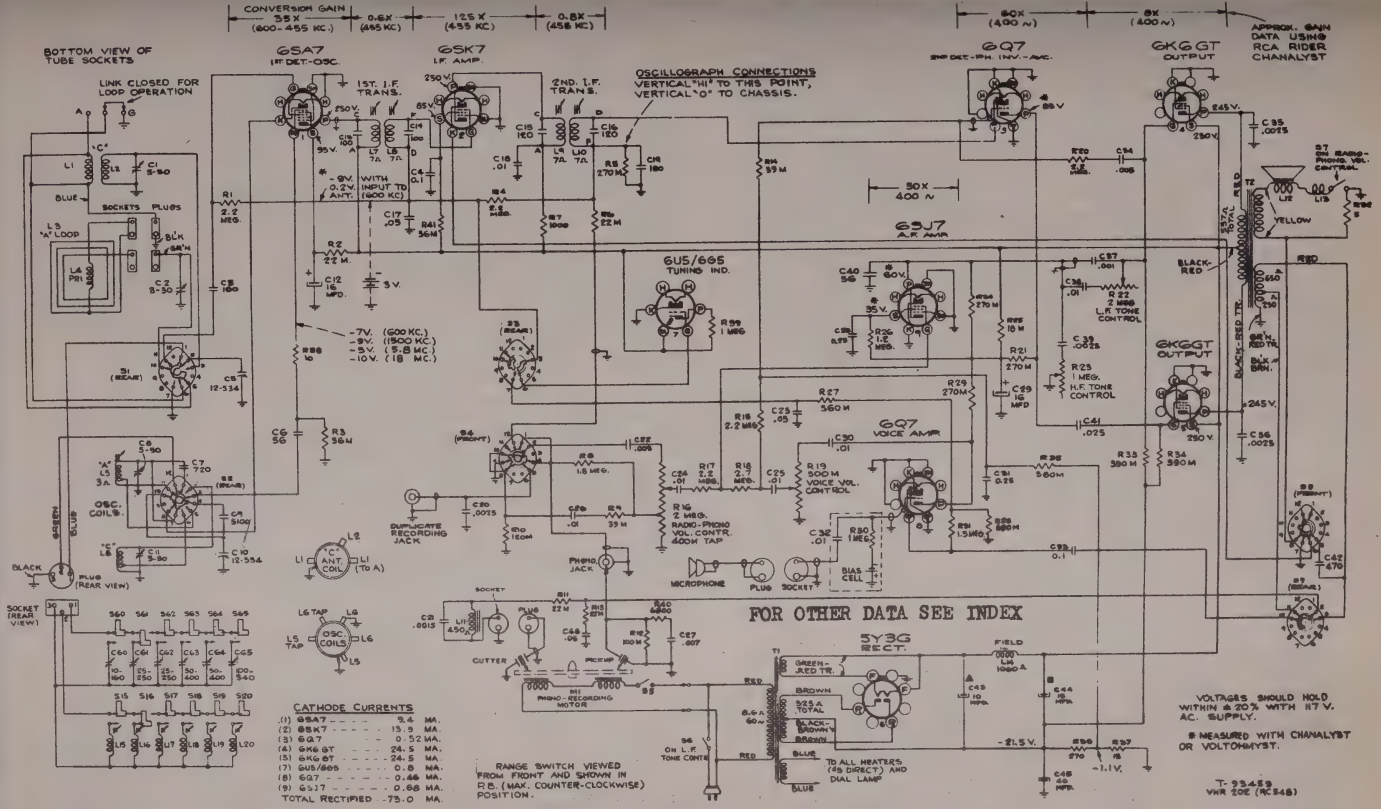
4—"Radio"

3—"Radio Recording"





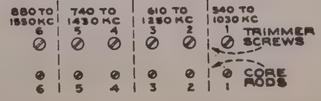
RCA MFG. CO., INC.


CONVERSION GAIN 35X (600-455 KC.)
0.6X (455 KC)
125 X (455 KC)
0.8X (456 KC)
60X (400 ~)
8X (400 ~)
APPROX. GAIN DATA USING RCA RIDER CHANALYST
BOTTOM VIEW OF TUBE SOCKETS
LINK CLOSED FOR LOOP OPERATION
6SA7 1ST DET.-OSC.
6SK7 I.F. AMP.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
6Q7 2ND DET.-PH. INV.-AVC.
6K6GT OUTPUT
6SJ7 A.F. AMP.
50X 400 ~
6U5/6G5 TUNING IND.
6Q7 VOICE AMP.
6K6GT OUTPUT
5Y3G RECT.
L3 "A" LOOP
L4 PRI
SOCKETS PLUGS
BLK
GR'N
BLUE
-9V. WITH -0.2V. INPUT TO ANT. (600 KC)
-7V. (600 KC.)
-9V. (1500 KC.)
-5V. (5.8 MC.)
-10V. (18 MC.)
R22 2 MEG L.F. TONE CONTROL
R23 1 MEG. H.F. TONE CONTROL
R19 500 M VOICE VOL. CONTROL
R16 2 MEG. RADIO-PHONO VOL. CONTR. 400M TAP
DUPLICATE RECORDING JACK
PHONO. JACK
MICROPHONE
PLUG
SOCKET
BIAS CELL
OSC. COILS
"C" ANT. COIL
L1 (TO A)
SOCKET (REAR VIEW)
PLUG (REAR VIEW)
BLACK
GREEN
BLUE
CUTTER
PICKUP
M1 PHONO-RECORDING MOTOR
S6 ON L.F. TONE CONTR.
GREEN-RED TR.
BROWN
325 A TOTAL
BLACK-BROWN
BLUE
TO ALL HEATERS (45 DIRECT) AND DIAL LAMP
FIELD
-21.5 V.
-1.1V.
BLACK-RED
YELLOW
RED
S7 ON RADIO-PHONO VOL. CONTROL
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN P.B. (MAX. COUNTER-CLOCKWISE) POSITION.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
T-93453 VHR 202 (RC548)

FOR OTHER DATA SEE INDEX

CATHODE CURRENTS

(1) 6SA7	9.4	MA.
(2) 6SK7	13.9	MA.
(3) 6Q7	0.52	MA.
(4) 6K6 GT	24.5	MA.
(5) 6K6 GT	24.5	MA.
(7) 6U5/6G5	0.8	MA.
(8) 6Q7	0.46	MA.
(9) 6SJ7	0.68	MA.
TOTAL RECTIFIED	73.0	MA.



The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

1. Make a list of the desired stations, arranged in order from low to high frequencies.

2. Turn the range switch to the broadcast position and manually tune in the first station on the list.

3. Turn range switch to push-button position and press in the left-hand button.

4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.

5. Adjust trimmer screw No. 1 for peak output on the first station.

6. Proceed in the same manner to adjust for the remaining stations.

7. Repeat adjustments for best results.

On the 880 to 1,550 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

[redacted]

MODELS VHR-202, VHR-207, VHR-407

Chassis No.	RC-548	RC-547	RC-547A

FREQUENCY RANGES

Broadcast, "A" Band	540-1,600 kc
Short Wave, "B" Band (VHR-207, 407)	1,550-4,000 kc
Short Wave, "C" Band	5,800-18,000 kc

INTERMEDIATE FREQUENCY .... 455 kc

TUBE COMPLEMENT

	VHR-202	VHR-207, 407
R-F Amplifier		RCA-6SK7
1st-Det., Oscillator	RCA-6SA7	RCA-6SA7
I-F Amplifier	RCA-6SK7	RCA-6SK7
2nd-Det., A.V.C., Phase Inverter	RCA-6Q7	RCA-6Q7
1st—A-F Amplifier	RCA-6SJ7	RCA-6SJ7
Power Output	RCA-6K6GT (2)	RCA-6F6G (2)
Microphone Pre-Amplifier	RCA-6Q7	RCA-12K7GT
"Contractor" Rectifier		RCA-6H6
"Magic Eye" Indicator	RCA-6U5	RCA-6U5
Rectifier	RCA-5Y3G	RCA-5U4G

POWER OUTPUT	VHR-202	VHR-207, 407
Undistorted watts	5	10
Maximum watts	5.5	12

LOUDSPEAKER		
(Electrodynamic)	RL-70M-6	RL-70M-5
Diameter	12-inch	12-inch
Voice-coil impedance at 400 cycles	2.2 ohms	2.2 ohms

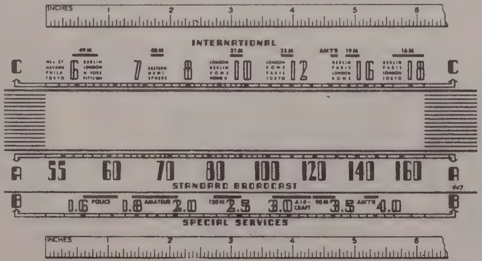
POWER SUPPLY RATING		
105-125 volts, 60 cycles	140 watts	200 watts

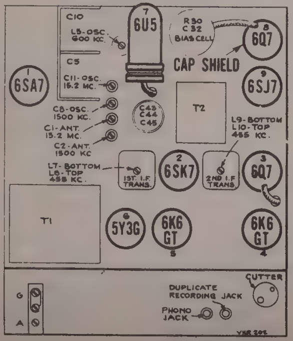
CABINET DIMENSIONS	VHR-202	VHR-207	VHR-407
Height (inches)	34	36	34
Width (inches)	32	35	34¾
Depth (inches)	17	17⅛	19

TUNING DRIVE RATIO .... 15 to 1

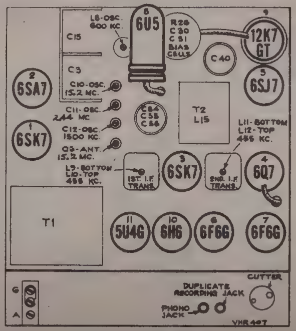
Alignment Procedure

At Right—Calibration Scale for VHR-207 and VHR-407. This also applies to Model VHR-202, except "B" Band is omitted.





Model VHR-202



Models VHR-207, 407

Model VHR-202

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet Point at High-Freq. end of "C" Band	L9 and L10 (2nd I.F. Trans.)
2	1st-detector grid, in series with .01 mfd.			L7 and L8 (1st I.F. Trans.)
3	1st-detector grid, in series with .01 mfd.	600 kc	600 kc "A" Band	L5 (osc.)
4		1,500 kc	1,500 kc "A" Band	C8 (osc.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 47 mmfd.	15.2 mc	15.2 mc "C" Band	C11 (osc.)* C1 (ant.)**
7	Install and connect chassis in cabinet. Close link on antenna terminal board. Tune in a radiated signal at 1,500 kc and peak "A" band loop trimmer C2. Rock in L5 at 600 kc. Repeat these adjustments.			

* Use minimum capacity peak if two peaks can be obtained.

** Rock in C1 and use maximum capacity peak if two peaks can be obtained.

Models VHR-207, VHR-407

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I.F. Grid in series with .01 mfd.	445 kc	"C" Band Quiet Point at High Freq. end	L11 and L12 (2nd I.F. Trans.)
2	1st Det. Grid in series with .01 mfd.			L9 and L10 (1st I.F. Trans.)
3	R.F. Grid in series with .01 mfd.	600 kc	"A" Band 600 kc	L8 (osc.)
4		1,500 kc	"A" Band 1,500 kc	C12 (osc.)
5	Repeat steps 3 and 4.			
6	R.F. Grid in series with .01 mfd.	2.44 mc	"B" Band 2.44 mc	C11 (osc.)
7	Antenna Terminal in series with 47 mmfd.	15.2 mc	"C" Band 15.2 mc	C10 (osc.)* C5 (ant.)**
8	Install and connect chassis in cabinet. Close link on antenna terminal board. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band trimmer C1 (on loop). Rock in L8 at 600 kc. Repeat these adjustments.			

* Use minimum capacity peak if two peaks can be obtained.

** Rock in C5 and use maximum capacity peak if two peaks can be obtained.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

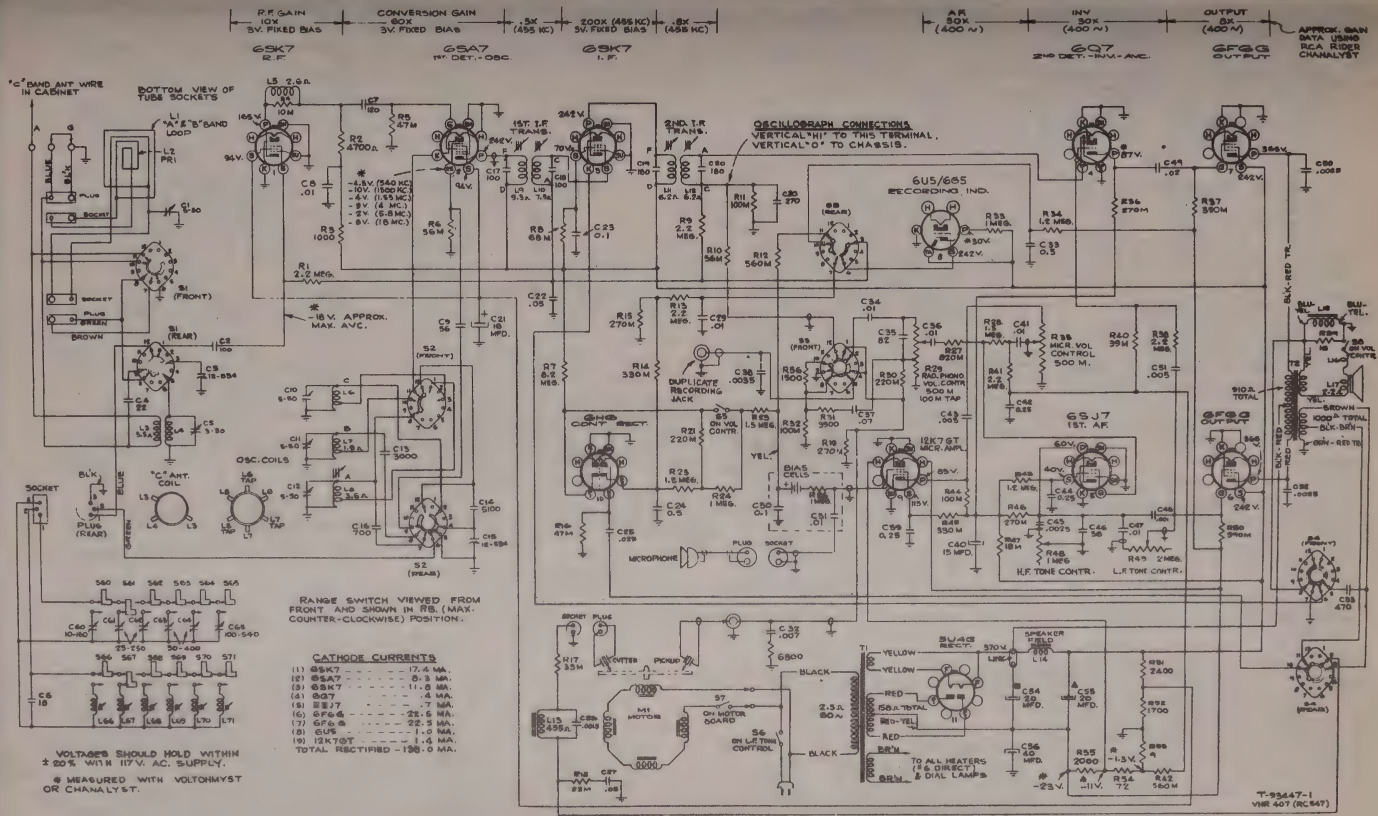
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

MODEL VHR-407
MODEL VHR-207

RCA MFG. CO., INC.



Phonograph (RP-155)

Type.................................. Automatic
Record Capacity.......... Eight 10-inch or Seven 12-inch
Turntable Speed.......................... 78 r.p.m.
Drive... Motor drive through idler on inside rim of turntable
Type Pickup.................................. Crystal
Pickup Impedance........... 100,000 ohms at 1,000 cycles
Average Output... 1½ volts at 1,000 cycles across ½ meg.

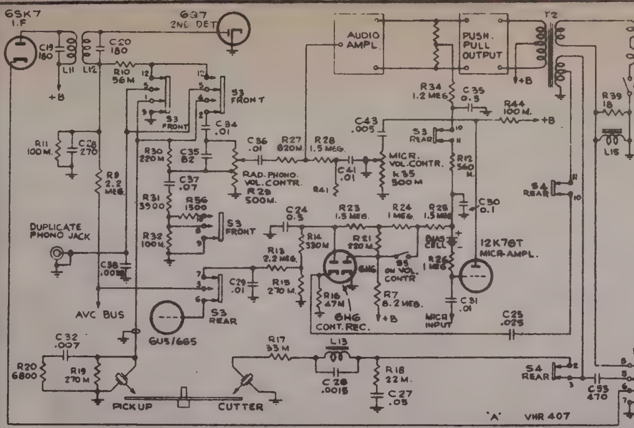
Recorder

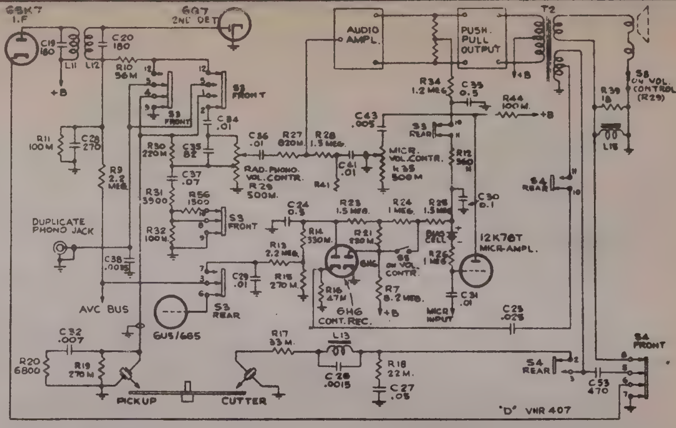
Recording Head (cutter)...................... Crystal
Impedance of Cutter at 1,000 cycles....... Approx. 60,000
Turntable Speed............................ 78 r.p.m.
Grooves Cut per Inch...................... Approx. 115
Inches Cut per Minute................ Approx. .713 inch
Recording Blank Discs.............. Coated metal-base or coated paper-base
Recording Disc Diameter................. Up to 10 inches
Drive....... Motor drive through idler on inside rim of turntable; the turntable spindle drives a lead screw which guides the recorder arm from outside of recording blank to inside

WHEN MEASURING RF AND IF GAIN, A 3-VOLT BIAS IS CONNECTED BETWEEN THE AVC BUS AND CHASSIS (PLUS TO CHASSIS)

FOR OTHER DATA SEE INDEX

MODEL VHR-207
MODEL VHR-407

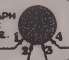




1—"Re-Recording"

Models VHR-207, VHR-407 Service Selector Circuits

2—"Victrola"



RE-RECORDING:
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUXILIARY TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

VICTROLA:
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (RA).

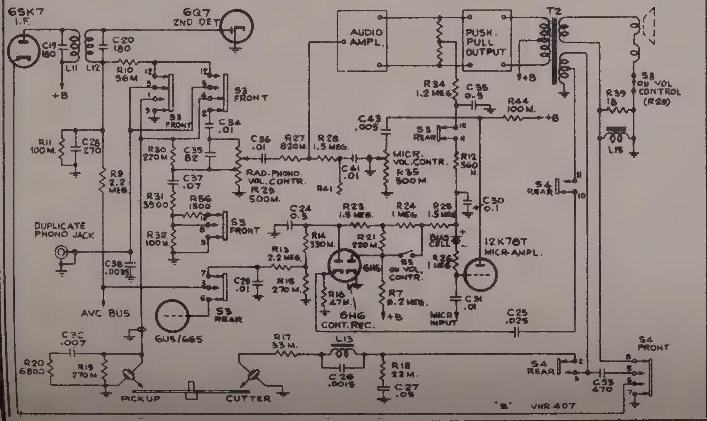
RADIO:
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.

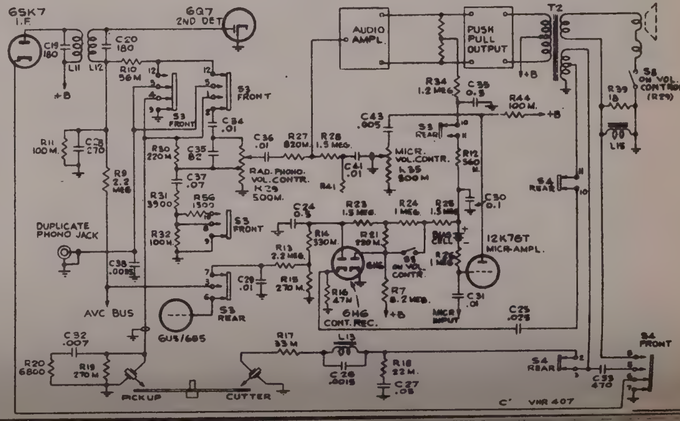
RECORDING:
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

4—"Radio"

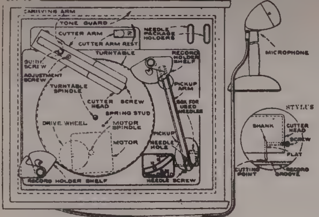
In some production, the wording on the Service Selector plate is like that shown for Model VHR-202.

3—"Recording"





Recorder Cutting Adjustments



IMPORTANT

The cutting point of the stylus must be in perfect condition in order to make good recordings.

The condition of the stylus point can not be determined by ordinary visual inspection. If the recordings are noisy or poor in quality, first try a new stylus.

The stylus cutting point can be ruined by dropping the cutter on the record, by cutting into the base metal of the recording blank, or by cutting into the paper label on the blank.

Always stop the recorder before it reaches its inner limit as it will repeat in the last groove and may wear into the base metal, thereby ruining the stylus point.

To insert or change a stylus, lift the recorder arm, loosen the stylus screw, and insert the stylus as far as it will go in the hole at bottom of cutter head, with the **flat** on the shank of the stylus toward the screw. Tighten the screw against the flat on the shank. **Retighten the screw before making each recording.** Do not use pliers or wrench.

To adjust the stylus pressure for the correct depth and width of cut, the best procedure is to cut some "blank" grooves in a recording disc of the type that will be used: The stylus pressure can be regulated, by means of the adjustment screw on top of the cutter arm, to produce the correct thickness of the hair-like cuttings. The procedure is as follows:

1. See that the phonograph pickup is on its rest, the turntable cleared of records, the record-holder shelves rotated back away from the turntable, index lever at "manual," a perfect stylus correctly inserted in the cutter head, and the stylus screw firmly tightened.

2. Place the blank recording disc on the turntable, with the spring stud that protrudes from the turntable engaged with one of the three holes at inside of the disc. This prevents the disc from slipping during recording.

3. Turn on power-bass control and turntable switch. Turn radio-phono and microphone volume controls fully counter-clockwise.

4. Lift the cutter arm well up and move it over so the stylus is about ¼-inch inside the recording disc and lower GENTLY on to the disc.

5. The stylus will begin to cut, and the cuttings should collect toward the center of the recording disc. If they collect toward the outside, the stylus is not correctly inserted, and must be adjusted by removal and re-insertion. If the threads continue to collect toward the outside, use a new stylus.

6. When the stylus is correctly inserted, with the cuttings collecting toward the center of the disc, lift the cutter, place it on the cutter rest, and stop the turntable. Then examine the cuttings and the grooves in the disc.

The cuttings should be even, thin, hair-like threads about three-thousandths of an inch across or approximately the diameter of a human hair.

The groove width should almost equal, but not exceed, the distance between grooves. A magnifying glass is helpful in examining the grooves. **If the grooves are too shallow, the phonograph needle will slide over them on play-back. If the grooves are cut too deep, rumble will be excessive.**

After examining the cuttings and the groove width, adjust the cutter pressure as required by means of the adjustment screw on top of the cutter arm. Turn this **clockwise to increase pressure** and increase size of cuttings. Turn **counter-clockwise to decrease pressure** and decrease size of cuttings.

Check the new adjustment by running more blank grooves.

Check the cuttings and groove width each time a new stylus is inserted, and whenever a different type of recording disc is used.

The stylus pressure, when adjusted for correct cutting, is approximately 1¾ ounces, measured at the end of the stylus screw.

Always lift the cutter-arm well up while moving it into cutting position, and while moving it back to the rest. Failure to do this will cause the follower-arm guide to drag across the lead screw under the motorboard.

Recorder Mechanism Adjustments

"N" Recorder Arm Stop.—An extension on the cross-bracket under the motorboard limits the inward movement of the follower arm. In this stop position, the stylus screw should be 1½ inches from the spindle.

The correct distance can be obtained by loosening set screws "N," moving the recorder arm in the required direction, and tightening the set screws.

"O" Follower-Arm Guide Adjustment.—When the recorder arm is lifted, the follower-arm rises up so that the follower-guide will clear the lead screw and permit the recording arm to be moved inward or outward.

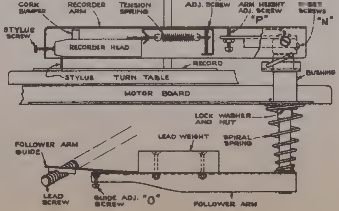
Adjust the set screw and locknut "O" so that the guide clears the lead screw when the bottom-front edge of recorder arm is 3 inches above record.

"P" Recorder-Arm Height Adjustment.—With the recording stylus resting on a metal-base recording disc, and adjusted for correct cutting pressure, the stylus screw should be approximately in the center of the hole in the recorder arm, and the cutter head should be free to move up and down. Adjust the recorder-arm height adjustment screw and locknut "P" to obtain these conditions.

If the arm is too low, the cork bumper on top of the cutter head will hit the inner top of recorder arm.

If the arm is too high, the stylus screw will hit the lower edge of the screw hole.

Also check to see that the stylus screw does not scrape against the side of the screw hole.



Recorder Operating Instructions

Preliminary.—

1. See that cutter is functioning correctly as outlined on facing page.

2. Place recording disc on turntable with stud engaged in one hole.

3. Turn on power-bass control, just past the click of the power switch. Turn treble tone control full clockwise. Set radio-phono volume control to soft, and microphone volume control fully counter-clockwise.

Radio Recording.—

1. Tune in the desired radio program.

2. Turn service selector to position "3."

3. Turn radio-phono volume control so the "Magic Eye" just closes during loudest passages.

4. Push turntable switch "on."

5. Lift the recording arm, move it over so the stylus is about ¼-inch inside the recording disc, and lower gently on the disc.

6. During the recording, listen to the loudspeaker, watch the "Magic Eye," and increase or decrease the radio-phono volume control if the broadcast level becomes too low or too high.

7. Use a fine hair brush occasionally to keep the area immediately ahead of the stylus free from chips and threads.

8. Before the cutter reaches its inner limit, lift the cutter head and place on rest. Turn off the turntable switch and remove the cuttings from the disc.

9. The recording may be **"played-back"** immediately: Turn the service selector to "Victrola," push the turntable switch "on," **turn power-bass control fully clockwise,** place pickup needle in outer groove of the disc, and adjust the radio-phono volume control. **Use a new needle for play-back.**

Microphone Recording.—

1. Turn service selector to position "1."

2. Turn radio-phono volume control to its "off" position to prevent feed-back and "howl."

3. Turn power-bass control just past the click of the power switch. Turn treble-tone control full clockwise.

4. To obtain an approximate setting of the microphone volume control before making a recording, talk into the microphone (which should be left plugged into its receptacle at all times) and adjust the microphone volume control so the "Magic Eye" just closes. By talking in a fairly level tone, and by maintaining the same distance between the microphone and lips, the microphone volume control will not require continual readjustment.

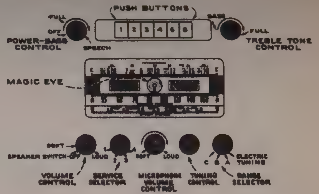
5. Start the turntable and place cutter on the disc.

6. Talk into the microphone to make the desired recording, and re-adjust the microphone volume control if required, as indicated by the "Magic Eye."

7. Stop the recorder before it reaches its inner limit, turn the microphone volume control counter-clockwise and play back the recording as described in "9" above.

Re-Recording.—

A record may be re-recorded, or duplicated (that is, a "copy" may be made from an "original") by connecting an RCA Victrola Attachment (record player) to the "re-recording jack" on the rear of the radio chassis. The "original" record is played on the RCA Victrola Attachment, and the "copy" is cut or recorded on the Home Recorder.



Controls on VHR-207 and VHR-407. Model VHR-202 Controls are identical, except "B" Band is omitted.

The procedure is as follows:

1. Turn the service selector to position "1."

2. Connect the RCA Victrola Attachment pickup cable to the jack on rear of the Home Recorder radio chassis.

3. Place the "original" record on the RCA Victrola Attachment, turn its volume control fully clockwise, and place its pickup on the "original" record.

4. Adjust the radio-phono volume control so the "Magic Eye" just closes on loudest passages, then lift pickup off the RCA Victrola Attachment.

5. Start the recorder by pushing turntable switch "on," and placing the recorder arm on the recording disc.

6. Put the RCA Victrola Attachment pickup arm on the "original" record. The recorder will cut a duplicate of this record, which may be played-back as described previously.

Mixed Recording.—

The RCA Home Recorders have complete flexibility for mixed recordings of radio, microphone, and phonograph. The various possible combinations are clearly shown in the illustration of the service selector control.

In mixed recordings, the radio-phono volume control regulates the recording level for radio, and for the RCA Victrola Attachment.

The microphone volume control regulates the recording level of the microphone only. In using the microphone on mixed recordings, or mixed PA, it should be placed as far as possible from the loudspeaker and faced away from the loudspeaker to avoid feed-back howl. (An extension cord may be added if necessary.)

"Rumble".—

1. **Excessive cutting pressure will cause rumble.** The width of the groove should almost equal, but not exceed, the distance between grooves.

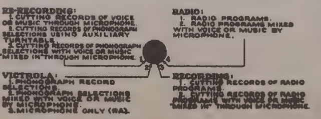
Check the groove width each time a new stylus is used, and each time a new disc is used.

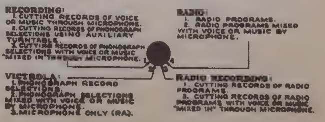
2. **When recording, use the maximum bass response,** by turning the power-bass control to "full" (just past the click of the power switch).

3. **On play-back, use the least bass response,** by turning the power-bass control to "speech" (full clockwise).

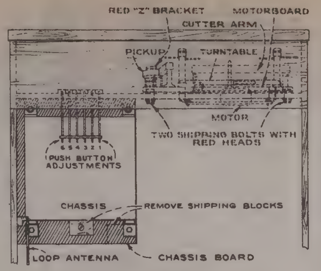
4. Be certain that the motor board and mechanism is "floating" free from the cabinet.

SERVICE SELECTOR

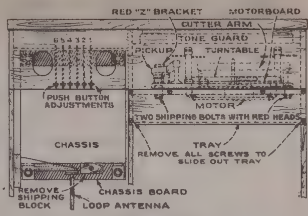

RE-RECORDING:
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUXILIARY TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
RADIO:
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
1
2
3
4
VICTROLA:
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (PA).
RECORDING:
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.


RECORDING:
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUXILIARY TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
RADIO:
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
1
2
3
4
VICTROLA:
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (PA).
RADIO RECORDING:
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

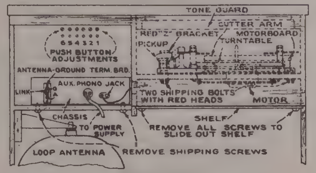
Two varieties of wording have been used on the Service Selector plate, as shown above: Also, in some production, the word "Phonograph" is used instead of "Victrola".



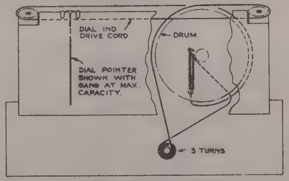
Model VHR-202



Model VHR-407

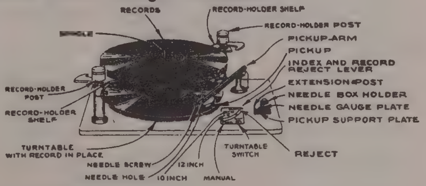


Model VHR-207



Dial Drive Cord Arrangement

Automatic Record Changer Mechanism



The RCA automatic record changer is the result of vast experience, continual improvements, precision manufacturing and rigid inspection. Hundreds of thousands of these mechanisms are giving satisfactory performance in everyday use in unskilled hands.

The mechanism is relatively simple, and as "foolproof" as human ingenuity can devise.

Cycle of Operation

In automatic operation (index lever set to "10" or "12"), when the pickup needle enters the eccentric or spiral groove at the inside of the record, the pickup arm swings in the groove, and this motion acts through a friction clutch to "trip" or start the cycle of the automatic record changer mechanism which:

1. Lifts up the pickup arm and swings it out clear of the records.

2. Turns the two record-holder posts, each of which has a "knife" and a "shelf": The knives enter between the bottom record and the rest of the stack. Continuing to turn, the shelves move from under the bottom record and it drops on the turntable, while the rest of the stack of records are supported by the "knives."

3. The pickup arm is then moved to correct position and lowered on the record, while—

4. The record-holder posts are turning back to their original positions, so that the records rest on the shelves, and the knives are in correct position to separate the next record from the stack.

The cycle is completed when the pickup comes down on the record. The pickup arm should not be moved while "in cycle."

Record-Separating Knives. 12-inch records are thicker than 10-inch records: To accommodate this difference, the "knife" or record-separating lever on each record post is raised slightly when a 12-inch record presses down against the ball-point screw that projects through a hole in the record-holder shelf on each post. (10-inch records do not rest on these screws, and the knife clearance is then correct for a 10-inch record.)

"Record Discriminating Lever." In playing a mixed group of 10-inch and 12-inch records, the index lever is set at "10." When the pickup arm moves out during the cycle of operation, the record discriminating lever (at left of the rear record-holder post) is moved to its forward position, toward the spindle, and sets the correct landing position of the pickup needle for a 10-inch record. If a 12-inch record drops down, it pushes the record discriminating lever back, and sets the correct landing position for the 12-inch record.

Cautions

1. This instrument is not recommended for playing 10-inch and 12-inch records in **mixed sequence.**

2. **Never use force** to start or stop the motor or any part of the record-changing mechanism or pickup arm.

3. **Warped or damaged records** may cause the mechanism to jam.

4. **Warped records** may slide on one another when playing, resulting in unsatisfactory reproduction.

5. **Do not leave records on the record-holder posts** as they may warp, particularly in warm climates. Warped records may be flattened by placing them on a flat surface with a flat heavy article placed on top of them for a few days.

6. **Do not leave pickup needle resting on a record** or on the turntable. Always place it on the pickup rest.

7. **Do not insert a used needle in the pickup,** and avoid turning a needle after it has been used.

8. If for any reason the phonograph stalls, turn off the turntable switch and remove the records from the record holder shelves. Start the turntable and allow the pickup arm to complete its cycle.

Manual Phonograph Operation

Inserting Needles.—To insert a needle, place pickup on its rest, loosen needle screw on the front of the pickup, place needle in hole at top of pickup so that it drops down against the polished gauge plate, press firmly on top of pickup so it sits squarely on the pickup rest, and then tighten the needle screw. This procedure ensures that the needle will project the correct distance from the pickup.

1. See that the recording arm is in its rest position at rear of turntable.

2. Turn power-bass control on, turn service selector to "Victrola," and turn microphone volume control fully counter-clockwise.

3. See that pickup is on the pickup rest.

4. Push index lever to "manual," lift the knobs on the top of the record holder posts, and rotate the shelves back, away from the turntable. Push back the vertical lever at left of the rear record post.

5. Place record on turntable.

6. Push turntable switch "on" and when turntable has attained speed, lift the pickup and lower it gently on the record so that the needle point enters the outside groove.

7. Adjust the radio-phonograph volume control for the desired volume, and adjust the tone controls for best reproduction.

8. To stop, place pickup on its rest and turn off the turntable switch.

Automatic Phonograph Operation

1. See that the recording arm is in its rest position at rear of turntable.

2. Turn power-bass control on, turn service selector to "Victrola," and turn microphone volume control fully counter-clockwise.

3. See that the pickup is on the pickup rest. If it is not, complete a cycle of operation as described previously.

4. Push index lever to "manual," lift the knobs on the top of the record-holder posts and rotate the shelves back, away from the turntable. Push back the vertical lever at left of the rear record post.

5. Select a series of eight 10-inch records, or seven 12-inch records, and place the first one on the turntable. Swing the record-post shelves into position and place the remainder of the series of records on the shelves as shown in the illustration.

6. Push the index lever to "10" for a series of 10-inch records, or to "12" for a series of 12-inch records.

7. Push turntable switch "on" and when turntable has attained speed, lift the pickup and lower it gently on the record, so that the needle point enters the outside groove.

8. Adjust the radio-phonograph volume control for the desired volume, and adjust the tone controls for best reproduction.

9. Close the lid of the cabinet to eliminate mechanical sound. The whole series of records will play without further attention, and the last record will repeat until the turntable switch or the power-bass control is turned off.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the index lever to the "reject" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the index lever, it will automatically return to the "10" position. If playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in at "manual" when not actually playing records automatically.

To stop the mechanism while a record is being played, push the index lever to "manual," place the pickup on its rest, and turn off the turntable switch.

To stop the mechanism at the completion of a record, first allow the pickup to complete its cycle (the cycle is completed when the pickup comes down on the record). Then push the index lever to "manual," place the pickup on its rest, and turn off the turntable switch.

When discontinuing operation, turn off both the turntable switch and power-bass control

To remove a record from the turntable, lift the knobs on top of the record-holder posts, swing the shelves back clear of the records, and push back the vertical lever at left of the rear record post.

RECORD CHANGER SERVICE DATA

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

The changer can be rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction. **The 10- and 12-inch records must be absolutely flat for smooth operation.**

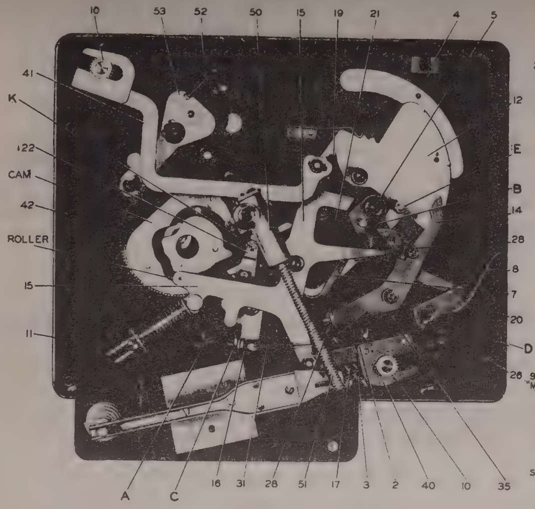
A pickup shorting switch, located under the motorboard, operates when the pickup is moved outward to the pickup rest.

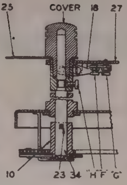
The turntable in RP-155 can be removed by tapping smartly on the top of the spindle while pulling upward on opposite sides of the turntable.

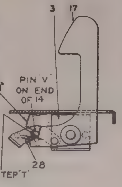
Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, lead screw and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, motor bearing, record post bearings, and all other bearings of various levers and pulleys on underside of motorboard and underneath turntable.

Do not allow oil or grease to come in contact with rubber idler wheel, bumper or rubber parts of the mechanism. Use quick drying naphtha to clean the rubber parts.







Names of Mechanism Parts

2	**Guide**	—Pickup-lift-cable guide.
3	**Bracket**	—Record-discriminating-lever bracket.
4	**Switch**	—Turntable motor switch.
5	**Clutch**	—Trip-lever friction clutch.
7	**Finger**	—Trip-lever friction finger.
8	**Cable**	—Pickup shielded cable.
9	**Spring**	—Record-discriminating-lever spring (flat).
10	**Gear**	—Record-separator-shaft gear.
11	**Guide**	—Main-lever-spring guide.
12	**Lever**	—Index lever.
14	**Lever**	—Locating lever and pawl.
15	**Lever**	—Main lever.
16	**Lever**	—Pickup lift-cable lever.
17	**Lever**	—Record-discriminating lever and pawl.
18	**Lever**	—Record-separator elevating lever.
19	**Lever**	—Trip-detaining lever.
20	**Lever**	—Trip lever.
21	**Lever**	—Trip-regulator lever.
22	**Pawl**	—Trip pawl.
23	**Pin**	—Separator-shaft pin (engages gear).
25	**Separator**	—Record-separator knife.
26	**Spring**	—Pickup-arm starting spring.
27	**Shelf**	—Record-support shelf.
28	**Spring**	—Record-discriminating-lever pawl spring, or locating-lever pawl spring.
31	**Spring**	—Pickup lift-cable spring.
34	**Shaft**	—Record separator shaft.
35	**Spring**	—Locating-lever spring.
40	**Gear**	—Short arm and rack gear.
41	**Gear**	—Long arm and rack gear.
42	**Cam**	—Cam and drive gear assembly.
43	**Spring**	—Main-lever spring.
50	**Casting**	—Casting and bearing for spindle and lead screw.
51	**Screw**	—Lead screw and pinion gear for recorder drive.
52	**Spring**	—Tension spring for motor idler pulley arm.
53	**Arm**	—Motor drive disc arm.

Names of Mechanism Adjustments

"A" Rubber Bumper. -Maintains 1/16-inch clearance between roller (on end of main lever) and cam plate.

"B" Friction Clutch Adjustment.—Regulates tripping of record-changing cycle when pickup swings in eccentric groove.

"C" Pickup Lift-Cable Adjustment.—Regulates height that pick-up arm is lifted during record-changing cycle.

"D" Needle Landing Position for 10-inch Records.—The relation between pickup shaft and trip lever "20," which are fastened by set screws "D," determines needle landing position for 10-inch records.

"E" Needle Landing Position for 12-inch Records.—Eccentric stud "E" adjusts position of lever "14" which determines landing position for 12-inch records.

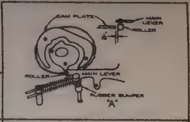
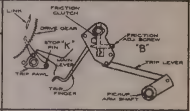
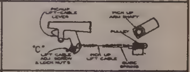
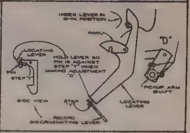
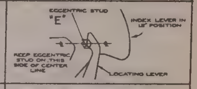
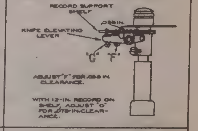
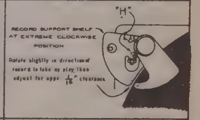
"F" Record separator knife adjustment for 10-inch records, adjusts spacing of knife with relation to record shelf so knife will accurately slice in between the bottom 10-inch record and the rest of the stack.

"G" Record separator knife adjustment for 12-inch records, adjusts movement of elevating lever which raises knife to compensate for greater thickness of 12-inch records.

"H" Record support shelf set screws, to adjust record support self on each record post, so the shelves move out from under the bottom record at the same instant, permitting record to drop properly.

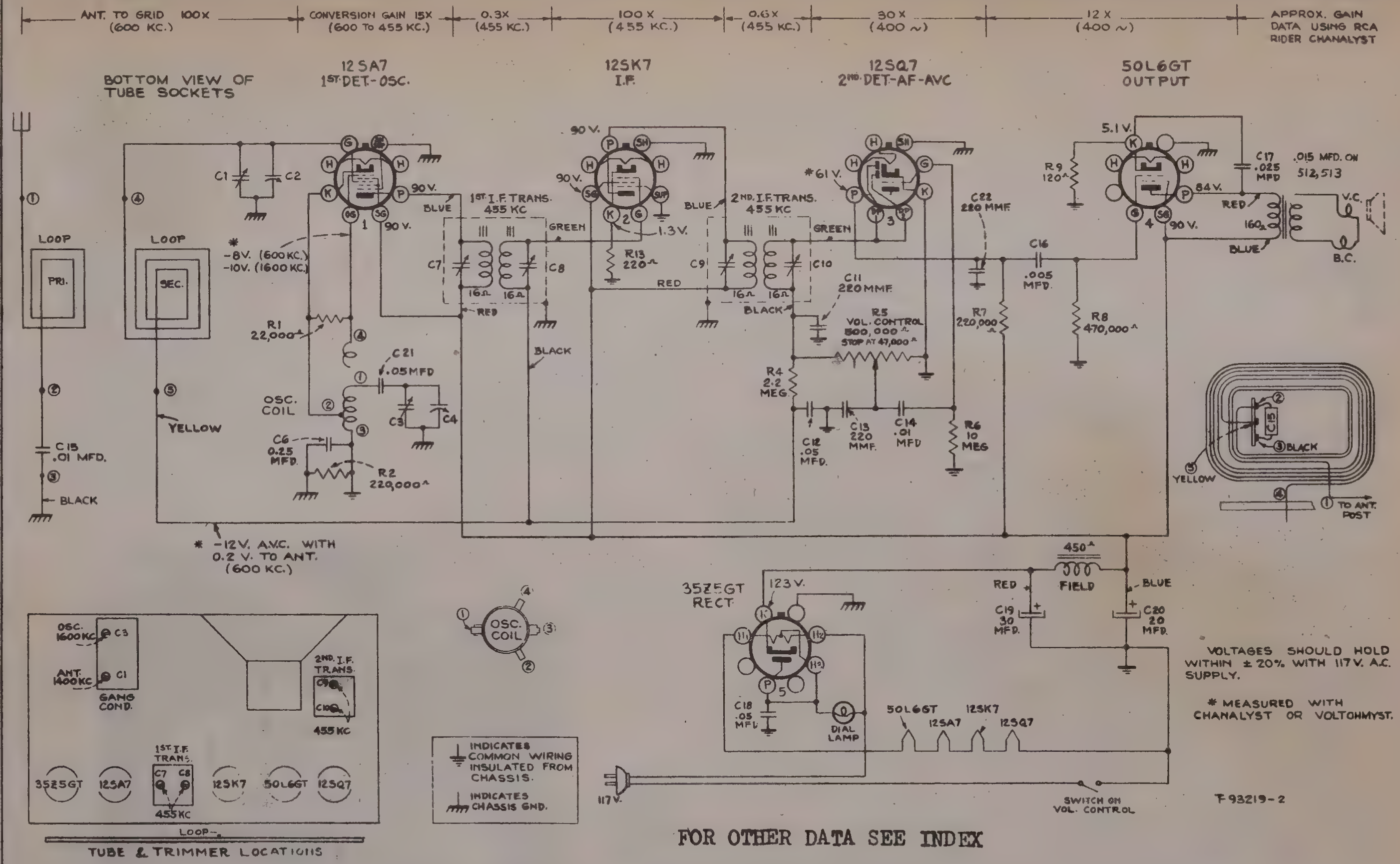
"K" Trip-pawl stop pin, regulates point at which the roller on main lever enters the cam.

Quick-Reference Chart for Automatic Record Changer Adjustments

General irregularity of operation.	With changer "out-of-cycle," the roller on main lever should clear the cam plate by 1/16-inch. Bend the rubber bumper stud, if necessary, to obtain this clearance.	 CAM PLATE MAIN LEVER ROLLER 1/16" ROLLER MAIN LEVER RUBBER BUMPER "A"
Fails to trip at end of record.	**Increase** clutch friction by turning clutch screw clockwise.	 LINK FRICTION CLUTCH DRIVE GEAR STOP PIN "K" FRICTION ADJ SCREW "B" MAIN LEVER TRIP LEVER TRIP PAWL TRIP FINGER PICKUP ARM SHAFT
Needle repeats grooves (does not follow the groove). *Change cycle starts before record is finished.*	**Decrease** clutch friction by turning clutch screw counter-clockwise. These troubles may also be caused by a defective record, binding of the pickup-arm bearing, twisted pickup output cable, or rubbing between the friction finger and the index-lever finger.	
Pickup arm strikes lower record in stack. *Pickup needle drags across top record on turntable.*	Rotate the changer "in-cycle" to the point where the pickup arm is raised to its maximum height above turntable plate, and has not started to move outward. Adjust the lift-cable screw and locknuts so needle point is 1-inch above top surface of turntable.	 PICKUP LIFT-CABLE LEVER PICK UP ARM SHAFT PULLEY "C" LIFT CABLE ADJ SCREW & LOCK NUTS PICK UP LIFT CABLE GUIDE SPRING
Needle doesn't land at correct point on 10-inch record. *(The correct landing point is 4-5/8 inches from the nearest side of the turntable spindle).*	Place 10-inch record on turntable, push record-discriminating lever to forward position, push index lever to "reject" and return it to "10." Rotate mechanism through cycle until needle is just ready to land on record. Hold pin on locating lever against step "T" as shown, loosen the two set screws at pickup arm shaft, and move pickup so needle is about 1/32-inch beyond the outer groove of record. See that there is 1/32-inch play between the pickup-arm bearing and set-screw collar, then tighten one (the blunt nose) set-screw. Run mechanism through cycle as a check, and then tighten the cone-pointed set screw.	 INDEX LEVER IN 10-IN. POSITION PAWL "D" LOCATING LEVER HOLD LEVER SO PIN IS AGAINST STEP "T" WHEN MAKING ADJUSTMENT "D" PIN STEP T PICKUP ARM SHAFT SIDE VIEW STEP "T" LOCATING LEVER RECORD DISCRIMINATING LEVER
Needle doesn't land at correct point on 12-inch record. *(The correct landing point is 5-5/8 inches from nearest side of spindle).*	Adjust for correct 10-inch landing, as described above, then place 12-inch record on turntable, push index lever to "reject" and return it to "12." Rotate mechanism through cycle until needle is ready to land on the record. Turn eccentric stud to bring pickup needle about 1/32-inch beyond the outer groove in record. (Keep eccentric on stud toward rear of motorboard as indicated.)	 ECCENTRIC STUD "E" INDEX LEVER IN 12" POSITION KEEP ECCENTRIC STUD ON THIS SIDE OF CENTER LINE LOCATING LEVER
Record knives strike edge of records. *(This is generally due to warped records, and records with rough edges).*	It is essential that the spacing between the knife and the record shelf "27" be accurately maintained. The spacing for the 10-inch record is nominally .058 inch, and for the 12-inch record is .075 inch. To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F," adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.	 RECORD SUPPORT SHELF .058IN. KNIFE ELEVATING LEVER "G" "F" ADJUST "F" FOR .058 IN. CLEARANCE. WITH 12-IN. RECORD ON SHELF, ADJUST "G" FOR .075-IN. CLEARANCE.
Records are not released properly, or do not fall flat. *(If record shelves are bent, or not perfectly horizontal, improper operation and jamming of mechanism will result).*	Place a 12-inch record on the turntable, rotate mechanism to point in cycle where the shelves have turned clockwise as far as the mechanism will turn them. Lift record up so it is in contact with both knives and check clearance between record and edges of shelves. It should be 1/16-inch as shown. If the clearance at either or both shelves is not correct, loosen set screws "H" and shift the shelves to obtain this clearance, with the backlash taken up by pressing the shelves toward the record. Tighten one set screw (the blunt-nose one), run mechanism through cycle several times to check action, then tighten the other (cone-pointed) set screw.	 "H" RECORD SUPPORT SHELF AT EXTREME CLOCKWISE POSITION Rotate slightly in direction of record to take up play, then adjust for appx 1/16" clearance
Pickup arm support bent too low, or too high.	Bend the support (which is associated with the pickup arm bearing, so that with the mechanism out of cycle, the lower front edge of the pickup arm is 5/16-inch above surface of motorboard.	
Roller on main-lever won't enter cam.	Bend the trip pawl stop pin so that the roller on end of main lever, when entering the cam, will definitely clear the cam outer guide plate as well as the nose of the cam plate. (Adjustment "K.")	
Needle lands in 10-inch position on 12-inch record, or misses record when playing both types mixed.	Increase pressure of flat spring "M" at bottom of record discriminating lever	
Needle fails to enter starting groove.	Raise the right-hand side of cabinet by placing thin spacers under legs.	
Needle slides over a few grooves in landing.	Raise the left-hand side of cabinet by placing thin spacers under the legs.	

MODEL Radiola 500, 501
Ch. RC-464

RCA MFG. CO., INC.



FOR OTHER DATA SEE INDEX

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

FREQUENCY RANGE .... 535-1,720 kc

Intermediate Frequency .... 455 kc

POWER OUTPUT (117 volt, 60 cycle supply).......... 1.0 watt

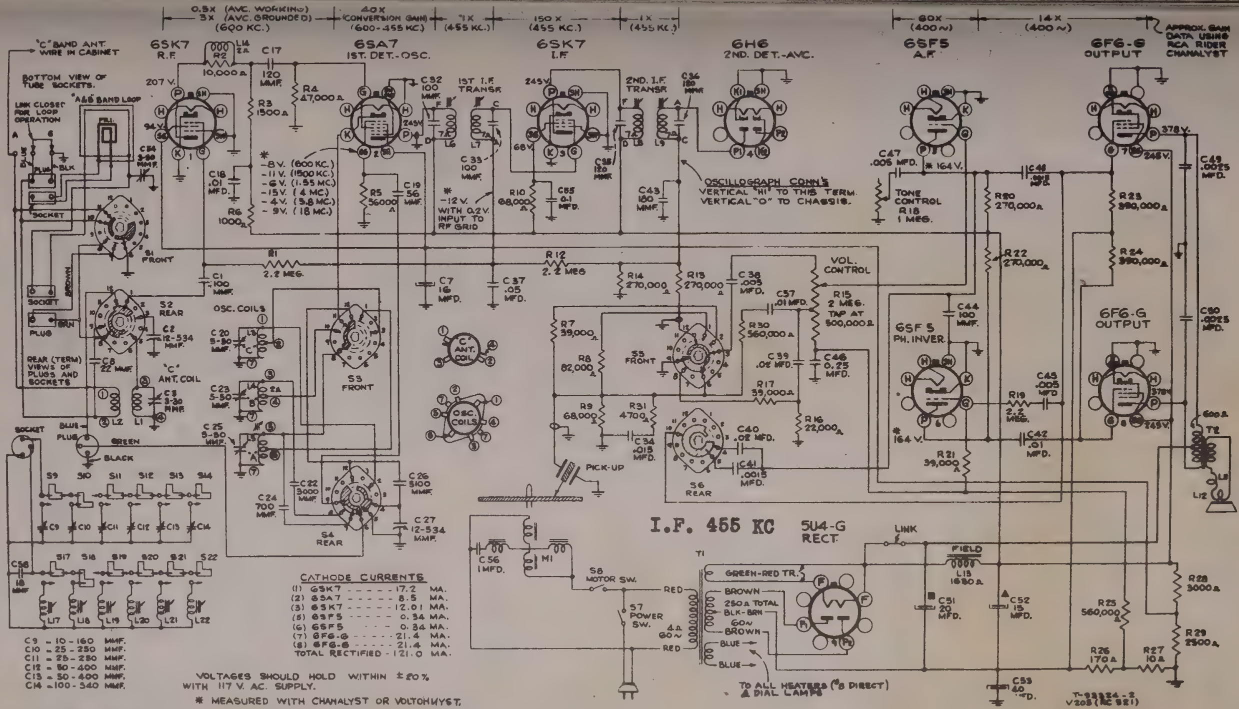
1. Dress grid lead of 12SK7 close to chassis under condenser (C12).
2. Dress green and blue leads from i-f transformers close to chassis and away from each other.
3. Dress leads from terminal board on loop support away from loop.

LOUDSPEAKER .... 4-inch Electrodynamic

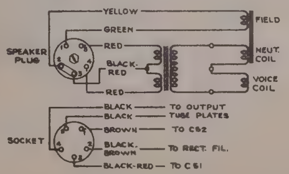
POWER SUPPLY RATINGS ... 105-125 volts, direct current, or 50-60 cycles, 30 watts

RCA MFG. CO., INC.

MODEL V-205, Ch. RC-521
MODEL V-405, Ch. RC-521B



ON SOME MODELS R31 IS 3900 OHMS



Speaker Connections

FOR OTHER DATA SEE INDEX

Frequency Range:
Standard Broadcast (A) .... 540-1,600 kc
Medium Wave (B) .... 1,550-4,000 kc
Short Wave (C) .... 5,800-18,000 kc

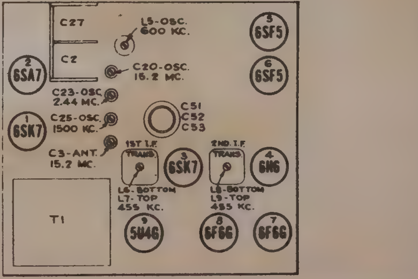
Electric Tuning

No. of Stations	Appr. Range
1	540-1,080 kc
2	610-1,250 kc
2	740-1,430 kc
1	880-1,550 kc

Pilot Lamps .... 4 Mazda Type 51—6-8 volts, 0.2 amps.
1 Mazda Type 55—6-8 volts, 0.4 amps.

Loudspeaker
Type .... 12-inch electrodynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles
Identification Number RL-70M-2

Power Supply Ratings
105-125 volts, 25, 50 or 60 cycles .... 155 watts
105-125, 205-250 volts, 50 or 60 cycles .... 155 watts



Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagrams.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter.—The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

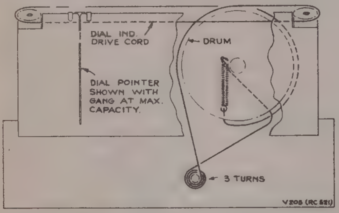
Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.
4. After completion of alignment, replace the glass dial in cabinet, taking care that the fibre light shields are in correct position at ends of dial.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.
3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example, 1,100 kc is approximately 4 inches from the reference mark

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.



Phonograph Information

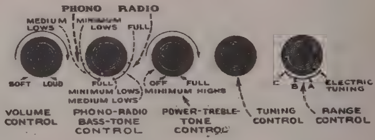
For information regarding the automatic record changer refer to service note covering RP-152 record changers.

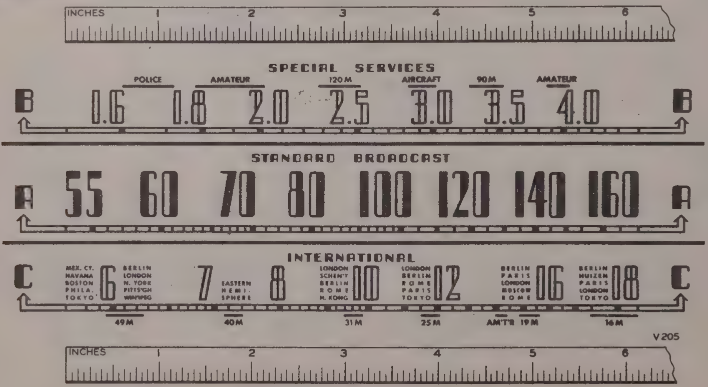
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band Quiet Point between 550 and 750 kc	L9, L8 (2nd I-F Trans.)
2	6SA7 grid in series with 0.01 mfd.			L7, L6 (1st I-F Trans.)
3		1,500 kc	"A" Band 1,500 kc	C25 (osc.)
4		600 kc	"A" Band 600 kc	L5 (osc.)
5	Repeat steps 3 and 4.			
6	6SA7 grid in series with 0.01 mfd.	2.44 mc	"B" Band 2.44 mc	C23 (osc.)
7	Ant. terminal in series with 47 mmf.	15.2 mc	"C" Band 15.2 mc	C20* (osc.) C3 (ant.)
	Assemble chassis in cabinet.			
8	Radiated signal 1,500 kc.		"A" Band Signal Frequency	C54 (ant.) (on loop assembly).
9	Radiated signal 600 kc.			L5 (osc.) (Rock in)
10	Repeat steps 9 and 10.			

* Use minimum capacity peak.

Precautionary Lead Dress:

1. "C" Band lead from antenna coil high side to No. 5 terminal on range switch must be held to correct length.
2. Lead from No. 3 terminal on rear switch to the variable condenser must be held to correct length and dressed away from side apron.
3. Lead from No. 4 terminal on front section of range switch must be held to correct length and dressed to rear of wafer.
4. Lead from No. 2 terminal on front section of range switch to oscillator must be held to length and dressed to the rear of the wafer.
5. Dress the leads to the power switch as free as possible.
6. Dress lead from pickup plug to terminal board on side apron down and towards the side apron.
7. Dress plate leads on output tubes toward the chassis.

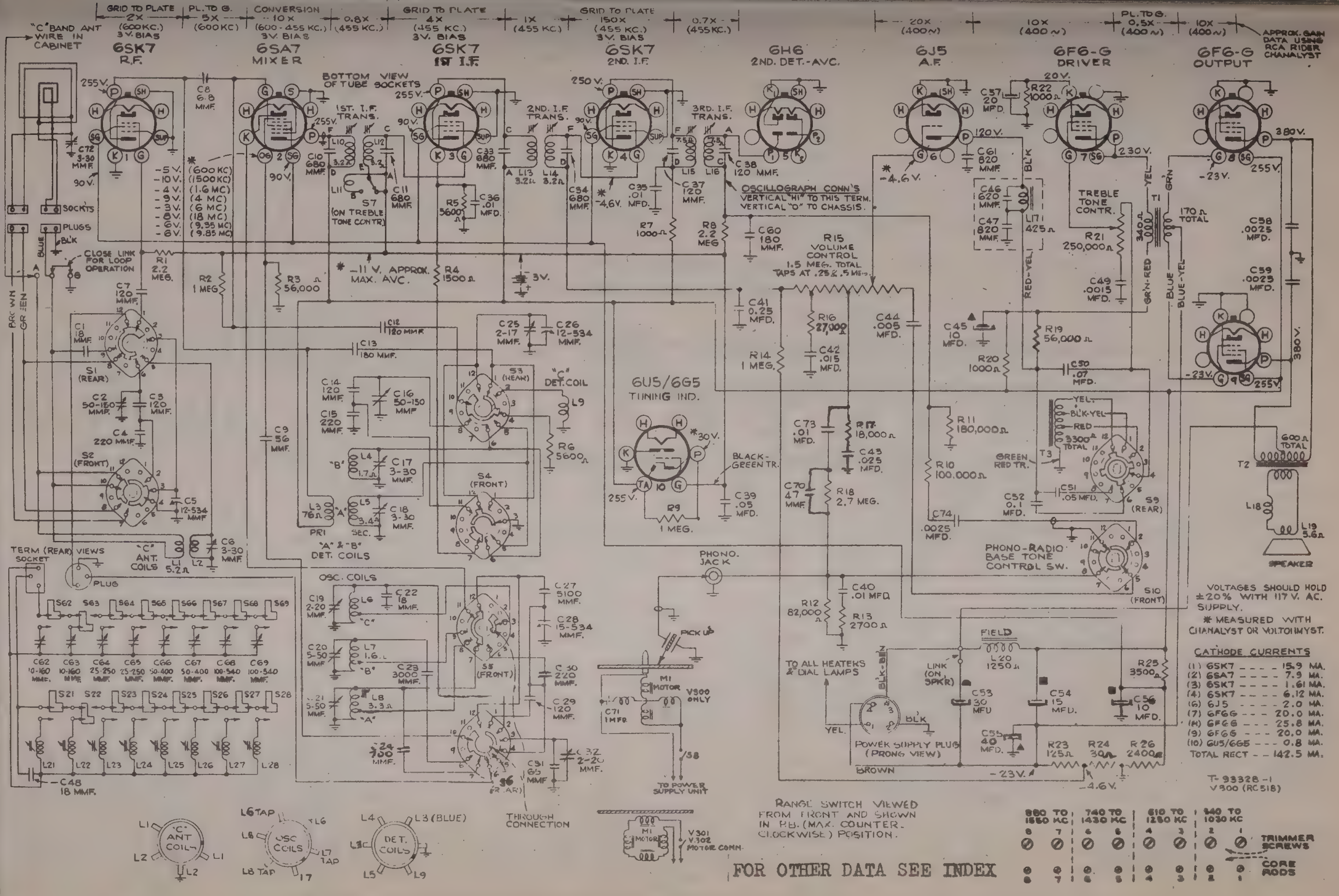




Calibration Scale

RCA MFG. CO., INC.

MODEL V-300, Ch. RC-518
MODEL V-301, Ch. RC-518A
MODEL V-302, Ch. R-518A


6SK7 R.F.
6SA7 MIXER
6SK7 1ST I.F.
6SK7 2ND. I.F.
6H6 2ND. DET.-AVC.
6J5 A.F.
6F6-G DRIVER
6F6-G OUTPUT
6U5/6G5 TUNING IND.
GRID TO PLATE 2X (600KC.) 3V. BIAS
PL. TO G. 5X (600KC)
CONVERSION 10X (600-455 KC.) 3V. BIAS
0.8X (455KC.)
GRID TO PLATE 4X (455 KC.) 3V. BIAS
1X (455 KC.)
GRID TO PLATE 150X (455 KC.) 3V. BIAS
0.7X (455KC.)
20X (400~)
10X (400~)
PL. TO G. 0.5X (400~)
10X (400~)
APPROX. GAIN DATA USING RCA RIDER CHANALYST
"C" BAND ANT WIRE IN CABINET
BOTTOM VIEW OF TUBE SOCKETS
CLOSE LINK FOR LOOP OPERATION
* -11 V. APPROX. MAX. AVC.
OSCILLOGRAPH CONN'S VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
R15 VOLUME CONTROL 1.5 MEG. TOTAL TAPS AT .25 & .5 MEG.
TREBLE TONE CONTR.
S7 (ON TREBLE TONE CONTR.)
PHONO-RADIO BASE TONE CONTROL SW.
PHONO. JACK
PICK UP
M1 MOTOR V300 ONLY
V301 V302 MOTOR CONN.
TO POWER SUPPLY UNIT
TO ALL HEATERS & DIAL LAMPS
POWER SUPPLY PLUG (PRONG VIEW)
SPEAKER
FIELD L20 1250 Ω
"C" ANT. COILS
"A" & "B" DET. COILS
OSC. COILS
TERM (REAR) VIEWS SOCKET PLUG
THROUGH CONNECTION
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN P.B. (MAX. COUNTER-CLOCKWISE) POSITION.
VOLTAGES SHOULD HOLD ±20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
CATHODE CURRENTS
(1) 6SK7 ---- 15.9 MA.
(2) 6SA7 ---- 7.9 MA.
(3) 6SK7 ---- 1.61 MA.
(4) 6SK7 ---- 6.12 MA.
(6) 6J5 ---- 2.0 MA.
(7) 6F6G ---- 20.0 MA.
(8) 6F6G ---- 25.8 MA.
(9) 6F6G ---- 20.0 MA.
(10) 6U5/6G5 ---- 0.8 MA.
TOTAL RECT ---- 142.5 MA.
T-93328-1 V300 (RC518)
880 TO 1560 KC
740 TO 1430 KC
610 TO 1250 KC
540 TO 1030 KC
TRIMMER SCREWS
CORE RODS

FOR OTHER DATA SEE INDEX

When measuring R-F and I-F gain, a 3-volt bias was connected between the A.V.C. bus and chassis, as shown in dotted lines.

V.C. Impedance .... 7.2 ohms at 400 cycles

FREQUENCY RANGES

Broadcast "A"	540-1,600 kc
Medium Wave "B"	1.55-4.0 mc
Short Wave "C"	5.8-18.0 mc
SPREAD BAND	9.34-9.86 mc

POWER OUTPUT RATING

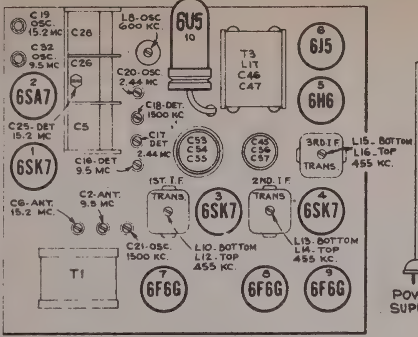
Undistorted	18 watts
Maximum	20 watts

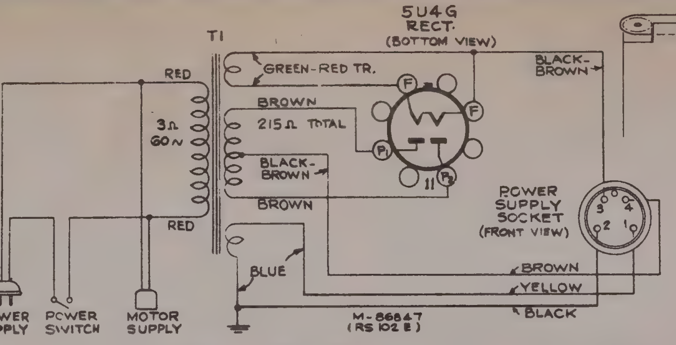
POWER SUPPLY RATINGS

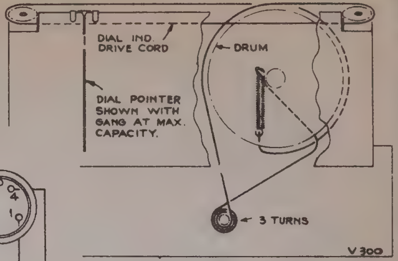
105-125 volts, 60 cycles	200 watts
105-125 volts, 25 cycles	200 watts

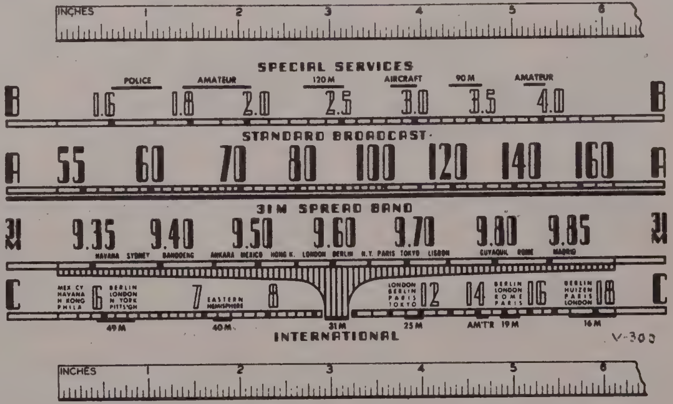
MODEL V-300, Ch. RC-518
MODEL V-301, Ch. RC-518A
MODEL V-302, Ch. R-518A

RCA MFG. CO., INC.








INCHES 1 2 3 4 5 6
SPECIAL SERVICES
POLICE
AMATEUR
120 M
AIRCRAFT
90 M
AMATEUR
B 1.6 1.8 2.0 2.5 3.0 3.5 4.0 B
STANDARD BROADCAST
A 55 60 70 80 100 120 140 160 A
31 M SPREAD BAND
31M 9.35 9.40 9.50 9.60 9.70 9.80 9.85 31M
HAVANA SYDNEY BANDOENG ANKARA MEXICO HONG K. LONDON BERLIN N.Y. PARIS TOKYO LISBON GUYAQUIL ROME MADRID
C 6 7 8 12 14 16 18 C
MEX CY HAVANA H KONG PHILA
BERLIN LONDON N YORK PITTS'GH
EASTERN HEMISPHERE
LONDON BERLIN PARIS TOKYO
BERLIN LONDON ROME PARIS
BERLIN HUIZEN PARIS LONDON
49 M
40 M
31 M
25 M
AM'TR 19 M
16 M
INTERNATIONAL
V-300
INCHES 1 2 3 4 5 6

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Turn "Treble Tone Control" (center knob) counter-clockwise so that I-F is in "Sharp" position.			
2	2nd I-F grid, in series with .01 mfd.	455 kc	"A" Band Quiet Point at HF end	L15 and L16* (3rd I-F Trans.)
3	1st I-F grid, in series with .01 mfd.			L13 and L14* (2nd I-F Trans.)
4	1st-Det. grid, in series with .01 mfd.			L10 and L12* (1st I-F Trans.)
5	Turn Treble Tone Control full clockwise to "Broad" position. Response on CRO should be the conventional double-humped type. If necessary, retouch 3rd I-F transformer slightly (so as not to disturb the "Sharp" curve appreciably). Leave control in sharp position for the following steps.			
6	Ant. terminal, in series with 47 mmfd. (link closed)	15.2 mc	"C" Band 15.2 mc	C19 (osc.)** C25 (det.) C6 (ant.)
7		9.5 mc	"31M" Band 9.5 mc	C32 (osc.)** C16 (det.) C2 (ant.)
8	Rear stator of gang, in series with .01 mfd.	2.44 mc	"B" Band 2.44 mc	C20 (osc.) C17 (det.)
9		600 kc	"A" Band 600 kc	L8 (osc.) Rock in
10		1,500 kc	"A" Band 1,500 kc	C21 (osc.) C18 (det.)
11	Repeat steps 9 and 10.			
12	Install and connect chassis in cabinet. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band trimmer C72 (on loop). Rock in L4 for peak output.			

* Adjust for coincidental curves and maximum gain.

** Use minimum capacity peak if two peaks can be obtained. (Check for correct peak on "C" band by tuning receiver to 14.29 mc, where a weaker signal should be received.)

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

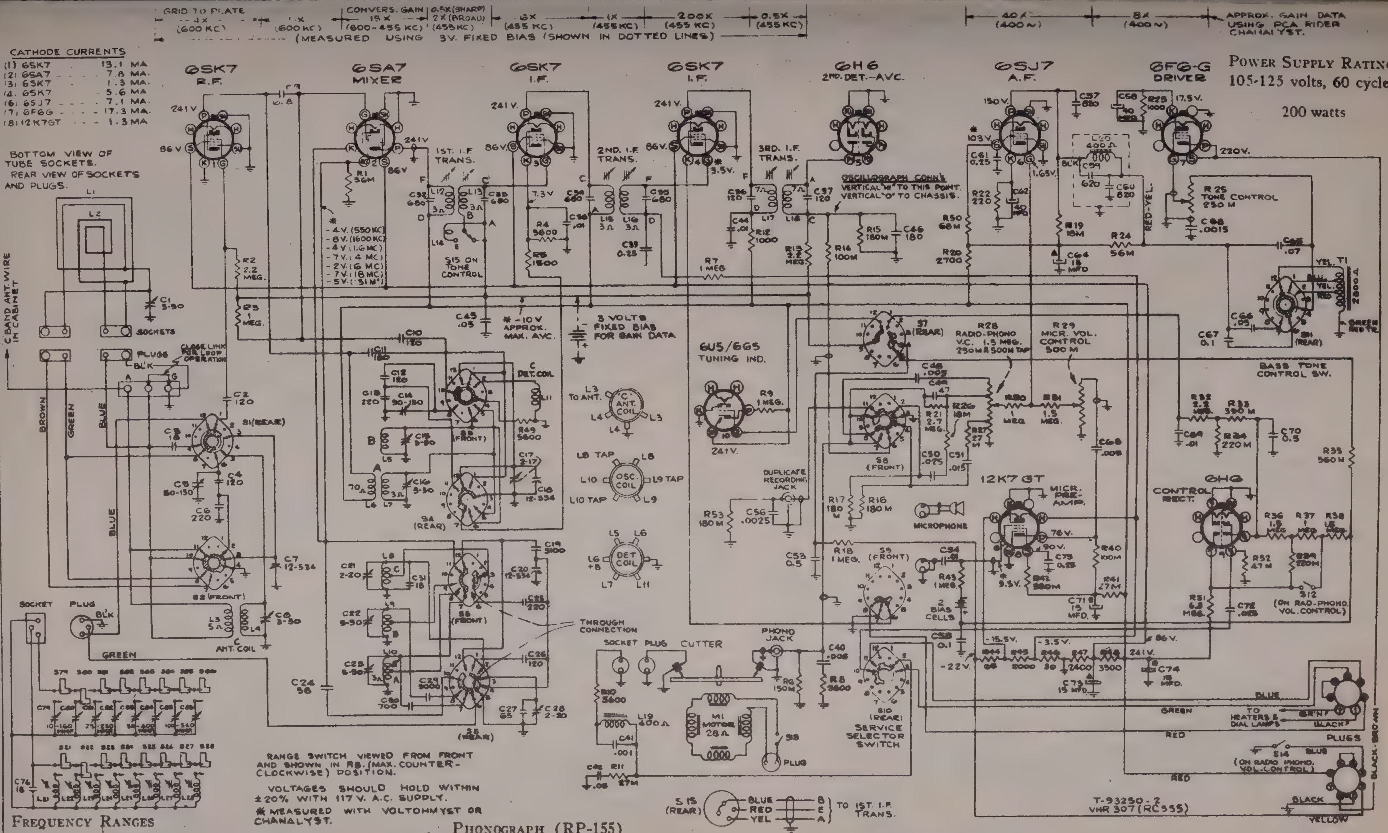
2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

RCA MFG. CO., INC.

MODEL VHR-307
Ch. RC-555


GRID TO PLATE
1X (600 KC)
CONVERS. GAIN 15X (600-455 KC)
0.5X (SHARP) 2X (BROAD) (455 KC)
6X (455 KC)
1X (455 KC)
200X (455 KC)
0.5X (455 KC)
(MEASURED USING 3V. FIXED BIAS (SHOWN IN DOTTED LINES)
40X (400 ~)
8X (400 ~)
APPROX. GAIN DATA USING RCA RIDER CHANALYST.
CATHODE CURRENTS
(1) 6SK7 13.1 MA.
(2) 6SA7 7.8 MA.
(3) 6SK7 1.3 MA.
(4) 6SK7 5.6 MA.
(6) 6SJ7 7.1 MA.
(7) 6F6G 17.3 MA.
(8) 12K7GT 1.3 MA.
6SK7 R.F.
6SA7 MIXER
6SK7 I.F.
6SK7 I.F.
6H6 2ND. DET.-AVC.
6SJ7 A.F.
6F6-G DRIVER
BOTTOM VIEW OF TUBE SOCKETS. REAR VIEW OF SOCKETS AND PLUGS.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
3RD. I.F. TRANS.
S15 ON TONE CONTROL
OSCILLOGRAPH CONN'S VERTICAL "H" TO THIS POINT. VERTICAL "O" TO CHASSIS.
R25 TONE CONTROL 250 M
C BAND ANT. WIRE IN CABINET
SOCKETS
PLUGS
CLOSE LINK FOR LOOP OPERATION
-10V APPROX. MAX. AVC.
3 VOLTS FIXED BIAS FOR GAIN DATA
6U5/6G5 TUNING IND.
R28 RADIO-PHONO V.C. 1.5 MEG. 250M & 500M TAP
R29 MICR. VOL. CONTROL 500 M
BASS TONE CONTROL SW.
C ANT. COIL
OSC. COIL
DET. COIL
DUPLICATE RECORDING JACK
MICROPHONE
12K7GT MICR. PRE-AMP.
6H6 CONTROL RECT.
S12 (ON RAD-PHONO. VOL. CONTROL)
THROUGH CONNECTION
SOCKET PLUG CUTTER
PHONO JACK
M1 MOTOR 28 Ω
S9 (FRONT)
2 BIAS CELLS
S10 (REAR) SERVICE SELECTOR SWITCH
TO HEATERS & DIAL LAMPS
S14 (ON RADIO PHONO. VOL. CONTROL)
T-93250-2 VHR 307 (RC555)
S15 (REAR) BLUE RED YEL TO 1ST. I.F. TRANS.
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN RB. (MAX. COUNTER-CLOCKWISE) POSITION.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY.
* MEASURED WITH VOLTOHMYST OR CHANALYST.

POWER SUPPLY RATING
105-125 volts, 60 cycles

200 watts

FREQUENCY RANGES

Broadcast, "A" Band	540-1,600 kc
Short Wave, "B" Band (VHR-207, 407)	1,550-4,000 kc
Short Wave, "C" Band	5,800-18,000 kc
Spread Band	9,340-9,860 kc

INTERMEDIATE FREQUENCY	455 kc

LOUDSPEAKER

(Electrodynamic)	RL-94-2
Diameter	15 inches
Voice-coil impedance at 400 cycles	7.2 ohms

PHONOGRAPH (RP-155)

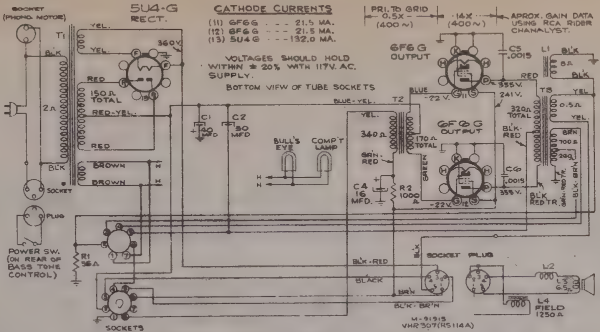
Type	Automatic
Record Capacity	Eight 10-inch or Seven 12-inch
Turntable Speed	78 r.p.m.
Drive	Motor drive through idler on inside rim of turntable
Type Pickup	Crystal
Pickup Impedance	100,000 ohms at 1,000 cycles
Average Output	1½ volts at 1,000 cycles across ½ meg.

RECORDER (RP-155)

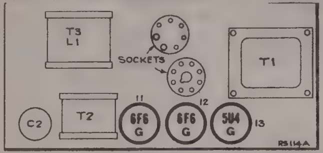
Recording Head (cutter)	Crystal
Impedance of Cutter at 1,000 cycles	Approx. 60,000 ohms
Turntable Speed	78 r.p.m.
Grooves Cut per Inch	Approx. 115
Inches Cut per Minute	Approx. .713 inch
Recording Blank Discs	Coated metal-base or coated paper-base
Recording Disc Diameter	Up to 10 inches
Drive	Motor drive through idler on inside rim of turntable; the turntable spindle drives a lead screw under motor board which guides the recorder arm from outside of recording blank to inside
Motor Wattage	35 watts

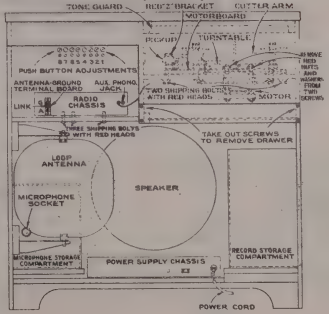
MODEL VHR-307
Ch. RC-555

RCA MFG. CO., INC.

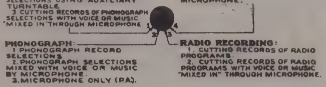


The recorder and automatic record-changer mechanism (RP-155) in Model VHR-307 is the same as used in Models VHR-202, 207, 407. Refer to the service note on these models for service data and replacement parts list.




TONE GUARD
CUTTER ARM
MOTORBOARD
PICKUP
TURNTABLE
PUSH BUTTON ADJUSTMENTS
8 7 6 5 4 3 2 1
ANTENNA-GROUND TERMINAL BOARD
AUX. PHONO. JACK
LINK
RADIO CHASSIS
TWO SHIPPING BOLTS WITH RED HEADS
MOTOR
TO MOVE RED NUTS AND WASHERS FROM TWO SCREWS
THREE SHIPPING BOLTS WITH RED HEADS
TAKE OUT SCREWS TO REMOVE DRAWER
LOOP ANTENNA
SPEAKER
MICROPHONE SOCKET
MICROPHONE STORAGE COMPARTMENT
POWER SUPPLY CHASSIS
RECORD STORAGE COMPARTMENT
POWER CORD

SERVICE SELECTOR



RECORDING:
1 CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2 CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUXILIARY TURNTABLE.
3 CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE

PHONOGRAPH:
1 PHONOGRAPH RECORD SELECTIONS
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (PA).

RADIO:
1. RADIO PROGRAMS.
2 RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.

RADIO RECORDING:
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.

Push Button Adjustments

The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

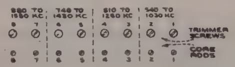
1. Make a list of the desired stations, arranged in order from low to high frequencies.

2. Turn the range switch to the broadcast position and manually tune in the first station on the list.

3. Turn range switch to push-button position and press in the left-hand button.

4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.

5. Adjust trimmer screw No. 1 for peak output on the first station.

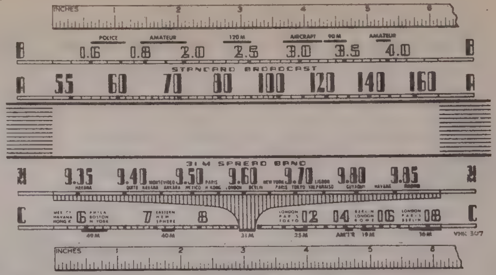


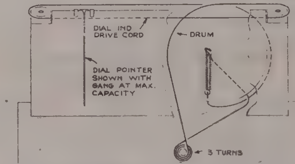
6. Proceed in the same manner to adjust for the remaining stations.

7. Repeat adjustments for best results.

On the 880 to 1,550 kc push-buttons, the higher frequency stations may be received with core rod No. 7 or 8 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with the core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.





Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

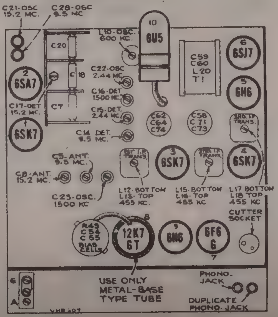
Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.



Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Radio dial to—	Adjust the following for maximum peak output
1	Turn "Treble Tone Control" counter-clockwise so that I-F is in "Sharp" position.			
2	2nd I-F grid, in series with .01 mfd.	455 kc	"A" Band Quiet Point at HF end	L17 and L18* (3rd I-F Trans.)
3	1st I-F grid, in series with .01 mfd.			L15 and L16* (2nd I-F Trans.)
4	1st-Det. grid, in series with .01 mfd.			L12 and L13* (1st I-F Trans.)
5	Turn Treble Tone Control full clockwise to "Broad" position. Response on CRO should be the conventional double-humped type. If necessary, retouch 3rd I-F transformer slightly (so as not to disturb the "Sharp" curve appreciably). Leave control in sharp position for the following steps.			
6	Ant. terminal, in series with 47 mmfd. (link closed)	15.2 mc	"C" Band 15.2 mc	C21 (osc.)** C17 (det.)*** C8 (ant.)***
7		9.5 mc	"31M" Band 9.5 mc	C28 (osc.)** C14 (det.)*** C5 (ant.)***
8	Rear stator of gang, in series with .01 mfd.	2.44 mc	"B" Band 2.44 mc	C22 (osc.) C15 (det.)
9		600 kc	"A" Band 600 kc	L10 (osc.) Rock in
10		1,500 kc	"A" Band 1,500 kc	C23 (osc.) C16 (det.)
11	Repeat steps 9 and 10.			
12	Install and connect chassis in cabinet with antenna link closed. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band trimmer C1 (on loop). Rock in L10 for peak output at 600 kc.			

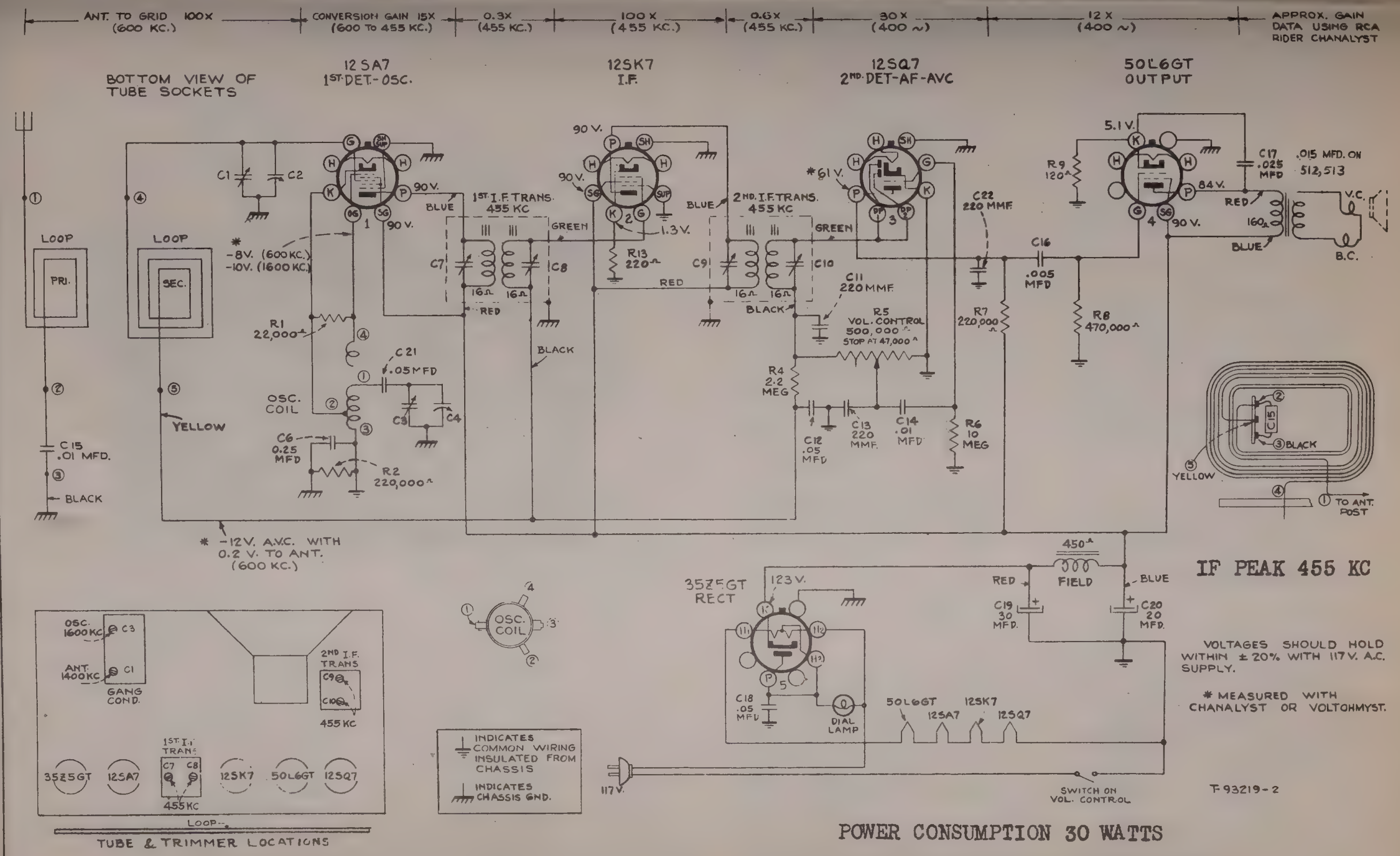
* Adjust for coincidental curves and maximum gain.

** Use minimum capacity peak if two peaks can be obtained. (Check for correct peak on "C" band by tuning receiver to 14.29 mc, where a weaker signal should be received.)

*** Rock in.

RCA MFG. CO., INC.

MODELS 510, 511, 512, 513



TUBE & TRIMMER LOCATIONS

IF PEAK 455 KC

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. A.C. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

POWER CONSUMPTION 30 WATTS

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

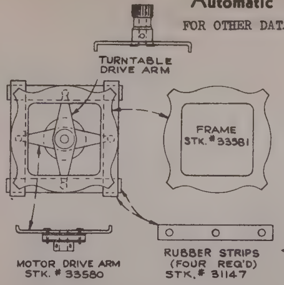
1. Dress grid lead of 12SK7 close to chassis under condenser (C12).
2. Dress green and blue leads from i-f transformers close to chassis and away from each other.
3. Dress leads from terminal board on loop support away from loop.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

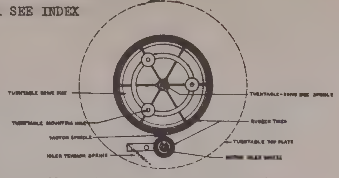
RP-152, -A, -B, -C, -D; -J and RP-153

Automatic Record Changers

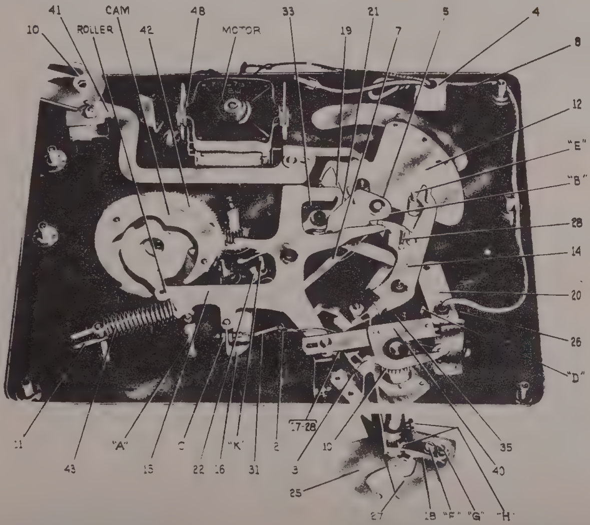
FOR OTHER DATA SEE INDEX


TURNTABLE DRIVE ARM
FRAME STK. # 33581
MOTOR DRIVE ARM STK. # 33580
RUBBER STRIPS (FOUR REQ'D) STK. # 31147

Motor Coupling Details on RP-153



Motor Drive Details on RP-152, -A, -B, -C, -D, -J



Bottom View of RP-152, -A, -B, -C, -J Automatic Record Changer

RP-153 mechanisms are similar to above but have flexible coupling turntable drive, and automatic switch.

RP-152-D mechanisms are similar to above but include automatic switch.

Note: Numbers refer to parts—letters refer to adjustments.

TECHNICAL INFORMATION AND SERVICE DATA

—1940 No. 38—

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. Rotate the turntable until the changer is out-of-cycle; and check rubber bumper bracket (A). The roller should clear the nose of the cam plate by approximately 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5". If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B". If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

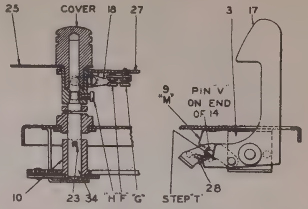
D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10-inch record. Position of eccentric stud "E" governs the landing of the needle on a 12-inch record; this, however, is dependent on the proper 10-inch adjustment.

To adjust for needle landing, place 10-inch record on turntable; push index lever to reject position and return to the 10-inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4⅞ inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32-inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10-inch record, place 12-inch record on turntable; push index lever to reject and return to 12-inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5⅝ inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motorboard, otherwise incorrect landing may occur with 10-inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10-inch record is nominally .058 inch, and for the 12-inch record is .078 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F," adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .075—.078 inch.



H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12-inch record on the turntable, rotate mechanism into cycle to the point where both separating knives have turned clockwise as far as the mechanism will turn them; lift record upward until it is in contact with both separating knives. Then loosen screws "H" and shift record shelves "27" so that the curved inner edges of the shelves are uniformly spaced approximately 1/16-inch from the record edge. Some backlash will be present in the rotation of these shelves. They should be adjusted so that the backlash permits them to move away from the record but not closer than the approximate 1/16 inch specified above. Tighten the blunt tipped screw "H," run mechanism through cycle several times to check action, then tighten cone tipped screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motorboard. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers and pulleys on underside of motorboard.

Do not allow oil or grease to come in contact with rubber bumper or rubber parts of the mechanism.

MOTOR SERVICE DATA

On the RP-152 drive motors a 0.014-inch feeler gage is recommended for centering the rotor in the field bore.

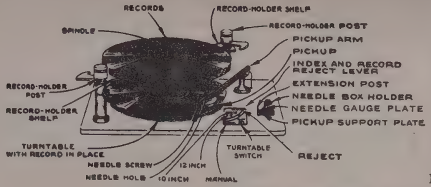
The field coils can be disassembled and reassembled if care is used in reassembling the field lamination block in a manner so that the dove tail joint will not be sprung.

When disassembling the rotor or rotor shaft bearing only, the field stacking should be held in a clamp to prevent the field springing when the bolts which hold the assembly together are loosened.

RCA MFG. CO., INC.

MODELS RP-152, -A, -B, -C, -D, -J
MODEL RP-153

AUTOMATIC RECORD CHANGER REPLACEMENT PARTS



When the RP-152-D and RP-153 type record changers are operated in the "manual" position, power to the drive motor is controlled by an automatic starting and stopping switch. The mounting holes on this switch are elongated for adjustment purposes. Proper adjustment is obtained when power is disconnected with the pickup needle 1¾ inches from the center of the turntable spindle.

FOR OTHER DATA SEE INDEX

Replacement Parts Model RP-152

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	PICKUP AND ARM ASSEMBLIES (RP-152)	
33906	Arm—Pickup arm only—less crystal, cable, and pivot arm	.45
36320	Arm—Pickup pivot arm and shaft—less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pickup pivot arm	.05
32635	Cable—Pickup lift cable	.24
35694	Cable—Pickup shielded cable (8)	.40
35171	Crystal—Pickup crystal cartridge and needle screw	4.25
33529	Screw—Pickup needle screw	.10
	PICKUP AND ARM ASSEMBLIES (RP-152-A)	
36321	Arm—Pickup arm only—less crystal, cable, and pivot arm	.75
36320	Arm—Pickup pivot arm and shaft—less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pickup pivot arm	.05
32635	Cable—Pickup lift cable	.24
35694	Cable—Shielded pickup cable (8)	.40
35171	Crystal—Pickup crystal cartridge and needle screw	4.25
33974	Screw—Pickup needle screw	.15
	PICKUP AND ARM ASSEMBLIES (RP-152-B)	
36322	Arm—Pickup arm only—less crystal, cable, and pivot arm and shaft	1.80
36320	Arm—Pickup pivot arm and shaft — less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pickup pivot arm	.05
32635	Cable—Pickup lift cable	.24
35694	Cable—Pickup shielded cable	.40
37158	Crystal—Pickup crystal cartridge and needle screw	4.25
33529	Screw—Pickup needle screw	.10
	PICKUP AND ARM ASSEMBLIES (RP-152-C)	
36591	Arm—Pickup arm shell only	.75
36320	Arm—Pickup pivot arm and shaft—less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pickup pivot arm	.05
32635	Cable—Pickup lift cable	.24
32556	Cable—Shielded pickup cable	.75
35171	Crystal—Pickup unit crystal cartridge	4.25
33974	Screw—Needle screw	.15
	PICKUP AND ARM ASSEMBLIES (RP-152-D)	
37181	Arm—Pickup arm (shell only)	1.80
36320	Arm—Pickup pivot arm and shaft—less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pivot arm	.05
32635	Cable—Pickup lift cable	.24
33905	Crystal—Pickup crystal cartridge	4.25
33976	Pin—Support pin used to fasten arm shell to pivot arm	.03
33529	Screw—Needle screw	.10
	PICKUP AND ARM ASSEMBLIES (RP-152-J)	
36322	Arm—Pickup arm (shell only)	1.80
36320	Arm—Pickup pivot arm and shaft — less lift cable and rubber bushings	1.00
34550	Bushing—Rubber bushing for pivot arm	.05
32635	Cable—Pickup lift cable	.24
35694	Cable—Shielded pickup cable to shorting switch	.40
37158	Crystal—Pickup crystal cartridge	4.25
33976	Pin—Used to attach pickup arm to pivot arm	.03
33529	Screw—Needle screw	.10
	MOTOR ASSEMBLIES (110 volts, 60 cycles) (Motor No. 91706-1) (RP-152 — RP-152-A)	
	NOTE: For complete 110 volts, 60 cycle motor replacement order: 1—Stock No. 36254 Motor—with capacitor 1—Stock No. 36274 Idler wheel 1—Stock No. 36275 Idler wheel arm 2—Stock No. 33726 "C" washer for idler wheel 1—Stock No. 30585 Spring for idler	
37108	Bearing—Bottom bearing and bracket	.40
37107	Bearing—Top bearing and bracket	.40
37109	Bracket—Motor mounting bracket	.40
37111	Coil—Motor field coil assembly	1.50
37110	Rotor—Motor rotor complete with fan	1.75
37106	Pad—Rotor thrust pad	.05
	MOTOR ASSEMBLIES (Motor No. 91655-1, 2, and 3)	
36954	Armature—Motor armature and shaft for 25 cycle motor	7.85
36953	Armature—Motor armature and shaft for 50 cycle motor	4.00
36255	Armature—Motor armature and shaft for 60 cycle motor	2.75
36952	Cap—Bakelite cap for motor	.50
36955	Capacitor—1.1 mfd. for 60 cycle motor	1.50
36951	Capacitor—1.25 mfd. for motors (1 required for 50 cycles) (2 required for 25 cycles)	1.75
36726	Motor—105-125 volts, 25 cycle, complete with capacitor	10.75
36725	Motor—105-125 volts, 50 cycle, complete with capacitor	8.00
36254	Motor—105-125 volts, 60 cycle, complete with capacitor	6.75
	MOTORBOARD ASSEMBLIES	
36259	Base—Pickup arm mounting base—RP-152 only	.40
36378	Base—Pickup arm mounting base—RP-152-A, RP-152-B, and RP-152-J only	.40
36512	Base—Pickup arm mounting base—RP-152-C only	.40
36811	Base—Pickup arm mounting base—RP-152-D only	.40
36257	Board—Motorboard complete with bearings and posts—less operating parts—RP-152 only	7.00
36375	Board—Motorboard complete with bearings and posts—less operating parts—RP-152-A, RP-152-B, and RP-152-J	7.00
36256	Board—Motorboard complete with bearings and posts—less operating mechanisms—RP-152-C only	7.00
36813	Board—Motorboard with welded and riveted studs and bearing — less operating parts — RP-152-D only	7.00
32556	Cable—Shielded pickup cable and plug, connects to shorting switch	.75
36262	Cup—Used needle (insert only for pickup rest) —RP-152, RP-152-A, RP-152-B, RP-152-C and RP-152-J)	.15
36518	Cup—Used needle cup (insert for pickup rest) —RP-152-D only	.40
36258	Escutcheon—Index escutcheon — RP-152, RP-152-A, RP-152-B, RP-152-C and RP-152-J	.25
36377	Escutcheon—Index escutcheon—RP-152-D only	.50
36260	Gauge—Pickup needle gauge	.15
34368	Grommet—Rubber grommet for motor mounting	.08
36263	Plate—Turntable shaft support and spring plate	.40
30870	Plug—2-contact male for motor leads	.35
31048	Plug—Plug for pickup leads—RP-152-D only	.15
36261	Rest—Pickup arm rest—RP-152 only	.35
36379	Rest—Pickup arm rest—RP-152-A, RP-152-B and RP-152-J	.25

Replacement Parts Model RP-152 (Continued)

STOCK No.	DESCRIPTION	Unit List Price
36812	Rest—Pickup arm rest—RP-152-D only	.35
36543	Rest—Pickup arm rest—RP-152-C only	.25
36798	Spring—Index lever spring (riveted to motorboard)	.20
32875	Switch—Motor switch (4)	.30
	OPERATING MECHANISMS	
36275	Arm—Motor idler wheel arm and studs—less wheel—for use with motor marked No. 91655	.25
10129	Ball—Steel ball for spindle shaft	.02
33984	Bracket—Bracket and pin for locating post and lever (3)	.20
36277	Bumper—Main lever rubber bumper	.10
33987	Cam—Cam and drive gear complete (42)	2.00
36531	Cam—Trip lever cam and link—RP-152-D only	.75
36266	Clutch—Trip lever clutch—less adjusting stud (5)	.25
36282	Disc—Turntable drive disc, rubber tire, and spindle shaft assembled—less turntable finished plate	2.80
36265	Finger—Trip lever friction finger (7)	.50
31121	Gear—Record separator shaft gear (10)	.90
36280	Gear—Turntable shaft drive gear	.75
33982	Guide—Main lever spring guide (11)	.10
31151	Guide—Pickup lift cable guide (spring) (2)	.10
36264	Lever—Index lever—RP-152 only (12)	.70
36380	Lever—Index lever—RP-152-A, RP-152-B, and RP-152-J	.70
36545	Lever—Index lever—RP-152-C only	.70
36816	Lever—Index lever—RP-152-D only	.70
36273	Lever—Locating lever and pawl—RP-152, RP-152-A, RP-152-B and RP-152-J	.50
31138	Lever—Locating lever and pawl—RP-152-C and RP-152-D (14)	.70
33985	Lever—Main lever (15)	1.05
31140	Lever—Pickup lift cable lever and spring (16)	.55
36814	Lever—Pickup discriminating lever and pawl—RP-152-D only	.85
36272	Lever—Record discriminating lever and pawl—RP-152 only (17)	.85
36381	Lever—Record discriminating lever and pawl—RP-152-A, RP-152-B, and RP-152-J	.85
36544	Lever—Record discriminating lever and pawl—RP-152-C only	.85
36476	Lever—Record separator elevating lever with adjustment screws (18)	.80
31132	Lever—Trip detaining lever (19)	.30
36530	Lever—Trip lever — less cam and link — RP-152-D only	1.60
36284	Lever—Trip lever—less friction finger and clutch —RP-152, RP-152-A, RP-152-B, RP-152-C, and RP-152-J (20)	1.25
36525	Link—Index link assembly—RP-152-D only	.20
31133	Pawl—Trip pawl (22)	.80
36268	Pin—Pin to fasten gear to separator shaft (23)	.05
36267	Rack—Long arm and gear (41)	.60
32880	Rack—Short arm and gear (40)	.55
36281	Ring—Retaining ring for set screw in turntable drive gear	.04
36477	Screw—No. 6-32 ball point screw for record separator elevating lever	.10
36276	Screw—No. 6-32 x ¼ cup point set screw for turntable drive gear	.02
31118	Screw—No. 10-32 x 5/16 cone pointed set screw for record separator shelf ("H")	.06
32869	Screw—No. 10-32 x 5/16 machine screw for record separator shelf	.01
4563	Screw—Pickup lift cable adjusting screw	.04
33983	Screw—Record separator elevating lever point screw	.15
36270	Separator—Record separator knife—RP-152 and RP-152-A only	1.85
33990	Separator—Record separator knife—RP-152-B, RP-152-J and RP-152-D (25)	1.85
34775	Separator—Record separator knife — RP-152-C only	1.95
33988	Shaft—Record separator shaft (34)	.70
36269	Shelf—Record separator rotating shelf—less set screw—RP-152, RP-152-A, and RP-152-C	1.25
33989	Shelf—Record separator rotating shelf—less set screws—RP-152-B, RP-152-D, and RP-152-J (27)	1.25
36269	Shelf—Record separator rotating shelf—less set screws—RP-152-C only	1.25
33994	Spring—Flat spring for record discriminator lever	.05
32882	Spring—Main lever spring (43)	.05
36580	Spring—Motor tension spring, for use with motor No. 91706-1 — RP-152, RP-152-A, RP-152-B, RP-152-C, and RP-152-J	.08
36278	Spring—Pickup arm feed spring	.10
3666	Spring—Pickup lift cable spring (31)	.04
14190	Spring—Record discriminating lever pawl spring (28)	.08
3676	Spring—Tension spring for cam pawl	.04
30585	Spring—Tension spring for idler assembly, for use with motor marked No. 91655	.06
32436	Spring—Tension spring for locating lever and pawl (35)	.05
31136	Spring—Tension spring for roller index link—RP-152-D only	.05
36921	Spring—Tension spring for trip detaining lever	.03
36279	Spring—Tension spring for trip pawl	.02
36271	Stud—No. 4-40 hex stud for trip lever clutch adjustment	.08
36529	Switch—Automatic switch—RP-152-D only	1.10
34875	Switch—Pickup shorting switch—RP-152, RP-152-A, RP-152-B, RP-152-C, and RP-152-J	.45
36283	Turntable—Finished top plate only — RP-152, RP-152-A, RP-152-B, RP-152-C, and RP-152-J	1.25
36815	Turntable—Finished top plate only—RP-152-D only	1.00
31608	Washer—"C" washer for roller index link — RP-152-D only	.01
33726	Washer—"C" washer for motor idler—for use with motor marked No. 91655	.02
8078	Washer—Spring washer for mounting record discriminator lever	.06
2917	Washer—Spring washer for mounting levers	.03
36274	Wheel—Motor idler wheel and bearing — less arm—for use with motor marked No. 91655	.55

Replacement Parts Model RP-153

STOCK No.	DESCRIPTION	Unit List Price
	PICKUP AND ARM ASSEMBLIES	
36513	Arm—Pickup arm shell only	3.85
36320	Arm—Pickup support and pivot arm	1.00
34550	Bushing—Rubber bushing for pickup pivot arm	.05
32635	Cable—Pickup lift cable	.24
33905	Crystal—Pickup crystal cartridge and needle screw	4.25
33976	Pin—Pickup arm shell mounting pin	.03
	MOTOR ASSEMBLIES	
37300	Armature—Motor armature and worm gear for 50 cycle motor	XX
37298	Armature—Motor armature and worm gear for 60 cycle motor	XX
37303	Bearing—Fibre insert for motor spindle bottom bearing	XX
37296	Motor—105-120 volts, 50 cycles	XX
37295	Motor—105-120 volts, 60 cycles	32.00
37299	Spindle—Motor spindle and fibre gear for 50 cycle motor	XX
37297	Spindle—Motor spindle and fibre gear for 60 cycle motor	XX
37304	Support—Motor mounting support plate	.45
37301	Washer—"C" washer for motor armature shaft (thrust bearing)	XX
37302	Washer—Felt washer for motor armature shaft (thrust bearing)	XX
	MOTORBOARD ASSEMBLIES	
36516	Base—Pickup arm mounting base	.40
36514	Board—Motorboard complete with bearings and posts—less operating parts	7.00
36517	Brace—Motorboard strain brace	.70
32556	Cable—Shielded pickup cable and plug, connects to shorting switch	.75
36518	Cup—Used needle cup	.40
36377	Escutcheon—Index escutcheon	.50
36260	Gauge—Pickup needle gauge	.15
30870	Plug—2-contact male for motor leads	.35
31572	Plug—Female, for switch leads	.15
36515	Rest—Tone arm rest and needle cup holder	.85
36798	Spring—Index lever spring (riveted to motorboard)	.20
	OPERATING MECHANISM	
34009	Arm—Motor coupling arm and gear—turntable end	.70
33580	Arm—Motor coupling arm and hub—motor end	.70
33984	Bracket—Bracket and pin for locating post and lever (3)	.20
36277	Bumper—Main lever rubber bumper	.10
33987	Cam—Cam and drive gear complete (42)	2.00
36531	Cam—Trip lever cam and link—less trip lever	.75

FOR BALANCE OF REPLACEMENT PARTS SEE INDEX

The RP-152 and RP-153 automatic record changers are very similar in design and construction. Most of the parts and adjustments are identical on both. The RP-153 turntable is driven through a worm gear in the motor housing while the RP-152 turntables are driven through a friction drive disc mounted under the turntable.

On Models RP-152 it is important that the drive motor spindle, and rubber tires on main driving disc and idler pulley be kept clean and free from oil, grease, dirt, or any foreign matter at all times. Any quick-drying naphtha is satisfactory for cleaning these parts. The drive motor bearing is lubricated from an oil well filled and sealed at the factory. It should not require lubrication in the field.

The rubber-tired drive disc on Models RP-152 is not removable from the spindle. The turntable is fastened to the driving disc by three bolts. If necessary to remove these parts the spindle drive gear set screw should first be removed. The driving disc, turntable and spindle assembly can now be lifted upward from the motorboard. If this is done, great care should be taken not to bend the spindle.

To remove the turntable and spindle on the RP-153 type it is necessary to first remove the tapered pin in the turntable drive arm assembly. The turntable and spindle can then be drawn up through the motorboard bearing.

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

When a record has been played the pickup moves out, another record is dropped down, and the needle is fed automatically into the starting groove of this record. If the needle fails to enter the starting groove, raise the right-hand side of the cabinet by inserting thin spacers under the feet on that side. If the needle slides over a few grooves, raise the left-hand side of the cabinet in a similar manner.

The 10- and 12-inch records must be absolutely flat for smooth operation.

A pickup shorting switch, located under the motorboard, operates when the pickup is moved outward to the pickup rest.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10- and 12-inch records—Make complete adjustments "D" and "E."
3. Needle does not land properly on 12-inch record but correct on 10-inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature; oil, grease, dirt, or other foreign matter on motor spindle, main driving disc or idler pulley rubber tire. Clean with any quick drying naphtha.
9. Record knives strike edge of records—Records warped record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. When playing both types of records mixed and needle either lands in 10-inch position on 12-inch record or misses record entirely—Increase tension of mixed record discriminating lever spring "M".

Replacement Parts Model RP-153 (Concluded)

STOCK No.	DESCRIPTION	Unit List Price
36266	Clutch—Trip lever clutch—less adjusting stud (5)	.25
36265	Finger—Trip lever friction finger (7)	.50
33581	Frame—Motor coupling frame only	.20
31121	Gear—Record separator shaft gear (10)	.90
33982	Guide—Main lever spring guide (11)	.10
31151	Guide—Pickup lift cable guide (spring) (2)	.10
36520	Lever—Index lever (12)	.75
36273	Lever—Locating lever and pawl	.50
33985	Lever—Main lever (15)	1.05
31140	Lever—Pickup lift cable and spring (16)	.55
36522	Lever—Record discriminating lever	1.30
36476	Lever—Record separator elevating lever with adjustment screws (18)	.80
31132	Lever—Trip detaining lever (19)	.30
36530	Lever—Trip lever less cam and link	1.60
36525	Link—Roller index link	.20
31133	Pawl—Trip pawl (22)	.80
31535	Pin—Drive pin for turntable spindle shaft	.03
36268	Pin—Pin to fasten gear to separator shaft (23)	.05
36267	Rack—Long arm and gear (41)	.60
32880	Rack—Short arm and gear (40)	.55
33983	Screw—Elevating lever pivot screw	.15
36519	Screw—No. 6-32 ball point screw for elevating lever	.30
36477	Screw—No. 6-32 ball point screw for record separator elevating lever	.10
36526	Screw—No. 10-32x5/16 cup point set screw for record separator	.30
32869	Screw—No. 10-32x5 16 screw for record separator	.01
31118	Screw—No. 10-32x5 16 set screw for trip lever cam	.06
14188	Screw—No. 10-32x7 16 set screw for motor coupling	.06
4563	Screw—Pickup lift cable adjusting screw	.04
36528	Separator—Record separator knife (25)	2.00
33988	Shaft—Record separator shaft (34)	.70
36527	Shelf—Record separator rotating shelf (27)	1.40
36524	Spindle—Turntable spindle	1.05
33994	Spring—Flat spring for record discriminator lever	.05
32882	Spring—Main lever spring (43)	.05
36278	Spring—Pickup arm feed spring	.10
3666	Spring—Pickup lift cable spring (31)	.04
14190	Spring—Record discriminating lever pawl spring (28)	.08
31136	Spring—Tension spring for automatic switch plunger	.05
3676	Spring—Tension spring for cam pawl	.04
32436	Spring—Tension spring for locating lever and pawl (35)	.05
36521	Spring—Tension spring for trip lever cam	.05
36921	Spring—Tension spring for trip detaining lever	.03
36279	Spring—Tension spring for trip pawl	.02
31147	Strip—Complete set of rubber strips for motor coupling	.40
36271	Stud—No: 4-40 hex stud for trip lever clutch adjustment	.08
36529	Switch—Automatic switch	1.10
34875	Switch—Pickup shorting switch	.45
36523	Turntable—Turntable less spindle shaft	4.50
8078	Washer—Spring washer for mounting record discriminating lever	.06
2917	Washer—Spring washer for mounting levers	.03
31608	Washer—Spring washer to hold index link	.01
31143	Washer—Washers for turntable bearing (1 steel, 1 bronze and 1 felt)	.15

XX—Price upon application to your local RCA Victor Parts Distributor.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

REFERENCE TABLE FOR AUTOMATIC MECHANISM ADJUSTMENTS

Symptom	Check and Correct
Does not play automatically.	Solenoid relay circuit and S2, S5, S6, L1, L8. Section 19, 20. S4 under recording arm open.
Keeps on repeating automatically.	Check S1, S2. Section 15, 26, 27.
Trips before record is finished.	Section 27.
Does not trip at end of record.	Section 27, 26.
Does not feed new record.*	Section 2, 3, 1
Record does not center on turntable.	Section 1, 7, 9, 10.
Does not reverse records properly.	Section 1, 8, 11, 12, 13, 28.
Does not reverse record.	Section 1, 8, 18, 28, 25.
Pickup does not land correctly on record.	Section 5, 6, 16, 17, 14.
Chatter while changing record.	Section 21, or short circuit in relay trip system.
Ringing noise while changing record.	Section 4.
Record Selector Lever does not work properly.	Section 25, 23, 18.

* Make sure record is not warped or chipped or has rough edges.

NOTE: When Automatic Mechanism jams, shut Master "Power" Switch "OFF" before clearing the jam, as the turntable "Motor Switch" does not shut power to the motor off while the mechanism is in cycle.

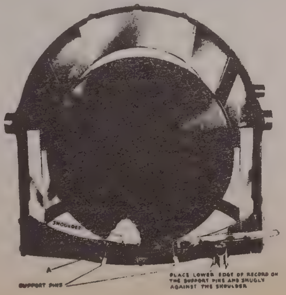
Note:—When mechanism jams upon first being played after being unpacked, check to see whether the record magazine is lined up as stated in Adjustment 7. Also check to see if the Record Reverse Arm Lock No. 46 Fig. 2 is on top of the Record Reverse Arm Lock Stop No. 48 Fig. 2.

1. MAGAZINE LINK ADJUSTING SCREWS ("D") (Fig. 1).

The record magazine should always come back snugly against the magazine stop screw, "C," Fig. 1. If it does not, it is necessary to loosen the two set screws ("D," Fig. 1) to a sliding tension and run the record changer through a cycle of change. When the magazine has reached the horizontal position, as shown in Fig. 1, press down on the lower end of the magazine; this will lengthen the link assembly. Then when the magazine returns to its normal position, the magazine link will adjust itself so that the magazine is snugly against the stop screw. Then tighten the magazine link screws "D."

2. RECORD SEPARATOR ADJUSTMENT.

The separator stop "J," Fig. 1, should be adjusted so that a small 10" record will positively clear the knife portion of the separator lever as shown in the following illustration. A standard to use is to make certain that there is approximately 1/32" clearance between the edge of the small record and the point of the separator lever, as shown at "A" in illustration below. However, it may be necessary to vary one way or the other from this measurement, depending on whether or not the slotted end of the record separator lever goes over the hook (7) (Fig. 1) without binding.


SHOULDER
A
SUPPORT PINS
PLACE LOWER EDGE OF RECORD ON THE SUPPORT PINS AND SNUGLY AGAINST THE SHOULDER

3. RECORD SEPARATOR HOOK ADJUSTMENT.

After adjusting the record separator it will be necessary to check the record separator hook (7) (Fig. 1) to see that it enters the slot in the record separator without binding. This hook is threaded and by loosening the locknut the hook can be turned in either direction, to raise or lower it. After the correct adjustment is obtained, tighten the locknut.

It should never be necessary to change these adjustments on record changers unless they have been tampered with by an inexperienced person.

SEPARATOR HOOK AND ARM (7) (Fig. 7).

Be sure set screw "K" in Fig. 4 is screwed all the way in.

4. RECORD MAGAZINE BUSHING (13) (Fig. 1).

If a ringing noise is heard while the instrument is changing records, i. e., such a noise that might be made by a spring, it will be found that the Durex bushing (13) (Fig. 1) is too tight, in which case it will be necessary to loosen the lock nut of the holding bolt, and back the bolt out, from a quarter to a half turn, then tighten the lock nut.

5. TO ADJUST THE TONE ARM HEIGHT.

To adjust the tone arm height, first place a 12" record on the turntable and adjust the tone arm stop lever (18) (Fig. 1) so that the record hits the rubber roller (21) (Fig. 1) in the center. Start the record changer through a cycle and stop it when the tone arm lever hook (22) (Fig. 1) just touches the stop lever assembly. In this position adjust the tone arm height so that the top of the stop lever is the same height as the center of the hook. This adjustment is made by loosening the two Allen set screws at the rear of the tone arm. These Allen set screws are accessible by raising the tone arm by hand. After making the height adjustment it is necessary to make certain that there is a clearance of approximately 5/8" between the pickup head and the record tray. This distance may be checked between the bottom of the record tray and the bottom of the pickup when the record tray is approximately parallel with the pickup.

6. TO ADJUST THE STOP LEVER HOOK (22) (Fig. 1).

Always adjust the tone arm position on a 12" record before adjusting for a 10" record. Adjust the tone arm stop lever hook (22) (Fig. 1) by moving it in or out. This hook is locked in place by a set screw in the stud whose nut is shown in Fig. 1 as No. 2. This set screw is at the bottom of this stud. Adjust the hook so that it will pass through the notch in the pickup arm lever (18) (Fig. 1) without binding against the top or bottom of the notch, when in the playing position. With a 12" record on the turntable, the rubber roller (21) (Fig. 1) against the edge of the record and the stop lever hook (22) against the blade of the stop lever (18) the needle should stop on the record exactly 3/32" from the edge of the record.

With the record changer in exactly the same position as described above, and with a 10" record on the turntable and the hook (22) (Fig. 1) against the blade, the stop lever should allow the needle to stop on the record 3/32" from the edge of the 10" record. A 6-32 screw shown in Fig. 1 is provided for making this adjustment, simply by screwing it in or out. A check should be made for clearance between the roller and the tray, this roller should never bind on the record tray. This can be taken care of by slightly bending the tone arm stop lever (18) (Fig. 1) up or down. If it is necessary to bend the stop lever it will be necessary to readjust for 12" records.

7. THE ADJUSTMENTS OF THE RECORD MAGAZINE.

Before attempting to adjust the magazine, be sure that the center of the magazine pivot pins (6) (Fig. 1) is 8 3/8" above the base plate. This height is very important and we recommend checking the height of the right hand pin, when looking at the magazine, before any adjustments are made.

The record magazine is positioned by moving it sideways on its bearing or pivot pins. The two set screws underneath the pivot, pins lock the magazine in position. Loosen these set screws, then see that the left hand side of the record reverse assembly fork (part of 4, Fig. 2) is between 1/32" and 1/16" inside the left hand side of the Reverse crank, when looking at the magazine. That is, the left hand edge of the record reverse fork is about 1/32" or 1/16" to the right of the left hand edge of the crank. After moving the magazine, lightly set up the set screws. Then with the selector arm in the "Repeat" position swing the record reverse arm around in front of the magazine, to see whether the record guide strikes either of the record support pins (55) (Fig. 2). If the guide strikes either of the support pins it will be necessary to bend the pin away from the guide so they can not strike. If it is necessary to bend either pin, set the control lever in the "Repeat" position, then raise the record tray by hand, with a 10" record on it, observing the way the record strikes the support pins, the record should hit both pins about 1/16" from the end of the pin; if it does not it will again be necessary to adjust the pin until the record hits both pins an equal distance from the ends. If it is necessary to bend the pins, check the clearance between the record guide arms and the pins and between the arm carrying the record guide and the right hand pin. Also if the magazine has been shifted it is necessary to see that the two points, which extend downward from the magazine, have ample clearance in the channels, in the record tray, which are provided for their passage. If there is possibility of the points striking it probably means the magazine has been shifted too much.

If the magazine has been adjusted, it is also necessary to see that the record separator hook (7) (Fig. 1) does not bind in the slot in the end of the record separator arm (45) (Fig. 2). If it does the section covering these parts give the adjustment.

8. MAGAZINE STOP SCREW.

The magazine stop screw "C," Fig. 1, should be adjusted so that the crank pin (part of 9, Fig. 1) is approximately 1/16" from the edge of the record reverse arm fork (part of 4, Fig. 2) which is furtherest from the magazine, when the record reverse guide is in front of the magazine, that is, in the reversing position.

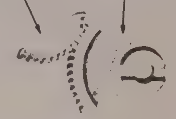
9. TO LOCATE AND ADJUST THE RECORD TRAY (29) (Fig. 2).

In assembling the record tray to the record changer, the first tooth of the driver quadrant (107) (Fig. 3) should mesh with the second tooth of the driven quadrant of the tray as shown.

With the two gears properly meshed, loosen the Allen set screws which hold pins No. 8, Fig. 1, in place. This will allow you to move the record tray sidewise, adjust tray sidewise until the turntable spindle is exactly in the center of the 10" record level of the record tray. (The 10" record level is that part of the tray where the felts No. 24 are indicated in Fig. 2.)

With the control lever in the "one side" position, run the record changer through its cycle until the large hole in the main cam is exactly half way past the upper edge of the record tray cam follower, as shown at "A," figure 1. At this position, the points of the ten-inch felts (24) (Fig. 2) should be level with the top of the turntable felt. If this tray is too low or too high, it may be adjusted to the proper level by loosening the eccentric screw (15) (Fig. 1) "B" and turning this screw until the proper level is obtained. Be sure to tighten the lock nut after adjustment.

If the tray is too high, at this position, the ten-inch records will not be centered over the turntable spindle. If the record tray is too low, the ten-inch records will slide out over the ten-inch tray shoulder and not properly center.


107 FIG.3
134 FIG.7

10. TO ADJUST THE VERTICAL BUMPER GUIDE (10) (Fig. 2).

This guide is located back of the magazine cross bar (33) (Fig. 2). After the records are separated from the magazine they are guided in dropping off the separator so they hit the center of the record bumpers (31) (Fig. 2). This vertical bumper guide also guides the records when the elevating hook, on the rear of the record tray lifts the record. The vertical bumper should be set back just far enough to allow a 12" record to drop onto the record bumpers freely. The lower part of the vertical bumper, which extends into the record well, should extend toward the center of the well rubber bumpers far enough to make sure that the upper edges of the records fall behind the points of the upper record support (39) (Fig. 2). This adjustment is not critical. In most cases it will be found that the upper end of the vertical bumper will just clear the elevating hook on the rear of the tray. In cases where it is found that 10" records are chipping about the edges, due to bouncing against the points of the upper record support (39) (Fig. 2) it will be necessary to bend the vertical bumper (10) (Fig. 2) back at the top to a point where it just barely clears the elevating hook at the rear of the tray. It should never be bent back far enough to raise the front of the tray.

11. RECORD REVERSE GUIDE (41) (Fig. 2).

With a 12" record in the magazine the record reverse guide assembly (41) (Fig. 2) should be parallel with the record when in the reversing position, in front of the magazine.

If the record reversing assembly is parallel with a 12" record as above, it should come around and lay against the reverse guide pin tubing (42) (Fig. 2), if the eccentric cam (77) (Fig. 4) is properly adjusted. This cam can be adjusted, by loosening the screw through the cam and turning it so that the record reversing assembly returns to the reverse guide pin tubing. Care should be taken when making this adjustment so that the crank pin (part of 9, Fig. 1) does not hold the reverse guide away from the pin tubing. This cam should be turned so that the reverse guide assembly just touches the pin tubing; if the cam is turned too far it will allow the reverse guide assembly to hit the pin tubing, but in the reversing position the assembly will not be able to assume a position parallel with a 12" record.

12. REVERSE ASSEMBLY LINK ROD.

Loosen lock nut "H," Fig. 6, while the record changer is in the reversing position, that is, when the reversing assembly (41) (Fig. 2) is in front of the magazine. Remove the screw (79) (Fig. 4) holding the reverse segment link (80) (Fig. 4) to the reverse segment (61) (Fig. 4) and lengthen or shorten the link, by the link thread until the reversing crank (9) (Fig. 1) stands with the crank pin just barely touching, but not binding, against the front side of the fork (4) (Fig. 2). After the adjustment has been made, lock the link in place with the lock nut "H," Fig. 6.

13. TO ADJUST REVERSE CAM ARM AND ROLLER ASSEMBLY (57) (Fig. 3).

See Section 7 under Instructions For Replacing a Reverse Cam.

14. LATERAL LOCATION OF THE MAIN CAM SHAFT.

Both end bearings of the main cam shaft are movable, and are used to locate the cam shaft in its proper lateral position, as well as adjust the amount of end play. The main cam shaft is located laterally so that the ball in the end of the tone arm lift rod (87) (Fig. 5) travels in the exact center of the tone arm lift cam (86) (Fig. 5). As shown at "M" in Fig. 5.

15. TO ADJUST THE CLUTCH THROWOUT LEVER AND CAM.

The clutch throwout lever cam is shown as No. 125 in Fig. 7 and is adjusted by loosening the shoulder screw (69) (Fig. 4) to a sliding tension after the record changer has been stopped in the playing position. The clutch throwout lever cam should just clear the point of the turntable throwout cam (93) (Fig. 5) with the clutch disengaged. Unless clearance between the turntable throwout cam and the clutch lever throwout cam is maintained the record changer will jam. If too much clearance is allowed the turntable throwout cam will not disengage the clutch and the record changer will continue to change records without playing them.

16. TO ADJUST THE PICKUP ELEVATION.

When the tone arm swings in towards the record, the pickup arm lever hook (22) (Fig. 1) comes to rest against the pickup arm stop lever (18) (Fig. 1) and when the tone arm lowers the pickup toward the record it pauses momentarily before the pickup arm lever hook goes through the stop lever. If the record changer is stopped during this pause, it will be found that the ball in the end of the pickup arm lift shaft (87) (Fig. 5) is at the point marked "L" in Fig. 5 on the lift cam (86) (Fig. 5). Now if the pickup, with a needle in the proper position, is moved beyond the edge of the record, the point of the needle will extend below the top surface of the record a distance equal to half the thickness of the record. The correct elevation of the pickup is made by the screw in the underside of the tone arm fork against which the pickup cover rests. Loosen the locknut, adjust the screw to bring the needle to the position mentioned above, then lock the locknut.

17. PICKUP FEED IN ADJUSTMENT.

The collar of the pickup arm swing lever and collar assembly (84) (Fig. 5) should ride on the leather facing of the friction cam (96) (Fig. 5) until the pickup arm lever hook (22) (Fig. 1) has engaged the stop lever (18) (Fig. 1). Then a slight amount of friction should be maintained after the ball at the end of the pickup lift arm (87) (Fig. 5) has engaged with the lift cam (86) (Fig. 5). This friction should be maintained until the needle has touched the record, otherwise the pickup arm may move away from the stop lever and the needle miss the record. If the friction be maintained too long the needle may be forced beyond the first playing groove. To adjust this, the pin locking the friction cam to the main cam shaft should be driven out and the Allen set screw loosened to a sliding tension. The cam is rotated forward, in the direction of rotation of the main cam shaft, to maintain the friction a longer time and backward to maintain it for a shorter time.

18. TO ADJUST THE REVERSE CAM SHIFT LEVER (105) (Fig. 7).

This lever is moved by the record control shaft (116) (Fig. 7) and is held in position by an Allen set screw. It should be positioned on its shaft so that the record reverse cam (85) (Fig. 5) is firmly engaged with its pin (74) (Fig. 4) in the "Both Sides" position. In the "One Side" and "Repeat" positions it should have good clearance with the pin. If any adjustment of this lever is made be sure to check the setting of the Reverse Cam Arm and Roller Assembly (57) (Fig. 4) as instructed in Section 7 of the instructions on replacing a reverse cam.

19. TO ADJUST THE SOLENOID MOTOR SWITCH (108) (Fig. 6).

After the switch cover has been removed the switch is exposed. The upper switch points should make good electrical contact, while the main clutch is disengaged, in this position the clearance between the bottom points should be approximately 3/32". While the clutch moves from the disengaged to the engaged position the upper switch points should remain closed until the lower set of points are closed. When the clutch is fully engaged the lower points should make good contact and the clearance between the upper points should be approximately 3/32".

To adjust the switch loosen the screw through the bakelite switch base at the rear of the switch assembly. After the position is found where proper clearance is secured, with the clutch engaged and disengaged, the switch should be locked in position with the screw.

In some machines a headless set screw is used to lock the switch in position. This screw is near the point of the tapered bakelite insulating block. Loosen this screw and adjust switch to get proper clearance then lock the switch in position by the set screw.

The two upper contacts are in series with the auto trip switch and the two lower contacts are shunted across the motor switch. When the clutch is engaged the auto trip switch is out of circuit and the motor switch is shunted by the lower contacts thus insuring the completion of the change cycle even though the instrument is switched to radio or turned off.

20. CLUTCH CLEARANCE.

The clearance between the driven (70) (Fig. 5) and driving (99) (Fig. 5) members of the clutch should be approximately .020" (Twenty thousandths), and is adjusted by loosening screw "N" Fig. 7 to a sliding tension and adjusting the clutch fork (121) (Fig. 7) and the solenoid to clutch lever and pin assembly until the proper clearance is obtained. After adjustment is made lock the screw "N," Fig. 6.

21. TO ADJUST SOLENOID WEDGE SPRING.

This phosphor bronze spring is located on one of the three spacers used to mount the solenoid plate bracket to the solenoid bracket. It is used to prevent clutch chatter or bounce when the clutch engages. The only adjustment is to bend the spring to a snug fit with a long screw driver so as to increase or decrease its pressure on the solenoid to clutch lever (118) (Fig. 7).

22. TO ADJUST THE RECORD REPEAT LOCK LEVER (82) (Fig. 7).

The purpose of this lever is to prevent accidental shifting of the Selector Arm while the instrument is not in the playing position. In the "Repeat" position this lever is on the side of the Solenoid to Clutch Lever (118) (Fig. 7) away from the main cam. In the "One Side" and "Both Sides" positions it is on the main cam side of the solenoid to clutch lever. With the tone arm in the playing position (Main Clutch Disengaged) this lock lever should clear the solenoid to clutch lever by approximately 3/16" when moved under it.

23. TO ADJUST THE REVERSE CAM LOCK LEVER (115) (Fig. 7).

This lever should be on the main cam side of the solenoid to clutch lever when in the "Both Sides" position. And on the opposite side when in the "One Side" and "Repeat" positions. With the main clutch disengaged the lock lever should clear the solenoid to clutch lever by approximately 1/16" when moving under it.

24. TO ADJUST RECORD REPEAT THROW-OUT LEVER (119) (Fig. 7).

No adjustment of this part is necessary.

25. TO ADJUST RECORD REPEAT CLUTCH LEVER (83) (Fig. 7).

The adjustment of this lever is made by loosening the Allen set screw to a sliding tension then moving the part along the shaft. The sliding clutch should engage in the "One Side" and "Both Sides" positions, but should be disengaged in the "Repeat" position. The fork of this lever should not bind the sliding clutch in either the "Repeat" or "Both Sides" position.

26. TO ADJUST THE STOP TRIP SWITCH (137) (Fig. 8).

This switch is accessible by removing the turntable, which will expose the switch cover. To remove the switch cover it is necessary to remove the trip arm, which goes through the switch cover and the two flat head screws which hold the cover in place. The clearance between the contact points on the fixed and movable arms of the switch should be 1/32". After replacing the trip arm (27) (Fig. 8) in the switch, after the switch cover has been removed, set the turntable on the spindle, push stop trip arm (142) (Fig. 8) slowly about 1/4" toward the magazine and then turn the turntable through one complete revolution. This will insure the fibre cam, on the turntable, resetting the trip switch, the clearance between the trip arm and the moveable arm of the switch should be 1/32". The distance between the trip arm and the switch trip guard finger should also be 1/32".

To adjust the clearance between the trip arm hook (27) (Fig. 8) and the moveable switch arm, loosen the screw in the bakelite switch base, at the end nearest the tone arm. Move the switch until 1/32" clearance is secured between the trip arm hook and the moveable arm of the switch, then tighten the screw holding the switch. In making this adjustment be sure that the stationary arm of the switch is not bent when tightening this screw.

On some models a headless set screw, near the end of the coil spring, is used to lock the switch in position: loosen this screw, adjust the switch, then tighten the set screw.

27. TO ADJUST THE FRICTION JOINT OF AUTOMATIC TRIP SWITCH.

The amount of friction necessary in the friction joint between the auto stop trip lever—long (27) (Fig. 8) and the auto stop trip lever—short (142) (Fig. 8) should be just sufficient to close the automatic stop trip switch (137) (Fig. 8). The friction is regulated by adjusting the screw which tightens the flat spring (141) (Fig. 8). If the tension is too great the instrument may trip before finishing a record, if not enough tension is had the instrument will not change records when the needle hits the automatic change groove.

28. INSTRUCTIONS FOR REPLACING THE RECORD REVERSE CAM AND ITS ADJUSTMENTS.

1. Set record changer in the playing position. Carefully mark the drive gear (92) (Fig. 3) on the main shaft and the driven gear as shown 81, Fig. 3, by prick punch marks or scriber, so that the same teeth can be engaged after reassembly, thus insuring proper timing.
2. Remove the two bolts, one (60) (Fig. 3) securing the magazine slide and roller assembly to the magazine slide arm lever, and one (15) (Fig. 1) securing the record slide arm and stud assembly to the record tray drive crank.
3. Looking in from the rear of the instrument, remove the Durex bushing from the end of the main cam shaft, nearest the motor drive shaft. This is accomplished by loosening the bolt to the right of the main shaft. Care should be

taken when replacing this bushing so as not to tighten the bolt enough to crush the bushing; a snug fit only is required.

4. Remove lower half of bearing and Durex bushing from the other end of the main cam shaft and work the cam shaft out of the record changer. The same precaution against crushing this bushing should be taken with this one as with the one in the preceding section.

5. Remove taper pin from gear and loosen set screw in the collar, both shown as 81 in Fig. 4, of the reverse cam shaft assembly, as well as the pin (74) (Fig. 5) over which the reverse cam forks, when in the reversing position. After removing the collar and sliding the gear to one side, file all burs from the edges of the holes in the reverse cam shaft. Slide the shaft through its Durex bushing toward the rear of the instrument far enough to allow the removal and replacement of the reverse cam (85) (Fig. 5).

6. Reassemble the reverse cam shaft assembly, making certain that the taper pin holes in the shaft and gear are correctly aligned to permit the taper pins being properly inserted. The set screw in the collar at the end of the shaft should be properly tightened.

7. Remove the reverse cam arm and roller assembly (57) (Fig. 4) and make sure that the roller pin and arm are not bent, if either of these items are found bent we suggest that you replace the reverse arm and roller assembly.

8. In reassembling the reverse cam arm and roller assembly (57) (Fig. 4) in its proper position for alignment with the reverse cam, be sure the roller is about 1/32" inside the ridge on the reverse cam, when the cam is in the reversing position.

9. Remove the taper pin from the gear (92) (Fig. 5) on the main shaft, which drives the gear on the reverse cam shaft assembly (81) Fig. 5) and remount the main shaft to the record changer chassis, pushing the above gear, from which the pin was removed, to one side so that it will not mesh with its driven gear.

10. Locate the main shaft so that the lower end of the pickup arm lift shaft travels in the center of the pickup arm lift cam, as shown at "M" in Fig. 5. With the main shaft in this position, adjust the main shaft Durex bushings so that there is no end play in the main cam shaft assembly.

11. Rotate the main cam shaft to the playing position so that the pickup arm is lowered over the turntable.

12. Set the reverse cam in its lowest position, with the control lever in the "Both Sides" position, so that the fork of the reverse cam is meshed with the driving pin.

13. Mesh the reverse cam assembly driver gear (92) (Fig. 5) with the reverse cam assembly driven gear so that the identifying punch marks correspond to the original position. The taper pin for the driver gear should be inserted next. If the assembly has been properly made there should be approximately 1/32" clearance between the roller or the reverse cam arm and the reverse cam. See "F," Fig. 5.

14. Throw the control lever to the "One Side" position and rotate the reverse cam with the fingers until it is in the reversing position. Again throw the control lever to the "Both Sides" position. Now there should be approximately 1/32" clearance between the reverse cam and the roller. See "G," Fig. 5. If the clearance is not approximately 1/32" for both positions of the reverse cam it indicates either the gears are not properly meshed or the reverse segment link rod may be bent. A careful check of the latter while the main shaft is out will save time and trouble later.

29. INSTRUCTIONS FOR REMOVING THE AUTOMATIC MECHANISM FROM THE CABINET.

In most cases, any repairs and adjustments on this mechanism can be made with the mechanism in the cabinet. If it is necessary to remove the mechanism for any reason, it is recommended that the following procedure be observed, and that two persons take part in the removal. Make sure the mechanism is not in cycle.

1. There is a great possibility, when removing the chassis from the cabinet, to mar or scratch the cabinet. If you will place a piece of cardboard around the record changer it will eliminate, to a great extent, the possibility of marring the finish. A rubber auto mat, with a hole for the record changer, the same size as the one in the cabinet makes an excellent pad. This pad can be split and is easily put in position and removed. Pad the sides of the cabinet with pieces of cardboard.

2. Remove the backs from the record changer, and amplifier compartments.

3. Remove the five prong socket cable from the solenoid assembly, remove the pickup lead from the terminal board, and free the shielded lead going to the shorting switch.

4. Remove the four bolts that hold mechanism to the shelf.

5. Loosen the two Allen set screws in the flexible coupling and allow it to slide down the drive shaft, so as to clear the record changer shaft.

6. Remove the screw marked "P" in Fig. 2. This is the middle of the screws of the upper record support.

7. Remove the magazine link shoulder screw No. 40 Fig. 2. This will allow the magazine to be swung parallel to the turntable, and take up less room.

8. Remove the pickup arm assembly by removing the three screws in the pickup arm base, swinging the pickup arm to the back of the mechanism and working the bottom of the pickup assembly out of the hole.

9. Carefully mark the drive gear (92) (Fig. 3) on the main shaft and the driven gear shown as part of 81, Fig. 3, by prick punch marks or scriber, so that the same teeth can be engaged after reassembly, thus insuring proper timing.

10. Remove the two bolts, one (60) (Fig. 3) securing the magazine slide and roller assembly to the magazine slide arm lever, and one (15) (Fig. 1) securing the record slide arm and stud assembly to the record tray drive crank.

11. Looking in from the rear of the instrument, remove the Durex bushing from the end of the main cam shaft, nearest the motor drive shaft. This is accomplished by loosening the bolt to the right of the main shaft. Care should be taken when replacing this bushing so as not to tighten the bolt enough to crush the bushing; a snug fit only is required.

12. Remove lower half of bearing and Durex bushing from the other end of the main cam shaft and work the cam shaft out of the record changer. The same precaution against crushing the bushing should be taken as stated, in the preceding section.

13. From the rear of the cabinet, lift the mechanism straight up, and carry it straight back until the rear bearing bracket of the main shaft has cleared the shelf; then rotate the mechanism 90°, turning it so that the record magazine comes toward the back of the cabinet until the record magazine is clear of the cabinet. Then drop the record magazine end of the mechanism slightly so that the drive shaft will clear the bottom shelf, and remove the mechanism.

To Replace Mechanism:—1. Replace mechanism by reversing procedure of step 13 above.

2. Replace the main cam shaft and its bushings, but do not tighten the bushings in place. Make sure that the gears marked in (9) above are meshing properly as marked. Make sure the throw-out cam 71 Fig. 4 is resting on top of the main shaft.

3. Replace the pickup arm assembly. Locate the main shaft so that the lower end of the pickup arm lift shaft travels in the center of the pickup arm lift cam, as shown at "M" in Fig. 5. With the main shaft in this position, adjust the main shaft Durex bushings so that there is no end play in the main cam shaft assembly.

4. Replace the two bolts removed in (4) (6) (7) and (10) above.

5. Adjust the position of the record tray as described under: "9. TO LOCATE AND ADJUST THE RECORD TRAY", by adjusting screw 15 (Fig. 1).

6. Turn the drive shaft or turntable with the fingers and put the mechanism thru a cycle to see that it is working correctly.

7. Replace the flexible coupling on drive shaft and replace connections to record changer.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the speaker voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep test-oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0°" mark on the drum scale must be horizontal, and a line drawn through the 0° and 180° marks on the scale should be parallel with the top of the chassis when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at the sides.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

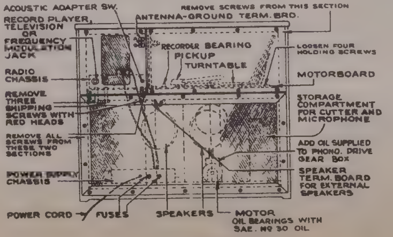
1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations by known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

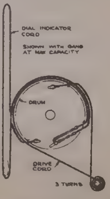
For additional information, refer to booklet "RCA Victor Receiver Alignment."

Precautionary Lead Dress:—

(1) All oscillator leads should be kept as short as possible.
(2) Lead from No. 8 on S1 must be held to 3 in. length and dressed toward the bottom end of coils, away from coil windings.
(3) Lead from No. 9 on S1 must be held to 3 in. length and dressed toward the bottom end of coils, away from coil windings.
(4) Lead from No. 5 on S2 must be held to 5 in. length.
(5) Lead from No. 8 on S5 must be held to 4 1/4 in. length.
(6) Lead from Det. coil L17 to trimmer must be held to 2 1/4 in. length.
(7) Lead from Det. coil L18 to No. 2 on S8 must be held to 5 3/8 in. length.
(8) The leads from the top and arm of the microphone volume control should be dressed away from the pilot light leads and toward the pre-amplifier shield.
(9) The condenser from the volume control arm to the first audio tube must be shielded and the lead on the tube side as short as possible.
(10) The leads to the selectivity switch must be dressed along the side of the chassis away from the R.F. coils.
(11) Keep pilot light leads as far as possible away from oscillator coils.
(12) Dress leads to low frequency tone control on outside of chassis under bracket.
(13) The long ground lead from the oscillator heater must be kept away from all condensers, resistors, and leads to RF tubes.
(14) Dress all filament leads away from oscillator and detector grid lugs.
(15) C-14 (2700 mmf) and C-72 (120 mmf) must be dressed toward A osc. trimmer, C-17.


ACOUSTIC ADAPTER SW.
REMOVE SCREWS FROM THIS SECTION
RECORD PLAYER, TELEVISION OR FREQUENCY MODULATION JACK
ANTENNA-GROUND TERM. BRD.
RECORDER BEARING
PICKUP
TURNTABLE
LOOSEN FOUR HOLDING SCREWS
RADIO CHASSIS
MOTORBOARD
REMOVE THREE SHIPPING SCREWS WITH RED HEADS
STORAGE COMPARTMENT FOR CUTTER AND MICROPHONE
REMOVE ALL SCREWS FROM THESE TWO SECTIONS
ADD OIL SUPPLIED TO PHONO. DRIVE GEAR BOX
POWER SUPPLY CHASSIS
SPEAKER TERM. BOARD FOR EXTERNAL SPEAKERS
POWER CORD
FUSES
SPEAKERS
MOTOR OIL BEARINGS WITH SAE. NO 30 OIL

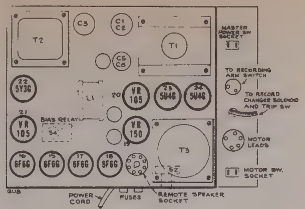
Rear View of Instrument



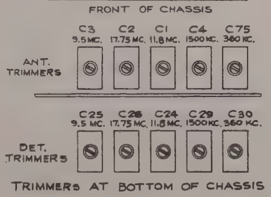
Tuning Drive Cord Assembly

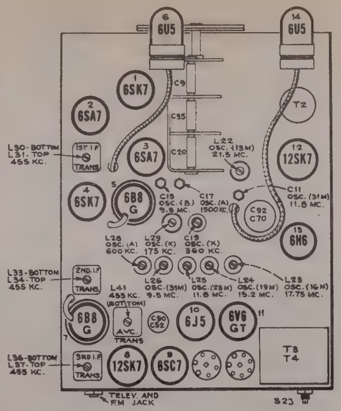
MODEL QU8
Ch. RC-551

RCA MFG. CO., INC.



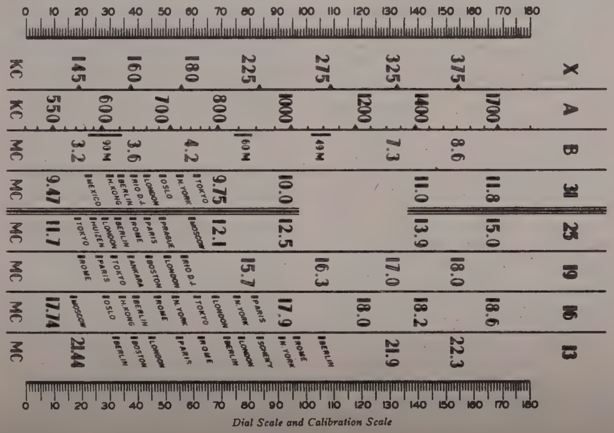
Top View—Power Unit





Tube and Trimmer Locations

IMPORTANT:—IF ANY ONE OF THE VOLTAGE REGULATOR TUBES Nos. 19, 20, 21, ARE OUT OF THEIR SOCKETS THE INSTRUMENT WILL NOT OPERATE, AS THE A.C. CIRCUIT WILL BE OPEN.



Dial Scale and Calibration Scale

Step	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	Turn selectivity control maximum counter-clockwise for maximum selectivity.			
2	6B8G 2nd I-F grid in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L37, L36 Third I-F Transformer
3	6SK7 1st I-F grid in series with .01 mfd.			L34, L33 Second I-F Transformer
4	6SA7 1st Det. grid in series with .01 mfd.			L31, L30 First I-F Transformer
5	With selectivity control in broad position retouch L37, L36 for selectivity curve 2.			
5A	With selectivity control in sharp position see that curve 1 has not changed appreciably.			
6	6SA7 1st Det. grid in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L41 AVC Transformer See Note 1
7	Antenna Terminal in series with 200 mmfd.	360 kc	"X" Band 360 kc (149°)	C19 (osc.)** C30 (det.) C75 (ant.)
8		175 kc	"X" Band 175 kc (51°)	L29 (osc.) (Rock-in)
9	Repeat steps 7 and 8.			
10	Antenna Terminal in series with 200 mmfd.	1,500 kc	"A" Band 1,500 kc (150.5°)	C17 (osc.) C29 (det.) C4 (ant.)
11		600 kc	"A" Band 600 kc (26°)	L28 (osc.) (Rock-in)
12	Repeat steps 10 and 11.			
13	Antenna Terminal in series with 300 ohms	9.5 mc	"31M" Band 9.5 mc (21.5°)	L26 (osc.)*** C25 (det.) C3 (ant.)
14		11.8 mc	"31M" Band 11.8 mc (169.5°)	C11 (osc.)***
15		Repeat steps 13 and 14 until dial tracks correctly.		
16		9.5 mc	"B" Band 9.5 mc (172.5°)	C15 (osc.)***
17		11.8 mc	"25M" Band 11.8 mc (36°)	L25 (osc.)*** C24 (det.) C1 (ant.)
18		15.2 mc	"19M" Band 15.2 mc (37°)	L24 (osc.)***
19		17.75 mc	"16M" Band 17.75 mc (28°)	L23 (osc.)**** C26 (det.) C2 (ant.)
20		21.5 mc	"13M" Band 21.5 mc (59°)	L22 (osc.)****

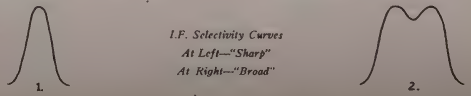
NOTE 1: Connect oscilloscope to junction of R8 and C42. Also short junction of R11 and R12 to ground.

** Core of L29 should be approximately ⅛-inch out before adjusting C19.

*** Use minimum capacity or inductance peak.

**** Use maximum inductance peak.

NOTE.—Oscillator tracks above all signals except on 16 and 13 meter bands.



I.F. Selectivity Curves
At Left—"Sharp"
At Right—"Broad"

Public Address

External speakers may be connected to the terminal board located at the rear of the cabinet under the phono compartment. The total impedance of all the speakers connected to the instrument in parallel or series should be approximately 500 ohms.

Speakers recommended for use with this instrument are RCA MI-6247A, MI-6248B or MI-6233 Speakers. The MI-6247A, 6248B Speakers are rated about 10 watts. The MI-6233 Speaker is rated about 4 watts. These are speakers for handling low power in small rooms. For larger auditoriums and larger installations consult your local RCA Commercial Sound Distributor.

For outdoor, high volume applications the RCA MI-6260 (20 watts), MI-6255 (60 watts), or MI-6264 (50 watt co-axial speaker) Speakers are recommended. As all these speakers are 15 ohm impedance, a matching transformer will be needed to match them to the 500 ohms output of the instrument.

The following tables show the impedances of the speakers listed above.

AVAILABLE IMPEDANCES

MI-12315 Coupling Transformer

(Used in MI-6233 Permanent-magnet Speaker)

Voice coil impedance	6 ohms
Blue to green-red tracer	2 ohms
Yellow to green-red tracer	6 ohms
Blue to yellow	15 ohms
Black to green-red tracer	36 ohms
Blue to black	55 ohms
Red to black	225 ohms
Red to yellow	342 ohms
Red to green-red tracer	438 ohms
Red to blue	500 ohms

Note: As shipped from factory, MI-6233 Speakers have red and blue leads connected to terminal board.

AVAILABLE IMPEDANCES

RCA-MI-6247-A or MI-6248-B Permanent-magnet

Dynamic Speaker

Voice coil impedance	2 ohms
Black to red	5,000 ohms
Red to blue	2,500 ohms
Red to red-black	1,250 ohms
Blue to black	410 ohms
Red-black to blue	225 ohms

Example: To match 2 MI-6233 Speakers to the instrument, connect each of the speakers for 342 ohms impedance as shown in the table above, and then connect the speakers in series.

To match 3 MI-6233 Speakers, connect each speaker for 225 ohms, then connect the three speakers in series.

To match 2 MI-6247A or 6248B Speakers choose the 225 ohm impedance, and connect the primaries of the transformers in series.

To match 3 MI-6247A or 6248B Speakers, choose the 1,250 ohm impedance and connect the speakers in parallel.

LOCATING LOUDSPEAKERS

When installing loudspeakers, either temporarily or permanently, the installation will be simplified if one considers the loudspeaker to be similar to a search light. The sound waves from the loudspeaker are distributed in much the same manner as light rays from a search light. If a sufficient amount of the sound waves, either direct from the loudspeakers or reflected from hard surfaces, reach the microphone the system will howl. This is technically termed acoustic feedback, because the amplified sound from the loudspeakers is picked up by the microphone and fed back through the amplifier, where it adds to the original sound until a continuous whistle or howl is produced. Directional projectors, such as the 25-watt loudspeaker (MI-6260) will, to a great extent, prevent howling by directing the sound waves to a restricted area and the amplifier can then be operated at much greater volume. When two speakers are used in an auditorium, hall, etc., the speakers and microphone should be so located that the speakers will be slightly in front of the microphone. Locate one speaker on each side of the microphone and as far from it as possible without destroying the allusion that the sound being heard is actually coming from the individual speaking. The speakers should be pointed in the direction of and at the proper angle to the audience so that as little of the sound waves as possible will be reflected from the side walls and hard surfaces.

It is not recommended that loudspeakers be located in the rear of the auditorium to provide coverage for this area, but rather that directional sound projectors be used and raised to a sufficient height to be directed into the audience at the rear of the seating area. The horns should be located so that the center of the sound beam will strike the floor at a point slightly more than two-thirds of the length of the room. There are occasions, however, where this is not practical, because of the high reverberation or poor acoustical conditions of the building. In this condition better results can be obtained by using a number of speakers operating at comparatively low volume. In an installation of this type a sufficient number of loudspeakers should be used and so located that the sound will be evenly distributed over the entire area in such a manner that an individual will hear the sound only from the speaker nearest him.

In a small room, the loudspeaker should be mounted fairly high, and in the center of one wall.

The RCA MI-6292, MI-6294 and MI-6233 loudspeaker housings are tilted downward twenty degrees for correct sound distribution.

MI-6292 and MI-6294 are tilted loudspeaker cabinets for MI-6248B and MI-6247A Speakers respectively.

The height of the loudspeaker should be such that the center axis points toward seats about two-thirds of the room length away from the speaker.

In a large room, it may be necessary to use two or more loudspeakers connected in parallel and correctly phased.

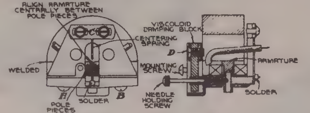
In an auditorium, RCA auditorium-type loudspeakers of correct type should be used. The auditorium speaker should be centered on the front wall, with its center axis pointing toward seats about two-thirds of the room length away from the speaker. If the speaker cannot be centered laterally on the front wall, it is advisable to use two speakers, one on each side of the proscenium arch. The height of the speaker or speakers should be sufficient to ensure good coverage of all seats, including the balcony.

Automatic Phonograph Service

Magnetic Pickup:—

The magnetic pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

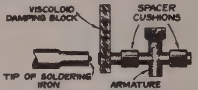
Centering Armature.—Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.



Magnetic Pickup Detail

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then reassemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually accur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.



Attaching Damping Block

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

Pickup Angle.—The pickup head should be set at 15° angle to the pickup arm. This may be done by loosening the nut No. 2, Fig. 1 on top of the pickup arm and adjusting the pickup bracket to the correct angle.

LUBRICATION.

Due to its careful design and precise workmanship, this record changer requires a minimum of oiling.

About once each year a light coat of vaseline or petroleum jelly should be applied to all moving surfaces which were coated with graphite at the factory.

A very light coat of vaseline should be applied to the surfaces of the magazine, indicated at "E" in Fig. 2. It is best to apply this coating every six months. The vaseline should be applied with, and removed by, the fingers, on the magazine faces. DO NOT USE EXCESSIVE AMOUNTS OF LUBRICANT ANYWHERE ON THE RECORD CHANGER.

A good grade of machine oil, not too light, should be used on the sliding clutches, reverse cam shaft and all eccentric and shoulder screws.

NEVER OIL THE "DUREX" BUSHINGS (one of which is shown as No. 17 in Fig. 1), AS THIS WILL CAUSE THEM TO DISINTEGRATE.

Once each year the motor oil cups should be oiled with a good grade of motor oil. At the same time the gear box should be inspected, and the grease replaced if it has become hard. A good mixture to use here is 75% vaseline and 25% SAE 40 motor oil.

RECORD SIZE LIMIT.

The record changer will play any 10" or 12" record of standard size. The minimum size for 12" records is 11⅞". The minimum size for 10" records is 9²⁷⁄₃₂". Records smaller than these limits are very apt to miss centering over the turntable spindle and in most cases are broken.

These record changers will automatically trip on any record having an automatic stop change groove, either spiral or oscillating, where the blank space in the center of the record is not more than 6½" in diameter.

Always inspect the records to see that no rough edges are present. Occasionally you will find a record which has a rough outside edge. This rough edge will greatly interfere with the satisfactory performance of the record changer. A small piece of No. 00 sandpaper will assist you greatly in removing this rough edge.

DRIVE CLUTCH.

The phono drive clutch is located on the drive shaft just above the reduction gear box. The clutch should be adjusted so that there is no slippage in the clutch during a cycle of the mechanism, yet the clutch should slip if the turntable is stopped by hand. To adjust clutch, loosen the two nuts above the clutch on the drive shaft, and move the lower nut down the shaft for more pressure in the clutch, or move the lower nut up for less clutch pressure.

MODEL QU8
Ch. RC-551

RCA MFG. CO., INC.

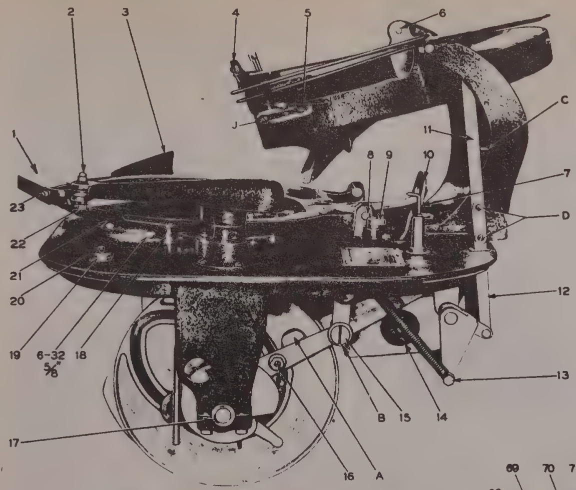


Fig. 1

Reference No.	Stock No.	Description
1	37298	Pickup Housing
2	38066	1/4"—28 Hex. Cap Nut
3	38084	Record Tray Shield Felt—Outer
4	38117	Record Reverse Arm and Fork Assembly
5	38044	Spring—Separator
6	38017	Pin—Magazine Pivot
7	38116	Separator Hook and Arm Assembly
8	38018	Pin—Record Tray Pivot
9	38119	Reverse Pinion and Crank Assembly
10	38138	Record Bumper Guide and Felt Assembly
11	38075	Magazine Link Upper
12	38076	Magazine Link Lower
13	38057	Record Magazine Bushing
14	38113	Chassis Plug
15	38006	Shoulder Screw — Record Tray Slide
16	38024	Pin—Record Tray Slide
17	38068	Main Shaft Bushing
18	38131	Pickup Arm Stop Lever Assembly (Specify color)
19	38005	Escutcheon Plate Off-On
20	38001	Switch, Automatic
21	38094	Stop Lever Roller Tubing
22		Pickup Arm Lever Hook
23	38069	Lock Nut for Pivot Screw

NOTE: In ordering any part that is painted, please specify color wanted.

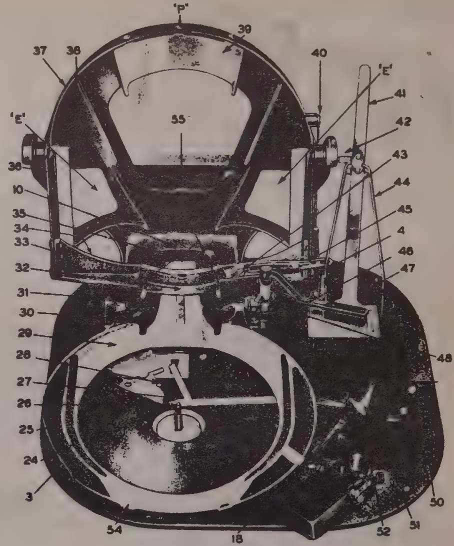


Fig. 2

Reference No.	Stock No.	Description
3	38084	Record Tray Shield Felt Outer
4	38117	Record Reverse Arm and Fork Assembly (specify color)
10	38138	Record Bumper Guide and Felt Assem.
18	38131	Pickup Arm Stop Lever Assembly (specify color)
24	38079	Record Tray Felt—Small
25	38078	Record Tray Felt—Large
26	38139	Turntable Drive Shaft Cap
27	38132	Automatic Stop Trip Lever Assembly
28	38023	Pin—Record Control Rod
29	38137	Record Tray Assembly
30	38089	Record Tray Bumper—Rear
31	38097	Record Bumper
32	38092	Reverse Arm Bumper
33	38135	Lower Record Support Assembly
34	38081	Lower Record Support Felt
35	38082	Record Bumper Guide Felt

Reference No.	Stock No.	Description
36	38083	Magazine Side Felt
37	38136	Record Magazine Assembly
38	38080	Record Magazine Felt
39	38106	Record Support—Upper
40	38008	Shoulder-Screw-Magazine Link
41	38126	Record Reverse Guide Assembly
42		Pin—Reverse Guide Stop
43	38011	Shoulder Screw—Separator
44	38108	Record Reverse Guide
45	38127	Record Separator and Hub Assembly
46	38072	Record Reversing Arm Lock
47	38052	Record Reverse Guide Spring
48	38074	Record Reverse Arm Lock Stop
50		Pickup Arm Base
51	38071	Automatic Stop Trip Lever, Short
52	38110	Pickup Arm Casting only
54	38088	Record Tray Bumper—Front
55	38140	Pin—Record Support

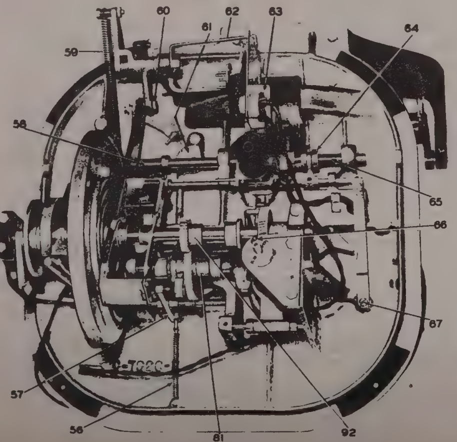


Fig. 3

Reference No.	Stock No.	Description
56	38050	Spring—Reverse Arm
57	38128	Reverse Cam Arm and Roller Assembly
58	38036	Spring—Record Separator Hook Lever
59	38039	Spring—Magazine Slide Arm
60	38007	Shoulder Screw—Magazine Slide Arm
61	38031	Record Reverse Pinion Segment
62		Solenoid Plate Bracket
63	38000	Condenser—1.0 Mfd. 400-Volt (in can)
64	38037	Record Repeat Sliding Clutch Cam
65	38040	Spring—Record Repeat Clutch
66	38016	Screw—Turntable Shaft Collar
67	38012	Shoulder Screw—Repeat Lever
81	38121	Record Reverse Cam Shaft Assembly
92		Gear—Reverse Cam Shaft Driver

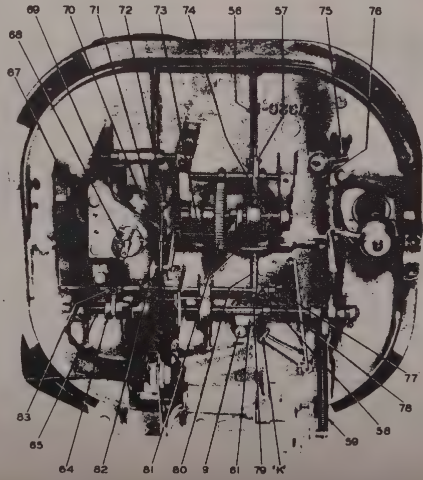


Fig. 4

Reference No.	Stock No.	Description
9	38119	Reverse Pinion and Crank Assembly
56	38050	Spring—Reverse Arm
57	38128	Reverse Cam Arm and Roller Assembly
58	38036	Spring—Record Separator Hook Lever
59	38039	Spring—Magazine Slide Arm
61	38031	Record Reverse Pinion Segment
64	38037	Record Repeat Sliding Clutch Cam
65	38040	Spring—Record Repeat Clutch
67	38012	Shoulder Screw—Repeat Lever
68		Turntable Drive Shaft Assembly
69	38015	Screw—Clutch Throwout Cam
70	38124	Worm and Bushing Assembly

Reference No.	Stock No.	Description
71	38130	Clutch Throwout Lever and Spring Assembly
72	38013	Shoulder Screw—Clutch Throwout Lever
73	38043	Spring—Record Reverse Cam Control
74	38022	Pin—Reverse Cam Shaft
75	38025	Stop Lever Collar Pin Tubing
76	38046	Spring—Tone Arm Lever
77	38036	Reverse Segment Stop Cam
78	38101	Record Repeat Throwout Hook Lever
79	38010	Shoulder Screw Reverse Segment Link
80	38021	Pin—Short—Reverse Segment
81	38121	Record Reverse Cam Shaft Assembly
82	38104	Record Repeat Lock Lever
83	38102	Record Repeat Clutch Fork Lever

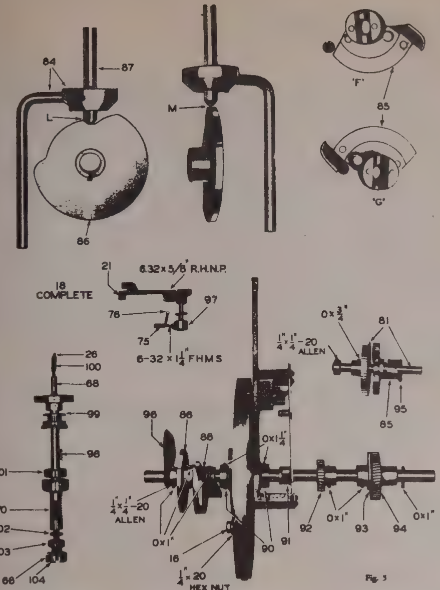


Fig. 5

Reference No.	Stock No.	Description
16	38084	Pin—Record Tray Slide
18	38131	Pickup Arm Stop Lever
21	38094	Stop Lever Roller Tubing
26	38159	Turntable Driveshaft Cap
66	38016	Screw—Turntable Shaft Collar
68		Turntable Shaft Assembly
70	38124	Worm and Bushing Assembly
74	38032	Pin—Reverse Cam Shaft
75	38095	Stop Lever Collar Pin Tubing
76	38046	Spring—Tone Arm Stop Lever
81	38121	Record Reverse Cam Shaft Assembly
84		Pickup Swing Lever and Collar Assembly
85	38123	Record Reverse Cam and Pin
86		Pickup Lift Cam and Hub Assembly
87		Pickup Arm Lift Shaft
88		Pickup Arm Swing Cam
90		Main Cam Collar
91		Magazine Slide Arm Cam
92		Gear—Reverse Cam Shaft Driver
93		Turntable Throwout Cam and Hub Assembly
94	38030	Gear—Main Drive
96		Pickup Arm Friction Cam Assembly
97		Pickup Arm Stop Lever Collar
98	38162	No. 2 Woodruff Key
99	38034	Turntable Shaft Clutch
100		Turntable Driveshaft Cap Tubing
101	38033	Ball Bearing—Upper
102	38069	Thrust Washer—Worm Shaft
103	38032	Ball Bearing—Lower
104	38064	Turntable Shaft Collar

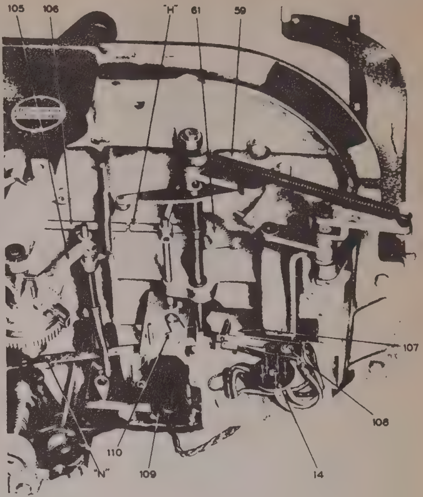


Fig. 6

Reference No.	Stock No.	Description
14	38118	Chassis Plug 5 Prong Male
59	38039	Spring—Magazine Slide Arm
61	38031	Record Reverse Pinion Segment
105	38100	Record Reverse Cam Shaft Lever
106	38020	Pin—Long, Reverse Segment
107	38111	Record Tray Gear—Driver
108	38003	Switch Assembly—Solenoid and Motor
109	38141	Solenoid Coil only
110	38047	Spring—Solenoid Lever Torsion

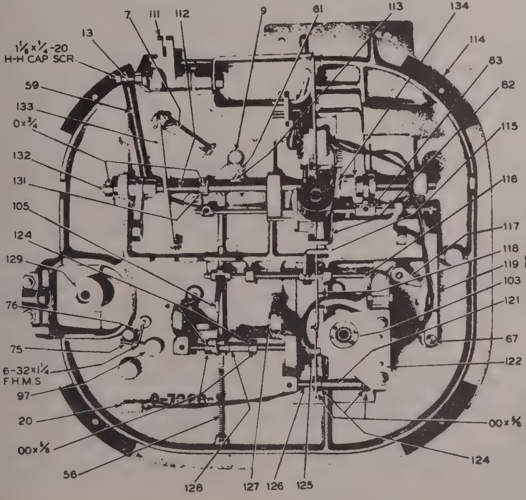
Fig. 7

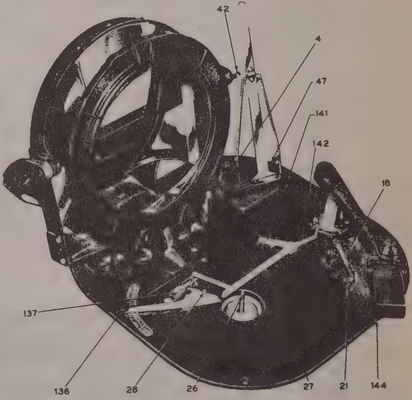
Reference No.	Stock No.	Description
7	38116	Separator Hook and Arm Assembly
9	38119	Reverse Pinion and Crank Assembly
13	38057	Record Magazine Bushing
20	38001	AC Line Toggle Switch
56	38050	Reverse Arm Spring
59	38039	Magazine Slide Arm Spring
61	38031	Record Reverse Pinion Segment
67	38012	Repeat Lever Shoulder Screw
75	38095	Stop Lever Collar Pin Tubing
76	38046	Tone Arm Stop Lever Spring
82	38104	Record Repeat Lock Lever
83	38102	Record Repeat Clutch Fork Lever
97		Pickup Arm Stop Lever Collar
103	38032	Ball Bearing
105	38100	Record Reverse Cam Shaft Lever
111		Magazine Slide Arm Lever
112	38045	Separator Hook Spring
113	38009	Reverse Segment Shoulder Screw
114	38098	Main Frame Pad
	38152	00x¾ Taper Pin
	38154	0x¾ Taper Pin
115	38105	Reverse Cam Lock Lever
116		Record Control Shaft
117	38120	Record Control Lever and Stud Assembly
118	38129	Solenoid to Clutch Lever and Pin Assembly
119	38073	Record Repeat Throwout Lever
121	38108	Main Clutch Fork Lever
122	38066	Bearing Retainer Plug
124	38063	5/16" Shaft Collar
125	38107	Clutch Throwout Cam
126	38115	Solenoid Lever Shaft Assem.
127	38059	Record Tray Shaft Bushing
128	38114	Record Reverse Arm Shaft Assem.
129	38090	Pickup Arm Brake Facing
131	38068	7/16" Shaft Collar
132		Record Tray Drive Shaft Assembly
133	38144	Separator Hook Lever and Roller Assembly
134	38122	Record Tray Gear and Sliding Cam Clutch

Fig. 8

Reference No.	Stock No.	Description
4	38117	Record Reverse Arm and Fork Assembly (specify color)
18	38131	Pickup Arm Stop Lever Assembly (specify color)
21	38094	Stop Lever Roller Tubing
26	38159	Turntable Drive Shaft Cap
27	38133	Automatic Stop Trip Lever Assembly
28	38022	Pin—Record Control Rod
42		Pin—Reverse Guide Stop
47	38052	Record Reverse Guide Spring
136		Selector Knob
137	38004	Record Trip Switch Assembly—complete
141	38048	Spring—Automatic Trip Lever Pin
142	38071	Automatic Stop Trip Lever—Short
144	37292	Pickup Brush Assembly

STOCK No.	DESCRIPTION
	MAGNETIC PICKUP ASSEMBLIES
14891	Armature—Pickup armature and spring
37292	Brush—Pickup brush and mounting bracket
14872	Coil—Pickup coil and support assembly
14292	Damper—Pickup armature damper block
37293	Housing—Finished pickup housing only—less mechanism and cover
37291	Mechanism—Magnetic pickup unit only—less housing and brush
8811	Screw—Pickup needle screw
37294	Terminal—Pickup connector block with set screws and mtg. screw
37286	Pivot—Pickup unit pivot screw and locknut
37287	Bearing—Pickup unit pivot bearing





Recording and Playback Notes

IMPORTANT

The cutting point of the stylus must be in perfect condition in order to make good recordings.

The condition of the stylus point can not be determined by ordinary visual inspection. If the recordings are noisy or poor in quality, first try a new stylus.

The stylus cutting point can be ruined by dropping the cutter on the record, by cutting into the base metal of the recording blank, or by cutting into the paper label on the blank

Always stop the recorder before it reaches its inner limit as it will repeat in the last groove and may wear into the base metal, thereby ruining the stylus point. See that the instrument is perfectly level.

CUTTER ADJUSTMENT

To adjust the stylus pressure for the correct depth and width of cut, the best procedure is to cut some "blank" grooves in a recording disc of the type that will be used: The stylus pressure can be regulated, by means of the adjustment screw on top of the cutter bracket, to produce the correct thickness of the hair-like cuttings. The cuttings should collect toward the center of the recording disc. If they collect toward the outside the stylus is not correctly inserted, and must be adjusted by removal and re-insertion. If the threads continue to collect toward the outside, use a new stylus.

The cuttings should be even, thin, hair-like threads about three-thousandths of an inch across or approximately the diameter of a human hair.

The groove width should almost equal, but not exceed, the distance between grooves. A magnifying glass is helpful in examining the grooves. If the grooves are too shallow, the phonograph needle will slide over them on playback. If the grooves are cut too deep, rumble will be excessive.

After examining the cuttings and the groove width, adjust the cutter pressure as required by means of the adjustment screw on top of the cutter bracket. Turn this clockwise to increase pressure and increase depth of groove. Turn counterclockwise to decrease pressure and decrease depth of groove.

Check the new adjustment by running more blank grooves.

Check the cuttings and groove width each time a new stylus is inserted, and whenever a different tpe of recording disc is used. Due to variations in material composition and hardness among different types of discs, the same cutting-pressure adjustment will not give an equal depth of cut on all types. Thus, it may be necessary to change the adjustment previously set for one type of disc, when recording on a different type.

Excessive cutting pressure will cause rumble. The width of the groove should almost equal, but not exceed, the distance between grooves.

Check the groove width each time a new stylus is used, and each time a new disc is used.

When recording, use the maximum bass response, by turning the bass control to the maximum clockwise position.

On play-back, use the least bass response, by turning the Bass control to the maximum counter-clockwise position.

Be certain that the motorboard and mechanism is "floating" free from the cabinet.

Recorder Service

Cutter Head Drive:—The cutting head drive screw (lead screw) should rotate freely and be free from end play. If end play is present loosen the jamb screw which locks the cone point bearing located at end away from driving gear and adjust this bearing until end play is eliminated (being careful not to cause binding), then tighten jamb screw.

Cutter Head Mounting:—Two cone pointed set screws support the cutter head and its mounting bracket. These should be adjusted to prevent end play but to permit free movement of the cutter head up and down.

Record Threads:—Keep the drive gears and lead screw free from record threads.

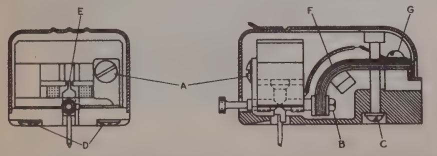
Equalizing Groove Width:—In order to keep the groove width cut at the inside and outside of record equal, it may be necessary to adjust the spindle bearing into which the swivel spindle of the recording arm is placed, and which is located at the right hand center of the phono board. To adjust this bearing loosen the set screw in the base and move bearing up or down as desired. If the grooves at the edge of record are shallower than those at center of record, lower the bearing. If grooves at edge of record are deeper than those at center of record, then raise the bearing.

Lubrication:—Keep the drive gears, lead screw, and other bearing surfaces well lubricated with Vaseline or Petroleum Jelly.

"Automatic" Cut-Off Switch Under Recorder Arm:—When the Recorder Arm is swung in position over a record to make a recording, the weight of the arm is brought down on a switch mounted under the recorder arm swivel bearing, opening the switch and making the Automatic Phonograph inoperative.

This switch should be adjusted so that when the Recording Arm is on its rest, the switch is closed; i. e. the switch plunger is all the way up; and there should be about 1/32-inch clearance between the top of switch, and the swivel shaft. When the Recording Arm is in the recording position, the switch is open; i. e. the switch plunger is pushed down.

Cutter Head:—



Cutter Head

The cutter head used is of an improved design. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the cutter are as follows:

Centering Armature:—Refer to the figure showing the cutter inner structure. The armature "E" is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. To center armature remove screw C and remove cutter cover. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws D have not been disturbed, screw A should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screw A should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the cutter armature.

Replacing Coil:—Remove the cutter cover by removing screw C. Remove screws D and A and lift magnet off coil assembly. Unsolder coil leads. Remove coil and bakelite board on which it is mounted. Replace with new coil and mounting board. Replace magnet. Replace screws A and D. Solder new leads. Tighten screws D so that the armature is perpendicular to the pickup base. Center armature as described above.

To Replace Viscoloid Damping Block (F) or Replace Armature E:—Remove cover. Remove screws G. Remove screws D and A. Remove magnet assembly. Unsolder coil leads. Remove coil assembly. Remove armature and viscoloid block. Remove nut B. Remove viscoloid from armature. Replace either new armature, new viscoloid or both as desired. When replacing nut B make sure that viscoloid is parallel to the armature and that it will not twist the armature when clamped under screws G. Tighten nut B so that viscoloid is firmly fastened on shaft. Replace parts in reverse order as removed above. Center armature as described above.

QU5

Radio Break-Through on Phono:

In localities where a strong local broadcast signal is present, it can sometimes be heard very faintly on Model QU5 when the receiver is tuned to the signal and the radio-phono switch turned to the phono position.

This condition can be eliminated by removing one bus wire connection and changing the yellow lead on the radio-phono switch as shown in accompanying illustration.

VV2-35, VV2-55

Incorrectly Cut Winding Gear:

There is a possibility that several incorrectly cut gears (No. 10203) have reached the field. The gear teeth form a left-hand spiral when viewed from either side, whereas the correct cut is a right-hand spiral.

7QB

Transformer Polarity:

On some production receivers, the leads from the primary winding of the output transformer are color-coded in a manner reverse to that shown in the Service Notes wiring diagram. That is, the red lead and the black-with-red tracer lead are interchanged.

BP-10

Replacing Lid or Front Panel:

When the molded lid (which contains the loop antenna), or the chrome front panel requires replacement, it is not necessary to replace the complete assembly of lid and front panel, as either one may be replaced separately in a few minutes by taking out the hinge pins as described below.

The following parts are available for this purpose:

RCA Stock No.	
37855	Lid and antenna (type without lid support)
37856	Chrome front panel (type without lid support)
37853	Lid and antenna (type with lid support)
37854	Front chrome panel (type with lid support)
37857	Two hinge pins and two hinge springs for BP-10

The following parts are discontinued:

RCA Stock No.	
36510	Antenna loop and cover (discontinued)
36511	Lid and chrome panel (discontinued)

Installation Instructions:

First remove the three self-tapping screws that hold the chassis in the center case, and remove the case. Unsolder the leads from the loop lugs.

(a) With lid closed, cut hinge pins at point "A" with sharp cutters.

(b) Start removal of pin sections as shown, using long-nose pliers.

(c) Grasp end of pin section with long-nose pliers and pull out of hinge.

(d) Install new lid, or new front panel, using the replacement hinge pins and springs that are provided with replacement lids and panels. Arrange springs as shown. Apply a small amount of "Thermoplastic Cement" (G.E. ZV 5057) near outer end of each pin to insure tight and permanent fit.

Loose Control Knobs:

If for any reason either the tuning or volume control knob on Model BP-10 should become loose on its shaft, it may be rigidly mounted in the following manner:

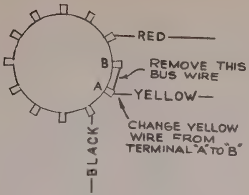
(a) Remove the loose control knob from its shaft and scrape off the old cement from both shaft and control knob.

(b) Apply a generous even coating of a good cement to the shaft region which is to engage the knob. G.E. Thermoplastic cement, ZV-5057, is excellent for this purpose; it is a green fluid, easily thinned with acetone if necessary.

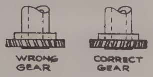
(c) Allow the cement on the shaft to air-dry, to evaporate any acetone present.

(d) Apply a small amount of heat to the shaft, sufficient to soften the cement.

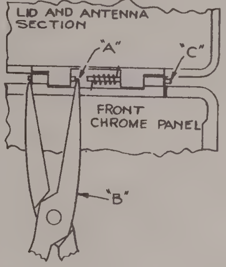
(e) Mount knob on shaft while cement is still soft, and allow a few minutes for drying.



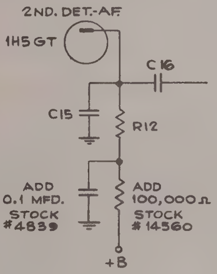
Model QU5 Revision to Prevent Radio Break-Through on Phono



Winding Gear in VV2-35 and VV2-55



Replacing Lid or Chrome Panel on Model BP-10



"RC" Filter Inserted in Audio Plate Circuit of Model 15BP to Reduce Hum

"A" Battery Polarity:

In the battery layout diagram at the top left of page 2 of the BP-10 Service Note (1940, No. 32), the 1.5 v. "A" battery is shown incorrectly. The actual polarity is reverse to that shown, minus being at the top, and plus at the bottom.

10X

Hum:

Keep heater lead wiring away from audio input circuit.

14BT, 14BT-2, 14BK

Distortion and Loss of Sensitivity:

Some cases of loss of sensitivity, and distortion have been associated with frequency drift. In such an event, correction may be made by:

(a) Connecting a 9 mmfd. condenser (RCA Stock No. 37814) from the high side of the oscillator section, at the gang condenser, to ground.

(b) Realigning the 1st detector and oscillator tuned circuits.

(c) Realigning the I.F. circuits if necessary.

15BP

Fidelity Change:

Should accentuation of the higher audio frequency register be desired, capacitor C-15, connected across the 1st A.F. output, may be decreased from 390 mmfd. to 100 mmfd. Some production instruments will have this change already applied; therefore, circuit diagrams should be revised accordingly.

Hum:

Occasional cases of hum on Model 15BP instruments may often be reduced by application of the following:

(a) Shield the 1H5GT 2nd det. A.F. tube by means of a tube shield securely grounded.

(b) Insert a filter network in the 1st audio plate circuit as shown in the accompanying diagram.

Dial Cord Slippage:

To remedy dial cord slippage, on Model 15BP add an extra turn of cord around the drive shaft, without lengthening the cord, thus securing better grip and increased spring tension.

15BP-7, RC-527C

Service Data:

Model 15BP-7 chassis is similar to the Model 15BP (1940). Page 12-23

Model 15BP-7 has the late-type power switch circuit

Replacement parts for the 15BP-7 are the same as in the 15BP Series, except for the following:

Stock No.	Description	Unit List Price
36128	Dial—Dial scale (15BP-7)..	$1.00
37385	Indicator—Power switch indicator plate (Power Line—Off—Battery)	.35
36842	Resistor—5 ohm resistor (1 watt) (Flexible)........	.20
37681	Resistor—Resistance power cord, 545 ohms.........	1.00
37384	Switch—Power switch......	.90
	SPEAKER ASSEMBLIES (RL-81-B1)	
32907	Cap—Dust cap...........	.02
35570	Cone—Cone complete with voice coil...............	1.20
36098	Transformer—Output transformer	1.25
	MISCELLANEOUS ASSEMBLIES	
36152	Crystal—Dial scale crystal less dial................	.50
35392	Decalcomania — Trade - mark decal	.05
36222	Fastener—Snap fastener for power cord door.........	.10
37368	Handle—Carrying handle...	.35
35121	Knob—Control knob.......	.10
36154	Spacer—Rubber spacers for control shafts...........	.10

(Prices subject to change or withdrawal without notice.)

VA-15

Stock Number Correction:

In the Replacement Parts List for Model VA-15 (published on the back page of "Supplementary Information No. 2"), the lamp shade should be changed to read Stock No. 37887 instead of 36727.

16K, 16T2, 16T3, 16T4, 17K, 19K, V-205, V-405

Increasing Sensitivity:

These models have an untuned R-F stage which is resistance-coupled to the 1st-detector. The sensitivity may be increased by changing the R-F plate load resistor to a higher value, between 6,000 and 10,000 ohms. This change is not recommended in metropolitan localities owing to possiblity of cross-modulation.

BT-40 and 94BP1 SERIES

Loudspeakers:

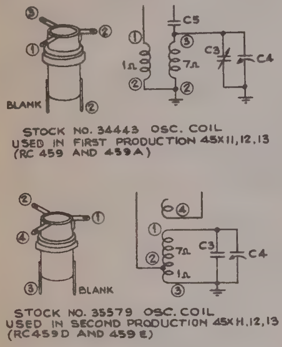
Three types of loudspeakers have been employed in Models BT-40 and 94BP1. Though of different design and using non-interchangeable cones, unfortunately, two of these speakers were identically marked. As a consequence, there has been considerable misunderstanding in ordering and in filling orders for replacement cones, with resultant delay.

In order to prevent delays in the filling of future orders, the complete speakers only will be stocked. This may be ordered by Stock Number 33058.

45X-11, -12, -13

Oscillator Coil Connections:

The oscillator coil in the 2nd production of these models is different from the 1st production: The correct connections are shown below. Note that when installing a No. 34443 coil, it is necessary to connect a jumper from the bottom lug No. 2 to the top lug No. 2.


⑤
②
①
BLANK
②
①
1Ω
②
C5
③
7Ω
②
C3
C4
STOCK NO. 34443 OSC. COIL
USED IN FIRST PRODUCTION 45X11,12,13
(RC 459 AND 459A)
②
①
④
③
BLANK
④
①
7Ω
②
1Ω
③
C3
C4
STOCK NO. 35579 OSC. COIL
USED IN SECOND PRODUCTION 45XH,12,13
(RC459D AND 459E)

Oscillator Coil Connections in 1st and 2nd Production 45X-11, -12, -13

45X11, 12, 13 (2nd Prod.)

Circuit Revisions:

Schematic diagram for 2nd prod. 45X11, 12, and 13, given on page 233 of the 1939 RCA-Victor Service Notes Bound Volume has later revisions as follows:

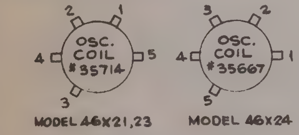
(a) R15 eliminated and a connection made from C16 direct to the 50L6GT grid.

(b) Terminal DP1 (1st diode plate) of tube 12SQ7 (2nd Det.-A.F.-AVC) connected direct to ground instead of to its illustrated connection.

46X21, 46X23

Correct Osc. Coil Connections:

The oscillator coil terminations shown at the bottom of the 46X21, 46X23, and 46X24 Service Notes (1940, No. 6) apply to coil No. 35667 used in Model 46X24 only. The terminations for coil No. 35714 used in Models 46X21 and 46X23 are shown below: The numbers refer to the oscillator coil connections in the schematic diagram.



Oscillator Coil Terminals in Models 46X-21, 46X-23

T64, T80

Control Knobs:

The correct listing of control knobs for Models T64 and T80 is as follows:

Stock No.	
33471	Knob—Tuning knob
33553	Knob—Tone control knob
33470	Knob—Range selector knob
33505	Knob—Volume control knob

K-80

Hum Modulation and Howl:

Tendency of occasional receivers towards hum modulation and howl may be alleviated by:

(a) Rubber-mounting the loudspeaker by means of rubber grommets (Stock No. 33774).

(b) "Rigid-izing" loop antenna by taping winding in six places (2 each side, 1 top, and 1 bottom), using cellulose tape.

RP-145, RP-152 RECORD CHANGER

Centering Motor:

Should centering of the rotor be necessary, it may be accomplished quickly in the following steps:

(a) Remove the two long machine screws, and lift off plastic end cover.

(b) Loosen the two remaining screws sufficiently to permit adjustment of stator laminations.

(c) Insert a .010-inch speaker shim between the rotor and each of the four stator field poles. Rotor should now be equidistant from each pole, and accurately centered.

(d) Tighten screws and replace plastic cover.

RP-152 RECORD CHANGER

Stalling Going into Cycle:

The mechanism should be loaded with one record on the turntable. If stalling going into cycle takes place, it is probably due to insufficient tension in the main lever spring or booster spring (43). An additional metal washer should be inserted between the spring and its guide.

Stalling Coming Out of Cycle:

If the mechanism stalls just as it is coming out of cycle, that is, when the pickup is at its farthest distance laterally from the turntable, it is probable that there is too much tension in the booster spring. Any metal washers in this assembly should be removed.

CAUTION: The mechanism is designed to handle a total of 8—10-inch records or 7—12-inch records.

RP-153 RECORD CHANGER

Motor Data:

Should it be necessary to rebuild or service any of these motors in the field by replacing end heads or using new rotors and shafts, it must be noted that the rebuilt motors should be operated continuously for at least 48 hours before installation. The use of bronze bearings, diamond-bored for accuracy, together with the burnished steel shaft at the rotor provides a very close fit. As a result, the motor must be run in approximately 48 hours, after which the oil has had a chance to fairly cover all contact surfaces of shaft and bearings, and a very smooth-operating long life bearing results.

RCA 156 TUBE TESTER

1T5GT Data:

There has been some question as to the correct settings for testing 1T5GT tubes. On charts earlier than that included in the 156-D and E, the information is incorrect. Correct test data follows:

Tube	Fil.	Class	Type	Test Buttons
1T5GT	1.5	A	21	3, 4, 5

VHR-202, 207, 407

"Rumble":

Any instrument with the sensitivity and tone response of these home recorders is capable of picking up the mechanical vibrations of the motor. However, due to many preventives incorporated in the design of these instruments, rumble will not be recorded if the following precautions are observed:

LEVELING—See that the instrument is perfectly level.

FREENESS—Be certain that the motorboard and mechanism is "floating" free from the cabinet. All four mounting springs should be at approximately equal tension.

FOLLOWER ARM DAMPING WEIGHT—See that the lead weight is in place attached to the follower arm underneath the motorboard.

STYLUS—Make sure that a perfect stylus is tightly inserted in the cutter-head. Because both stylus and retaining screw are of hard steel there is a tendency towards loosening during cutting. Tightness should be checked before each cut.

INPUT LEVEL—Set for sufficient input level so that the "Magic Eye" just closes on modulation peaks.

TONE CONTROL SETTINGS—During recording, the power-bass control should be set for maximum lows, just beyond the click of power switch. The treble tone control setting will depend on the degree of potential rumble present. For extreme cases, it should be set for minimum highs during recording only, in order that the low frequencies in the selection or voice may have a full chance to mask any possible rumble.

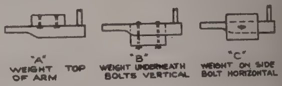
DEPTH OF CUT—During recording, the shavings should be directed towards the spindle and prevented from obstructing the cutter path. The thickness of these shavings should be about that of human hair, or approximately .003 inches. An additional check on depth of cut is to inspect the recording under a magnifying glass. The groove width should approach but not exceed the distance between grooves. Depth of cut may be varied by means of the cutting-pressure adjusting screw at the top of cutter arm.

TURNTABLE DRIVE—If rumble persists, inspect the idler wheel (between motor spindle and turntable) for possible runout, flat spots, and scraping against bottom of turntable.

RECORDING DISCS—Due to variations in material composition and hardness among different types of discs, the same cutting-pressure adjustment will not give an equal depth of cut on all types. Thus, it may be necessary to change the adjustment previously set for one type of disc, when recording on a different type.

Follower-Arm Weight:

Two other methods, besides the one shown in the Service Notes, have been used in attaching the lead weight to the recorder follower arm. These are indicated in the following sketches. All three provide similar results, "C" being the method used in latest production.



Three Mounting Arrangements of Follower-Arm Weight on Home Recording Models

The weight is packed separately for methods "A" and "B" and must be mounted as shown when the instrument is installed in the consumer's home. Excessive "rumble" occurs when the weight is not in place.

Pickup Arm Starting Spring:

The pickup arm starting spring in RP-155 mechanism in the home-recorder models is Stock No. 36278.

Motorboard Mounting Spring:

Change Stock No. of Mounting Spring from 31470 to 37878 (4 required).

VHR-207, 407

12K7-GT Burnouts:

When shooting trouble or when testing Models VHR 207, and VHR 407 do not under any circumstances short the +B to ground with screwdriver or any other tool as a test for plate voltage.

A +B short will burn out the filament of the 12K7-GT microphone pre-amplifier tube. Always test for +B voltage on the chasses with a voltmeter and not with a screwdriver.

V-300, V-301, V-302

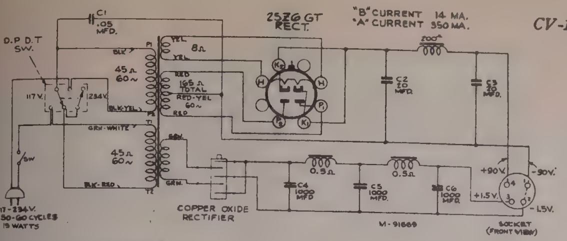
Increasing Phono Gain:

The audio output from low cut records may be increased somewhat by effecting the following changes:

Change R12 from 82,000 to 150,000 ohms.
Change R13 from 2,700 to 5,600 ohms.
Change C40 from .01 to .005 mmfd.

The above changes have been incorporated in 2nd production.

RCA MFG. CO., INC.



CV-112 CONVERTER

A-C Power Unit for QB2:

The CV-112 is designed to convert Model QB2 from battery to a-c operation.

Stock No.	Description	Unit List Price
4886	Capacitor—.05 mfd. — 400 volts. (C1)	.20
30873	Capacitor—Electrolytic, 2 sections 20 mfd., 150 volts	1.35
36553	Capacitor—Electrolytic, 1,000 mfd., 3 volts	1.40
36547	Coil—High voltage choke coil —200 ohms	1.75
36548	Coil—Low voltage choke coil —marked 1B84	2.00
36549	Coil—Low voltage choke coil —marked 1B85	2.00
36551	Rectifier—1.5 volt rectifier	1.40
36552	Socket—4-contact power output socket	.30
18008	Socket—Tube socket	.25
36550	Switch—Power cord switch	1.00
33491	Switch—Voltage change switch	.35
36546	Transformer — Power transformer—110-220 volts, 50-60 cycle	5.00

MODELS 16T2, 16T3, 16T4

2nd Production (RC-509J, H, F):

In the 1st Production of these models, "A" band covers 540-1,560 k. c. In 2nd Production, the range is extended to cover 540-1,600 k. c.

Calibration scales for use in alignment of the 2nd Production receivers are printed on this page.

Also in 2nd Production, the volume control is changed from .25 meg. to 2 megs. and the circuit is revised to isolate the control from the diode d-c current as shown in the accompanying sketches. This isolation reduces the possibility of controls becoming "noisy." These changes should be made on any 1st Production receivers when this trouble is encountered.

For replacement parts lists, refer to the original Service Notes, except for the items which are used in 2nd Production:

MODELS 45X-11, -12, -13

Service Data for these models is given on pages 233 and 234 of the 1939 Bound Volume. Two changes have been made in 2nd Production:

(a) C-13 is connected to the grid of the 12SQ7 instead of to the arm of the volume control, to provide more effective I-F filtering.

(b) Diode plate No. 1 is connected to chassis instead of to diode plate No. 2, to reduce residual hum.

VHR-207, VHR-407

Changing 470 mmfd. Capacitor C-53:

Some cases have been reported of break down of capacitor C-53 in the cutter circuit. A higher voltage rating capacitor is now available under the same Stock Number, 30433. The former type capacitor (black color) should be replaced with the new type (grey color) whenever these sets are serviced.

V-205, V-405, VHR-207, VHR-407

Radio Break-Through on Phono:

Radio break through may occur in these models, due to capacity coupling between the I.F. 6SK7 plate lead and 6F6G grid leads. When this condition exists, dress the 6F6G grid leads down against the chassis well away from the 6SK7 I.F. plate lead.

MODELS 16K and 16T3

2,400 KC Police Band:

Where desirable, reception of a police station in the 2,400 kc band may be obtained by adding a jumper connection from trimmer C-3 to trimmer C-40, and lining up push button No. 5 to the desired police station. Re-alignment of C-3 at 1,500 kc will be necessary.

MODELS 16K, 16T3, 16T4

Station Selector Marker No. 36149:

The Service Notes for these models list the station selector marker incorrectly as Stock No. 33842. The correct Stock Number is 36149.

MODELS 16K, 16T3, 16T4, 17K, 18T, 19K, 110K, 111K

Failure to Oscillate on Push-Button Tuning:

Should a case of non-oscillation on any push-button range be experienced, check the oscillator grid leak to assure that it is 56,000 ohms. Some sets employed a 33,000 ohm leak which was occasionally found troublesome with low line voltage.

Low-Frequency Oscillator Push-Button Coil:

To ensure low-frequency coverage on the push-button oscillator coils in these models, a high-inductance coil, Stock No. 37133, is used for the 540-1,030 kc push-button oscillator ranges.

PRICES SUBJECT TO CHANGE
WITHOUT NOTICE

MODEL 16T4 (2nd Prod., RC-509F)

Stock No.	Description	Unit List Price
37133	Coil—Push button oscillator coil for 540-1,030 kc range (used in 1st and 2nd production)	$ .30
37955	Control—Tone control	1.10
36486	Control—Volume control and power switch	2.00
35883	Button—Push button, dark brown	.15
36300	Button—Push button, light brown	.15
37956	Dial—Glass dial scale	1.00
36149	Marker—Push button markers	.25

MODEL 16T2 (2nd Prod., RC-509J)

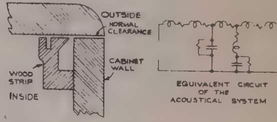
MODEL 16T3 (2nd Prod., RC-509H)

Stock No.	Description	Unit List Price
37133	Coil—Push button oscillator coil for 540-1,030 kc range (used in 1st and 2nd production)	.30
36486	Control—Volume control and power switch	2.00
12738	Resistor—27,000 ohm, ½ watt	.20
30651	Resistor—270,000 ohm, ½ watt	.20
37608	Switch—Tone switch	1.00
35883	Button—Push button, dark brown (16T3)	.15
36300	Button—Push button, light brown (16T3)	.15
37346	Dial—Glass dial scale for 16T2	1.10
37345	Dial—Glass dial scale for 16T3	1.10
36149	Marker—Push button markers (16T3)	.25

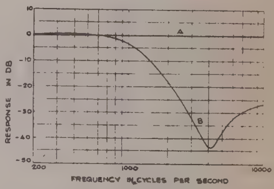
RCA TONE GUARD

The RCA Tone Guard is an acoustic network around the opening of the phonograph compartment in some models. It acts as a low-pass filter to reduce passage of the high-frequency sound that is generated and radiated directly into the air by the vibrating parts of the pickup.

A cross-section view of the Tone Guard and the equivalent electrical circuit are shown below. The series elements of the filter are formed by the normal slit between cabinet and lid. The shunt elements are formed by slots in the wood strip. The filtering action is very effective, as indicated in curve "B" below.

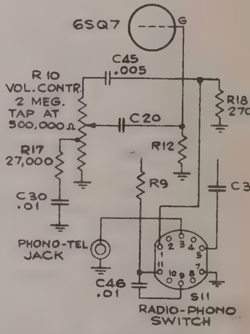


Tone Guard and Equivalent Circuit

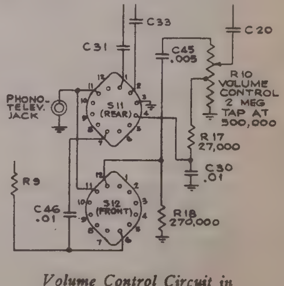


Curve "A"—Response Frequency Characteristic of Conventional Door and Cabinet (Taken as Unity)

Curve "B"—Response Frequency Characteristic of Tone Guard Relative to "A," Showing Reduction of High-Frequency Noise



Volume Control Circuit in 2nd Production 16T2, 16T3.



Volume Control Circuit in 2nd Production 16T4.

CHANGES IN SERVICE NOTES PARTS LIST

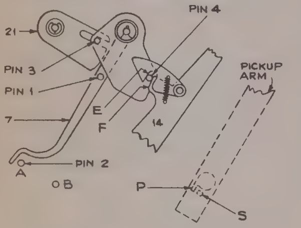
10X, 11X1	C-3 is changed from .005 (Stock No. 33584) to .015 mfd. (Stock No. 11315).
14X	Delete Trade Mark Decal Stock No. 35392.
14X, 14AX	Change description of No. 37904 capacitor to read—"Mica trimmer comprising 1 section of 300-800 mmfd., and 1 section of 200-280 mmfd. Change walnut range switch knob from Stock No. 32895 to No. 35121.
15X	C-5 is changed from 120 mmfd. (Stock No. 12724) to 150 mmfd. (Stock No. 12725). C-8 is changed from .015 mfd. (Stock No. 11315) to .025 mfd. (Stock No. 30938). C-9 is changed from 120 mmfd. (Stock No. 12724) to 300 mmfd. C-9 is built in with C-10 (.005 mfd.) and the Stock Number on the combination is 37359.
15X, 16X1, 16X2	Change Stock Number of push-on fastener from 35069 to 37831.
16X11	Delete Stock No. 35681 Rotor—Cabinet rotor disc.
Q33	Change No. 31418 Spring to read "Drive-Cord Spring." Add No. 13638 Spring Dial-Cord tension spring. Add the following parts: 37921 Crystal—"Magic Eye" crystal 37922 Indicator—Station selector indicator 30716 Clip—"Magic Eye" clip and thumb screw 33438 Screw—Thumb screw for "Magic Eye" clip
V-100	Change Stock No. 4109 cup to Stock No. 37933.
V-170	Change Stock No. 33444 output transformer to No. 31801.
VHR-202, 207, 407	Add under "Home Recording" Assemblies: 37969 Spring—"U" shaped spring for recorder-arm fulcrum 37970 Screw—Slotted, hex-head, cup-point, set screw to fasten recorder arm to pivot shaft
V-300	Add No. 18469 Socket for No. 36599 electrolytic.
VHR-307	Add No. 38324 Sleeve—Rubber sleeve for actuating arm No. 34133.

RCA VICTROLA MECHANISM DATA

RP-152, RP-153, RP-155:

The following changes have been made in these Record Changers:

(a) Removal of Trip Regulator Lever (Part 21).
(b) Removal of Pin 1 on Trip Lever Friction Finger (Part 7).
(c) Repositioning of Stop Pin 2 from position "A" to position "B."
(d) Removal of Pin 3. Since this pin does not interfere with the operation, it has been left in some mechanisms.



Trip Regulator Lever (21) is Removed in Some Production.

The Trip Regulator Lever was formerly used to prevent premature tripping due to a too early return of the Trip Lever Friction Finger at the end of each changing cycle. The same result is obtained by removing the Trip Regulator Lever and repositioning the Trip Finger Stop Pin as shown in the diagram.

Binding or Hesitation of Tone Arm:

This may be due to the following causes:

(1) Small burr on edge "E." Correction: Carefully remove burr with a fine file until edge is entirely smooth.
(2) Binding of Pin 4 between edges "E" and "F." Correction: File off edge "F" with a fine file to give just enough clearance for smooth operation.
(3) Too far an outward swing of the Pickup Arm. This causes Pin 4 to be caught in the upper curved portion of edge "F." Correction: On some models the Pick-up Arm Shaft can be rotated by loosening the nut under the motor board. Rotate sufficiently to prevent Pin 4 from riding into curved portion mentioned, when Pick-up Arm is in the outermost position.

On models where the Pick-up Arm Shaft is positioned by a locating key, it is necessary to bend Stop Guide "S" on Pick-up Arm towards Stop Ear "P" on Pick-up Arm Shaft so that the condition mentioned in the above paragraph is obtained.

RP-152 SERIES

No. 38304 Spindle Bearing and Washer:

The turntable spindle bearing and washer for the RP-152 Series automatic record changer mechanism, used in Models VA-15, V-170, V-200, V-201, V-205, V-300, and V-405, are now stocked as No. 38304.

"RP" vs. "MODEL" NUMBERS

RP-139A and **RP-145** mechanisms are used in models U-40, U-42, U-43, U-44, and U-45.

RP-152 and **RP-153** mechanisms are used in the following models:

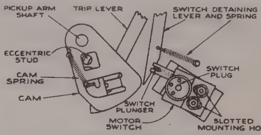
Model No.	Mech. No.	Model No.	Mech. No.
VA-15	RP152	V-300	RP-152J
V-170	RP-152	V-301	RP-153
V-200	RP-152A	V-302	RP-153
V-201	RP-152A	V-405	RP-152J
V-205	RP-152B		

RP155 mechanism is used in the home-recording models VHR-202, 207, 307, and 407.

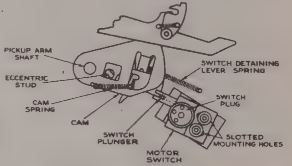
RP-152D AND RP-153

Automatic Switch Adjustment:

In RP-152D and RP-153, an automatic motor switch is mounted under the motorboard, near the pickup arm shaft.



RP-152D & 153 AUTOMATIC SWITCH
(PICKUP ARM ON REST, AND INDEX LEVER AT 10" OR 12")



RP-152D & 153 AUTOMATIC SWITCH
(PICKUP ARM 1¾" FROM SPINDLE AND INDEX LEVER AT "MANUAL")

When the index lever is set at its "10-inch" or "12-inch" position, a detaining lever holds the switch plunger in and keeps the motor running.

When the index lever is set at its "manual" position, the detaining lever moves aside and the switch plunger is then actuated by a cam on the pickup arm shaft. In "manual" position, when the pickup is on its rest, the switch plunger is out and the motor circuit is open. When the pickup is moved from its rest to the edge of a 12-inch record, the cam pushes the switch plunger in and the motor starts. When the pickup needle reaches a point 1¾ inches from the centerline of the turntable spindle, the switch plunger is released by the sharp corner of the cam, thus shutting off the motor.

When the pickup is lifted off the record and moved to its rest, the motor starts momentarily.

ADJUSTMENTS:

The slotted switch mounting holes permit positioning of the switch so that the plunger will be pushed in by the cam.

The eccentric stud on the cam should be turned so that the switch plunger is released by the sharp corner of the cam when the pickup needle is 1¾ inches from the centerline of the turntable spindle.

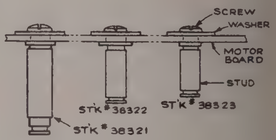
REPLACEMENT STUDS

For Main Lever, Cam-and-Gear, or Trip Pawl:

In automatic record changers of the RP-139A, 145, 152, 153, 155, and similar types, loosening of the mounting studs on which the main lever, cam-and-gear, or trip pawl are pivoted may be caused by jamming of the main lever against the pawl pin at the end of the change cycle due to one or more of the following reasons:

(a) The long arm of the main lever slides over the thin pawl pin instead of pushing against it during first half of cycle. **Check for bent arm on main lever.**
(b) After being cleared out of the way, the trip pawl bounces back due to vibration (dancing near mechanism, etc.) **Check the trip-pawl phosphor-bronze spring for sufficient "drag" or pressure against the pawl.**
(c) The index lever is put into "REJECT" position while the mechanism is still in its change cycle. Caution customer against this.

Loose studs may be quickly and easily replaced by using special replacement studs that are fastened to the motorboard by means of a screw and washer. Three different studs are available:



Stock No.	
38321	Main Lever replacement stud, with screw and washer...
38322	Cam-and-Gear replacement stud, with screw and washer.
38323	Trip Pawl replacement stud, with screw and washer...

VHR-202, 207, 407

50-Cycle Motor Parts:

Stock No.	Description	Unit List Price
37943	Bearing—Bottom bearing and bracket (50 cycle)......	$ .50
37945	Field—Motor field — 110 volts, 50 cycles.........	7.75
37941	Motor—105-120 volts, 50 cycles	14.00
37944	Pulley—Motor shaft pulley (50 cycle)	.35
37942	Rotor—Motor armature (50 cycle)	4.25

Parts originally listed in RP-155 Service Notes (VHR-202, VHR-207, and VHR-407) are applicable to 110 volts, 60 cycle motor only, except Stock No. 37040 Ring, which is used on both 60 and 50 cycle motors.

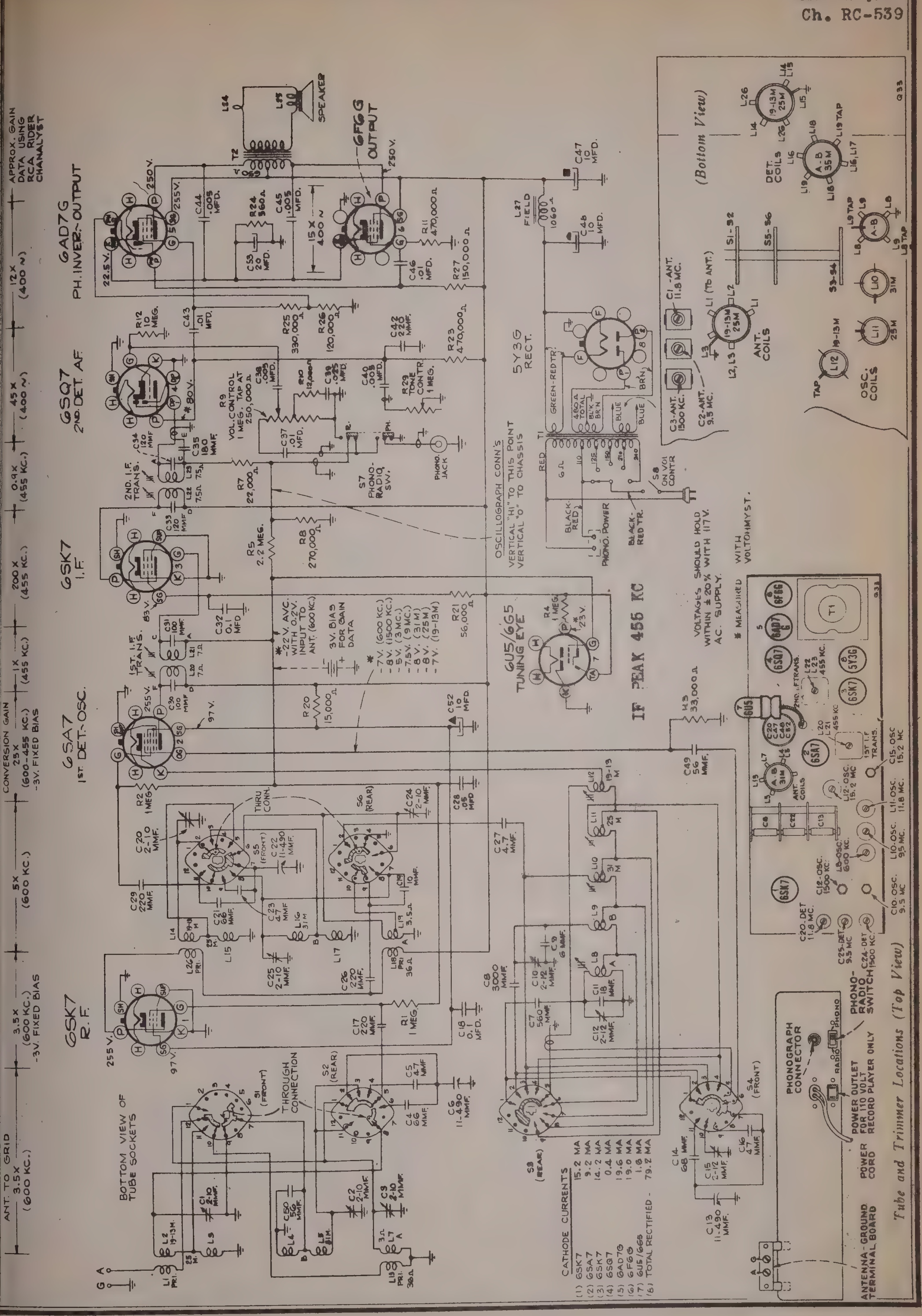
V-301, V-302

Mechanical Motor Noise:

Mechanical motor noise due to armature end play sometimes develops with wear in the above instruments which use type RP-153 record changers. This can be eliminated by tightening the armature thrust bearings. Care should be taken to avoid making them too tight which will cause binding.

RCA MFG. CO., INC.

MODEL Q33
Ch. RC-539



* -22 V. AVC. WITH 0.2V. INPUT TO ANT. (600 KC.)

3V. BIAS FOR GAIN DATA

* -7V. (600 KC.)
-8V. (1500 KC.)
-5V. (3 MC.)
-7.5V. (9 MC.)
-8V. (31 M)
-8V. (25 M)
-7V. (19-13 M)

OSCILLOGRAPH CONN'S
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS

IF PEAK 455 KC

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. AC. SUPPLY.

* MEASURED WITH VOLTOHMYST.

CATHODE CURRENTS

(1)	6SK7	15.2 MA
(2)	6SA7	9.2 MA
(3)	6SK7	14.2 MA
(4)	6SQ7	0.4 MA
(5)	6AD7G	19.6 MA
(6)	6F6G	19.0 MA
(7)	6U5/6G5	1.8 MA
(8)	TOTAL RECTIFIED -	79.2 MA

RCA MFG. CO., INC.

Alignment Procedure

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L23-L22 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L21-L20 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (41.5°)	L11 (osc.) C1 (ant.) C20 (det.)
4		15.2 mc		15.2 mc (161.7°)	C15 (osc.)*†
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (24°)	L12 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (23.8°)	L10 (osc.)** C2 (ant.) C25 (det.)***
8		9.5 mc	"B" band	9.5 mc (168.5°)	C10 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (153°)	C12 (osc.) C3 (ant.) C24 (det.)
10		600 kc		600 kc (30.5°)	L8 (osc.) Rock in
11	Repeat steps 9 and 10.				

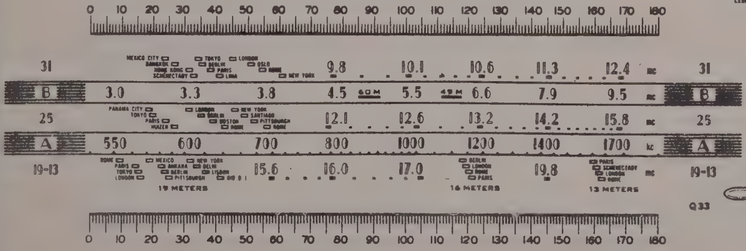
* Use minimum capacity peak if two can be obtained.

** Peak at minimum plunger position if two peaks can be obtained.

*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C15 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

NOTE: **Oscillator tracks above signals on all bands.**



Calibration Scale

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 30° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

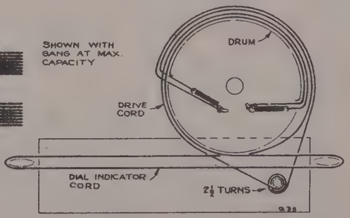
Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations by known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.



FREQUENCY RANGES

Standard Broadcast ("A" Band)..540-1,720 kc (556-17...)
Medium Wave ("B" Band).......3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band..........9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band.........11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band......15.1-22.5 mc (19.9-13.3 m)

INTERMEDIATE FREQUENCY.................... 455 kc

PILOT LAMPS..........2—Type 44, 6.3 volts, 0.25 amps.

POWER SUPPLY RATINGS

105-125 volts, 50-60 cycles.................... 80 watts
105-125 volts, 25-60 cycles.................... 80 watts
100-130, 140-160, 200-250 volts, 50-60 cycles...... 80 watts

POWER OUTPUT

Undistorted.............................. 3 watts
Maximum................................ 3.5 watts

LOUDSPEAKER

Type........................... 8-inch electrodynamic
V.C. Impedance................. 2.2 ohms at 400 cycles
Indentification Number...................... RL-63K5

Precautionary Lead Dress:

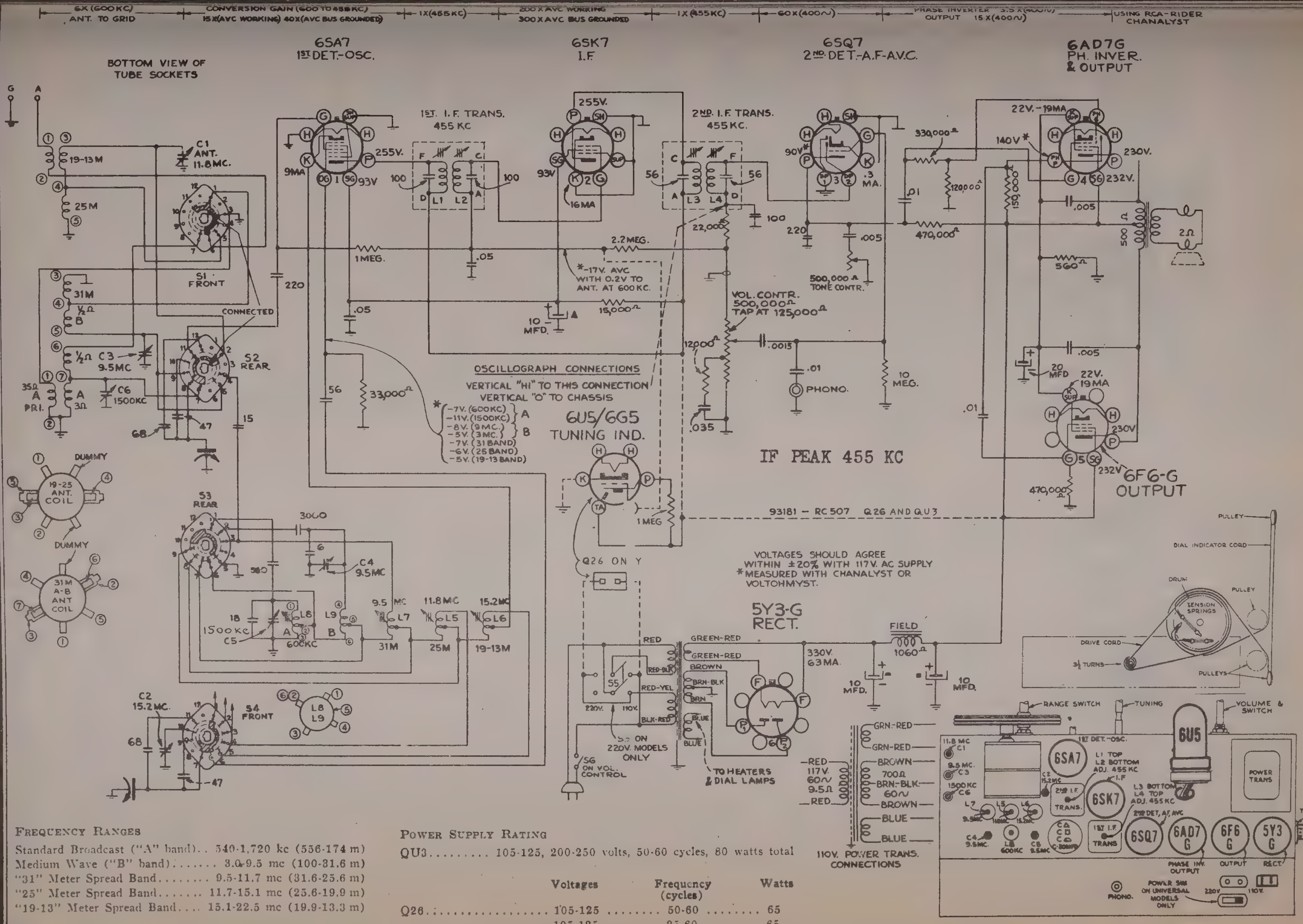
1. Dress green leads from antenna and R-F gang sections away from all metal including chassis shield plates. The spaghetti covered braid in the antenna section should be at least 1/4 inch away from gang.
2. Black and brown twisted filament leads between 6SA7 and 6SK7-RF must run along front side of the shield plate.
3. Dress toothpick capacitors and switch leads away from and edge on to shield plates.
4. Closely twist ground lead about 2nd I-F transformer diode lead and dress close to chassis.
5. Dress volume control-arm lead and capacitor close to front apron and away from output tubes by-pass capacitors.
6. 6SQ7 10 megohm grid resistor should have no lead length on the grid side.
7. Dress capacitor high side of volume control toward base and as far as possible from a-c switch.
8. Leads to converter socket should not impede flexible mounting.
9. Converter control grid: clear of any other leads, especially filament leads which must be at least 1/4 inch away. The megohm grid leak must have its body as close to grid as possible.
10. Dress oscillator grid and control grid capacitors apart. Dress oscillator grid coupling condenser away from coil form and 1/4 inch from any other parts.
11. 6AD7G plate to cathode capacitor must be flat against chassis.
12. Dress all filament and B+ leads close to chassis.

Oscillation:

Audio oscillation may be encountered if the receiver is switched to the phonograph position and the pickup is not plugged into the jack provided in the rear chassis apron.

RCA MFG. CO., INC.

MODEL Q26, Ch. RC-507J
MODEL QU3C, Ch. RC-507F
MODEL QU3M, Ch. RC-507H



Note: 6U5 and 110-V receptacle on Q26 only.

FREQUENCY RANGES

Standard Broadcast ("A" band)	540-1,720 kc (556-174 m)
Medium Wave ("B" band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)
INTERMEDIATE FREQUENCY	455 kc

POWER SUPPLY RATING

QU3......... 105-125, 200-250 volts, 50-60 cycles, 80 watts total

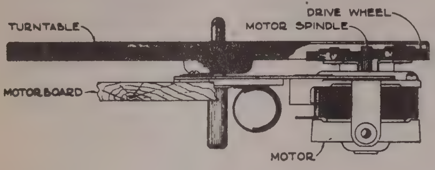
	Voltages	Frequency (cycles)	Watts
Q26	105-125	50-60	65
	105-125	25-60	65
	105-125, 200-250	50-60	65

MODEL Q26, Ch. RC-507J
MODEL QU3C, Ch. RC-507F
MODEL QU3M, Ch. RC-507H

RCA MFG. CO., INC.

The phonograph motor has its bearing filled with oil and sealed at the factory and hence should not require lubrication in the field. However the two rubber tired idler pulleys should have their bearings lubricated occasionally with S.A.E. 10 oil. Care should be taken not to get any oil, grease, or other foreign matter on the rubber tires. These tires and the motor spindle should be cleaned occasionally with quick drying naphtha.

The turntable spindle bearing should also be lubricated occasionally with S.A.E. 10 oil.



Motor Detail

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)**
7		9.5 mc	31M	156°	L7 (osc.)** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

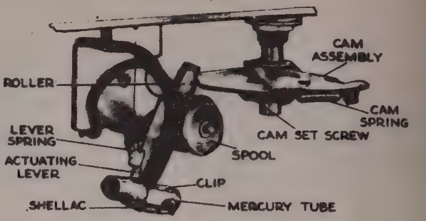
* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1⅜ inches from the center line of the spindle shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.



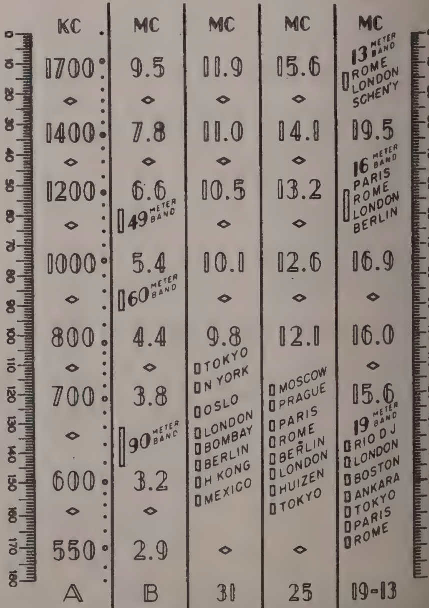
MERCURY SWITCH MECHANISM
(VIEWED FROM FRONT
SHOWN WITH PICKUP IN REST POSITION)

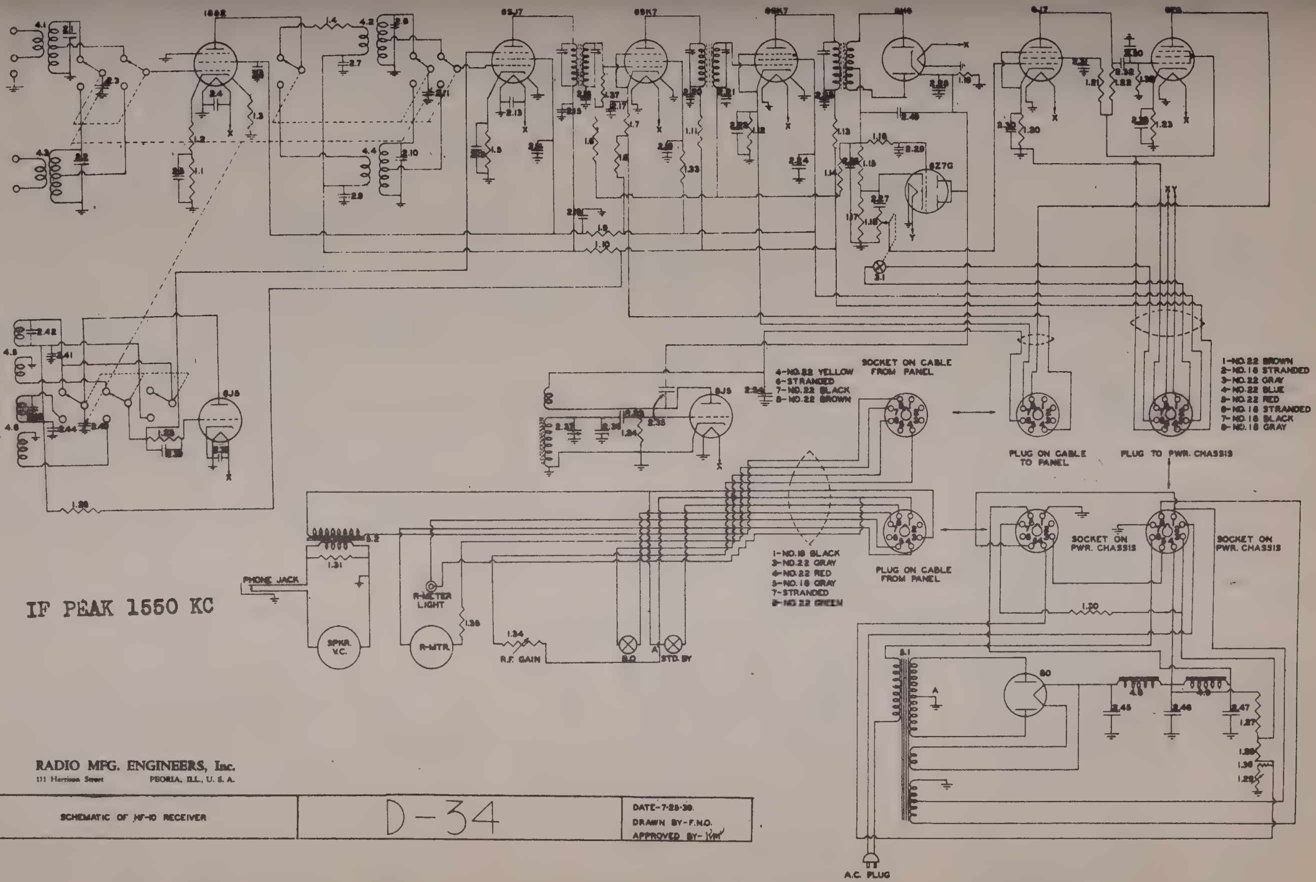
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

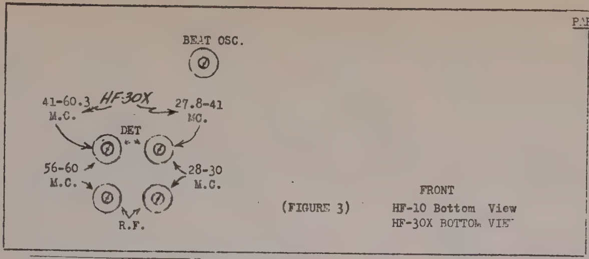




The HF-10 High Frequency Receiver is made in a standard model for operation when connected to supply lines supplying 115 volts at 50 or 60 cycles. Other voltages and frequencies may be used for operation of the instrument, if the receiver is specially made to accommodate them.

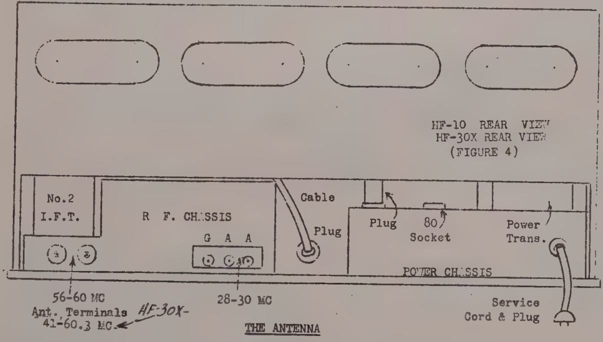
MODELS HF-10
HF-30X

RADIO MFG. ENGINEERS, INC.



FRONT

(FIGURE 3) HF-10 Bottom View
HF-30X BOTTOM VIEW



HF-10 REAR VIEW
HF-30X REAR VIEW
(FIGURE 4)

PART CODE NUMBER	PART SPECIFICATION
1.1	200 ohm, 1/3 watt insulated resistor
1.2	35 ohm, 1/3 watt insulated resistor
1.3	35 ohm 1/3 watt insulated resistor
1.4	35 ohm 1/3 watt insulated resistor
1.5	5000 ohm 1/3 watt insulated resistor
1.6	250,000 ohm 1/3 watt insulated resistor
1.7	300 ohm 1/3 watt insulated resistor
1.8	20,000 ohm 1 watt resistor
1.9	2,000 ohm 1/3 watt insulated resistor
1.10	2,000 ohm 1/3 watt insulated resistor
1.11	2,000 ohm 1/3 watt insulated resistor
1.12	300 ohm 1/3 watt insulated resistor
1.13	2,000 ohm 1/3 watt insulated resistor
1.14	1 Megohm 1/3 watt insulated resistor
1.15	50,000 ohm 1/3 watt insulated resistor
1.16	1 Megohm 1/3 watt insulated resistor
1.17	50,000 ohm 1/3 watt insulated resistor
1.18	250,000 ohm 1/3 watt insulated resistor
1.19	100,000 ohm 1/3 watt insulated resistor
*1.20	1,500 ohm 1/3 watt insulated resistor
1.21	1 Megohm 1/3 watt insulated resistor
*1.22	250,000 ohm 1/3 watt insulated resistor
1.23	400 ohm 1/2 watt carbon resistor
1.24	50,000 ohm 1/3 watt carbon resistor
1.25	5,000 ohm 1/3 watt insulated resistor
1.26	10,000 ohm 1 watt insulated resistor
1.27	6,800 ohms of 10 watt bleeder section
1.28	7,200 ohms of 10 watt bleeder section
*1.29	300 ohm variable resistor
*1.30	100,000 ohm 1/3 watt insulated resistor
1.31	35 ohm 1/3 watt insulated resistor
1.32	1 Megohm 1/3 watt insulated resistor
1.33	2,000 ohm 1/3 watt insulated resistor
*1.34	30,000 ohm variable resistor
1.35	2,000 ohm 1/3 watt insulated resistor
2.1	20mmfd adjustable mica padding cond
2.2	20mmfd adjustable padding condenser
2.3	Number one section of 3 gang variable
2.4	400mmfd mica condenser
2.5	400mmfd mica condenser
2.6	400mmfd mica condenser
2.7	400mmfd mica condenser
2.8	20mmfd adjustable mica padding cond
2.9	400mmfd mica condenser
2.10	20mmfd adjustable padding condenser
2.11	Center section of 3 gang variable cond
2.12	400mmfd mica condenser
2.13	400mmfd mica condenser
2.14	400mmfd mica condenser
2.15	.01mfd paper condenser
2.16	.01mfd paper condenser
2.17	.01mfd paper condenser
2.18	.01mfd paper condenser
2.19	.01mfd paper condenser
2.20	.01mfd paper condenser
2.21	.01mfd paper condenser
2.22	.01mfd paper condenser
2.23	100mmfd mica condenser
2.24	.01mfd paper condenser
2.25	.01mfd paper condenser
2.26	50mmfd mica condenser
2.27	.1mfd paper condenser
2.28	100mmfd mica condenser
2.29	.01mfd paper condenser
2.30	20mfd 25 volt electrolytic
2.31	.1mfd paper condenser
2.32	.01mfd paper condenser
2.33	20mfd 25 volt electrolytic
*2.34	.002mfd paper condenser
2.35	15mmfd coupling condenser
2.36	100mmfd mica condenser
2.37	70mmfd adjustable mica condenser
2.38	400mmfd mica condenser
2.39	100mmfd ceramic condenser
2.40	Rear section of 3 gang variable condenser
*2.41	1500mmfd ceramic condenser
2.42	15mmfd adjustable air condenser
2.43	15mmfd adjustable air condenser
*2.44	500mmfd ceramic condenser
2.45	10mfd 450 volt electrolytic
2.46	15mfd 450 volt electrolytic
2.47	15mfd 450 volt electrolytic
2.49	250mmfd mica condenser
2.50	400mmfd mica condenser
3.1	Line switch
3.2	AVC-OFF switch in tandem with manual gain control
3.3 and 3.4	Combination beat oscillator and stand-by switch
4.1	10 meter RF coil
4.2	10 meter detector grid coil
4.3	5 meter RF coil
4.4	5 meter detector grid coil
4.5	10 meter oscillator coil
4.6	5 meter oscillator plate and grid coil
4.7	Beat oscillator grid coil
4.8	25 henry filter choke
4.9	30 henry filter choke
I.F.T.	Intermediate frequency transformer tuned to 1550KC

* FOR MODEL HF-10 ONLY—SEE SCHEMATIC OF MODEL HF-30X FOR HF-30X PARTS.

THE ANTENNA

Antennae are very important and should be given considerable attention when they are intended for use at the ultra high frequencies. Single pieces of wire of random specifications will sometimes perform, and sometimes give very poor performance, depending upon their length. In order to make sure that the antennae are adequate for the frequencies used in connection with the ultra high frequency type of receiver, it is best to cut the antennae to their proper length for operation in the middle portion of the band chosen.

The simplest type of antenna is what is called a half-wave doublet, which is an antenna suspended either vertically or horizontally, having an over-all length of approximately one-half wave length--the wave length being the middle wave length of the frequency range to which the tuning is adjusted. This means that the antenna for the 5 meter band will be approximately 8 feet long; and for the 10 meter band approximately 16 feet long.

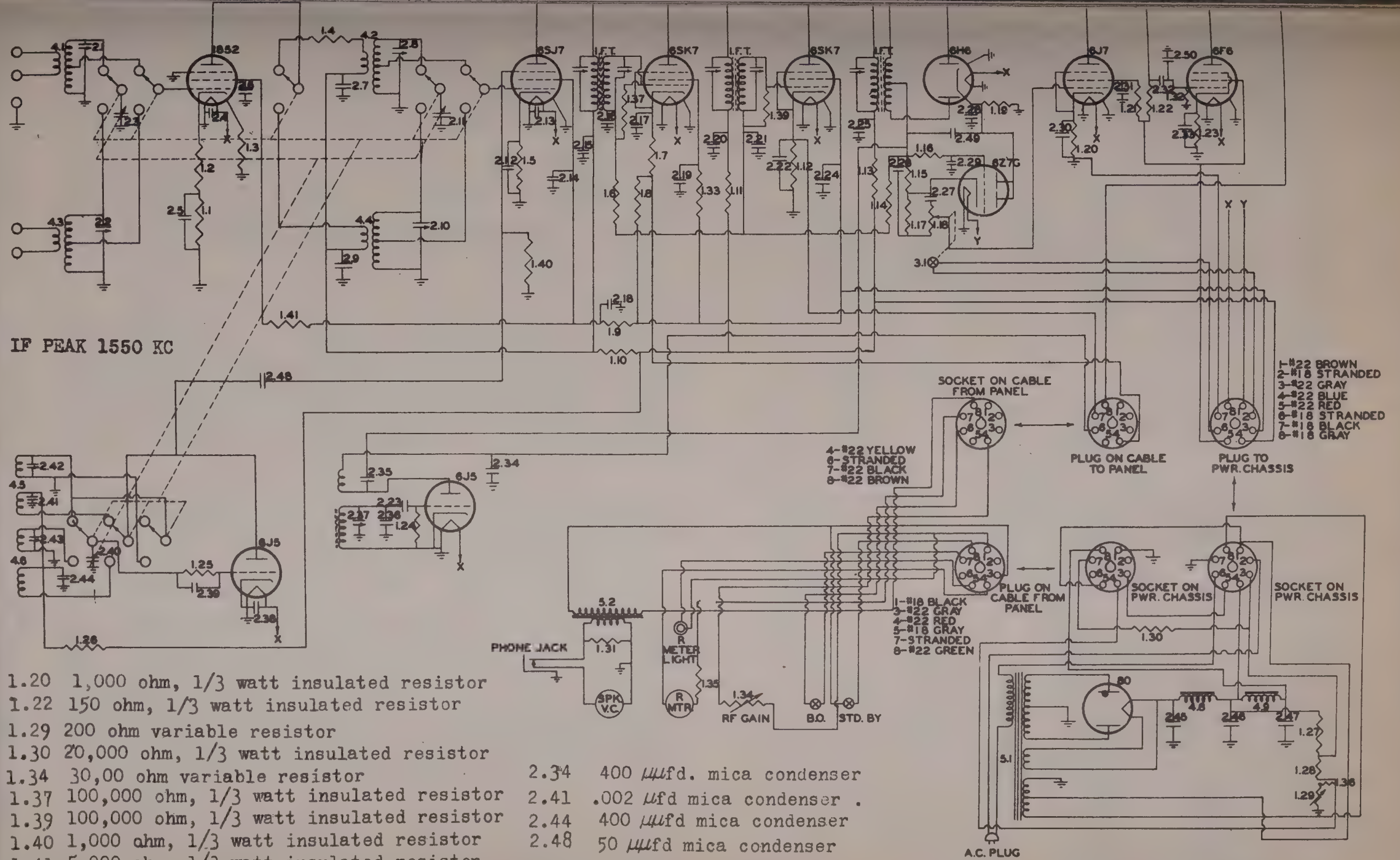
Connection can be made either by twisted pair in the center of the antenna, or by open wire type of line tapped off center in a "Y" connection, forming an antenna system commonly called the "Y" Connected Matched Impedance Type. The input impedance of the receiver, at all the frequencies of its operation, will average between 100 and 150 ohms. For this reason the twisted pair or the concentric cable type of feed will be superior to the high impedance open wire type of feed.

Separate terminals are provided for each band, since optimum results are obtained in this way. The antenna leads for the 28 to 30 megacycle coverage band, should be connected to terminals marked "A" and "A", with a good ground connected to the terminal "G". Terminal "G" serves as a ground for the entire equipment and is rather important, insofar as reducing noise to a minimum. The pair of leads coming from the 5 meter antenna are to be connected to the antenna terminals marked "56 and 60 MC".

With the proper antenna connected to the receiver, the instrument is ready to connect up and prepare for operation. In general, horizontal antennae are the most desirable, due to the fact that they will receive less local noise, since such noise is usually vertically polarized and consequently received considerably better on a vertical type of antenna. The horizontal antenna will receive signals coming over a longer path than the noise, and at the same time discriminate between that signal and the local noise level. The best type of antenna is one which is horizontally polarized and which will rotate. Horizontal doublet antennae are directional in a line perpendicular to the axis of the wire. Consequently, they will discriminate between signals at broadside and off the end of the wire. Being able to rotate them will overcome any handicap which might ensue from fixed directivity, because of the fact that the antenna can be pointed at any station, and the signal level will not be affected by the configuration of the antenna. While a vertical antenna will receive signals equally well in all directions, it will receive a much higher noise level than the horizontal type of antenna, and this is especially true of the high frequencies where a considerable portion of the noise level is due to automobile ignition interference, and similar types of radiation.

RADIO MFG. ENGINEERS, INC.

MODEL HF-30X



1.20 1,000 ohm, 1/3 watt insulated resistor
1.22 150 ohm, 1/3 watt insulated resistor
1.29 200 ohm variable resistor
1.30 20,000 ohm, 1/3 watt insulated resistor
1.34 30,00 ohm variable resistor
1.37 100,000 ohm, 1/3 watt insulated resistor
1.39 100,000 ohm, 1/3 watt insulated resistor
1.40 1,000 ohm, 1/3 watt insulated resistor
1.41 5,000 ohm, 1/3 watt insulated resistor

2.34 400 μμfd. mica condenser
2.41 .002 μfd mica condenser .
2.44 400 μμfd mica condenser
2.48 50 μμfd mica condenser

FOR OTHER PARTS – SEE INDEX

The HF-30X High Frequency Receiver is made in a standard model for operation when connected to supply lines supplying 115 volts at 50 or 60 cycles.

HF-30X RECEIVER	C-169		DATE-11-2-39. DRAWN BY-F.N.O. APPROVED BY-

MODELS HF-10
HF-30X

RADIO MFG. ENGINEERS, INC.

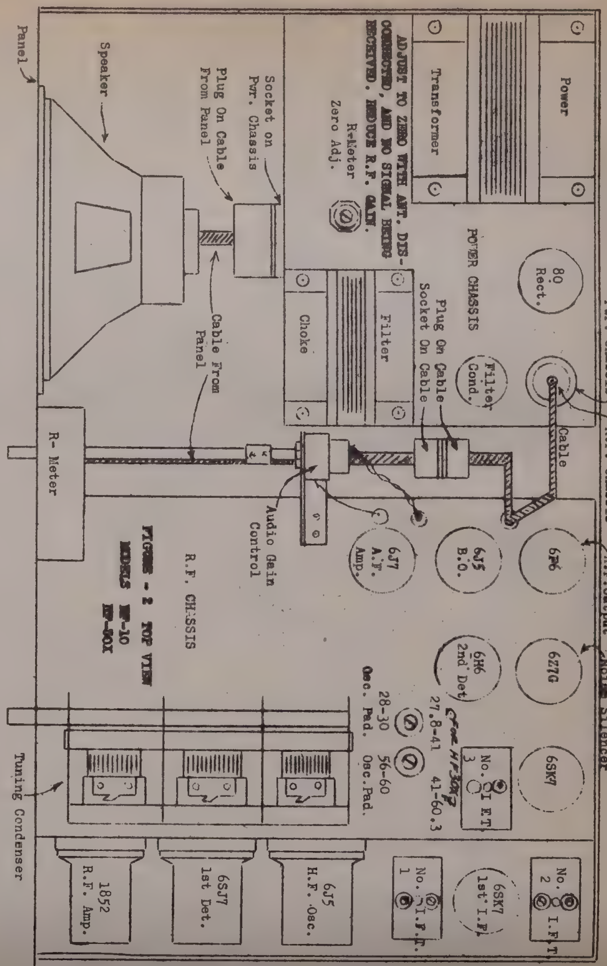


FIGURE - 2 TOP VIEW
MODELS HF-10
HF-30X

SERVICE NOTES

The HF-10 Receiver is designed for convenient dismantling by means of interconnecting cables and plugs, by which it is made possible to remove all of the units from the panel without having any of the components connected together. The panel may be removed from the instrument by disconnecting two cable plugs and removing the R meter illuminating lamp from the grommet and by taking the knobs off of the panel controls which protrude through the panel. Bolts fastening in the two chasses are easily removed from the bottom of the housing, permitting removal of each of the chasses. Figure 2 completely describes the visible components, as viewed through the top of the receiver.

The intermediate frequency used in the HF-10 is 1550 kilocycles and there are three intermediate frequency transformers--labeled 1, 2 and 3 (Figure 2). In order to adjust these intermediate frequency transformers, a test oscillator developing 1550 kilocycles may be fed into the first detector grid by means of connecting it to the stator connection of the variable condenser. This stator is the middle stator of the variable condensers. After the test oscillator has been set to 1550 kilocycles, and the Band Switch on the panel of the receiver (See Figure 1) is set to the *28 to 30 megacycles band, adjustment is made of the intermediate frequency transformers by means of an insulated alignment tool so that the R meter reads a maximum at a given input from the test oscillator. This provides a simple means of peaking the intermediate frequency transformers should they require it at any time.

All calibration is controlled by the two trimmers (See Figure 2) marked "OSC.PAD". One of these padders controls the calibration of the *28 to 30 megacycle band and the other for the †56 to 60 megacycle band. Of course, calibration is made using a signal input of an accurately determined frequency, but usually there will be no necessity for making this adjustment unless the receiver has been damaged in transit or thrown out of calibration by tampering. These two padders controlling the frequency calibration of the instrument are highly stable, air type, trimming condensers, and will remain in adjustment for long periods of time.

Sometimes the connection of various types of antennae to the equipment will slightly disturb the tuned circuits of the r.f. amplifier. Two padders are provided, one for each band, to correct for this misalignment if it does occur. Adjustment is made (See Figure 3) of the two r.f. padders with the antennae connected and a signal being received for maximum meter reading on that particular signal. It will seldom be found necessary to make any adjustment of the detector padders, but similar adjustment procedure is specified for the detector padders. All adjustments are made with the receiver set to the specified known frequency and left in a position providing maximum response, as indicated by maximum R meter reading on that signal.

MODEL HF-30X * 27.8 to 41 MEGACYCLE † 41 to 60.3 MEGACYCLE

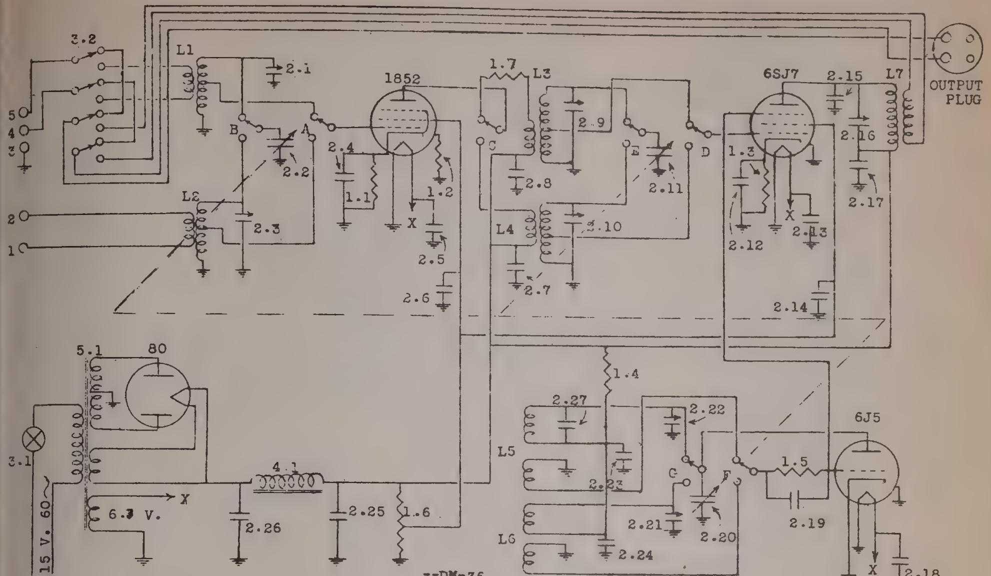
ADJUSTMENT OF THE BEAT OSCILLATOR PITCH CONTROL

The beat oscillator pitch is adjusted at the factory for approximately 1000 cycles off of exact tune of the I.F. amplifier. Reference to Figure 3 will point out the adjustment necessary to change the tuning of the beat oscillator. This adjustment is excessible through the bottom of the cabinet of the receiver.

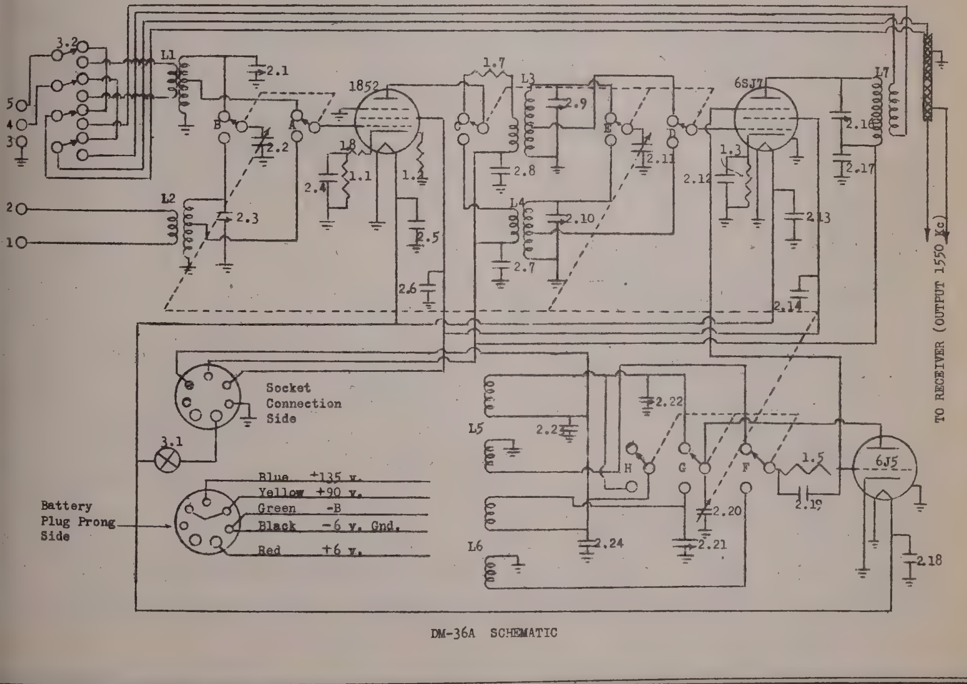
For best alignment of the beat oscillator, tune in a station without the beat oscillator on--that is, with the Stand-by Control Switch thrown to the "PHONE" position until the meter reading is an absolute maximum. Under these conditions, place the Stand-By Switch in the "C.W." position and adjust the beat oscillator, through the access hole in the bottom of the cabinet, to any pitch desired.

RADIO MFG. ENGINEERS, INC.

MODELS DM-36 (Late)
DM-36A
Band Expanders



--DM-36--
--SCHEMATIC--



DM-36A SCHEMATIC

MODEL DM-30X
MODELS DM-36 (Late)
DM-36A

RADIO MFG. ENGINEERS, INC.

PARTS LIST FOR THE RME MODEL DM-36 BAND EX

PART CODE NUMBER	SPECIFICATION
1.1	200 ohms, 1/3 watt resistor
1.2	35 ohms, 1/3 watt resistor
1.3	5000 ohms, 1/3 watt resitor
*1.4	10,000 ohms, 1 watt resistor
1.5	5000 ohms, 1/3 watt resistor
*1.6	15,000 ohms, 10 watts C.T.
1.7	35 ohms, 1/3 watt resistor
†1.8	35 ohms, 1/3 watt resistor
2.1	20 mmfd. condenser
2.2	Tuning condenser
2.3	20 mmfd. condenser
2.4	400 mmfd. condenser
2.5	400 mmfd. condenser
2.6	400 mmfd. condenser
2.7	400 mmfd. condenser
2.8	250 mmfd. condenser
2.9	20 mmfd. condenser
2.10	20 mmfd. condenser
2.11	Tuning Condenser
2.12	400 mmfd. condenser
2.13	400 mmfd. condenser
2.14	400 mmfd. condenser
*2.15	50 mmfd. condenser
2.16	30 mmfd. condenser
2.17	.01 mfd. condenser
2.18	400 mmfd. condenser
2.19	100 mmfd. condenser
2.20	Tuning Condenser
2.21	15 mmfd. Condenser
2.22	15 mmfd. condenser
2.23	1500 mmfd. condenser
2.24	500 mmfd. condenser
*2.25	15 mfd. condenser
*2.26	10 mfd. condenser
*2.27	15 mmfd. condenser
3.1	S.P.S.T. Switch
3.2	4.P.D.T. Switch
A,B,C,D, E,F,G.†(H)	Band Switch
*4.1	Choke, 30 henries
*5.1	Power transformer
L_1	10 M. R.F. coil
L_2	5 M. R.F. coil
L_3	10 M. Det. coil
L_4	5 M. Det. coil
L_5	10 M. Osc. coil
L_6	5 M. Osc. coil
†L_7	Output Coupling Transformer (10 M.C.) 1550 Kc. I.F. Output Transformer
†Switch 3.2	Antenna Changeover Switch
†Switch 3.1.	Line Snap Switch
†Output Shielded Cable.	3 feet of .25 inch tinned braided shield wire with female and male type of automobile antenna connector.

*DM 36 ONLY
†DM 36A ONLY

FOR 5 METERS
A= 4'- 1"
B= 8" Approx.

FOR 10 METERS
A= 8'-2"
B= 16" Approx.

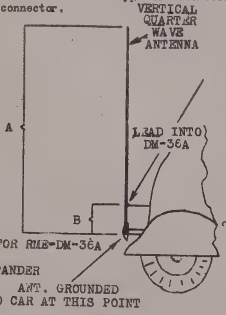
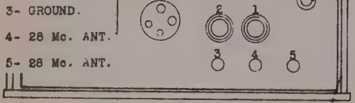

VERTICAL QUARTER WAVE ANTENNA
A
B
LEAD INTO DM-36A
ANT. GROUNDED TO CAR AT THIS POINT

FIGURE 6

SUGGESTED ANTENNA FOR RME-DM-36A MOBILE TYPE UHF EXPANDER

ANTENNA INPUT TERMINALS OF THE RME {DM-36 / DM-30X FREQUENCY EXPANDER.

1- 56 Mc. ANT.
2- 56 Mc. ANT.
3- GROUND.
4- 28 Mc. ANT.
5- 28 Mc. ANT.



The RME Model DM-36A Frequency Expander is identical in circuit arrangement, with certain exceptions, to the DM-36, and has the same sensitivity to the high frequencies. The exceptions to the similarity are; over-all size of the housing, and the intermediate frequency developed for injection into the associated receiver.

In all units of this type it is necessary, of course, to use a complete type of receiver in conjunction with the expander in order to provide the facilities of demodulation and audio reproduction, together with additional gain and selectivity. In the case of the DM-36A this associated receiver is intended to be an automobile type of receiver, which will tune to 1550 kilocycles. Practically all of the standard types of automobile receivers on the market today will tune to this frequency.

The DM-36 is in effect a frequency converter and therefore acts as a radio frequency amplifier and mixer tube with its oscillator in an over-all superheterodyne type of circuit. It must be used in connection with a regular receiver capable of tuning to a frequency of 10,000 KC (10 MC). The associated receiver therefore acts as an intermediate frequency amplifier unit and a demodulator and audio amplifier in order to reproduce the output of the expander.

ANTENNAE

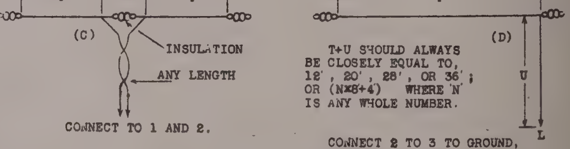
It is suggested that for best results insofar as antennae are concerned for these DM-36A converters, that vertical radiators, grounded to the body of the car, be used. Figure 6 shows the suggested dimensions and general configuration of antennas recommended for use with the converter in the two frequency bands. It is to be understood, that for optimum results, one antenna will not be satisfactory for both frequencies. Reference to figure 6 will suggest various ways of constructing suitable pick-up antennae for use with these converters.

The input impedance to the converter is very low and therefore will work out very satisfactorily with the single wire feeders as suggested.

An antenna changeover switch is provided on the DM-36 for connecting the antenna used on the triple terminal strip (See Fig. 2) to either the DM-36 in combination with the associated receiver or directly to the receiver with which the instrument is associated. This is accomplished by setting the switch to the position marked "DM-36" on the left pointer position, or to the right pointer position marked "RECEIVER", as indicated in Figure 1.

The triple terminal strip is designed for connecting the antenna to be used for the 28 to 30 megacycle band and also the antenna which will probably be used on the receiver alone when the DM-36 is not connected in the circuit. In order to make it possible to get the best results from the five meter channel a separate pair of terminals have been provided so that a doublet antenna may be connected into the primary coil of the five meter channel (See Fig. 2). The best performance will be obtained when an antenna is used especially designed for the middle frequency of the five meter amateur band--that is, 58 megacycles. It can either be a half wave doublet fed from the center to the DM-36 by means of a twisted pair or it can be a single wire antenna a half wave long placed vertically or horizontally (preferrably horizontally) in space and fed to the receiver by connection to antenna terminal #1, in which case antenna #2, for the five meter band, can be connected directly to the terminal marked "G" on the DM-36, see the page appended giving various configurations of antenna construction and the method of connection to the DM-36 for the various frequencies (Fig. 5).

DM-36; DM-30X --- 56 MEGACYCLE ANTENNA ---



DM-36; DM-30X
--- 28 MEGACYCLE ANTENNA ---

FOR ANY TYPE AS ABOVE, DOUBLE THE LENGTH OR OTHER DIMENSION INDICATED FOR 56 Mc., AND CONNECT AS FOLLOWS.

(A)
CONNECT 3 AND 4
CONNECT L TO 5.

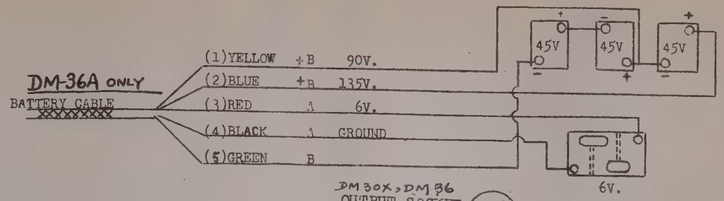
(B)
CONNECT TO 4 AND 5.
CONNECT 3 TO GROUND.

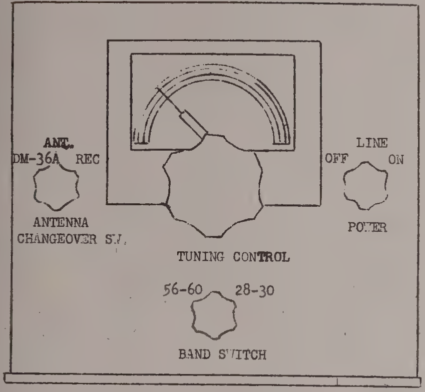
(C)
SAME AS B.

(D)
SAME AS A.

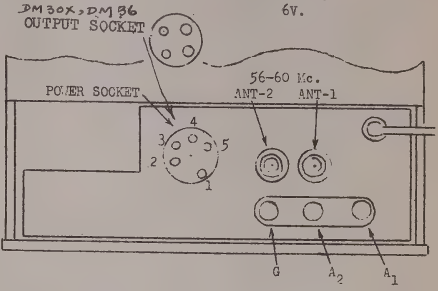
RADIO MFG. ENGINEERS, INC.

MODELS DM-30X
MODELS DM-36 (Late)
DM-36A





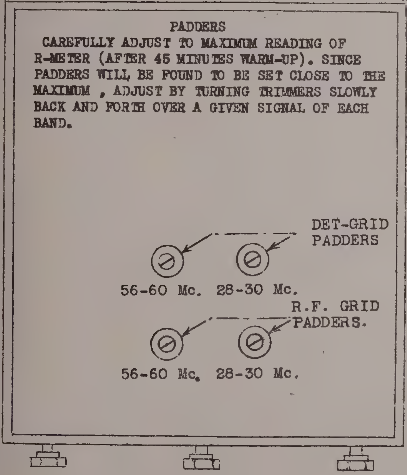
FRONT VIEW
--FIG.1--



IF SINGLE WIRE IS USED ON BAND 28-30 Mc. CONNECT ANTENNA LEAD TO A_1, AND GROUND A_2 TO TERMINAL G.

IF SINGLE WIRE IS USED ON BAND 56-60 Mc. CONNECT ANTENNA LEAD TO ANT-1, AND GROUND ANT-2 TO TERMINAL 'G' DIRECTLY BELOW IT.

REAR VIEW
--FIG.2--

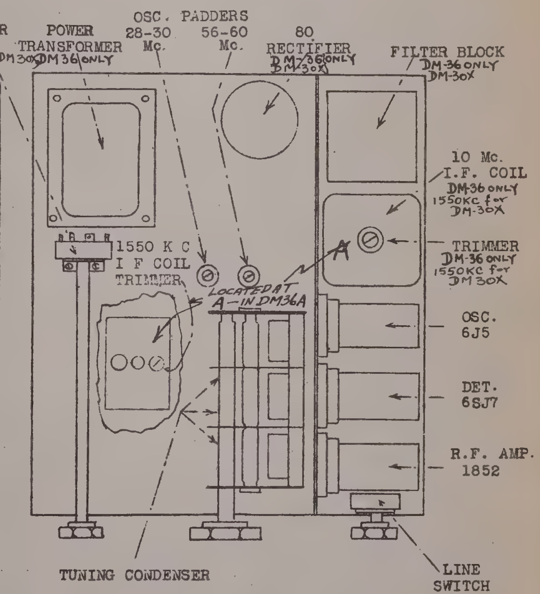


PADDERS

CAREFULLY ADJUST TO MAXIMUM READING OF R-METER (AFTER 45 MINUTES WARM-UP). SINCE PADDERS WILL BE FOUND TO BE SET CLOSE TO THE MAXIMUM , ADJUST BY TURNING TRIMMERS SLOWLY BACK AND FORTH OVER A GIVEN SIGNAL OF EACH BAND.

---FIG. 3---

BOTTOM VIEW



--DM-36A
--DM-36--

--FIG. 4--
TOP VIEW

ALIGNMENT

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-70 Receiver this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings. Due to the tremendous gain available in the audio system of the RME-70 Receiver, a misalignment due to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not effect the circuits of the audio amplifier and has solely to do with the intermediate frequency amplifier and the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

Misalignment of the radio frequency section (principally that part of the section which is made up of the high frequency oscillator) shows up in the receiver calibration. This section also is susceptible to certain outside influences which can cause variations to such a degree that the stated calibration of the receiver is changed to other values. However, this effect is not a common effect and usually the calibration of the receiver, unless tampered with by inexperienced hands, will remain very close to its stated value indefinitely.

This loss of gain when occurring in the radio frequency section of the receiver is usually due to the fact that the oscillator has been grossly misaligned so that it is apparent in the frequency calibration of the receiver. In other words, it might well be said that a loss of sensitivity in the receiver occurring simultaneously with a wide-spread condition of off calibration might indicate the fact that the loss of gain is caused by misalignment of the radio frequency section of the receiver

On the other hand, if the gain of the receiver is low, but the calibration is correct, it might be said without hesitation that the most probable cause for the low gain is the misalignment of the intermediate frequency amplifiers relative to the trimming condensers of the intermediate frequency amplifier transformers.

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined. IMPORTANT NOTE. It is essential that the 465 KC intermediate signal which is used for realignment of the intermediate frequency amplifier is not set according to any arbitrary calibration on the test oscillator itself since it has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type receiver in which is installed a quartz filter. It is therefore better if no test oscillator is had, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier, using the quartz filter for establishing the proper I.F. frequency as indicated in the following procedure.

The meter on the RME-70 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the three intermediate frequency amplifier transformers, 5-3, 5-4, and 5-5 is given on Figure 4 of the illustrated sheet attached. The two padding condensers located in each of these transformers and accessible through apertures in the top of the shields can also be seen.

OTHER DATA IN VOLUME XI

OUTLINE OF PROCEDURE FOR CORRECT ALIGNMENT OF THE INTERMEDIATE FREQUENCY AMPLIFIER TRANSFORMER OF THE RME-70 RECEIVER.

The intermediate frequency amplifiers in the RME-70 Receiver are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than one kilocycle plus or minus 465 KC. Rather therefore than align the intermediate frequency amplifier stages of the RME-70 to a set frequency of 465, it is essential that the alignment be done in conjunction with the quartz filter so that alignment of the intermediate frequency amplifier is achieved at the frequency of the filter. This is done as follows and when the process as herein outlined is followed accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferrably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of R9 or slightly less. If no station of this amplitude is available but a stronger station is available, a reduction in the efficiency of the antenna by the connection of a short wire to the antenna post may help to bring the signal strength as indicated down to R9. Usually between 550 and 800 KC in most any territory a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 720 KC. This of course will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band spread scale, the crystal filter is switched into the circuit by setting the phasing control pointer to vertical upright position (approximately 90° clockwise from "OFF" position). The band spread scale is then adjusted with respect to the signal so that a maximum meter reading is obtained. This procedure is one which requires patience and accuracy of adjustment since the receiver is ultra sharp with the crystal filter in and there will be one definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made regarding the intermediate frequency amplifier.

When this peak has been tuned to and the meter is at maximum reading, a small standard intermediate frequency trimmer tool of the insulated screw-driver type should be used. Then the selectivity control, should be set so that the condenser it adjusts is set at 50% mesh. Then, without particular attention to a course of procedure in tuning, any transformer may be adjusted at any particular time, the important factor being that they all be adjusted so that the R meter is brought to and left at a maximum meter reading. Usually this adjustment will not require very much turning of the adjustment screws. A good procedure to follow is to start with the 5.5 transformer and align in sequency 5.4 and 5.3. All adjustments should be made as before mentioned so that the meter reading is maximum.

It is advisable from time to time to make sure that the signal is still adjusted to peak resonance of the crystal by slightly varying the adjustment of the band-spread control. When this procedure has been completed as outlined and all transformers have been adjusted and left at maximum meter reading, the intermediate frequency amplifier of the receiver is in peak adjustment and the crystal aligned with it for maximum effectiveness in filter action.

PHASING CONTROL OPERATION

The phasing control of the RME-70 receiver, located on the front panel in the top right corner is indicated by the words "CRYSTAL PHASING". Directly to the left of the shaft is the word "OFF". There is a stop connected with the shaft so that when the receiver is to be used without the crystal filter, rotation of the crystal phasing control is set so that the pointer points to the "OFF" position and further counterclockwise rotation is impossible due to the stop. This indicates that the crystal filter has been removed from the circuit and normal receiver operation is possible. This function is provided by a cam operated switch connected with the phasing control of the crystal filter. In order to put the crystal into operation it is necessary to rotate the crystal phasing control clockwise to a position where the pointer is approximately in a vertical position, similar to that normally required of the selectivity control, located just below it.

Failure of the crystal to cut out of the circuit when the crystal phasing control pointer is set to the "OFF" position is due either to the fact that the knob has slipped or the switch contacts are bad and probably need adjustment. The cam switch closes when this pointer is in the "OFF" position, shorting out the crystal unit. Failure, of course, to short out the crystal unit will make it possible for the crystal filter to be in operation at all times. Slight pressure or bending of the contacts can improve this function should it fail.

When the crystal filter is being used the phasing function is provided by the variation in capacity of a phasing condenser controlled by the crystal phasing knob. Usually this is indicated by minimum noise or background response when the receiver is tuned off of the signal and the crystal is being used. This position, as before indicated, will be approximately one which allows the pointer to be vertical. Slight variations, either clockwise or counter clockwise, from this minimum noise response position change the rejection point of the crystal and make it possible to tune the rejection characteristic of the crystal to various slightly higher and lower frequencies for rejection purposes during QRM from a heterodyne on a desired signal.

If the phasing control does not work it is indicative of the fact that probably a connection is broken or that the R.F. choke connecting the A.V.C. to the grid of the tube (indicated on the schematic drawing by R.F.C. in the crystal filter circuit) is open. The continuity check between the grid of the first I.F. amplifier tube and the junction of resistor 1.8 on the automatic volume control terminal strip should show continuity when the crystal is in the operating position.

ALIGNMENT OF RADIO FREQUENCY SECTION OF THE RME-70 RECEIVER

Alignment of the radio frequency section of the receiver will effect principally the calibration of the receiver. Within certain limits this of course will also effect the sensitivity. Small variations in frequency (up to 2%) will not materially reduce the sensitivity of the receiver although they of course will show up as variations in the calibration as indicated by the required setting of the main tuning dial indicator. Correction for any variation is calibration can be made by following the suggestions outlined.

Band 1 includes the frequencies between 550 and 1500 KC. For band 1 there are two frequency adjustments for adjusting the indicator to proper calibration. The adjustments (condensers 2.51 and 2.50) are adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly. 2.51 adjusts the band 1 oscillator calibration in the low frequency portion of the range and condenser 2.50 is the adjustment for the high frequency end of band 1. The procedure is this: Put the main tuning indicator to a position so that the main tuning condensers are fully meshed. The pointer of the main tuning control should then be set at maximum left end of scale so that the pointer falls just below the line above the numbers indicating the various channels. In this respect it will partially cover the top half of the numerals indicating the different tuning bands on this scale. In other words, the line which borders the semi-circular scale at the extreme counter-clockwise position should rest on the top edge of the pointer as it is turned to maximum counterclockwise rotation and the condenser plates are at full mesh.

The next step is to choose a station or a signal of accurately known frequency, around 700 KC, and set the main indicator to the frequency of the signal which is going to be used for the test. For example: There is a station available with fairly good signal strength or a test oscillator is available which can ACCURATELY be set at 700 KC. If the receiver indicator on the main tuning dial is set at 700, and the receiver is considerably out of calibration of course the signal will not be received. However, leave the indicator at the correct frequency of the signal being used for the test and set the band-spread control to a reading of 180 on the dial at which position it has no material effect on the tuning circuits of the receiver and permits the calibration of the main tuning dial to indicate accurately the frequency of setting.

Then by means of condenser (2.51) (Figure 4) accessible through the trimming hole in the oscillator shield can for Band 1, adjust until the signal is brought in with the pointer set at the proper frequency. Then choose a signal at about 1200 or 1300 kilocycles, and set the main tuning dial indicator to the correct frequency for that signal and bring the signal in on that setting with trimmer 2.50. It will then be necessary to return to the former frequency setting of 700 KC to make sure that the variation of 2.50 has not made some slight change in the setting for the lower frequency calibration point and it may be necessary to readjust condenser 2.50 slightly again. Then in order to make certain of the accuracy of both settings return to the frequency chosen between 1200 and 1300 KC and if necessary, slightly readjust condenser 2.51 again. After several checks on each frequency it will be found that the calibration can be made satisfactorily.

Calibrations on the higher frequency bands are controlled for Bands 2,3,4,5, and 6 by the trimmers 2.49, 2.48, 2.47, 2.46, 2.45, (Figure 3) respectively. High side beat is used on all frequencies on the RME-70 Receiver which means that all of the condensers 2.49, 2.48, 2.47, 2.46, 2.45, must be set to the lowest capacity setting which will provide a beat and the proper calibration for the frequencies in the respective bands. Calibration frequencies used are as follows:

Band 2:	2 megacycles and 3 megacycles.
Band 3:	4 megacycles, 5 megacycles, 6 megacycles.
Band 4:	7 megacycles, 9 megacycles, 11 megacycles, 13 megacycles.
Band 5:	14 megacycles, 15 megacycles, 17 megacycles.
Band 6:	30 megacycles.

After the calibration has been made accurately on all of the frequencies, or if the receiver has been found to be accurately set insofar as its calibration is concerned on all frequencies, the trimmers 2.2

MODEL RME-69 (Late)
MODEL RME-69 (All Models)
MODEL RME-70

RADIO MFG. ENGINEERS, INC.

and 2.1 have a distinct effect upon the RF grid circuits for bands 5 and 6 respectively. They are adjusted as follows: With a steady incoming signal on between 14 and 15 megacycles and the most effective setting of the resonator control for signal in that region, and with the antenna connected, the condenser 2.2 is adjusted for maximum meter reading. With these same conditions existing on 30 megacycles, with the band switch set on band 6 and the antenna connected, 2.1 is adjusted for maximum response on a given steady signal. All other trimming and adjusting is done manually by means of the resonator control, a variable RF amplifier and detector grid padder, which can be critically adjusted for peak resonance at any frequency it is desired to tune to.

It is of importance to note the setting of the condenser 2.4 (Figure 4). This is the antenna coupling condenser used when the receiver is set to Band 1. It should be set to practically its minimum capacity in order to provide constant alignment and proper coupling to the antenna when using Band 1. Excessive capacity in the condenser 2.4 will cause misalignment of the RF amplifier and hence promiscuous beating of harmonically related broadcast frequencies to the effect that a number of whistling tones will be received on the high frequency end of the broadcast band. When the receiver leaves the factory it is set at a very small capacity and should not be set at any other capacity or material reduction in the efficiency of operation will be produced.

The padders 2.2 and 2.1 materially contribute to the image signal rejection on the bands 5 and 6. Special care should therefore be taken in the adjustment of these condensers when the receiver is aligned.

ADJUSTMENT OF THE BEAT OSCILLATOR

The beat oscillator has its frequency adjustable on the panel by means of the C.W.Tone control. This control is normally set for zero beat with the condenser 2.59 (C.W.Tone control) set at 50% mesh. If it is found that zero beat does not occur or that the beat oscillator is not beating with the intermediate frequency to produce an audible solid beat, it is probably due to the fact that the beat oscillator is tuning to a frequency other than the intermediate frequency of the receiver. This can be remedied by the following procedure:

Set the Band Switch to position Number 1, and tune in a broadcast station so that it reads maximum on the R meter. With this condition existing, snap on the C.W.Tone Control. Then by making certain that the condenser 2.59 is set to 50% mesh, the condenser 2.60 (Figure 4) located in the beat oscillator compartment just below 2.59 (Figure 4) near the top plate of the chassis in front of the beat oscillator tube should be adjusted by means of a screw-driver so that zero beat is achieved with the signal tuned in as before mentioned. When this is achieved, variation of the beat oscillator from minimum to maximum mesh will give a total beat frequency variation of eight kilocycles (plus or minus 4 kilocycles from zero beat).

Figure 4A shows the component layout for 69 receiver with LS-1 noise silencer. Figure 4B shows the layout of the section which was changed to accommodate the silencer and therefore is standard form of chassis layout. If the receiver is connected for use, the line drawing in connection with the photograph in Figure 4A or 4B will indicate the socket locations of the respective tubes.

FIG. 7

MODEL
69 (late)

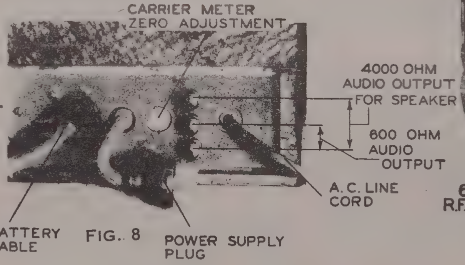


FIG. 8

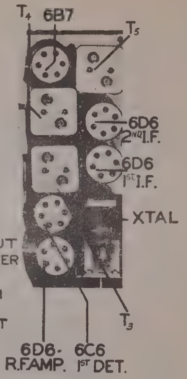


Fig. 4B

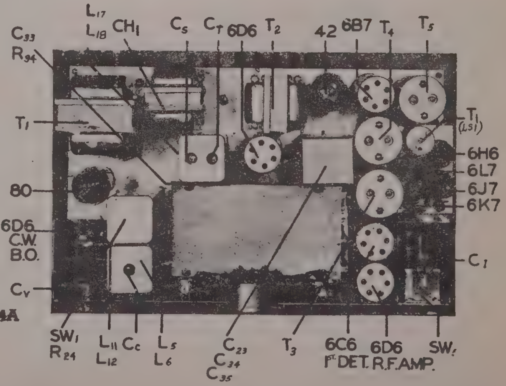
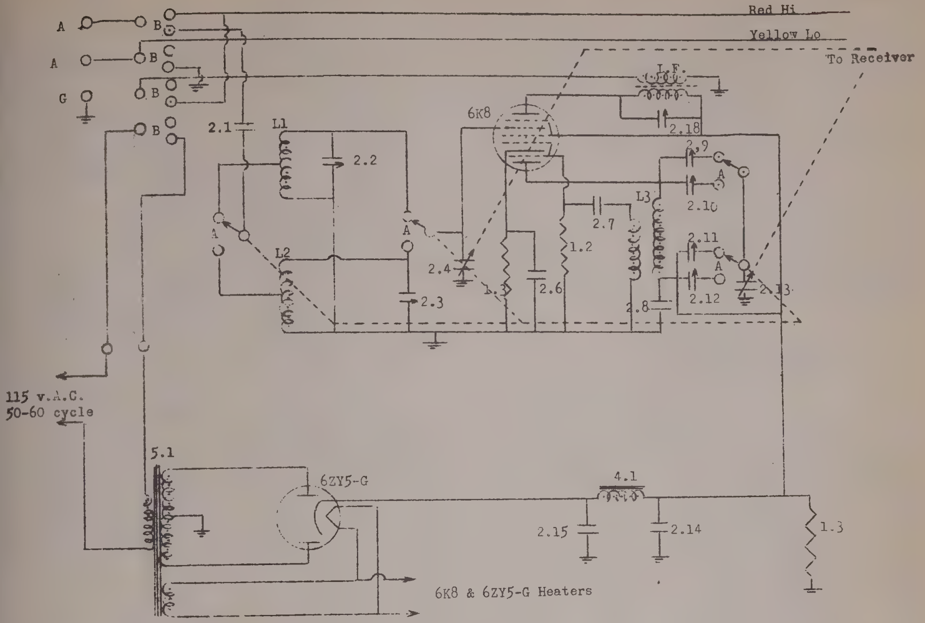


Fig. 4A

FOR ALIGNMENT AND FIGS. 3,6,11A, and 11B
SEE RME 69 VOLUME X Pages 3 through 6.



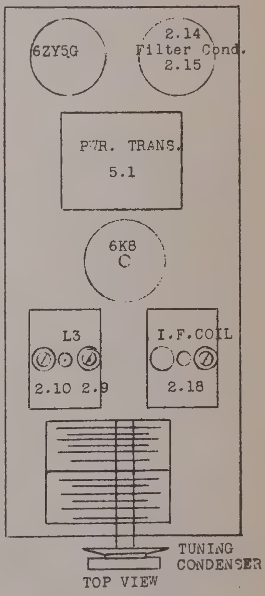
PART CODE NUMBER	PART SPECIFICATION	
2.1	100 mmfd mica condenser	
2.2	50 mmfd adjustable padder	
2.3	50 mmfd adjustable padder	
2.4	Rear section of variable condenser	
2.6	.1 mfd, 400 volt, paper by-pass condenser	
2.7	250 mmfd mica grid condenser	
2.8	.1 mfd, 400 volt, paper condenser	
2.9	Nominal 121 mmfd adjustable from 75 to 125	
2.10	105 nominal, adjustable 75 to 125	
2.11	70 mmfd adjustable plus 156 mica	
2.12	70 mmfd adjustable	
2.13	Front section of variable condenser	
2.14	15 mfd, 450 volt, electrolytic	In common container
2.15	10 mfd, 450 volt, electrolytic	
2.18	90 mmfd nominal capacity, adjustable from 75 to 125.	
1.1	15,000 ohms, 10 watt resistor	
1.2	50,000 ohms, 1/2 watt resistor	
1.3	300 ohms, 1/2 watt resistor	
L_1	Band 1 r.f. grid coil	
L_2	Band 2 r.f. grid coil	
L_3	Common oscillator coil for Band 1 and 2	

I.F. Transformer tuned to 1550 KC with low impedance output.

Switch sections marked "A": Band change switch.

Switch sections marked "B": Antenna changeover switch and line switch combination.

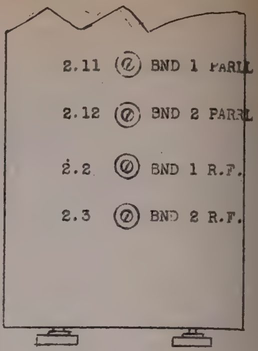
4.1	30 henry filter choke.
5.1	Power Transformer



-FIG. 2 -

The RME LF-90 Low Frequency Converter unit is designed to operate with any receiver which can be tuned to 1550 kilocycles, since this is the intermediate frequency generated by the converter unit. The function of the converter is to amplify and heterodyne all signals in the frequency range between 95 and 590 kilocycles to produce a constant frequency of 1550 kilocycles, which is fed out of the converter on a twisted pair line and into the input terminals of the associated receiver. This receiver can be either any of the RME Communication Receivers, or similar receivers, or even a broadcast type receiver which will tune to 1550 kilocycles. The sensitivity, of course, will depend upon the sensitivity of the receiver with which the unit is associated, but usually any receiver in fair operating condition will provide sufficient sensitivity for the long wave reception, since the converter itself has a substantial gain.

A switch in the lower right hand corner marked "LF-90 IN" and "LF-90 OUT" is an antenna changeover switch, which is used for cutting the LF-90 into the circuit ahead of the receiver, or cutting it out as conditions may warrant, permitting the operator to use either the combination for long wave reception, or the receiver itself for regular tuning purposes. When the position is set in the "OUT" position the converter circuits are switched off by means of a pair of contacts on this switch which removes the line voltage from the converter.



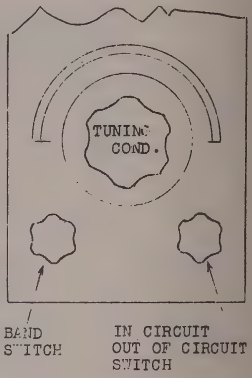
BOTTOM VIEW

-FIG.1 -

CAUTION: DO NOT REMOVE TOP OR BOTTOM COVER PLATES BEFORE REMOVING SERVICE CORD PLUG FROM LINE RECEPTACLE.

GENERAL INSTALLATION INSTRUCTIONS

The cabinet of the LF-90 unit is designed to match that of the RME-69 and RME-70 receivers, being identical in finish and in height to those cabinets. In general use it is intended to be set on the left hand side of the receiver cabinet as you face the instrument. On the rear of the LF-90 chassis (Figure 4) will be found three set screw terminals on a bakelite strip marked "G", "A" and "A" respectively. The ground terminal, marked "G", should be connected to a good ground. If a single wire antenna is used it should be connected to the topmost terminal marked "A"; the middle terminal marked "A" being connected to "G". If any type of doublet antenna is used, or any antenna of the two wire feed type, the ground terminal "G" should be grounded and the feed lines may be connected to "A" and "A" When the LF-90 is cut out of the circuit by having the switch on the front panel in the lower right set to "LF-90 OUT", these three terminals on the rear of the LF-90 (see Figure 4) will be connected that same sequence to similar terminals on the receiver; by-passing the LF-90 and providing reception on the receiver only.



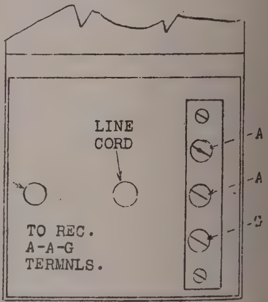
FRONT VIEW

-FIG. 3-

The two wires in the output cable, having red and yellow tracers respectively, are connected to the outside terminal marked "A" and the inside terminal marked "A" respectively on the receiver with which the LF-90 is used. This is with reference to RME receivers. For receivers having only two terminal inputs--that is, antenna and ground--the yellow wire output from the LF-90 is connected to the ground terminal of the receiver and the red wire output is connected to the antenna terminal of the associated receiver.

After the unit has been connected up, as described, and plugged into the rereceptacle (make sure that the line voltage does not exceed 125 volts), the receiver with which the LF-90 is to be used should be connected up and adjusted to an operating condition. The intermediate frequency developed by the LF-90 unit is 1550 kilocycles. It is therefore necessary that the associated receiver be tuned to that frequency and all adjustments left so that the operating efficiency is a maximum. If it is not certain that the calibration of the receiver is exactly correct and that it may not be possible by merely reading the calibration on the dials to set the receiver to 1550 kilocycles, a close approximation may be achieved by adjusting the receiver tuning to a point giving maximum background response from the LF-90. It is, of course, necessary that the LF-90 switch be set to the "IN" position and that the proper antenna be connected to the LF-90 antenna terminal strip.

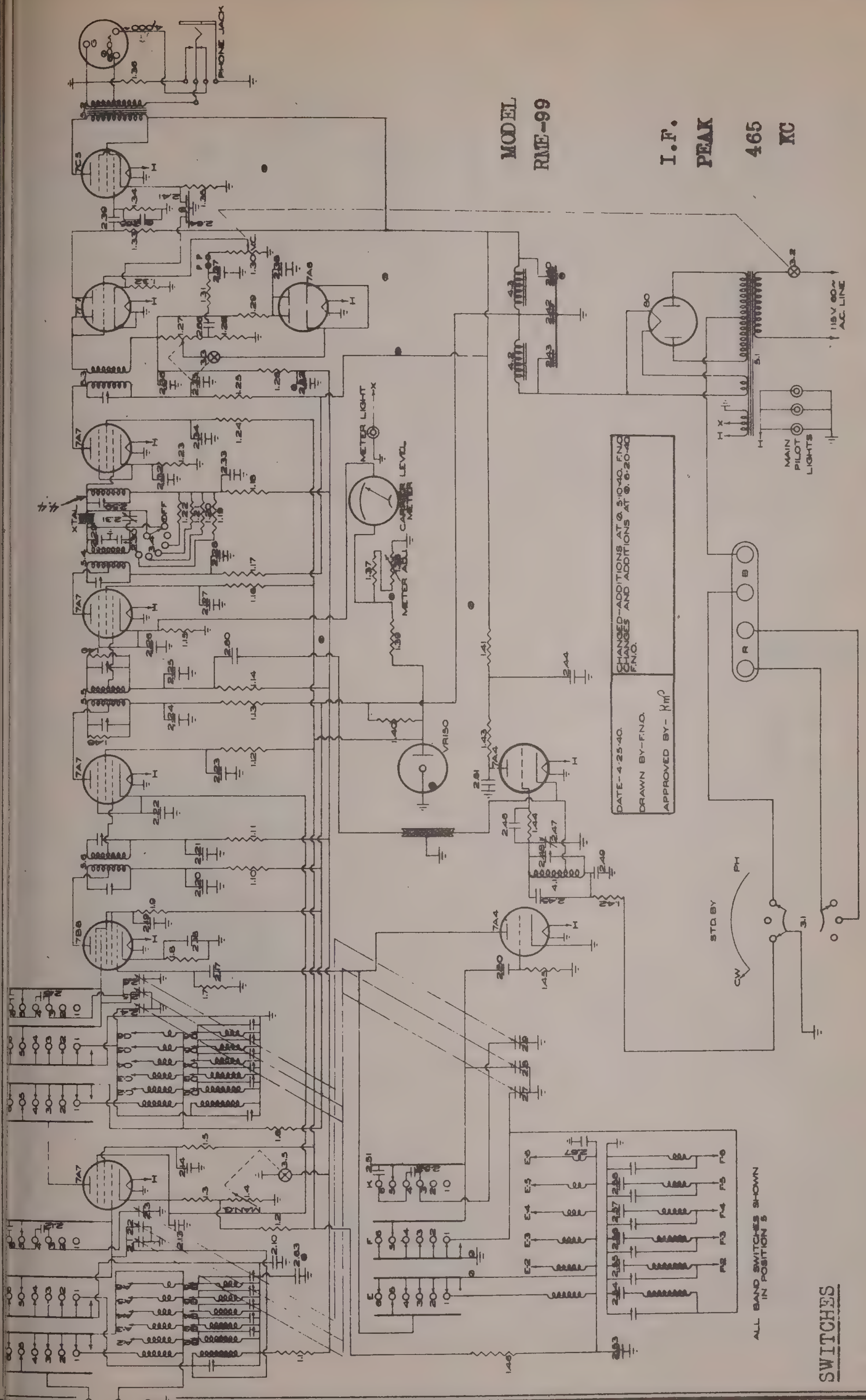
When the adjustments just described have been made the LF-90 dial may be tuned to the frequency desired and the response will depend upon the gain control setting of the associated receiver. When tuning Band 1 the innermost calibrated arc is to be used and the band range is 95 to 250 kilocycles. If it is desired to tune in the range between 250 and 590 kilocycles, the band switch must be set to Band 2 and tuning will then be indicated by the calibrated scale in the outermost position. The dial markings are in kilocycles and the white line on the skirt of the tuning knob is the indicator. There are no gain control facilities on the LF-90--the receiver being required to take care of any signal which the LF-90 develops for its operation. Outside of tuning, the other controls of the receiver can be used for developing beat frequency tones, for telegraph reception, for crystal filter operation, and for the control of audio level or radio frequency gain by either automatic or manual gain facilities, if they are provided in the particular receiver used. It is unnecessary to do any tuning adjustments on the associated receiver, since a constant frequency of 1550 KC. is developed by the LF-90 for input to the receiver. Any tuning is to be done on the LF-90 only, as indicated by the calibrated markings on the scale plate.



REAR VIEW

-FIG. 4-

RADIO MFG. ENGINEERS, INC.



RADIO MFG. ENGINEERS, Inc.
111 Harrison Street PEORIA, ILL., U. S. A.
RME-99 SCHEMATIC
C-183

SWITCHES

3.1 Stand-by Switch (3 position, 2 circuit).
3.2 Line Switch on Audio Gain Control (1 position, 1 circuit).
3.3 Noise Limiter on Limiter Control (1 position, 1 circuit).
3.4 Crystal Switch (5 position, 1 circuit).
3.5 AVC Switch on Manual Gain Control (1 position, 1 circuit).

CONDENSERS

2.1	Main Tuning Condenser, Large RF section
2.2	Main Tuning Condenser, Small RF section
2.3	Band Spread Condenser, RF section
2.4	Main Tuning Condenser, Large Det. section
2.5	Main Tuning Condenser, Small Det. section
2.6	Band Spread Condenser, Detector section
2.7	Main Tuning Condenser, Large Osc. section
2.8	Main Tuning Condenser, Small Osc. section
2.9	Band Spread Condenser, Oscillator section
2.10	.01 µfd. 400 volt paper
2.11	50 µµfd. 1% Silver Mica
2.12	50 µµfd. 1% Silver Mica
2.13	.01 µfd. 400 volt paper
2.14	.01 µfd. 400 volt paper
2.15	50 µµfd. 1% Silver Mica
2.16	50 µµfd. 1% Silver Mica
2.17	50 µµfd. 5% Mica
2.18	.01 µfd. 400 volt paper
2.19	.01 µfd. 400 volt paper
2.20	.01 µfd. 400 volt paper
2.21	.01 µfd. 400 volt paper
2.22	.01 µfd. 400 volt paper
2.23	.01 µfd. 400 volt paper
2.24	.01 µfd. 400 volt paper
2.25	.01 µfd. 400 volt paper
2.26	.01 µfd. 400 volt paper
2.27	.01 µfd. 400 volt paper
2.28	.01 µfd. 400 volt paper
2.29	50 µµfd. 5% Mica
2.30	50 µµfd. 5% Mica
2.31	30 µµfd. Variable
2.32	.01 µfd. 400 volt paper
2.33	.01 µfd. 400 volt paper
2.34	.01 µfd. 400 volt paper
2.35	.01 µfd. 400 volt paper
2.36	100 µµfd. Mica
2.37	250 µµfd. Mica
2.38	.1 µfd. 400 volt paper
2.39	.1 µfd. 400 volt paper
2.40	15 µfd. 450 v. electrolytic
2.41	20 µfd. 25 v. electrolytic
2.42	15 µfd. 450 v. electrolytic
2.43	10 µfd. 450 v. electrolytic
2.44	.01 µfd. 400 volt paper
2.45	100 µµfd. Mica
2.46	250 µµfd. Mica
2.47	50 µµfd. Variable
2.48	70 µµfd. Mica Padder
2.49	.01 µfd. 400 volt paper
2.50	100 µµfd. Ceramic
2.51	50 µµfd. Silver Mica
2.52	50 µµfd. Silver Mica
2.53	.1 µfd. 400 volt paper
2.54	550 µµfd. Mica
2.55	600 µµfd. Mica
2.56	1300 µµfd. Mica
2.57	1700 µµfd. Mica
2.58	3900 µµfd. Mica
2.59	100 µµfd, Mica Padder
2.60	100 µµfd. Mica
2.61	.01 µfd. 400 volt paper
2.62	.01 µfd. 400 volt paper
2.63	.1 µfd. 400 volt paper
2.64	20 µfd. 25 v. electrolytic
2.65	250 µµfd. Mica
2.66	.1 µfd. 400 volt paper
2.67	.01 µfd. 400 volt paper

All osc. and detector parallel padders 10 µµfd.
All RF Parallel padders 30 µµfd.
All IF Trimmers 100 µµfd.

TRANSFORMERS

5.1	Power transformer
5.2	Audio Output transformer
5.3	#4 IF transformer
5.4	#3 IF transformer
5.5	#2 IF transformer
5.6	#1 IF transformer

INDUCTANCES

4.1	B. O. Coil
4.2	Filter Choke, 30 henry, 100 m.a.
4.3	Filter Choke, 30 henry, 50 m.a.
4.4	Crystal Filter Choke

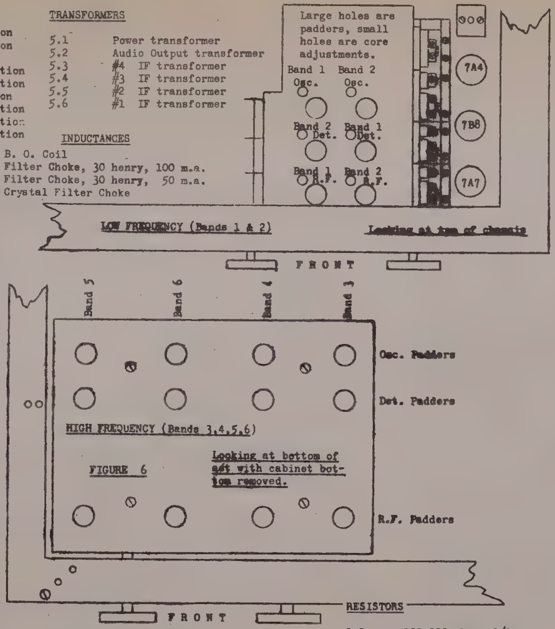

Large holes are padders, small holes are core adjustments.
Band 1
Band 2
Osc.
Osc.
Band 2 Det.
Band 1 Det.
Band 1 R.F.
Band 2 R.F.
7A4
7B8
7A7
LOW FREQUENCY (Bands 1 & 2)
Looking at top of chassis
FRONT
Band 5
Band 6
Band 4
Band 3
Osc. Padders
Det. Padders
R.F. Padders
HIGH FREQUENCY (Bands 3,4,5,6)
Looking at bottom of set with cabinet bottom removed.
FRONT

FIGURE 6

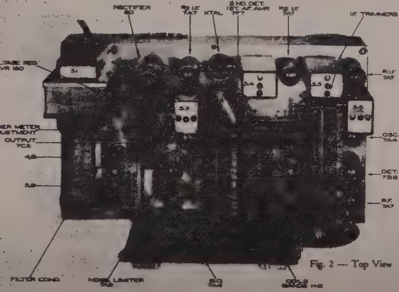


Fig. 2 — Top View

RESISTORS

1.1	100,000 ohms, 1/3 watt				
1.2	50,000 ohms, 1 watt				
1.3	150 ohms, 1/3 watt				
1.4	30,000 ohms, Pot. w/switch				
1.5	5,000 ohms, 1/3 watt				
1.6	2,000 ohms, 1/3 watt				
1.7	50,000 ohms, 1/3 watt				
1.8	1,000 ohms, 1/3 watt				
1.9	70,000 ohms, 1/3 watt				
1.10	2,000 ohms, 1/3 watt				
1.11	100,000 ohms, 1/3 watt				
1.12	5,000 ohms, 1/3 watt	1.25	2,000 ohms, 1/3 watt		
1.13	2,000 ohms, 1/3 watt	1.26	1 Megohm, 1/3 watt		
1.14	100,000 ohms, 1/3 watt	1.27	50,000 ohms, Pot. w/switch	1.38	200 ohms, Potentiometer
1.15	300 ohms, 1/3 watt	1.28	50,000 ohms, 1/3 watt	1.39	10,000 ohms, 5 watt
1.16	5,000 ohms, 1/3 watt	1.29	1 Megohm, 1/3 watt	1.40	2,000 ohms, 10 watt
1.17	2,000 ohms, 1/3 watt	1.30	250,000 ohms, Pot. w/switch	1.41	2,000 ohms, 1/3 watt
1.18	100,000 ohms, 1/3 watt	1.31	1 Megohm, 1/3 watt	1.42	5,000 ohms, 1/3 watt
1.19	250,000 ohms, 1/3 watt	1.32	1,000 ohms, 1/3 watt	1.43	1 Megohm, 1/3 watt
1.20	100,000 ohms, 1/3 watt	1.33	50,000 ohms, 1/3 watt	1.44	100,000 ohms, 1/3 watt
1.21	50,000 ohms, 1/3 watt	1.34	250,000 ohms, 1/3 watt	1.45	50,000 ohms, 1/3 watt
1.22	5,000 ohms, 1/3 watt	1.35	240 ohms, 1 watt	1.46	2,000 ohms, 1/3 watt
1.23	300 ohms, 1/3 watt	1.36	5,000 ohms, 1/3 watt	1.48	100,000 ohms, 1/3 watt
1.24	5,000 ohms, 1/3 watt	1.37	150 ohms, 1/3 watt	1.49	100,000 ohms, 1/3 watt

TEST VOLTAGES OBTAINED AT VARIOUS POINTS IN RECEIVER CIRCUIT

Measurements made with voltmeter having internal resistance of 1000 ohms per volt. Instruments with other internal resistances give entirely different readings. NOTE: Line voltage should be 115 volts, Stand-by Switch on.

PLACE TEST PRODS BETWEEN	CORRECT VOLTAGE
Radio frequency amplifier plate and ground	210 volts
Radio frequency amplifier screen and ground	130 volts
Radio frequency amplifier cathode and ground	4 volts
First detector plate and ground	250 volts
First detector cathode and ground	3.2 volts
First I.F. amplifier plate and ground	240 volts
First I.F. amplifier screen and ground	130 volts
First I.F. amplifier cathode and ground	4 volts
(The same voltages apply to the 2nd and 3rd I.F. Amplifier stages)	
First detector screen and ground	43 volts
First audio amplifier plate and ground	105 volts
First audio amplifier cathode and ground	1.5 volts
7C5 plate and ground	220 volts
7C5 screen and ground	230 volts
7C5 cathode and ground	12 volts
80 rectifier filament and ground	320 volts
Oscillator plate and ground	120 volts
Voltage regulator plate and ground	150 volts
(With stand-by switch on CW)	
B. O. plate and ground	11 volts

These voltages are subject to a fluctuation of plus or minus 15% without indication of material difficulties.

CONTINUITY CHECKS

(Receiver turned off. No jumper between A-2 and ground on antenna terminal strip.)

PLACE TEST PRODS BETWEEN		RESISTANCE VALUE
A-1 and ground		Infinite
A-2 and ground		Infinite
RF amplifier grid to ground		1.1 Megohm
First detector grid to ground	Band 1	3.5 Ohms
	Band 2	1.5 Ohms
	Band 3	.3 Ohm
	Band 4	.2 Ohm
	Band 5	.1 Ohm
	Band 6	.1 Ohm
First I.F. grid to ground		1.5 Ohms ±20%
Second I.F. grid to ground		1.5 Ohms ±20%
Third I.F. grid to ground		1.5 Ohms ±20%
Oscillator grid to ground		50,000 ohms ±20%
Beat Oscillator grid to ground		100 Megohms ±20%
First Audio grid and ground		250 Megohms to 0 ohm. (As audio gain control is rotated.)
7C5 grid and ground		250 Megohms ±20%
Oscillator section of main tuning condenser and ground		Bands 1,2,3,4, and 5 Infinite Band 6 .1 ohm

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-99 this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings Due to the tremendous gain available in the audio system of the RME-99 a misalignment due to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not effect the circuits of the audio amplifier and has solely to do with the intermediate frequency amplifier and the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

This loss of gain, when occurring in the radio frequency section of the receiver, is usually due to the fact that the oscillator has been grossly misaligned, so that it is apparent in the frequency calibration of the rec. In other words, it might well be said that a loss of sensitivity in the rec. occurring simultaneously with a wide-spread condition of 'off calibration' might indicate the fact that the loss of gain is caused by misalignment

I.F. AMPLIFIER ADJUSTMENT

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined:

> IMPORTANT NOTE: It is essential that the 465 KC intermediate signal, which is used for realignment of the intermediate frequency amplifier, is not set according to any arbitrary calibration on the test oscillator itself. It has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type receiver in which a quartz crystal is installed. It is therefore better if no test oscillator is used, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier, using the quartz filter for establishing the proper I.F. frequency as indicated in the following procedure:

The meter on the RME-99 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the 4 intermediate frequency amplifier transformers, 5.3, 5.4, 5.5 and 5.6 is given on Figure 2 of the illustrated sheet attached. The padding condensers located in each of these transformers, and accessible through apertures in the top of the shields, can also be seen.

The intermediate frequency amplifiers in the RME-99 are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than ±1 KC. Rather, therefore, than align the I.F. amplifier stages of the RME-99 to a set frequency of 465 KC, it is essential that the alignment be done in conjunction with the quartz filter so that alignment of the intermediate frequency amplifier is achieved at the frequency of the filter. This is done as follows and when the process as herein outlined is followed accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of R9 or slightly less. If no station of this amplitude is available, a reduction in the efficiency of the antenna by the connections of a short wire to the antenna post may help to bring the signal strength as indicated down to R9. Usually between 550 and 800 kilocycles, in most any territory, a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 720 KC. This, of course, will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band spread scale the crystal filter is switched on. The crystal selectivity switch should be tuned to position 3 or 4. The band spread scale is then adjusted with respect to the signal so that the maximum meter reading is obtained. This procedure is one which requires patience and accuracy of adjustment; since the receiver IS ULTRA sharp with the crystal filter in -- there will be one definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made on the intermediate frequency amplifier.

When the above adjustments have been made the intermediate frequency transformers may be peaked up. For this purpose a standard small trimmer tool of the insulated screw driver type is used. The four transformers to be adjusted may be located on Figure 2. They are marked 5.3, 5.4, 5.5 and 5.6. It will be noticed that the #1 and #2 transformers (5.5 and 5.6) have 2 trimmers; the #3 and #4 transformers (5.3 and 5.4) each have 1 trimmer. The order in which the transformers are adjusted is immaterial. However, each trimmer should be carefully adjusted to give the maximum reading on the meter.

It is advisable during the above procedure to check the tuning from time to time to see that the receiver is adjusted accurately on the crystal.

If the above procedure is followed carefully the intermediate frequency amplifier circuits will be adjusted to peak performance.

CRYSTAL FILTER CIRCUIT ADJUSTMENT

In order that the full capabilities of the wide band crystal operation on points 1 and 2 of the selectivity switch may be realized the tuned circuit in the filter circuit must be accurately adjusted. The trimmer for this circuit will be found on the rear apron (See Figure 3). The easiest way to adjust this trimmer is to tune in a station on the broadcast band, that is broadcasting music, preferably an orchestra. The crystal selectivity switch is turned to Position 1. The pointer on the phasing control should be set approximately vertical. When this is done it will be noticed that the higher frequencies of modulation and the background noise will be cut out. The trimmer should now be carefully adjusted. As the trimmer is turned it will be found that the character of the music changes. The trimmer should be set to the point that sounds the most natural. If this adjustment is made carefully there will be a regular sharpening of the receiver as the selectivity switch is turned from "off" to Position 5.

ALIGNMENT OF THE RADIO FREQUENCY SECTION

Alignment of the radio frequency section of the receiver will effect, principally, the calibration of the receiver. Within certain limits this, of course, will also effect the sensitivity. Small variations in frequency (up to 2%) will not materially reduce the sensitivity of the receiver, although they will, of course, show up as variations in the calibration as indicated by the setting of the main tuning dial. Correction of any variation of calibration can be made by following the suggestions outlined in the following paragraphs:

Band 1 includes frequencies between 550 and 1600 KC. For Band 1 there are two frequency adjustments for adjusting the main dial to the proper calibration. The adjustments are made on the top of the chassis through the dust cover over the Band 1 and 2 coils. The proper holes for making the adjustments are indicated on the top sketch on Figure 6. There are 6 sets of a large and a small hole each. The two sets toward the rear of the chassis are the oscillator adjustments. The set toward the front are the RF stage adjustments; and the center set are for the detector. Under the large hole is a padder for adjusting the high frequency end of the scale. Under the small hole is a screw which moves the core in the coil and adjusts the low frequency end. In aligning an RME-99 an output meter or such device is unnecessary since the carrier meter is available at all times to indicate resonance.

The next step is to choose a station or a signal of accurately known frequency on the low frequency end of the range (for example 600 KC) and set the main tuning scale to read this frequency.

> IMPORTANT: DURING ALL CALIBRATING AND ALIGNMENT PROCEDURE THE BAND SPREAD POINTER MUST BE AT THE EXTREME RIGHT, OR 180° END OF THE SCALE.

If the station is not tuned in which the scale indicates its frequency it may be brought in by adjusting the oscillator coil core. This may be done with a small screw driver through the small hole marked "BAND 1 OSC" on Figure 6. Another station or signal is now selected near the high frequency end of the range (for example 1400 KC). If this signal is not heard when the dial is accurately set to its frequency it may be brought in by adjusting the padder under the large hole marked "BAND 1 OSC" by means of an insulated trimmer tool. When this signal is accurately brought in as indicated by a maximum reading on the carrier meter one should go back to the low frequency test point and readjust it if it has changed. It may be necessary to go back and forth several times until both frequencies are accurately calibrated.

When the calibration is accurate the alignment of the RF and detector circuits may be checked. This is done at the two points used in calibrating. With the low frequency test signal tuned in, the Band 1 RF and detector coil cores are adjusted until a maximum meter reading is obtained. Then the high frequency signal is tuned in and the padders are adjusted as was done in calibrating.

Note on Figure 6 that the osicllator and RF adjustments are on the left hand side, but the detector adjustments are on the right hand side. Band 2 oscillator and RF adjustments are on the right side while the Band 2 detector adjustments are on the left side.

The accuracy of most service signal generators is not very great, especially on the higher frequencies. The owner of an RME-99 should hesitate in using one to calibrate his receiver unless he is sure that it is accurately calibrated.

The procedure in calibrating and aligning Band 2 is the same for Band 1. On this band two frequencies, such as 1800 and 2800 KC, may be used.

The four high frequency bands are calibrated and aligned by removing the bottom plate from the receiver. The screws holding the four rubber feet and the four small screws between them are removed. This allows the bottom plate to be removed. It will be found that an aluminum plate covers the coils. This plate has holes over the 12 padders and all adjustments should be made with this plate in position.

Since the inductance of the coils are accurately adjusted and set at the factory it is necessary only to calibrate one frequency on each band. The same applies to the alignment of the RF and detector padders. This calibration and alignment should preferably be made somewhere near the upper 3/4 of each range. Suggested calibration points for each band are as follows:

Band 3	5 MC.
Band 4	9 MC.
Band 5	17 MC.
Band 6	30 MC.

From the bottom sketch on Figure 6 the location of each of the 3 padders for each band may be readily located. Note in particular the location of Band 5 and 6 padders. Adjustments should be made with insulated screw driver type of trimmer tool.

High frequency beat is used on all bands. That is to say, that the oscillator is 465 KC higher in frequency than the signal received.

If sufficient input is used each signal can be received at two points, differing by 930 KC. The other signal is the image or "low beat" signal. The higher frequency signal received, according to the receiver dial, is the proper one and the circuits should be aligned to it.

When using a signal generator or test oscillator to align the set a resistor of about 150 or 200 ohms should be inserted between the signal generator and the antenna connection. This will prevent misaligning of the RF stage caused by the connection of the low impedance of the signal generators output circuit across the receiver input.

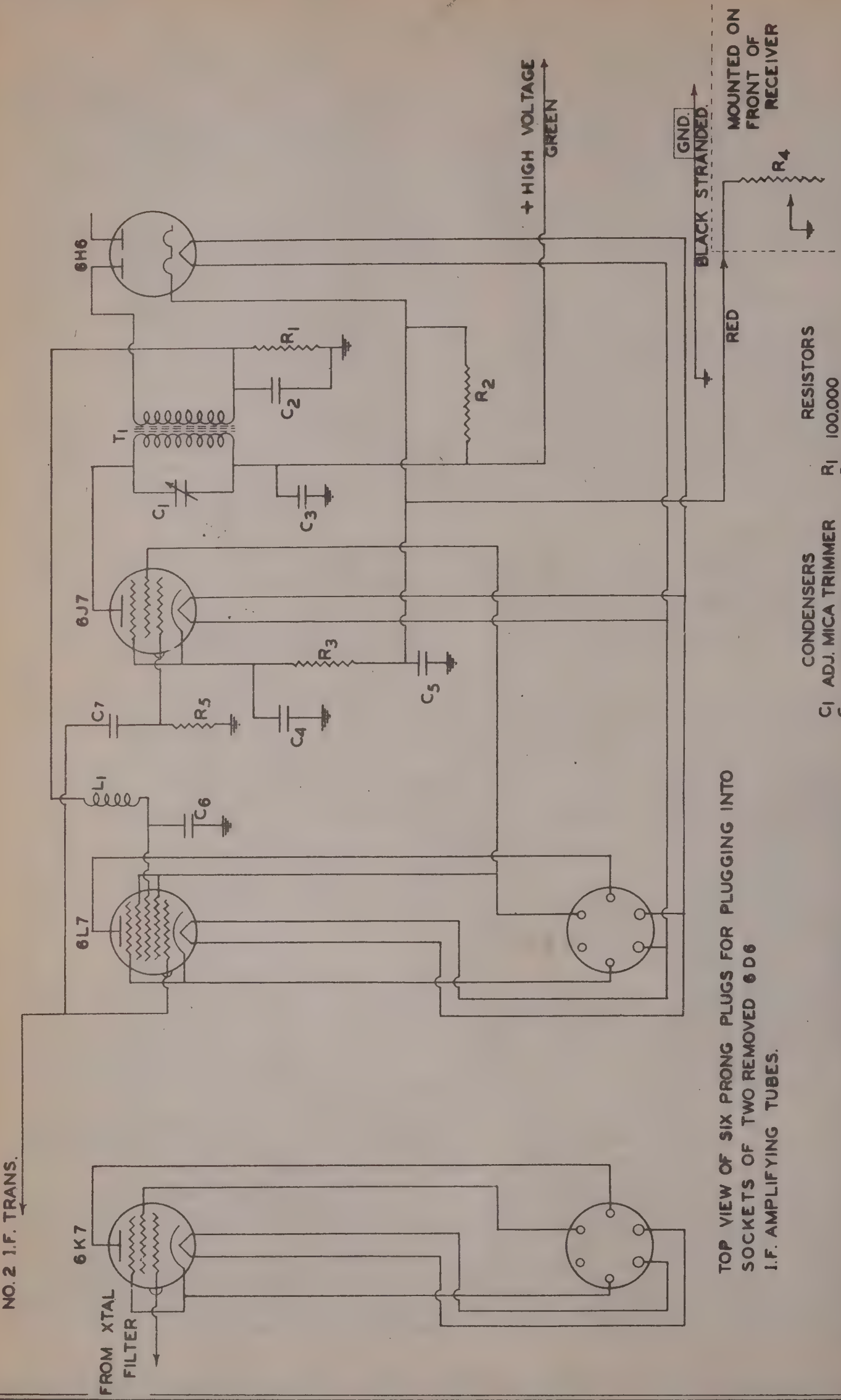
ADJUSTMENT OF THE BEAT OSCILLATOR

The beat oscillator has its frequency adjustable from the front panel. If it is found that zero beat does not occur with the pointer vertical, it may be adjusted as follows:

The cabinet bottom is removed and a signal should be tuned in, exactly on resonance as indicated by a maximum meter reading. The BO tone control ("F" Figure 1) pointer should be set vertical. The beat frequency is then adjusted by means of the padder that can be seen through the hole in the side of the beat oscillator shield can. When the padder is adjusted properly zero beat will be obtained when the control "F" is vertical and the beat frequency will rise when the control is turned either to the right or left.

MODEL LS-1
Noise Silencer

RADIO MFG. ENGINEERS, INC.



TOP VIEW OF SIX PRONG PLUGS FOR PLUGGING INTO SOCKETS OF TWO REMOVED 6D6 I.F. AMPLIFYING TUBES.

CONDENSERS	
C_1	ADJ. MICA TRIMMER
C_2	.00025 MF
C_3	.01
C_4	.01
C_5	.01
C_6	.00005
C_7	.00005

RESISTORS	
R_1	100,000
R_2	40,000
R_3	300
R_4	30,000 VARIABLE
R_5	1,000,000

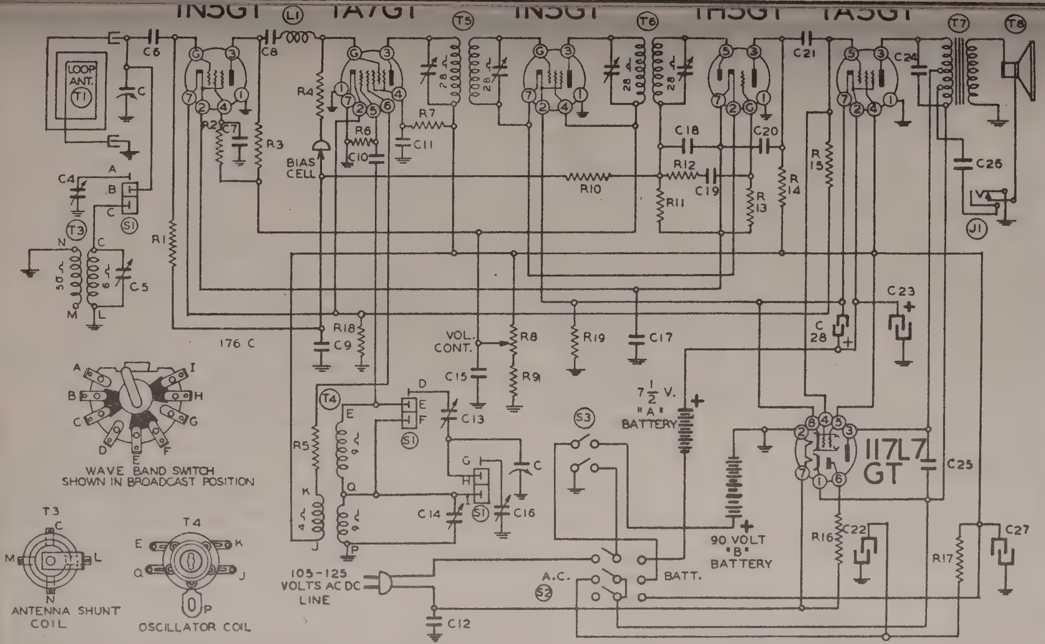
L_1 10 MH RF CHOKE

LS-1
NOISE SUPPRESSOR

B-76

SEA PAL RADIO CO.

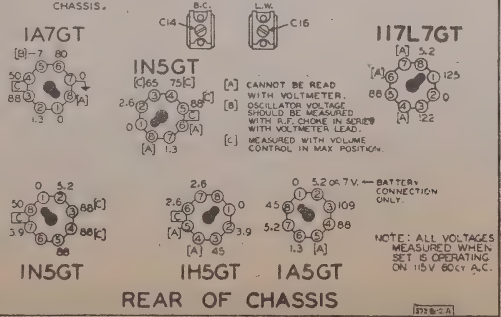
MODELS 101,202
Radio Compass



C	102130	2 gang variable
C4	124128	Long Wave Antenna Trimmer
C5	124128	Broadcast Antenna Trimmer
C6	12938	.00005 mica
C7	1009	.05 x 200 v.
C8	12912	.00025 mica
C9	1009	.05 x 200 v
C10	12921	.0002 mica
C11	1009	.05 x 200 v.
C12	10013	.05 x 400 v.
C13	124133	Long Wave Padder Condenser
C14	124129	Broadcast Oscillator Trimmer
C15	10020	.1 x 200 v.
C16	124129	Long Wave Oscillator Trimmer
C17	100104	.5 x 100 v.
C18	1295	.0001 mica
C19	10025	.002 x 600 v.
C20	12936	.0003 mica
C21	10011	.01 x 400 v.
C22	119107	40 mfd. lytic 150 w.v.
C23	119107	200 mfd. lytic 6 w.v.
C24	10025	.002 x 600 v.
C25	10019	.006 x 600 v.
C26	10011	.01 x 400 v.
C27	119107	20 mfd. lytic 150 w.v.
C28	119113	200 Mfd. Lytic 10 w. v.
		C22, C23 and C27 in same unit.
		C4 and C5 in same unit.
		C14 and C16 in same unit.
T1	111205	Loop Antenna (in cabinet)
T3	111175	Loop Antenna Shunt Coil
T4	110148	Oscillator Coil
T5	108174	Input I. F. Coil—465 kc.
T6	108175	Output I. F. Coil—465 kc.
T7	105107	Output Transformer
T8	114190	5" P. M. Speaker
S1	125109	Wave Band Switch
S2	125110	Power Supply Switch
S3		On Volume Control
L1	1238	R. F. Choke
J1	121255	Phones Jack

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.



[A] CANNOT BE READ WITH VOLTMETER.

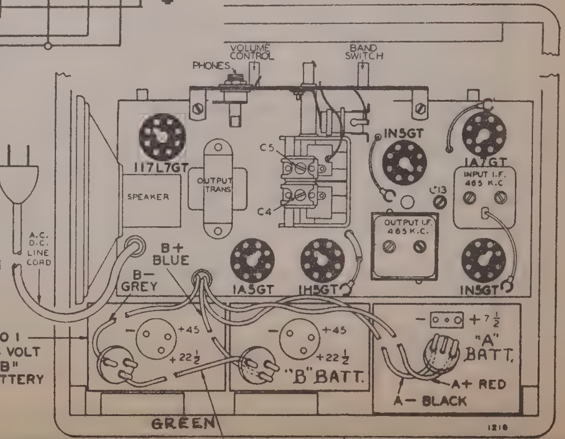
[B] OSCILLATOR VOLTAGE SHOULD BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

[C] MEASURED WITH VOLUME CONTROL IN MAX POSITION.

NOTE: ALL VOLTAGES MEASURED WHEN SET IS OPERATING ON 115V 60CY A.C.

IF PEAK 465 KC

Code No.	Part No.	Description
		RESISTORS
R1	13019	1 megohm—⅓ w.
R2	130176	20M ohm—⅓ w.
R3	130176	20M ohm—⅓ w.
R4	13019	1 megohm—⅓ w.
R5	130218	5M ohm—⅓ w.
R6	1309	200M ohm—⅓ w.
R7	1307	40M ohm—⅓ w.
R8	101212	1 megohm volume control
R9	13020	100M ohm—⅓ w.
R10	130170	3 megohm—⅓ w.
R11	13019	1 megohm—⅓ w.
R12	13020	100M ohm—⅓ w.
R13	130257	5 megohm—⅓ w.
R14	130309	350M ohm—⅓ w.
R15	1303	500M ohm—⅓ w.
R16	130310	30 ohm—⅓ w.
R17	13071	4M ohm—⅓ w.
R18	13092	1M ohm—⅓ w.
R19	130294	1200 ohm—⅓ w.



ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect generator ground to shell of antenna socket.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., 50 Mmfd.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1A7GT	Rotor full open (Plates out of mesh)	Four trimmers on top (See Fig. 1)	Output and input I. F.	(See Note "A") Adjust to maximum output
BROADCAST BAND (Band Switch in Broadcast Position)	1560 Kc.	.1 MFD.	Grid of 1A7GT	Rotor full open (Plates out of mesh)	Trimmer C14 (See Fig. 3)	Broadcast Oscillator	(See Note "A" and "C") Adjust to maximum output
	1400 Kc.	50 MMFD.	Antenna and Ground Terminals	Set dial at 1400	Trimmer C5—Front section of gang (See Fig. 1)	Broadcast Antenna	(See Note "B") Adjust to maximum output
LONG WAVE BAND (Band Switch in Long Wave Position)	410 Kc.	50 MMFD.	Grid of 1A7GT	Set dial at 410 (Rotor plates full open)	Trimmer C16 (See Fig. 3)	Long Wave Oscillator	(See Note "A" and "C") Adjust to maximum output
	400 Kc.	50 MMFD.	Antenna and Ground Terminals	Set dial at 400 Kc.	Trimmer C4—Rear Section of gang (See Fig. 1)	Long Wave Antenna	(See Note "B") Adjust to maximum output
	275 Kc.	50 MMFD.	Antenna and Ground Terminals	Set dial at 275 Kc.	Padder C13 (See Fig. 1)	Long Wave Oscillator Series Padder	Adjust to maximum output

NOTE "A"—The loop may be connected to the radio when making these adjustments. The ground of the signal generator is connected to the shell of the antenna socket and the other lead from the signal generator in series with the proper dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the shell of the antenna socket. The other lead of the signal generator is connected in series with a 50 Mmf. dummy to the antenna terminal.

NOTE "C"—Trimmers C14 and C16 can be reached by removing the Sea Pal Nameplate on the side of the cabinet.

Power Consumption..............................(On A.C. or D.C.) 35 Watts

Power Output..............600 Milliwatts Undistorted, 1200 Milliwatts Maximum

FREQUENCY RANGES
535 to 1560 KC.
190 to 410 KC.

When carefully used the instrument will indicate points within ± 1 Degree.

A Radio Beacon Broadcast Chart may be obtained from the United States Coast Guard at Washington, D. C. This chart contains instructions for its use

The Sea Pal should not be installed too near your compass or the speaker magnet may affect the reading of the compass. It is advisable to keep the unit away from metal as much as possible to eliminate excessive error in the readings.

Place the unit in line with the ship, that is, if you want the controls directly in front when you face the bow the back of the cabinet should point directly toward the bow. If the unit is used on one side of your cabin then it should be lined up so that it is parallel with a line drawn between the bow and the stern. The reason for keeping the unit in a parallel relation to the boat is that it will be easier to set the compass scale on top of the cabinet to conform to your compass settings when taking bearing.

There is an index marker opposite the compass scale locking screw which aids you to set the scale in exact agreement with your compass when required.

In any radio compass there may be a deviation from a true reading due to the motor or other metal parts around the boat just as there is with a magnetic compass. The simplest method to determine the amount of deviation is to select a broadcast or beacon station which you can see from the ship—Point your ship directly at the station and then tune the loop to the "Null" point. If there is no error the loop pointer should point to the station straight ahead, parallel with a line from bow to stern. If there is a deviation the pointer will not point exactly straight ahead. You can either note how many degrees the variation is and allow for it in future readings or you can turn the radio case so the loop pointer points straight ahead. This will correct for the error and you won't need to make any future allowance.

Check for deviation on several stations and also with the boat turned 180 Degrees from the stations.

To use your compass as a homing device—Tune in the station near the harbor. Rotate the loop to the point where the signal is loudest. This point is quite broad and is therefore not accurate enough to follow. You must therefore find the "Null" point (the point at which the station is weakest).

The Null point will be where the flat side of the loop faces the station. The pointer on the Loop should then point to the station. Follow this "Null" point all the way in toward the station. When near the harbor of course you'll pick up the harbor lights and marker buoys.

Since the "Null' point can be obtained when the loop pointer points either to the station or directly away from it you should check with your magnetic compass just to be certain your direction is not away from the station.

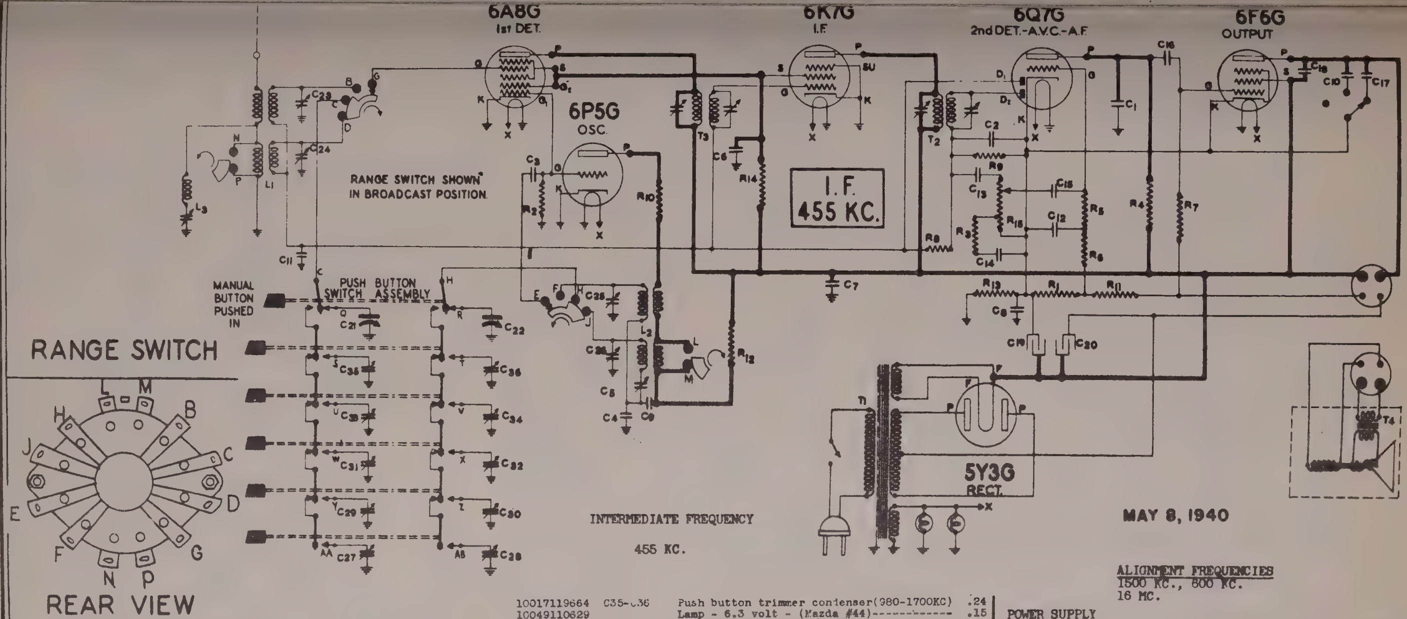
To determine your position at Sea it is only necessary to take bearings on two broadcast stations and transfer these bearings to your chart (map). To find your position first loosen the locking screws on the compass scale on top of the Sea Pal. Rotate the scale so it reads the same as your ships compass. Make the same correction as you would for your compass and hold the ships course steady.

Now tune in a broadcast or beacon station the position of which you know. Rotate the loop to a point where the signal is loudest—Now turn the loop approximately 90 degrees to the "Null Point" (The point of weakest signal). You may have to adjust the volume either up or down to find the "Null Point". Having found the "Null", the loop pointer should point directly at the station and on the loop scale you can now read in degrees the position of the station. Draw a line from this point on land with a parallel rule out to sea, on your chart.

Now repeat the same operation on another known station which is located farther along shore. When you draw your line from this station it will cross the first line at some point on the water—The point at which the lines cross is your position.

SEARS ROEBUCK & CO.

MODEL S61
Chassis 100.350



INTERMEDIATE FREQUENCY

455 KC.

MAY 8, 1940

ELECTRICAL PARTS

PART NUMBER	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
10028119687	L1	Coil - antenna	1.10
10028119688	L2	Coil - oscillator	1.00
10031119754	L3	Coil - wave trap with trimmer	.40
1001983539	C1	Condenser - mica, 260 mmfd.	.20
1001983783	C2	Condenser - mica, 110 mmfd.	.20
1001985061	C3	Condenser - mica, 51 mmfd.	.15
1001988587	C4	Condenser - mica, .0042 mfd.	.35
10017112799	C5	Condenser - padder	.36
	C6-C7	Condenser - .1 mfd. 600 volt	.25
10020110377	C8	Condenser - 10 mfd. 35 volt	.80
	C9-C10	Condenser - .01 mfd. 600 volt	.15
	C11-C12	Condenser - .05 mfd. 600 volt	.20
	C13-C14-C15-C16	Condenser - .02 mfd. 600 volt	.15
	C17	Condenser - .04 mfd. 600 volt	.20
	C18	Condenser - .002 mfd. 600 volt	.15
10020118421	C19-C20	Condenser - electrolytic 10-15 mfd. 450V-	1.50
10016118619	C21-C22	Condenser - variable tuning	3.00
10017118920	C23-C24-C25-C26	Trimmer strip (2 section)	.30
10017119783	C27-C28-C29-C30	Push button trimmer condenser(540-1000KC)	.28
10017119663	C31-C32-C33-C34	Push button trimmer condenser(750-1375KC)	.24
10017119664	C35-C36	Push button trimmer condenser(980-1700KC)	.24
10049110629		Lamp - 6.3 volt - (Mazda #44)	.15
1002188465	R1	Resistor - 25 ohms 1/2 watt, wire wound	.16
	R2-R3	Resistor - carbon, 47,000 ohms 1/4 watt	.12
	R4	Resistor - carbon 220,000 ohms 1/4 watt	.12
	R5-R6	Resistor - carbon, 1 megohm 1/4 watt	.12
	R7	Resistor - carbon 470,000 ohms 1/4 watt	.12
	R8	Resistor - carbon, 2.2 meg. 1/4 watt	.15
	R9	Resistor - carbon 330,000 ohms 1/4 watt	.12
	R10	Resistor - carbon, 180 ohms 1/4 watt	.12
10021117075	R11	Resistor - 300 ohms 1 watt, wire wound	.16
	R12	Resistor - 10,000 ohms 1 watt	.12
	R13	Resistor - 110 ohms 1 watt	.25
	R14	Resistor - 22,000 ohms 2 watts	.30
10024119634	R15	Volume control - 1 megohm	.90
10058115096		Speaker - dynamic (8 in.)	6.50
10057119597		Cone & Voice coil for 10058115096 speaker	2.00
10037119626		Range swith	1.00
10038119715		Push button switch	2.40
10025119640		Tone control and switch	.85
10010118498	T1	Transformer - power (50-60 cycles)	3.20
10011119804	T1	Transformer - power (25 cycles)	5.35
10035119024	T2	Transformer - 2nd I.F.	1.15
10033119220	T3	Transformer - 1st I.F.	1.30
10013119596	T4	Transformer - output for(speaker 10058115096)	1.95

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ANTENNA SYSTEM

This radio is equipped with a built-in antenna which consists of a metal foil plate built into the cabinet back. An external antenna maybe connected to the set by connecting the antenna lead-in to the clip provided on the cabinet back. When removing the chassis from the cabinet for alignment or test purposes, unsolder the blue wire at the clip on the cabinet back.

ALIGNMENT FREQUENCIES
1500 KC., 600 KC.
16 MC.

POWER SUPPLY
Model 61 is supplied for either 25 or 60 cycle power supplies

105-125 volts - 25 cycle - 55 watts
105-125 volts - 50-60 cycle - 55 watts

FREQUENCY RANGES
"AMERICAN" Band....................540 to 1725 KC.
"FOREIGN" Band....................5.5 to 18.1 MC.

POWER OUTPUT
Type....................Pentode
Undistorted....................2 watts
Maximum....................3 watts

OPERATING FEATURES
Tone control....................Three point
Automatic tuning....................Five station
Dial lighting....................Edge lit.
Pointer....................Slide-rule type

LOUD SPEAKER
Type....................Dynamic
Size....................8"
Field coil resistance....................920 ohms
App. field coil voltage drop....................50 volts

CHASSIS FEATURES
Number of I. F. stages....................one
Built-in antenna....................plate type
Wave trap....................455 KC.
Number of condensers in gang....................two

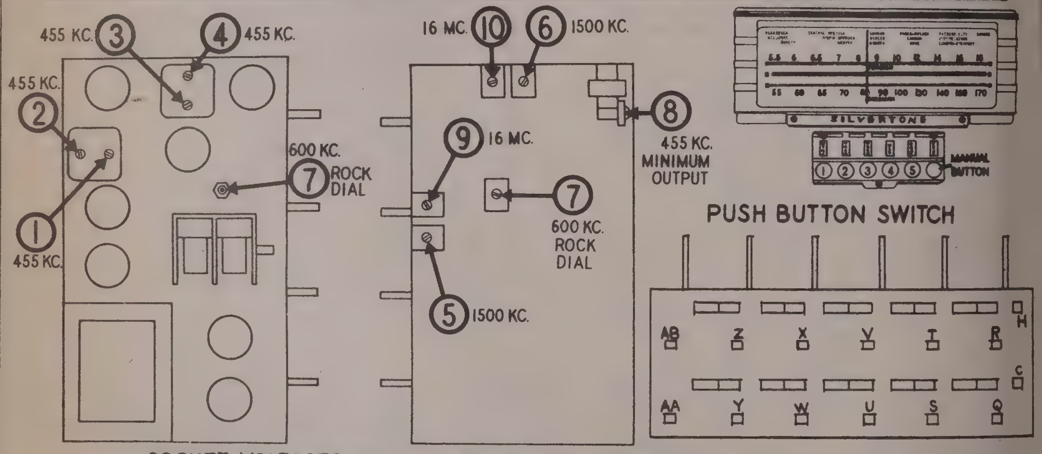
MODEL S61
Chassis 100.350

SEARS ROEBUCK & CO.

Before attempting to align the receiver see that the dial pointer is correctly set. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw in the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

Output meter connection----------Across loud speaker voice coil
Output meter reading to indicate 200 milliwatts----------.831 volts
Dummy antenna value to be in series with generator output----------See chart below
Connection of generator output lead----------See chart below
Connection of generator ground lead----------External ground
Generator modulation----------30%, 400 cycles
Position of Volume control----------Fully clockwise
Position of Tone control----------HI
Position of Dial Pointer with variable fully closed----------On mark to left of 550 kc calibration mark

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	455 KC	AMERICAN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1–2 3–4	2ND I.F. 1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	AMERICAN	1500 KC	5	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	AMERICAN	TUNE TO 1500 KC GENERATOR SIGNAL	6	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	600 KC	AMERICAN	TUNE TO 600 KC GENERATOR SIGNAL	7	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
200 MMFD. CONDENSER	ANTENNA TERMINAL	455 KC	AMERICAN	600 KC	8	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC	FOREIGN	16 MC	9	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC	FOREIGN	TUNE TO 16 MC GENERATOR SIGNAL	10	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

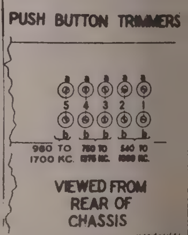


SOCKET VOLTAGES-ALL D.C. MEASURED TO CHASSIS

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	G_1	G_2	S	SU	P	D_1	D_2
6A8G	Ist DET.	6.0A.C	0	Note A	-5	85	85		240		
6P5G	OSC.	6.0A.C	0	-5					168		
6K7G	I.F.	6.0A.C	0	Note A			85	0	240		
6Q7G	2nd DET.-A.V.C.-A.F.	6.0A.C	-2.4	Note B					95	Note A	Note A
6F6G	OUTPUT	6.0A.C	-2.4	Note C			240		225		
5W4G	RECT.	5.0A.C	PLATES=350 A.C. TO CENTER TAP								



NOTE A: The bias on these elements is -2.4 volts measured across R 13.

NOTE B: The bias on the 6Q7G grid is -1.4 volts measured across R_1.

NOTE C: The bias on the 6F6G grid is -16 volts measured across R_1 and R_{11}.

USE A HIGH RESISTANCE VOLTMETER HAVING A RESISTANCE OF AT LEAST 1000 OHMS PER VOLT.

PUSH BUTTON ADJ. – BAND SW. AT "AM" POS.– "MANUAL BUTTON IN, TUNE IN DESIRED STATION WITH TUNING CONTROL– PUSH IN FREQ. RANGE BUTTON AND ADJUST CORRESPONDING SCREW "A".
ADJUST SCREW "B" (ONE BELOW "A") FOR DEEPEST TONE.
READJUST "A" & "B" SCREWS. FOR DEEPEST TONE.
SEE ABOVE DWGS.

SEARS ROEBUCK & CO.

MODELS R71,671
Chassis 101.612
101.612A
MODEL R381

POWER SUPPLY:
All models available . . . . .105-125 v., 50-60 cycles AC; 70 watts
All models available . . . . .105-125 v., 25-60 cycles AC; 75 watts

WER OUTPUT:
Type . . . . . . .Pentode
Undistorted . 2.5 watts
Maximum . . . 4.5 watts

FREQUENCY RANGES:
Band "A" . . .540-1610 kc
Band "B" . .1475-3510 kc
Band "C" . .5.95-18.2 mc

LOUDSPEAKER
Type . . . . .Dynamic
Size . . . . 8 inch
Field coil resistance. . . .1100 ohms
Approx.field coil voltage drop. .85 v.

PRELIMINARY:

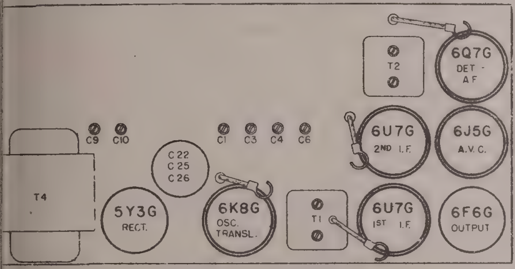
Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.2 volts
Approximate microvolts input to indicate 500 milliwatts output . . . . See chart below
Generator ground lead connection . . . . .To chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . .HI
Position of Dial Pointer with variable fully closed.. . . . . At mark to left of 550 kc calibration mark.

MODELS R71,671 AND R381

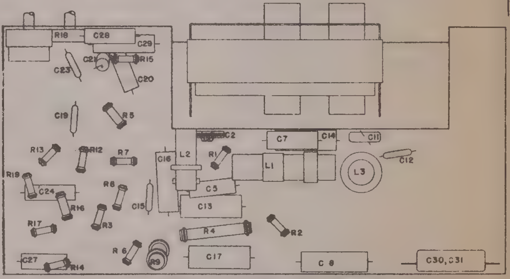
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	(FOR MODELS R71, 671 ONLY) APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	50
"A"	600 kc	455 kc	.00005 mfd.	Ant. Term.	C6*	Wave Trap	--
"A"	Open	1610 kc	.00005 mfd.	Ant. Term.	C9	Oscillator	--
"A"	1400 kc	1400 kc	.00005 mfd.	Ant. Term.	C1	Translator	85
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C10	Padder	35
"B"	3.4 mc	3.4 mc	400 ohms	Ant. Term.	C3	Translator	30
"C"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	10

IMPORTANT ALIGNMENT NOTES

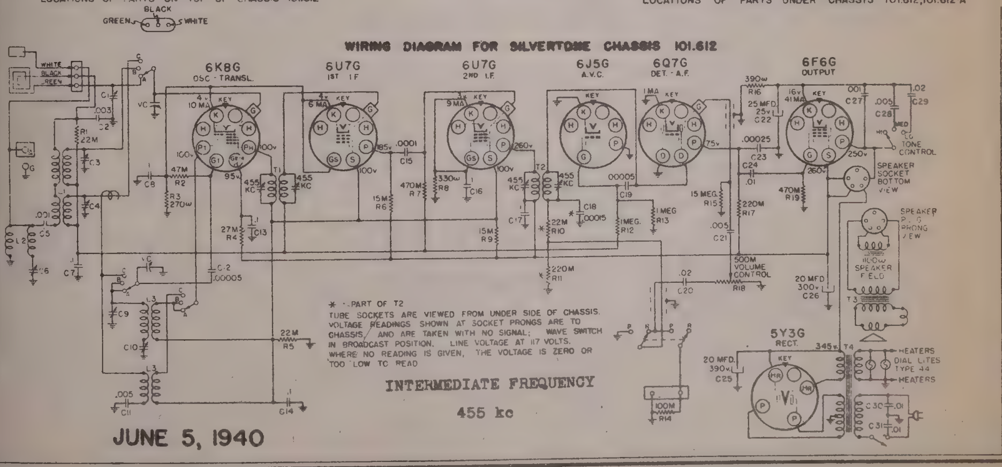
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.612



LOCATIONS OF PARTS UNDER CHASSIS 101.612,101.612-A



* ..PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ

INTERMEDIATE FREQUENCY

455 kc

JUNE 5, 1940

MODEL R81
Chassis 101.613

SEARS ROEBUCK & CO.

JUNE 18, 1940

POWER OUTPUT:
Type . . . . .Push-pull pentodes
Undistorted . . . . .4 watts
Maximum . . . . .6 watts

FREQUENCY RANGES:
Band "A" . . . . . 540-1610 k
Band "B" . . . . .1475-3510 k
Band "C" . . . . .5.95-18.2 m
Band "D" . . . . . 9.3-9.85 m

POWER SUPPLY:
All models available .105-125 v., 50-60 cycles AC; 35 watt
All models available .105-125 v., 25-60 cycles AC:100 watt

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.55 volts
Approximate microvolts input for 500 milliwatts output . . . . See chart below
Generator ground lead connection . . . . To chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . .HI
Position of Dial Pointer with variable fully closed . . . . At mark to left of 550 kc calibration mark

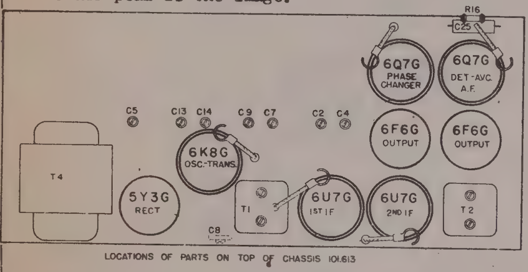
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"A"	600 kc	455 kc	.00005 mfd	Ant. Term.	C4*	Wave Trap	--
"A"	Open	1610 kc	.00005 mfd	Ant. Term.	C13	Oscillator	--
"A"	1400 kc	1400 kc	.00005 mfd	Ant. Term.	C8	Translator	220
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C5	Padder	85
"B"	2.4 mc(rock)	2.4 mc	400 ohms	Ant. Term.	C2	Translator	65
"C"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C7	Translator	15
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C14**	Oscillator	--
"D"	9.55 mc(rock	9.55 mc	400 ohms	Ant. Term.	C9	Translator	60

IMPORTANT ALIGNMENT NOTES

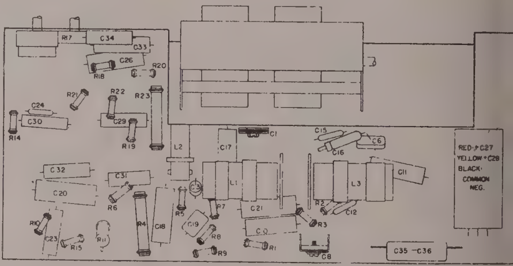
FOR TUNER DATA SEE INDEX

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

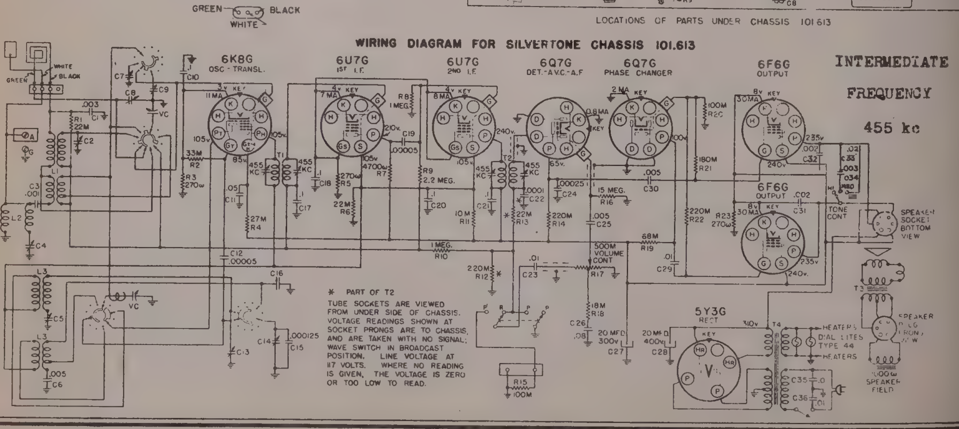
** If two peaks can be had, the correct one is with the trimmer screw further out. The other peak is the image.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.613



LOCATIONS OF PARTS UNDER CHASSIS 101.613

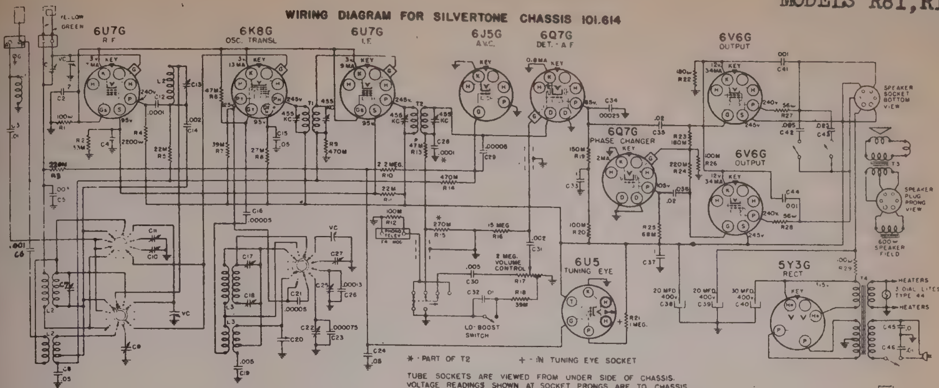


INTERMEDIATE FREQUENCY 455 kc

©John F. Rider, Publisher

SEARS-ROEBUCK & CO.

MODEL R101
Chassis 101.614
MODELS R81,R1171



* - PART OF T2 + - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ

JUNE 18, 1940

ALIGNMENT PROCEDURE

INTERMEDIATE FREQUENCY 455 kc

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . .1.6 volts
Approximate microvolts input for 500 milliwatts output . . . . See chart below
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . .Both buttons out
Position of Dial Pointer with variable fully closed . . . . .On first mark to left of 550 kc calibration mark

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"A"	Fully open	1650 kc	.00005 mfd	Ant. Term.	C17	Oscillator	--
"A"	1400 kc	1500 kc	.00005 mfd	Ant. Term.	C1,C13	Ant,Transl	160
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C18	Padder	65
"B"	2.4 mc	2.4 mc	400 ohms	Ant. Term.	C7	Translator	150
"C"	Open	18.3 mc	400 ohms	Ant. Term.	C27*	Oscillator	--
"C"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C11	Translator	60
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C25*	Oscillator	--
"D"	9.55 mc(rock)	9.55 mc	400 ohms	Ant. Term.	C10	Translator	90
"E"	11.71 mc	11.71 mc	400 ohms	Ant. Term.	C22*	Oscillator	--
"E"	11.71 mc(rock)	11.71 mc	400 ohms	Ant. Term.	C9	Translator	90

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

PUSH BUTTON TUNING MECHANISM:

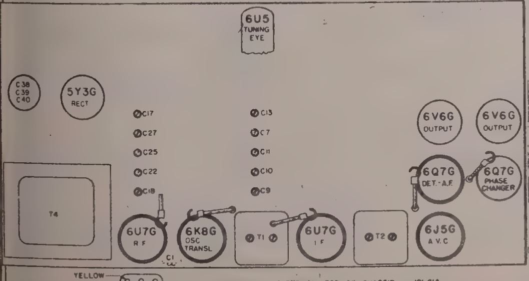
MODELS R81, R101,R1171

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment by holding the screw driver lightly in the screwhead allowing the spring tension to hold the plunger against the screw driver.

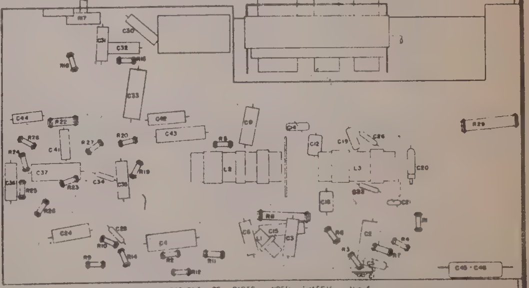
POWER SUPPLY:
All models available .105-135 volt AC; 50-60 cycle; 110 watts
All models available .105-135 volt AC; 25-60 cycle; 120 watts

POWER OUTPUT:
Type . . . . Push-Pull beam
Undistorted . . . . 6 watts
Maximum . . . . .11 watts

FREQUENCY RANGES:
Band "A" . . . . .540-1650 kc
Band "B" . . . . .1475-2510 kc
Band "C" . . . . 5.95-18.3 mc
Band "D" . . . . 9.3-9.85 mc
Band "E" . . . . 11-12 mc



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.614



LOCATIONS OF PARTS UNDER CHASSIS 101.614

MODEL R101 (Late)
Chassis 101.614-1

SEARS ROEBUCK & CO.

MODEL 1581
Chassis 101.572-2A

SEE PREVIOUS PAGE
FOR OTHER DATA

MODEL R101

FACTORY IDENTIFICATION NO. 101.614-1

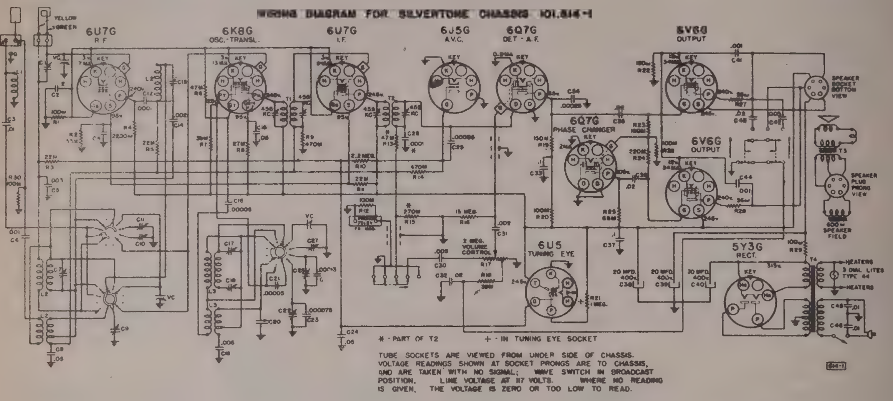
OCT. 15, 1940

ADDITION OF SUFFIX NUMBER -1 TO CHASSIS IDENTIFICATION NUMBER 101.614:

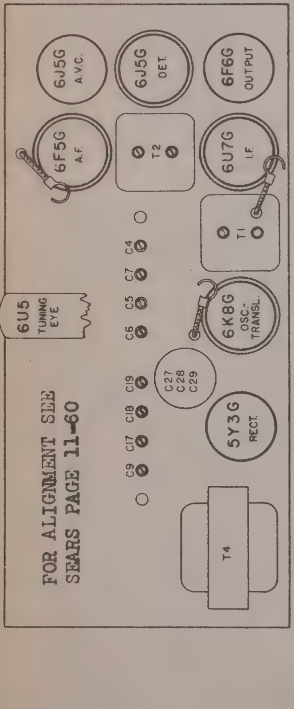
Chassis identified by 101.614-1 omit the low boost switch from the back of the chassis and incorporate its function in the tone push buttons.

The new Tone-Phono-Television-Frequency Modulation push button switch is part number 1013843862, selling price $1.02.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.614-1

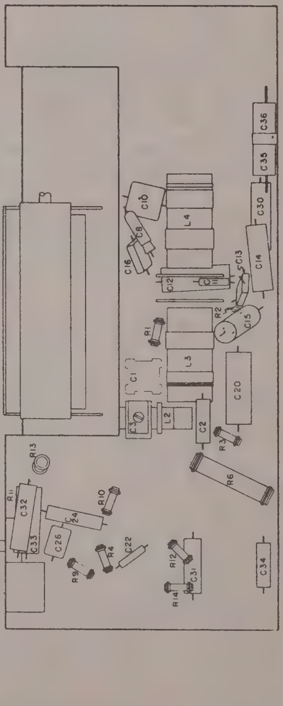


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



FOR ALIGNMENT SEE SEARS PAGE 11-60

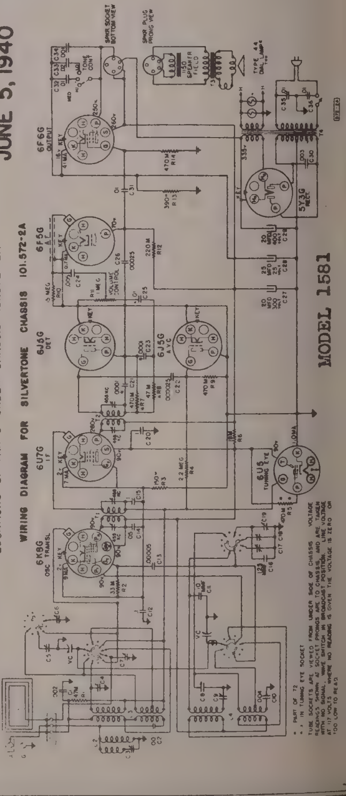
LOCATION OF PARTS ON TOP OF CHASSIS 101.572-2A



LOCATIONS OF PARTS UNDER CHASSIS 101.572-2A

JUNE 5, 1940

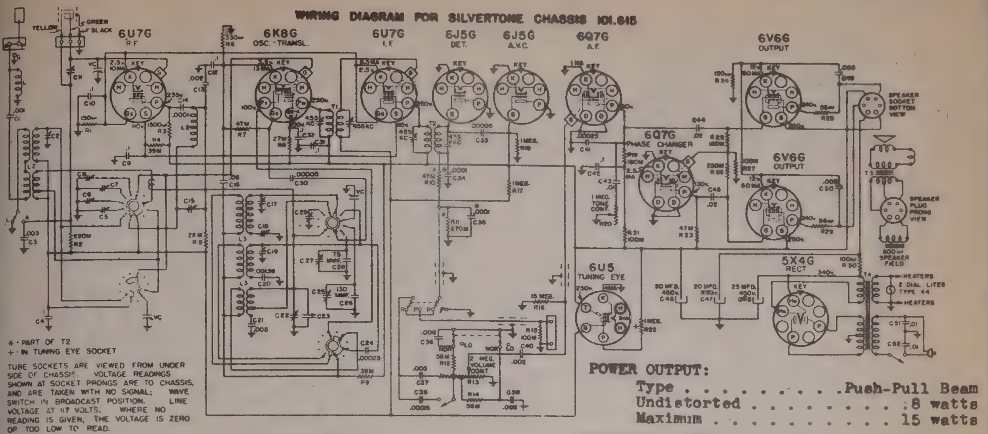
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.572-2A



MODEL 1581

SEARS ROEBUCK & CO.

MODEL R111
Chassis 101.615


WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.615

* - PART OF T2
+ - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER OUTPUT:

Type	Push-Pull Beam
Undistorted	8 watts
Maximum	15 watts

ER SUPPLY:
All models available 105-125 volts, 50-60 cycles: 120 watts
All models available 105-125 volts, 25-60 cycles: 130 watts

FREQUENCY RANGES:

Band "A"	540-1620 kc
Band "B"	1675-5200 kc
Band "C"	5.95-18.265 mc
Band "D"	9.3-9.85 mc
Band "E"	11-12 mc
Band "F"	12.9-15.95 mc

ERMEDIATE FREQUENCY . . . . .455 kc

ALIGNMENT PROCEDURE

PRELIMINARY:

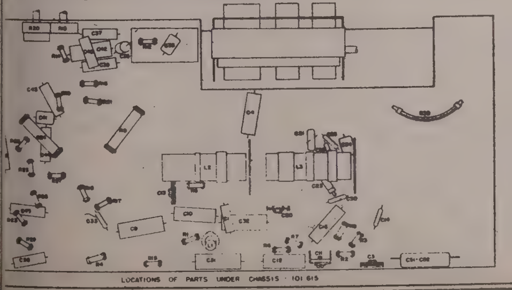
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.6 volts
Approximate microvolts input for 500 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Both buttons out
Position of Dial Pointer with variable fully closed	On first mark to left of 550 kc calibration mark
Position of Antenna Switch	Antenna position

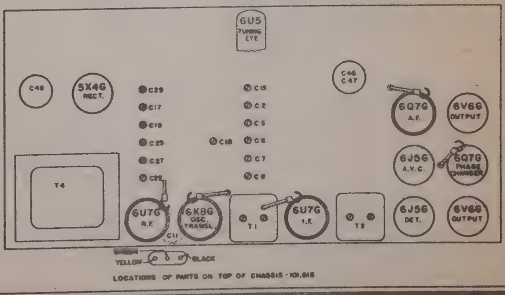
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"A"	Fully open	1620 kc	.00005 mfd	Ant. Term.	C17	Oscillator	--
"A"	1400 kc	1400 kc	.00005 mfd	Ant. Term.	C11,C15	Loop,Transl	120
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C18	Padder	50
"B"	5 mc	5.2 mc	400 ohms	Ant. Term.	C19	Oscillator	--
"B"	4 mc	4 mc	400 ohms	Ant. Term.	C3	Translator	80
"C"	Open	18.265 mc	400 ohms	Ant. Term.	C23*	Oscillator	--
"C"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C5	Translator	35
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C25*	Oscillator	--
"D"	9.55 mc(rock)	9.55 mc	400 ohms	Ant. Term.	C6	Translator	70
"E"	11.71 mc	11.71 mc	400 ohms	Ant. Term.	C27*	Oscillator	--
"E"	11.71 mc(rock)	11.71 mc	400 ohms	Ant. Term.	C7	Translator	50
"F"	15.5 mc	15.5 mc	400 ohms	Ant. Term.	C29*	Oscillator	--
"F"	15.5 mc(rock)	15.5 mc	400 ohms	Ant. Term.	C8	Translator	40

JUNE 18, 1940

IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

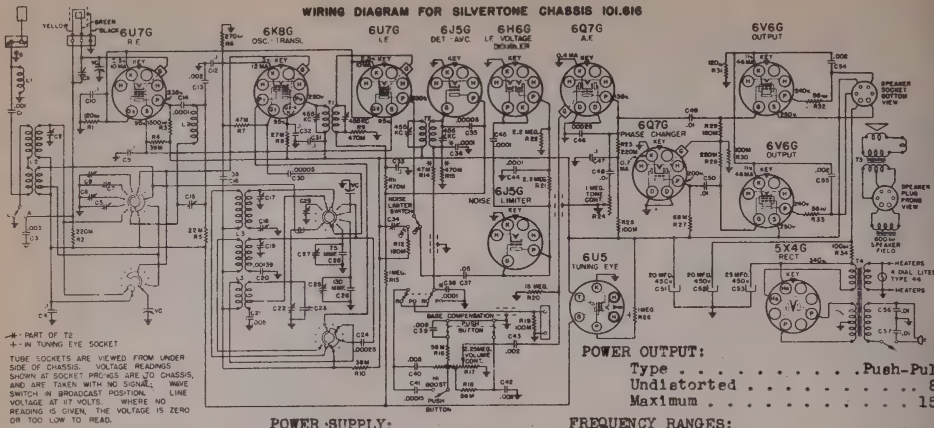

LOCATIONS OF PARTS UNDER CHASSIS 101 615



LOCATIONS OF PARTS ON TOP OF CHASSIS - 101.615

MODELS R121,721
Chassis 101.616

SEARS ROEBUCK & CO.



—✱- PART OF T2
+ - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER OUTPUT:

Type	Push-Pull Beam
Undistorted	8 watts
Maximum	15 watts

INTERMEDIATE FREQUENCY

. . 455 kc

POWER SUPPLY:
All models available
105-125 volts, 50-60 cycles: 125 watts
105-125 volts, 25-60 cycles: 135 watts

FREQUENCY RANGES:

Band "A"	540-1620 kc
Band "B"	1675-5200 kc
Band "C"	5.95-18.265 mc
Band "D"	9.3-9.85 mc
Band "E"	11-12 mc
Band "F"	12.9-15.95 mc

PRELIMINARY:

ALIGNMENT PROCEDURE

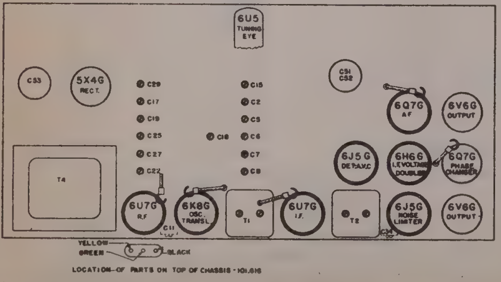
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.6 volts
Approximate microvolts input for 500 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Tone knob counter-clockwise and both buttons out
Position of Dial Pointer with variable fully closed	On first mark to left of 550 kc calibration mark.
Position of Anti-Static Switch	"Off" except when peaking T1 and T2

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	C34	Anti-Static	--
"A"	Fully open	1620 kc	.00005 mfd	Ant. Term.	C17	Oscillator	--
"A"	1400 kc	1400 kc	.00005 mfd	Ant. Term.	C11,C15	Loop,Transl	125
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C18	Padder	65
"B"	5.2 mc	5.2 mc	400 ohms	Ant. Term.	C19	Oscillator	80
"B"	4 mc	4 mc	400 ohms	Ant. Term.	C2	Translator	75
"C"	Open	18.365 mc	400 ohms	Ant. Term.	C22*	Oscillator	--
"C"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C5	Translator	35
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C25*	Oscillator	--
"D"	9.55 mc(rock)	9.55 mc	400 ohms	Ant. Term.	C6	Translator	60
"E"	11.71 mc	11.71 mc	400 ohms	Ant. Term.	C27*	Oscillator	--
"E"	11.71 mc(rock)	11.71 mc	400 ohms	Ant. Term.	C7	Translator	50
"F"	15.5 mc	15.5 mc	400 ohms	Ant. Term.	C29*	Oscillator	--
"F"	15.5 mc(rock)	15.5 mc	400 ohms	Ant. Term.	C8	Translator	40

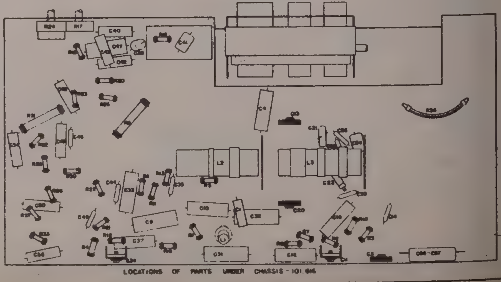
IMPORTANT ALIGNMENT NOTES

JUNE 18, 1940

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.



LOCATION OF PARTS ON TOP OF CHASSIS - 101.616



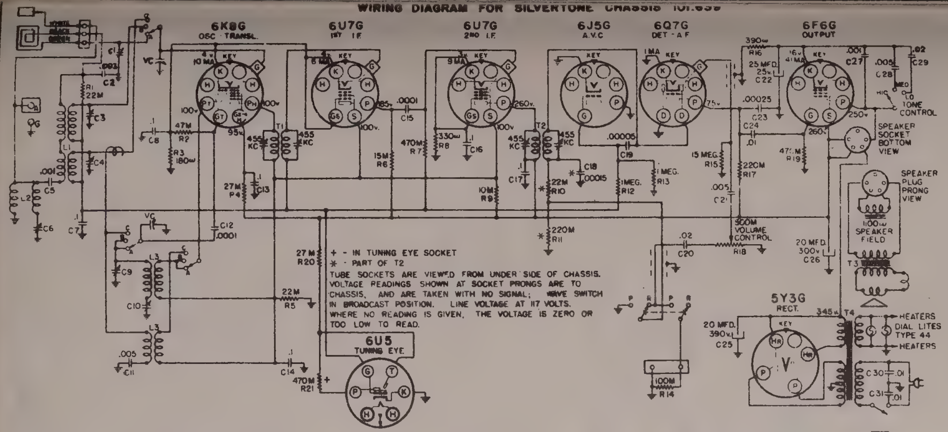
LOCATIONS OF PARTS UNDER CHASSIS - 101.616

©John F. Rider, Publisher

SEARS ROEBUCK & CO.

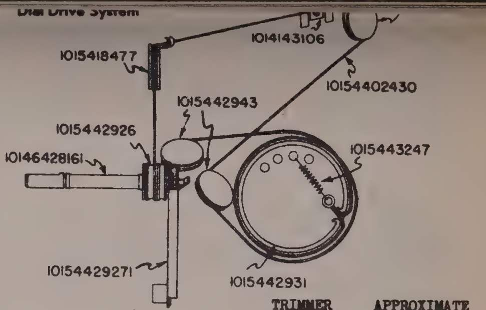
MODEL R381
Chassis 101.639

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.639



+ - IN TUNING EYE SOCKET
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

Dial Drive System

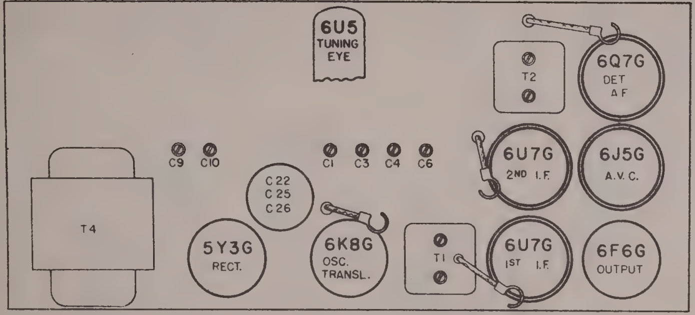


ALIGNMENT IS THE SAME AS FOR MODEL R71 EXCEPT FOR MICROVOLT DATA

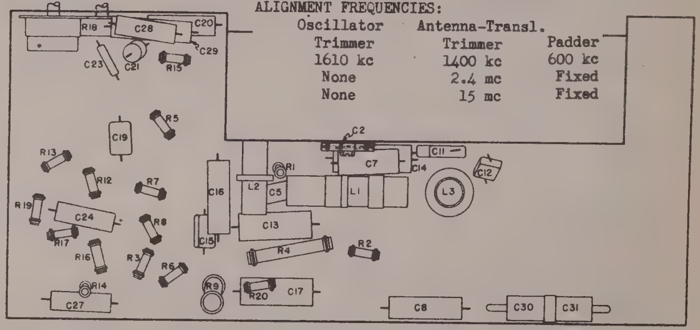
TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
IF	—
Wave Trap	—
Oscillator	—
Translator	100
Padder	45
Translator	35
Translator	10

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1610 kc	1400 kc	600 kc
None	2.4 mc	Fixed
None	15 mc	Fixed



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.639



LOCATIONS OF PARTS UNDER CHASSIS 101.639

FREQUENCY RANGES:
Band "A" . . . . 540-1610 kc
Band "B" . . . . 1.45-2.54 mc
Band "C" . . . . 5.72-18.53 mc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 2.5 watts
Maximum . . . . 4.5 watts

POWER SUPPLY:
All models available 105-125 v., 50-60 cycles AC; 75 watts
All models available 105-125 v., 25-60 cycles AC; 80 watts

INTERMEDIATE FREQUENCY . . . . 455 kc

OCTOBER 18, 1940

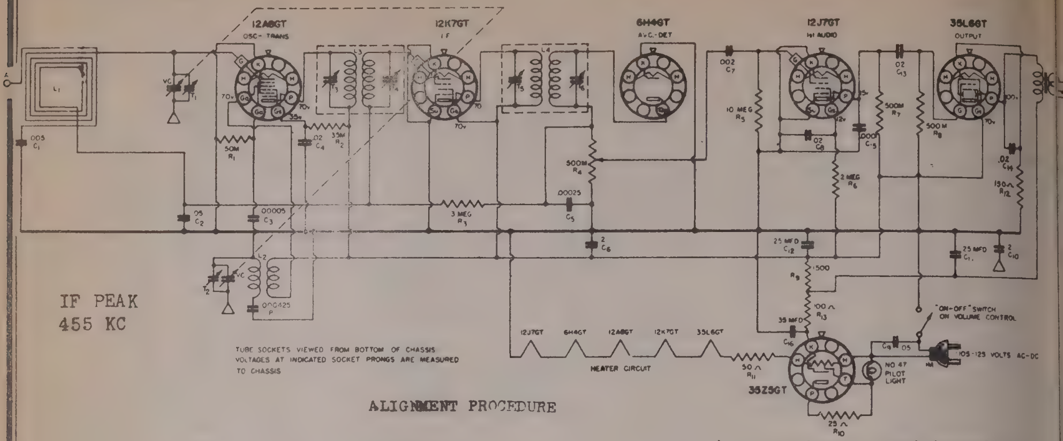
PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment.

LOUDSPEAKER
Type . . . . Dynamic
Size . . . . 8 inch
Approx. field coil res. . . . . 1100 ohms
Approx. field coil voltage drop..85 volts

MODEL R1061
Ch. 110.400

SEARS-ROEBUCK & CO.



IF PEAK
455 KC

ALIGNMENT PROCEDURE

Output meter connections. . . . . Across primary output transformer

Output meter reading to indicate 0.050 watt for Weston type 571 output meter on 15 volt scale. 9 volts

Connection of generator ground. . . . . .B- bus

Generator modulation. . . . . App. 30% @400 cycles

Position of volume control. . . . . .Fully clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
**	455 kc	12k7GT,Grid	T5,T6	I.F.
**	455 kc	12A8GT.Grid	T3,T4	I.F.
1500 kc	1500 kc	***	T2,T1	Osc.,R.F.

Important Alignment Notes

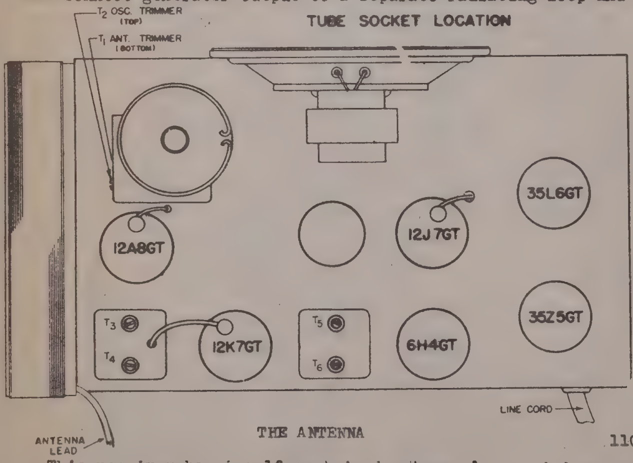
It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

** Short oscillator section of variable condenser.

*** Connect generator output to a separate radiating loop and pickup 1500 kc signal on receiver.

TUBE SOCKET LOCATION



JUNE 5, 1940

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Broadcast. .	.1500 KC	Fixed

FREQUENCY RANGE:
Broadcast. . . . . . . .535-1700 KC

LOUD SPEAKER:
Type.......................Dynamic
Size.......................5"
Field.......................P.M.

POWER OUTPUT
Type.......................Beam Power
Undistorted.......................1.0
Maximum.......................1.5

POWER SUPPLY:
All models available
110-125 volts, 25-60 cycle AC or DC, 30 watts

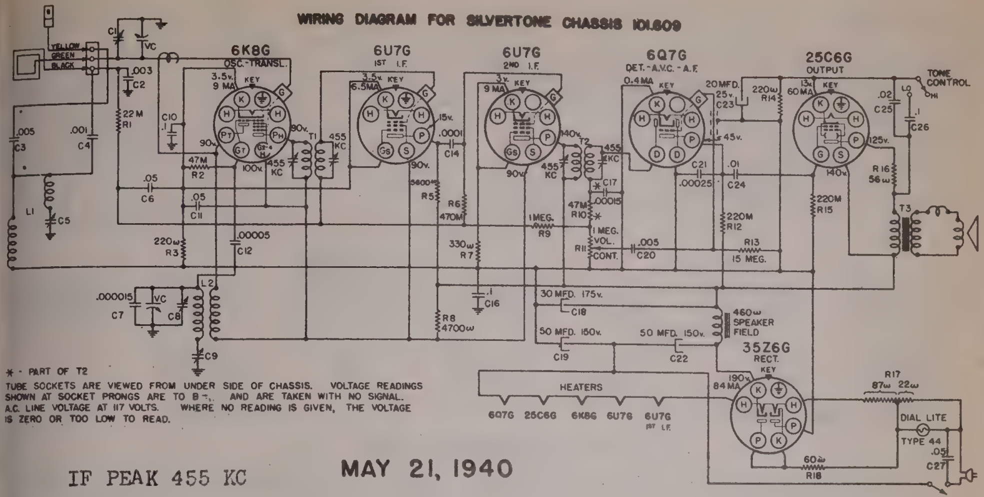
THE ANTENNA

This receiver has a self-contained antenna loop and does not require an additional antenna connection. If it is desired to improve reception of weak or distant stations, an additional outdoor antenna may be used. For this purpose an antenna connection is provided on the loop.

SEARS-ROEBUCK & CO.

MODEL R1161
Chassis 101.609

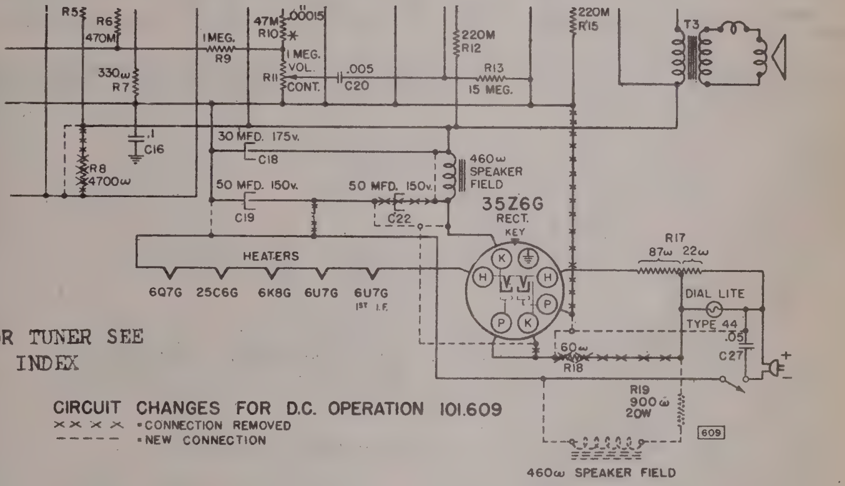
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.609



* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO B-, AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 455 KC

MAY 21, 1940



FOR TUNER SEE INDEX

CIRCUIT CHANGES FOR D.C. OPERATION 101.609

×× ×× = CONNECTION REMOVED
- - - - - = NEW CONNECTION

POWER SUPPLY:
All models available .105-125 v. 25-60 cycle AC, 70 watts

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1650 kc	1400 kc	600 kc

FREQUENCY RANGE: . . . . .540-1650 kc

INTERMEDIATE FREQUENCY . . . . .455 kc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . .1.9 watts
Maximum . . . . 3.5 watts

LOUDSPEAKER:
Type . . . . Dynamic
Size . . . . .5 inch
Field coil resistance . . . . 460 ohms

OPERATING FEATURES:
Tone Control . . . . . . .Two position
Automatic Volume Control
Push Button Tuning (5 Button)

CHASSIS FEATURES:
Number IF stages . . . . Two
Number condensers in gang . . . . .Two
Antenna..Built-in loop with provision for external antenna.

MODEL R1161
Chassis 101.609

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.3 volts
Approximate microvolts input for 500 milliwatts output	See chart below
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	External ground
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	HI
Position of Dial Pointer with variable fully closed	On mark to left of 550 kc calibration mark.

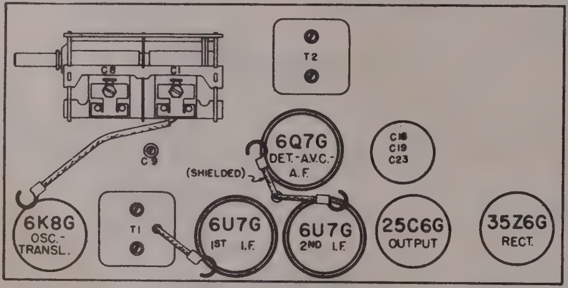
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	6K8G Grid	T3,T1	IF	--
600 kc	455 kc	.0002 mfd.	Ant. Clip	C5*	Wave Trap	--
Fully open	1650 kc	.0002 mfd.	Ant. Clip	C8	Oscillator	--
1400 kc	1400 kc	.0002 mfd.	Ant. Clip	C1	Translator	140
600 kc(rock)	600 kc	.0002 mfd.	Ant. Clip	C9	Padder	75

IMPORTANT ALIGNMENT NOTES

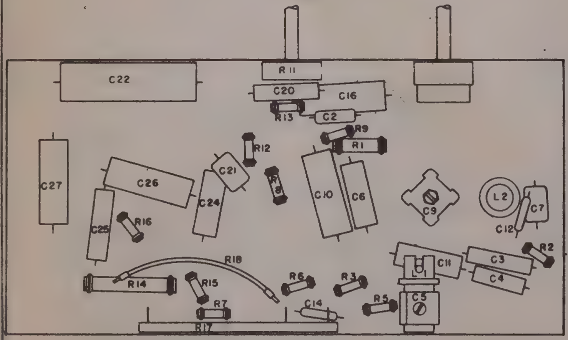
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF PARTS ON TOP OF CHASSIS



PUSH BUTTON TUNING MECHANISM: Adj. for each button is locked or unlocked by tightening or loosening slotted screwhead when button knob is pulled off plunger. Stations are set by unlocking mechanism, tuning in station, pushing in plunger (do not detune station), releasing plunger, locking adj. by holding screw driver lightly in screwhead allowing spring tension to hold plunger against screw driver.

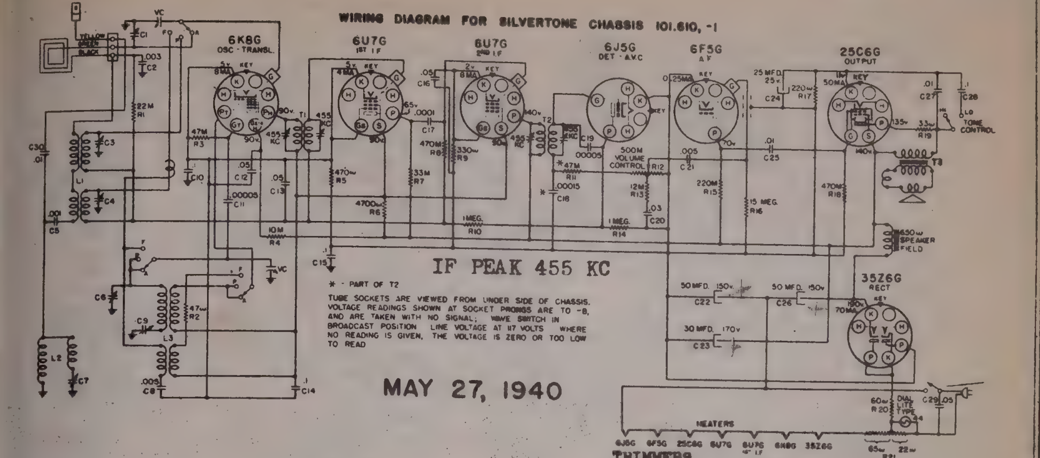
LOCATIONS OF PARTS UNDER CHASSIS - 101.609

MODEL 1571
Chassis 101.610-1

SEARS ROEBUCK & CO.

MODEL R1171
Chassis 101.610-1

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.610, -1



IF PEAK 455 KC

* - PART OF T2

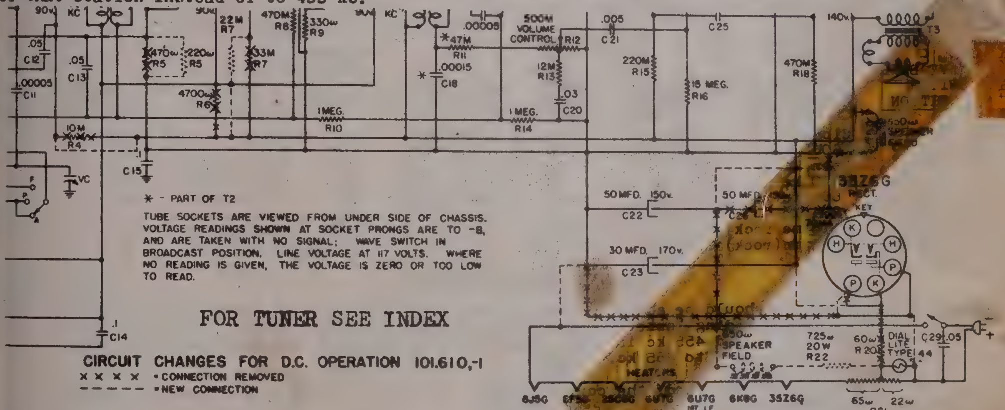
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO -B, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MAY 27, 1940

105-135 v. AC, 65 watts

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"AM"	600 kc	455 kc	.00005 mfd.	Ant. Clip	C7*	Wave Trap	--
"AM"	Fully open	1630 kc	.00005 mfd.	Ant. Clip	C6	Oscillator	--
"AM"	1400 kc	1400 kc	.00005 mfd.	Ant. Clip	C1	Translator	275
"AM"	600 kc(rock)	600 kc	.00005 mfd.	Ant. Clip	C9	Padder	160
"POL"	2.4 mc	2.4 mc	400 ohms	Ant. Clip	C3	Translator	50
"FOR"	15 mc(rock)	15 mc	400 ohms	Ant. Clip	C4	Translator	35

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

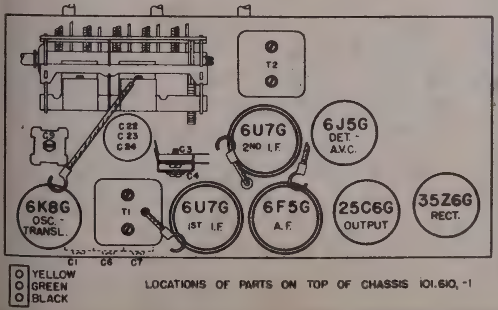


* - PART OF T2

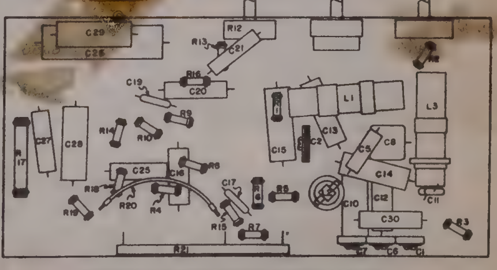
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO -B, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR TUNER SEE INDEX

CIRCUIT CHANGES FOR D.C. OPERATION 101.610,-1
× × × × = CONNECTION REMOVED
– – – – – = NEW CONNECTION



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.610,-1

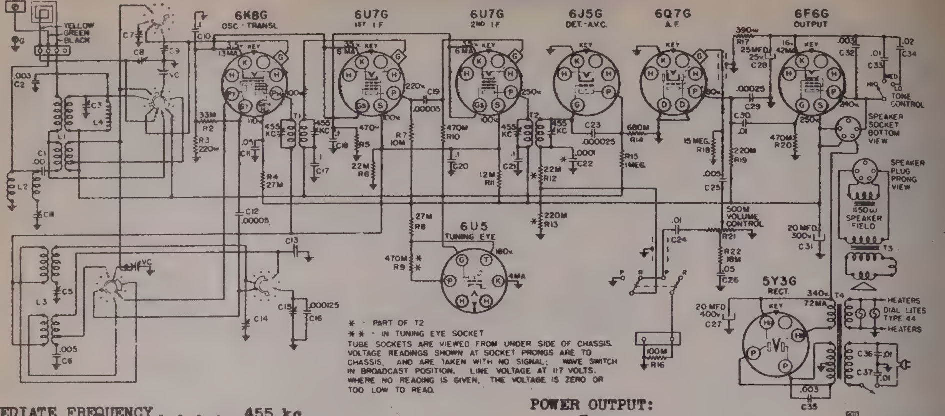


LOCATIONS OF PARTS UNDER CHASSIS - 101.610,-1

MODEL R1181
Chassis 101.611

SEARS-ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.611



* - PART OF T2
** - IN TUNING EYE SOCKET
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

INTERMEDIATE FREQUENCY . . . . . .455 kc

FREQUENCY RANGES:

Band "A"	540-1610 kc
Band "B"	1475-3510 kc
Band "C"	5.95-18.2 mc
Band "D"	9.3-9.85 mc

JUNE 5, 1940

POWER OUTPUT:

Type	Pentode
Undistorted	3.5 watts
Maximum	4.5 watts

POWER SUPPLY:
All models available

105-135 v., 50-60 cycles AC; 75 watts
105-135 v., 25-60 cycles AC; 80 watts

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.2 volts
Approximate microvolts input to indicate 500 milliwatts output . . .	See chart below
Generator ground lead connection	To chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	HI
Position of Dial Pointer with variable fully closed	At mark to left of 550 kc calibration mark.

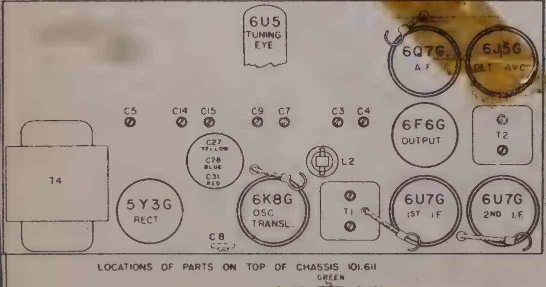
FOR TUNER, SEE MODEL R101

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	90
"A"	600 kc	455 kc	.00005 mfd	Ant. Term.	C4*	Wave Trap	--
"A"	Open	1610 kc	.00005 mfd	Ant. Term.	C14	Oscillator	--
"A"	1400 kc	1400 kc	.00005 mfd.	Ant. Term.	C8	Translator	150
"A"	600 kc(rock)	600 kc	.00005 mfd	Ant. Term.	C5	Padder	100
"B"	2.4 mc	2.4 mc	400 ohms	Ant. Term.	C3	Translator	70
"C"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C7	Translator	10
"D"	9.55 mc(rock)	9.55 mc	400 ohms	Ant. Term.	C15**,C9	Osc.,Transl.	40

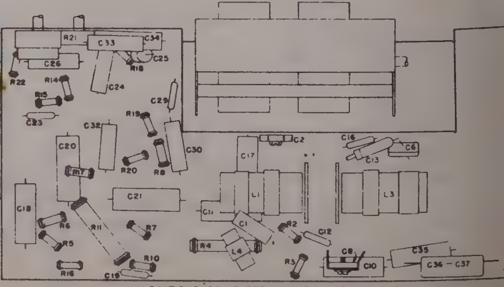
IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

** If two peaks can be had, the correct one is with the trimmer screw further out. The other peak is the image.



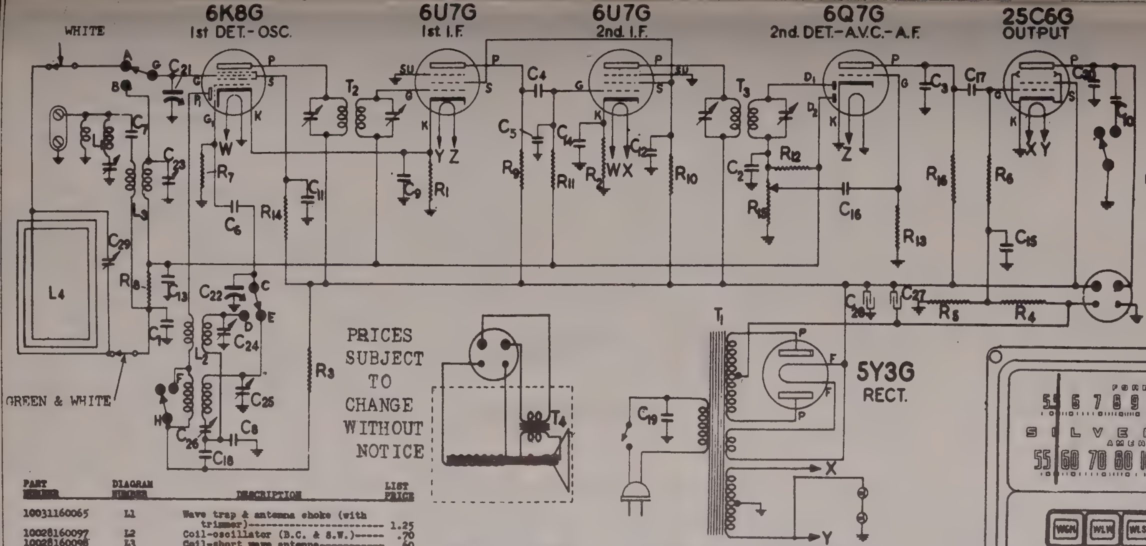
LOCATIONS OF PARTS ON TOP OF CHASSIS 101.611



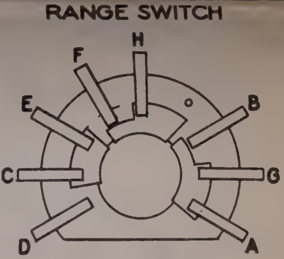
LOCATIONS OF PARTS UNDER CHASSIS - 101.611

SEARS-ROEBUCK & CO.

MODELS R1261,1561
Chassis 100.351

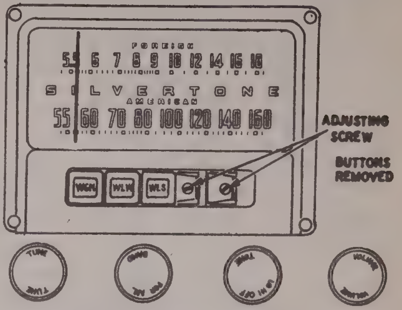


PRICES SUBJECT TO CHANGE WITHOUT NOTICE



REAR VIEW

I. F. = 455 KC.



PART NUMBER	DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
10031160065	L1	Wave trap & antenna choke (with trimmer)------------------------	1.25
10028160097	L2	Coil-oscillator (B.C. & S.W.)-----	.70
10028160098	L3	Coil-short wave antenna-----------	.60
10028160317	L4	Loop antenna complete-------------	1.30
1001981282	C1	Condenser - mica, .003 mfd.-------	.50
1001983539	C2-C3	Condenser - mica, 260 mmfd.-------	.20
1001983783	C4-C5	Condenser - mica, 110 mmfd.-------	.20
1001985061	C6	Condenser - mica, 51 mmfd.--------	.15
1001985394	C7	Condenser - mica, 510 mmfd.-------	.25
1001988587	C8	Condenser - mica .0042 mfd.-------	.35
10019116625	C9-C10-C11	Condenser - .1 mfd. 600 volt------	.25
10019116819	C12-C13-C14	Condenser - .05 mfd. 600 volt-----	.20
10019116706	C15	Condenser - .2 mfd. 600 volt------	.35
10019119817	C16	Condenser - .004 mfd. 600 volt----	.15
10019119193	C17	Condenser - .01 mfd. 600 volt-----	.15
10019119817	C18	Condenser - .004 mfd. 600 volt----	.15
10019119857	C19	Condenser - .01 mfd. 600 volt-----	.20
10019119414	C20	Condenser - .02 mfd. 600 volt-----	.15
10016119966	C21-C22	Condenser-tuning with push button tuner--------------------------	5.30
10017119174	C23-C24-C25	Condenser - trimmer 3 section-----	.45
10017119934	C26	Condenser - padder----------------	.36
10020160095	C27	Condenser - 40 mfd. 300 volts-----	.90
10029160096	C28	Condenser - 20 mfd. 300 volts-----	.85
10017119132	C29	Condenser - loop trimmer----------	.12
1002388461	R1	Resistor-carbon 150 ohms ¼ watt---	.12
10023110556	R2	Resistor-carbon 330 ohms ¼ watt---	.12
10023110577	R3	Resistor-carbon 3300 ohms ¼ watt--	.12
10023118809	R4	Resistor-carbon 680000 ohms ¼ watt	.10
10023118826	R5	Resistor-carbon 470000 ohms ¼ watt	.12
10023112956	R6	Resistor-carbon 220000 ohms ¼ watt	.12
10023110552	R7-R8	Resistor-carbon 47000 ohms ¼ watt-	.12
10023110550	R9-R10	Resistor-carbon 10000 ohms ¼ watt-	.15
10023110564	R11	Resistor-carbon 100000 ohms ¼ watt	.12
10023110570	R12	Resistor-carbon 2.2 meg. ¼ watt---	.15
10023112975	R13	Resistor-carbon 10 meg. ¼ watt----	.12
10023118817	R14	Resistor-carbon 6800 ohms ¼ watt--	.12
10023160006	R15	Volume control 1/2 meg.-----------	.90
10023112956	R16	Resistor-carbon 220000 ohms ¼ watt	.12
10025160007		Switch - tone & on-off------------	.78
10049110629		Dial light - 6.3 volt (Mazda #44)-	.15
10058115104-U		Speaker 6" (for Model R-1261)-----	5.50
10058115103-U		Speaker 5" (for Model 1561)-------	5.00
10037160104		Range switch-------- -------------	.60
10013160425-U		Transformer - output for 10058115104-U speaker-----------	1.80
10013160313-U	T4	Transformer - output for 10058115103-U speaker-----------	1.70
10057160426-U		Cone & Voice coil for 10058115104-U speaker-----------	1.75
10057160314-U		Cone & Voice coil for 10058115103-U speaker-----------	1.70

PART NUMBER	DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
10010160100	T1	Transformer - power (50-60 cycles)-	4.30
10011160470		Transformer - power (25 cycles)----	8.00
10033160070	T2	Transformer - 1st I.F.-------------	1.25
10035160270	T3	Transformer - 2nd I.F.-------------	1.20

1. Turn the set on and remove the Push Button knobs by pulling them toward you.
2. Insert a screwdriver into the adjusting screw on one of the Push Buttons and loosen it by turning it counter-clockwise about one turn.
3. Turn Band Switch to the "AM" position and, keeping the screwdriver inserted in the slot, push against the screwdriver until it reaches a stop.
4. Still pushing against the screwdriver tune in the desired station by means of the Tuning Control and then retighten the screw by turning it clockwise.

Set up the remaining buttons in the same way.

AUGUST 8, 1940

SOCKET VOLTAGES-ALL D.C. MEASURED TO CHASSIS

NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	G_1	P_1	S	SU	P	D_1	D_2
6K8G	1st DET.-OSC.	6.0 A.C.	2.3	0	-5	118	100		135		
6U7G	1st I.F.	6.0 A.C.	2.3	0			95	0	72		
6U7G	2nd I.F.	6.0 A.C.	2.5	0			95	0	135		
6Q7G	2nd DET.-A.V.C.-A.F.	6.0 A.C.	0	0					55	0	0
25C6G	OUTPUT	25 A.C.	0	Note A			135		122		
5Y3G	RECT.	5.0 A.C.	PLATES = 250 V A.C. TO CENTER TAP								

NOTE A: The bias on the 25C6G grid is -12.5 volts measured across R5. This voltage cannot be read on ordinary instruments. USE A HIGH RESISTANCE VOLTMETER OF AT LEAST 1000 OHMS PER VOLT.

MODELS R1261,1561
Chassis 100.351

SEARS ROEBUCK & CO.

ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT
1 6K8-G....................1st Det. & Osc.
1 6U7-G....................I. F. Amp.
1 6U7-G....................I. F. Amp.
1 6Q7-G.................... 2nd Det.-A.V.C.-A.F.
1 25C6-G....................Output
1 5Y3-G....................Rectifier

POWER SUPPLY
Models R-1261 & 1561 are supplied for either 25 or 60 cycle power supplies
105-125 volts - 25 cycle - 70 watts
105-125 volts - 50-60 cycle - 70 watts

FREQUENCY RANGES
"AMERICAN" Band....................540 to 1620 KC.
"FOREIGN" Band....................5.5 to 18.1 MC.

ALIGNMENT FREQUENCIES
1400 KC., 600 KC.
16 MC

INTERMEDIATE FREQUENCY....................455 KC

POWER OUTPUT
Type....................Pentode
Undistorted....................1.8 watts
Maximum....................3.0 watts

LOUD SPEAKER
Type....................Dynamic
Size....................5" for 1561, 6" for R-1261
Field coil resistance....................350 ohms (cold)
App. field coil voltage drop....................31 volts

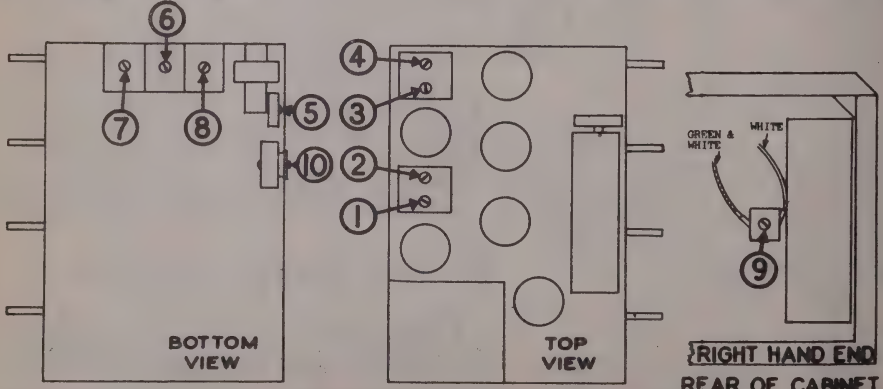
ALIGNMENT PROCEDURE

Before starting the alignment procedure the pointer should be set to the last division on the 550 KC end of the dial scale with the gang condenser in full mesh. Cement the pointer securely to the pointer cord in this position and allow to dry before moving.

Output meter connection------------Across loud speaker voice coil
Output meter reading to indicate .5 Watt------------1.32 volts
Dummy antenna value to be in series with generator output------------See chart below
Connection of generator output lead------------See chart below
Connection of generator ground lead------------External ground
Generator modulation------------30%, 400 cycles
Position of Volume Control------------Fully clockwise
Position of Tone Control------------HI
Position of Dial Pointer with variable fully closed------------On mark to left of 550 KC calibration mark.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6K8G TUBE	455 KC	AMERICAN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2 3 - 4	2ND I. F. 1ST I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	455 KC	AMERICAN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC	FOREIGN	16 MC	6	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. IF TWO PEAK CAN BE HAD, THE CORRECT ONE IS WITH THE TRIMMER SCREW FARTHER OUT. THE OTHER PEAK IS THE IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC	FOREIGN	TUNE TO 16 MC GENERATOR SIGNAL	7	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1400 KC	AMERICAN	1400 KC	8	BROADCAST OSCILLATOR (TRIMMER)	ADJUST FOR MAXIMUM OUTPUT
200 MMFD. CONDENSER	ANTENNA TERMINAL	1400 KC	AMERICAN	TUNE TO 1400 KC. GENERATOR SIGNAL	9	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT
200 MMFD. CONDENSER	ANTENNA TERMINAL	600 KC	AMERICAN	TUNE TO 600 KC GENERATOR SIGNAL	10	BROADCAST OSCILLATOR (PADDER)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

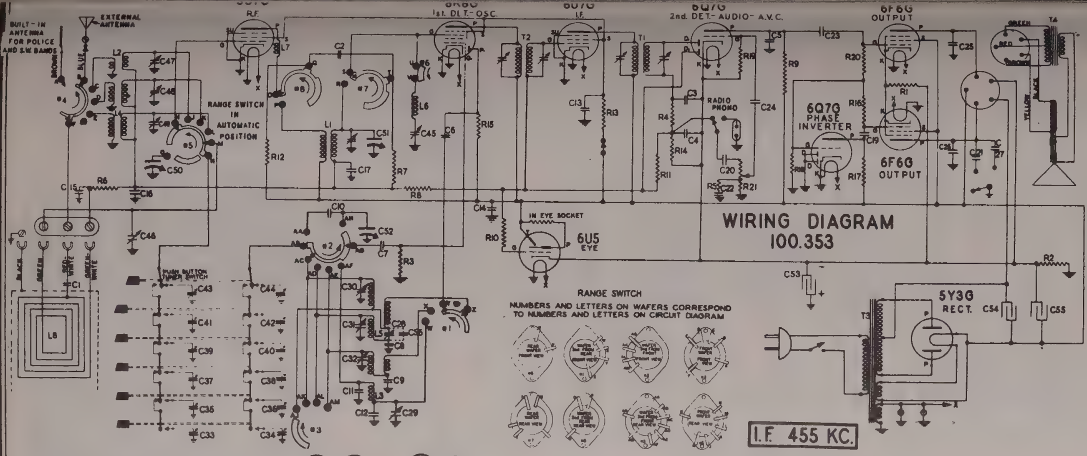
*NOTE: THE SET SHOULD BE PLACED IN THE CABINET BEFORE STEPS 9 & 10 ARE TAKEN. THE LOOP AND ITS LEADS MUST BE IN THEIR FINAL POSITION AT THIS TIME. MAKE A FINAL CHECK AFTER INSTALLATION USING A WEAK RADIATED 1400 KC. SIGNAL.



SEARS ROEBUCK & CO.

MODEL 1591
Chassis 100.353

SEPTEMBER 30, 1940



WIRING DIAGRAM
100.353

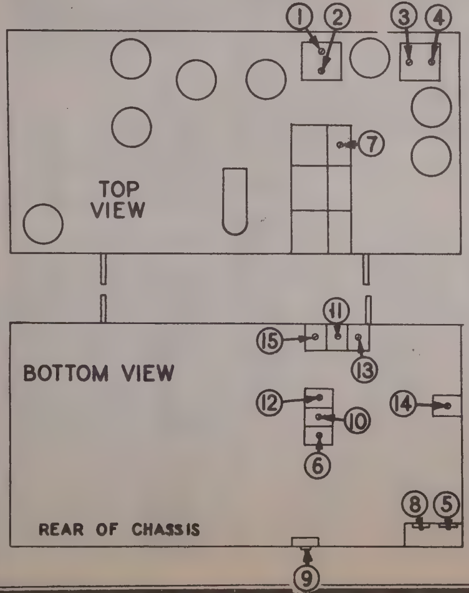
1. Turn the Band Switch to the "A" position and tune in the desired station by means of the Tuning Control.

2. Push in a button of the proper frequency range and turn the Band Switch to the "PB" position.

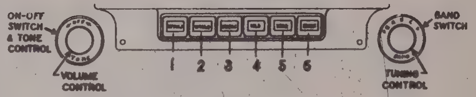
3. Adjust the "a" screw with the same number as that of the button you have pushed in, until you again hear the desired station.

4. Adjust the "b" screw (below the "a" screw) for deepest tone.

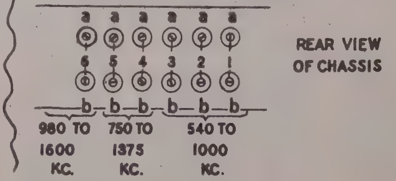
5. Readjust both "a" and "b" screws for deepest tone or maximum TUNING EYE closure.



PART NUMBER	DIAGRAM NUMBER	DESCRIPTION
1001983539	C1-C2	Condenser - mica 260 mmfd............. .20
1001983783	C3-C4-C5	Condenser - mica 110 mmfd............. .20
1001984833	C6	Condenser - mica 70 mmfd.............. .28
1001985061	C7	Condenser - mica 51 mmfd.............. .15
1001986473	C8	Condenser - mica .00123 mfd........... .25
10019110906	C9	Condenser - mica .00332 mfd........... .40
10019160625	C10	Condenser - mica .00006 mfd. (low drift) .25
10019160645	C11	Condenser - mica .0001 mfd. (Low drift). .20
10019160646	C12	Condenser - compensating .0001 mfd..... .28
10019116625	C13	Condenser - .1 mfd. 600 volt.......... .25
10019116706	C14	Condenser - .2 mfd. 600 volt.......... .35
10019116819	C15 to C19	Condenser - .05 mfd. 600 volt......... .20
10019119193	C20-C21	Condenser - .01 mfd. 600 volt......... .15
10019119414	C22-C23	Condenser - .02 mfd. 600 volt......... .15
10019119817	C24	Condenser - .004 mfd. 600 volt........ .15
10019119875	C25-C26	Condenser - .002 mfd. 600 volt........ .15
10019161000	C27	Condenser - .03 mfd. 600 volt......... .20
10017112799	C28	Condenser - padder - used on early sets .36
10017119934		Condenser - padder - used on late sets.. .36
10017116879	C29	Condenser - trimmer .... .15
10017119174	C30-C31-C32	Condenser - trimmer 3 section......... .45
10017119662	C33 to C38	Condenser - single trimmer (low freq.). .24
10017119663	C39 to C42	Condenser - single trimmer (med. freq.) .24
10017119664	C43-C44	Condenser - single trimmer (high freq.) .24
10017160526	C45-C46	Condenser - trimmer - 2 section....... .38
10017160629	C47-C48-C49	Condenser - trimmer - 3 section....... .50
10016160537	C50-C51-C52	Condenser - variable tuning........... .45
10020110377	C53	Condenser - electrolytic 10 mfd. 35 volt .80
10020160975	C54-C55	Condenser - dual elect. 30-20 mfd. 450 V.1.85
10019111575	C56	Condenser - mica - used on early sets.. .20
10035119024	T1	Transformer - 2nd I.F....................1.15
10033119220	T2	Transformer - 1st I.F....................1.30
10010160432	T3	Transformer - power (50-60 cycle)......5.60
10011160780		Transformer - power (25 cycle).........8.00
10013160822-M	T4	Transformer - output for 10058115117-M spkr.2.00
10022118830	R1	Resistor - 430 ohms 1 watt............. .15
10022118831	R2	Resistor - 75 ohms 1 watt.............. .15
10023110552	R3-R4-R5	Resistor - carbon 47,000 ohms 1/4 watt. .12
10023110559	R6 to R9	Resistor - carbon 470,000 ohms 1/4 watt .12
10023110570	R10-R11	Resistor - carbon 2.2 meg. 1/4 watt.... .15
10023110573	R12	Resistor - carbon 2,200 ohms 1/4 watt.. .12
10023110575	R13	Resistor - carbon 12,000 ohms 2 watts.. .30
10023110584	R14	Resistor - carbon 330,000 ohms 1/4 watt .12
10023110592	R15	Resistor - carbon 22,000 ohms 1 watt... .12
10023112956	R16-R17-R18	Resistor - carbon 220,000 ohms 1/4 watt .12
10023112975	R19	Resistor - carbon 10 meg. 1/4 watt..... .12
10023118825	R20	Resistor - carbon 180,000 ohms 1/4 watt .12
10024160558	R21	Volume control - 1 meg..................1.00
10028160502	L1	Coil - Broadcast R. F.................. .65
10028160592	L2	Coil - Antenna (band spread)........... .25



PUSH BUTTON TRIMMERS



REAR VIEW OF CHASSIS

PART NUMBER	DIAGRAM NUMBER	DESCRIPTION
10028160593	L3	Coil - Oscillator (band spread).... .... .25
10028160595	L4	Coil - Police & Short Wave antenna.............1.00
10028160598	L5	Oscillator coil & trimmer assembly.............2.30
10031160606	L6	Wave trap coil................................. .25
10030160626	L7	Compensating coil.............................. .20
10028160725	L8	Loop antenna & cabinet back - complete.........3.10
10038160580		Switch - push button...........................2.50
10037160539		Switch - range.................................2.80
10038114141		Switch - D.P.D.T............................... .44
10025160557		Tone control - with on-off switch.............. .85
10058115117-M		Speaker - dynamic (8")..........................6.70
10049112636		Lamp - dial (Mazda #44)........................ .25
10013160822-M		Transformer - output for 10058115117-M spkr....2.00
10057160823-M		Cone & voice coil for 10058115117 speaker......2.00

MODEL 1591
Chassis 100.353

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

Before starting the alignment procedure check to see if the pointer is set to the last mark on the 550 KC. end of the dial scale with the gang condenser in full mesh.

Output meter connection----------Across speaker voice coil
Output meter reading to indicate 500 milliwatts----------1.28 volts
Dummy antenna value to be in series with generator output----------See chart below
Connection of generator output lead----------See chart below
Connection of generator ground lead----------To chassis
Generator modulation----------30%, 400 cycles
Position of Volume Control----------Fully clockwise
Position of Tone Control----------Brilliant position
Position of Dial Pointer with gang fully closed.----------On mark to left of 550 KC. calibration mark

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6K8G TUBE	455 KC	"A" POSITION	500 KC.	1 - 2	2ND I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3 - 4	1ST I. F.	
50 MMFD MICA CONDENSER	ANTENNA TERMINAL (BLUE WIRE)	455 KC	"PB" POSITION	PUSH ANY PUSH BUTTON IN WHICH DOES NOT AFFECT SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
50 MMFD. MICA CONDENSER	ANTENNA TERMINAL (BLUE WIRE)	1400 KC	"A" POSITION	1400 KC	6	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
50 MMFD. MICA CONDENSER	ANTENNA TERMINAL (BLUE WIRE)	1400 KC	"A" POSITION	1400 KC	7	BROADCAST DETECTOR	ADJUST FOR MAXIMUM OUTPUT.
					8 *	BROADCAST R.F.	
50 MMFD. MICA CONDENSER	ANTENNA TERMINAL (BLUE WIRE)	600 KC	"A" POSITION	600 KC	9	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	5 MC	"B" POSITION	5 MC	10	POLICE BAND OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR, REALIGN AT 5 MC WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	5 MC	"B" POSITION	5 MC	11	POLICE BAND ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	16 MC	"C" POSITION	16 MC	12	SHORT WAVE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR, REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	16 MC	"C" POSITION	16 MC	13	SHORT WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	9.5 MC	"D" POSITION	9.5 MC	14	BAND SPREAD OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT.
400 CHM CARBON RESISTOR	ANTENNA TERMINAL (BLUE WIRE)	9.5 MC	"D" POSITION	9.5 MC	15	BAND SPREAD ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

* Replace chassis and cabinet back in cabinet and repeat adjustment #8 using a weak radiated signal.

POWER SUPPLY
Model R-1591 is supplied for either 25 or 60 cycle power supplies
105-125 volts - 25 cycle - 85 watts
105-125 volts - 50-60 cycle - 85 watts

FREQUENCY RANGES
Broadcast.............540 to 1600 KC
Intermediate band......1.6 to 5.4 MC
Short Wave..........5.4 to 18.1 MC
Band Spread...........9.25 to 9.9 MC

POWER OUTPUT
Type....................P.P. Pentode
Undistorted...............2.8 Watts
Maximum.....................5 Watts

CHASSIS FEATURES
NO. of I.F. stages..................1
Built in antenna.....Short wave plate and loop
Wave trap.......in automatic position
T.R.F. Preselector......in Manual B.C. position

LOUD SPEAKER
Type..................Electro dynamic
Size...............................8"
Field resistance (cold)......450 ohms

USE A VOLTMETER OF 1000 OHMS PER VOLT

Note A. Due to the high value of resistance involved, this voltage cannot be measured with a voltmeter of 1000 ohms per volt.

Note B. This voltage is - 3 volts measured across resistor R 2.

SOCKET VOLTAGES-ALL D.C. MEASURED TO CHASSIS

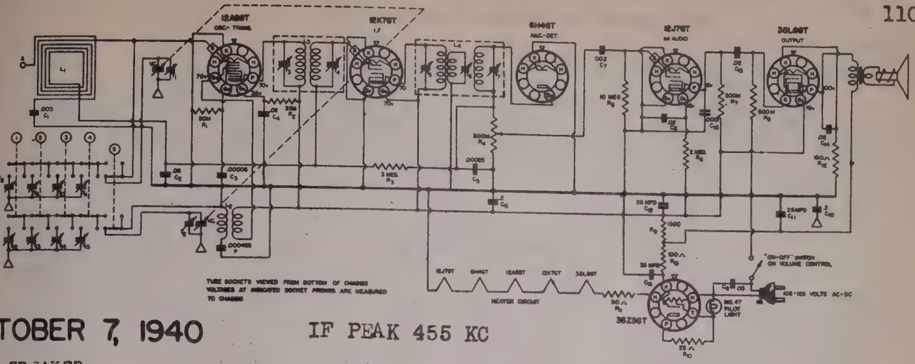
BAND SWITCH IN AUTOMATIC POSITION — DIAL TUNED TO 540 K.C.

TUBE	FUNCTION	H	K	G	G_1	P	S	SU	P_1	D_1	D_2	T
6U7G	R.F.	6.3 A.C.	0	NOTE B		216	105	0				
6K8G	1st DET.-OSC.	6.3 A.C.	0	NOTE B	-10	220	105		134			
6U7G	I.F.	6.3 A.C.	0	NOTE B		220	105	0				
6Q7G	2nd. DET.-A.V.C.-A.F.	6.3 A.C.	-3	NOTE A		50				NOTE B	NOTE B	
6Q7G	PHASE INVERTER	6.3 A.C.	0	0		55				0	0	
★ 6F6G	OUTPUT	6.3 A.C.	14	0		212	220					
6U5	EYE	6.3 A.C.	-3	NOTE B		NOTE A						220
5Y3G	RECTIFIER	5.0 A.C.	PLATES-330 A.C. TO CHASSIS									

★ Pushpull Stage - Data same for each tube.

SEARS-ROEBUCK & CO.

MODEL 1661
Chassis 110.414
110.415


12A8GT OSC.-TRANS.
12K7GT I.F.
6H4GT AVC-DET.
12J7GT 1st AUDIO
35L6GT OUTPUT
35Z5GT
TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS
HEATER CIRCUIT
"ON-OFF" SWITCH ON VOLUME CONTROL
105-125 VOLTS AC-DC
NO.47 PILOT LIGHT

OCTOBER 7, 1940

IF PEAK 455 KC

LOUD SPEAKER:
Type.............................Dynamic
Size.............................5"
Field............................P.M.

POWER OUTPUT
Type.......................Beam Power
Undistorted 1.0
Maximum.............................1.5

POWER SUPPLY
All models available..................... 110-125 volts, 25-60 cycle AC or DC, 30 watts

ALIGNMENT NOTES

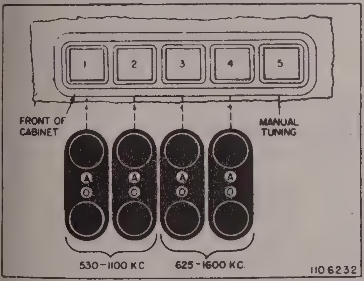
*First time T5 is misaligned by loosening center screw one turn.

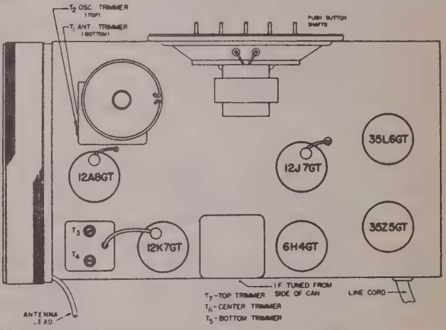
**Short oscillator section of variable condenser. Second I.F. alignment must be done twice to secure flat top tuning.

*** Connect generator output to a separate radiating loop and pickup 1500 KC signal on receiver.

PUSH BUTTON SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
Manual "IN"	**	455 kc	12K7GT,Grid	T6*,T5,T7	I.F.
"	**	455 kc	12A8GT,Grid	T3,T4	I.F.
"	1500 kc	1500 kc	***	T2,T1	Osc.,R.F.

TRIMMER ADJUSTMENT CARD





AUTOMATIC TUNING CONTROL ADJUSTMENT

From the diagram, after finding where the proper pair of adjustment screws are located, trace the dotted line connecting these screws to one of the push buttons. This is the button which after the adjustments are completed, will tune in the station.

Push this button "IN".

Turn the volume control knob on full(to the extreme right) and adjust screw marked "O" until the desired station is heard. If when making this adjustment, a number of stations can be brought in as the screw is turned and it is doubtful which station is the correct one, press button No. 5(Manual Tuning) "IN" and turn the station selector knob to the number on the dial that corresponds to the frequency of the station. Listening to the program being broadcast will identify the station when adjusting the screw "O".

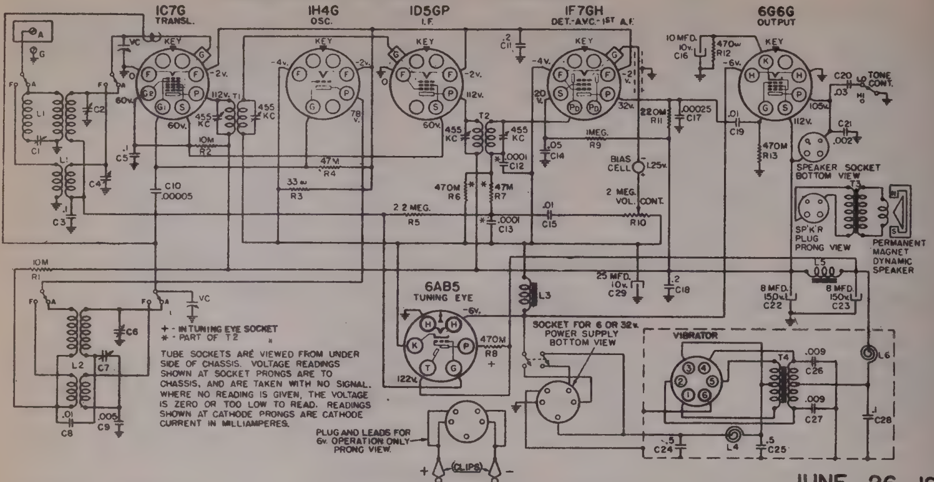
Adjust the screw marked "A" for maximum volume, retarding the volume control and readjusting if necessary. This completes the adjustments for this particular station.

Proceed in the same manner to adjust the tuning screws for the other stations on your list.

MODELS 2061,2421
Chassis 101.602

SEARS-ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.602



+ - IN TUNING EYE SOCKET
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES.

PLUG AND LEADS FOR 6v. OPERATION ONLY PRONG VIEW.

JUNE 26, 1940

FREQUENCY RANGES:
Band "AM" . . . . .550-1700 kc
Band "FOR" . . . . .5.95-18.2 mc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 0.25 watts
Maximum . . . . .0.5 watts

INTERMEDIATE FREQUENCY . . . . .455 kc

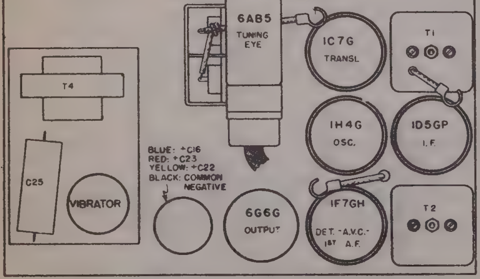
IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

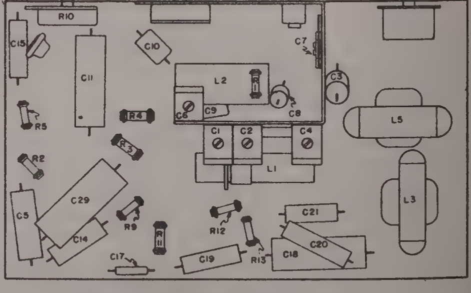
PRELIMINARY:

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts . . . . .0.37 volts
Approximate microvolts input for 50 milliwatts output . . . . .See chart below
Generator ground lead connection . . . . .Receiver chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator moudulation . . . . .30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . .HI
Position of Dial Pointer with variable fully closed . . . . Horizontal

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	1C7G Grid	T2,T1	IF Output IF Input	--
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap	--
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6,C2	Osc.,Transl.	65
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder	50
"SW"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C4	Translator	30



LOCATIONS OF PARTS ON TOP OF CHASSIS.

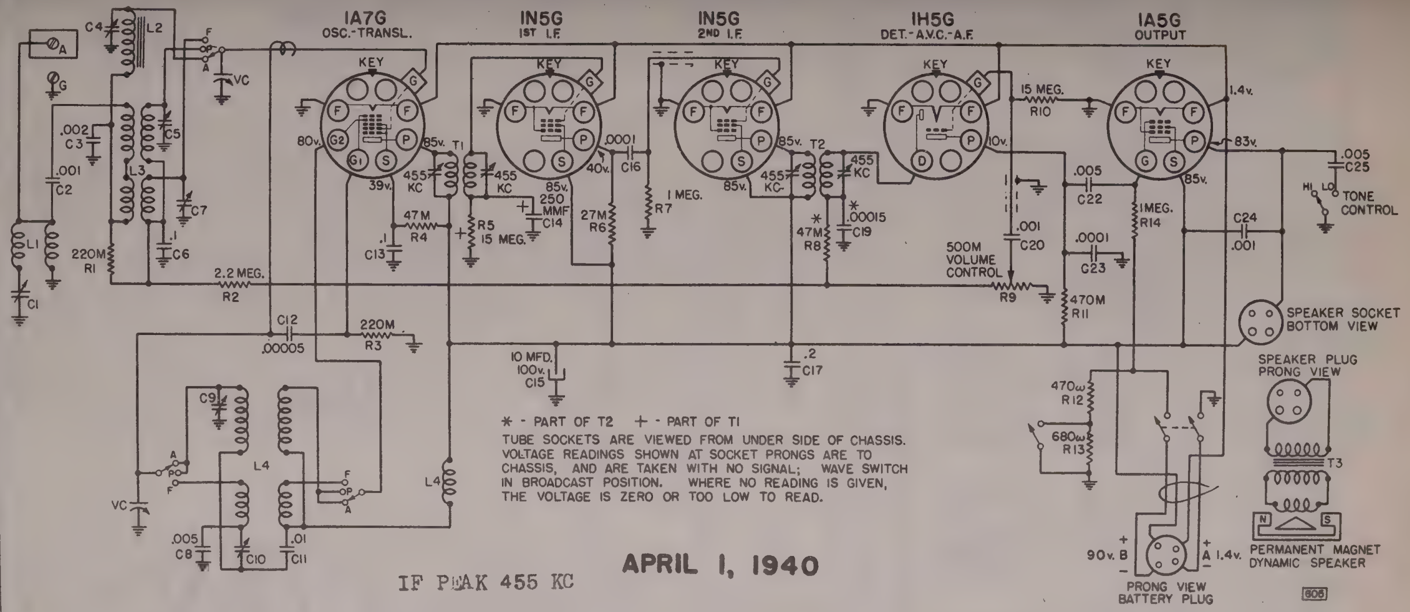


LOCATIONS OF PARTS UNDER CHASSIS 101.602

SEARS-ROEBUCK & CO.

MODELS 2511,2611,2711
Chassis 101.605

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.605



* - PART OF T2 + - PART OF T1

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 455 KC

APRIL 1, 1940

POWER SUPPLY:
#5170. . A-B block(1.5v. "A",90v. "B")
or
#5200 . . . . .2v. Storage "A"
2 - #5150 . . . . . . 45v. "B" battery
#5071. . .Adaptor necessary with 2 volt Storage "A"

"A" Drain . . . . 0.25 Amperes
"B" Drain . . . . 10.25 ma.

FREQUENCY RANGES:
Broadcast . . . . .545-1750 kc
Police . . . . .1455-2650 kc
Short Wave . . . . 5.95-18.2 mc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1750 kc	1400 kc	600 kc
None	2.4 mc	None
None	16 mc	Fixed

INTERMEDIATE FREQUENCY . . . . .455 kc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . .0.1 watts
Maximum . . . . 0.18 watts

LOUDSPEAKER:
Type . . . . PM Dynamic
Size . . . . .6 inch

OPERATING CONTROLS:
1. Left knob . . . . .Volume
2. Next to left knob . . . . . . .Tone
3. Next to right knob. . . Wave switch
4. Right knob . . . . Station Selector
5. Top knob. . . "On-Off" & Time Delay

6. Chassis rear..Battery Thrift Switch

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right: . . . ."HI", "LO"
Turning right: . . ."AM", "POL", "FOR"
Tuning ratio: 6:1
Turning part way right: . . . . . .ON;
all way right: . . On-Time Delay
"LO": Maximum battery life
"HI": Increased volume and range

MODELS 2511,2611,2711
Chassis 101.605

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts	0.3 volts
Approximate microvolts input for 50 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	HI
Position of Dial Pointer with variable fully closed	Horizontal

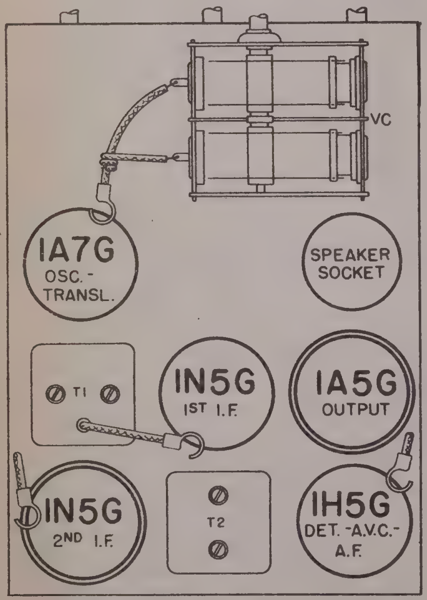
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	1A7G Grid	T2,T1	IF Output IF Input	--
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap	--
"AM"	Fully open	1750 kc	.0002 mfd.	Ant. Term.	C9	Oscillator	45
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C4	Translator	32
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C10	Padder	35
"POL"	3.4 mc	3.4 mc	400 ohms	Ant. Term.	C5	Translator	60
"FOR"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C7	Translator	30

IMPORTANT ALIGNMENT NOTES

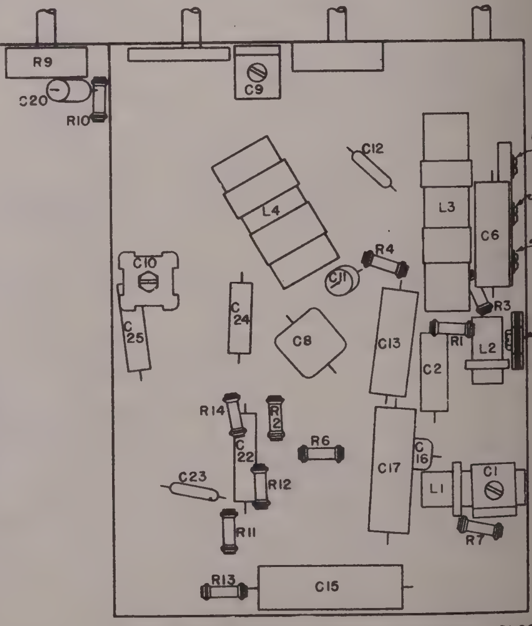
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF PARTS ON TOP OF CHASSIS

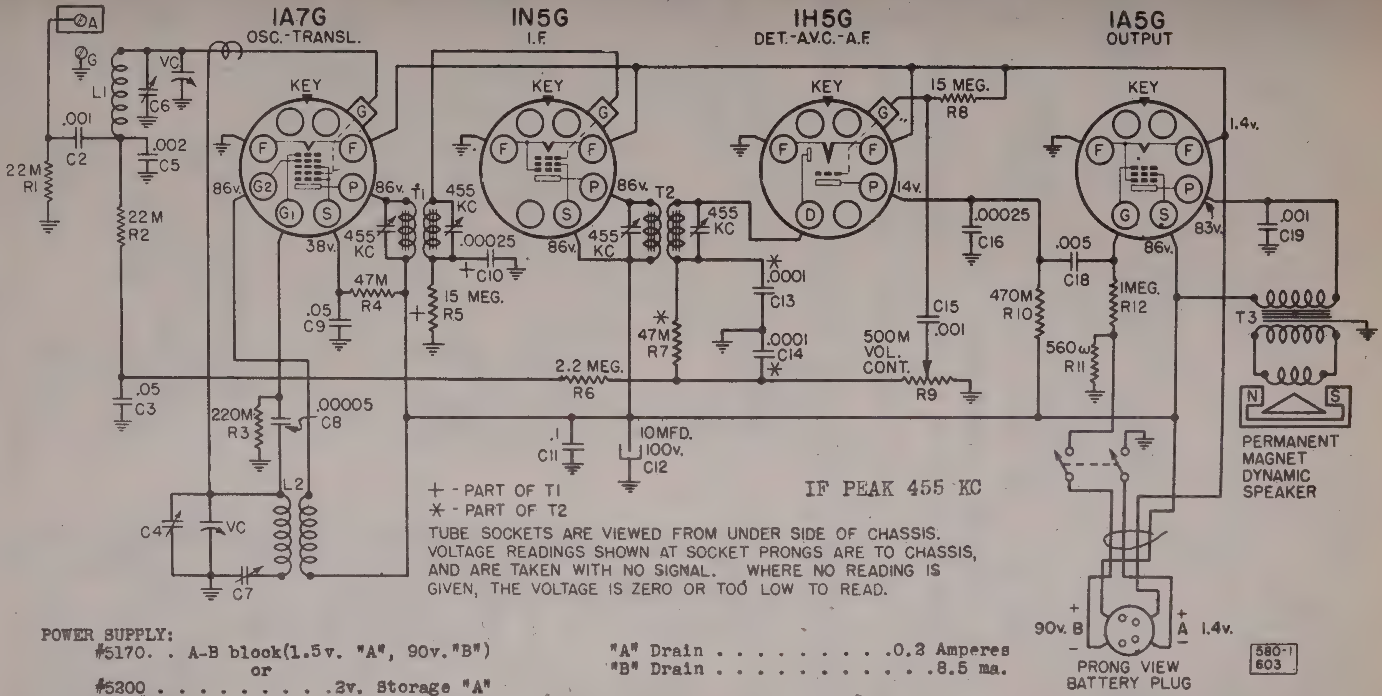


LOCATIONS OF PARTS UNDER CHASSIS 101.605

SEARS-ROEBUCK & CO.

MODELS 2541,2641,2741
Chassis 101.603

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.603



+ - PART OF T1
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 455 KC

FOUR TUBE, BATTERY POWERED SUPERHETERODYNE

MODEL 2541, 2641, 2741

POWER SUPPLY:
#5170. . A-B block(1.5v. "A", 90v."B")
or
#5200 . . . . .2v. Storage "A"
2 - #5150 . . . . . 45v. "B" battery
#5070 . . . Adaptor necessary with 2v. Storage "A"

"A" Drain . . . . .0.2 Amperes
"B" Drain . . . . .8.5 ma.

FREQUENCY RANGE:
Broadcast . . . . .540-1750 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1750 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . .455 kc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . .0.1 watts
Maximum . . . . 0.18 watts

LOUD SPEAKER:
Type . . . . .PM Dymanic
Size . . . . .5 inch

MARCH 22, 1940

MODELS 2541,2641,2741 **SEARS ROEBUCK & CO.**
Chassis 101.603

PRELIMINARY:

ALIGNMENT PROCEDURE

Output meter connections	Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts	0.3 volts
Approximate average sensitivity in microvolts for 50 milliwatts output.	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully on
Position of pointer with variable fully closed	Horizontal (To fall on block below 550 kc calibration mark.)

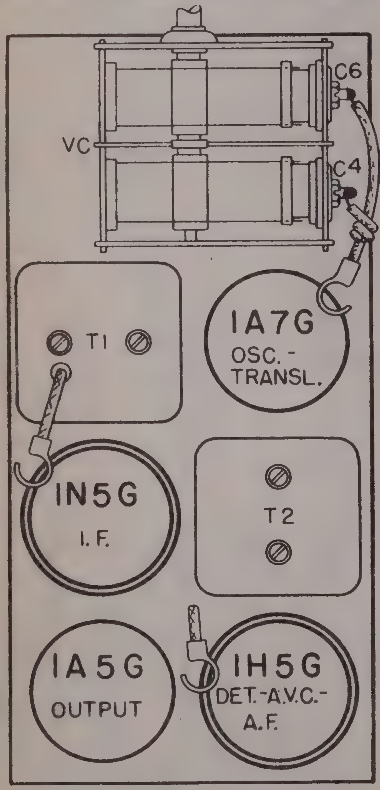
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	1A7G Translator Grid	T2,T1	IF	--
Open	1750 kc	.0002 mfd.	Ant. Term.	C4	Oscillator	--
1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6	Translator	50
600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder	50

IMPORTANT ALIGNMENT NOTES

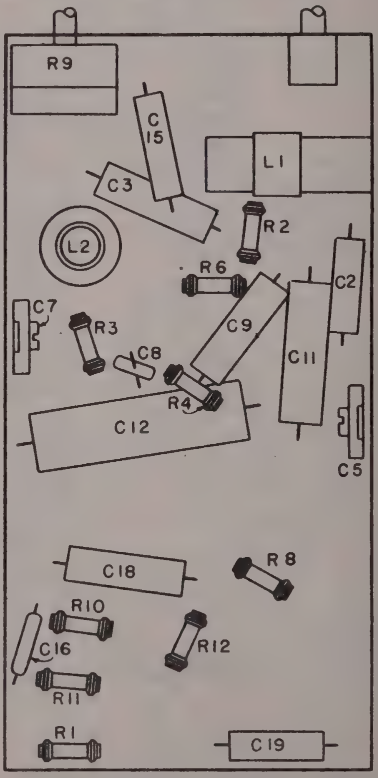
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

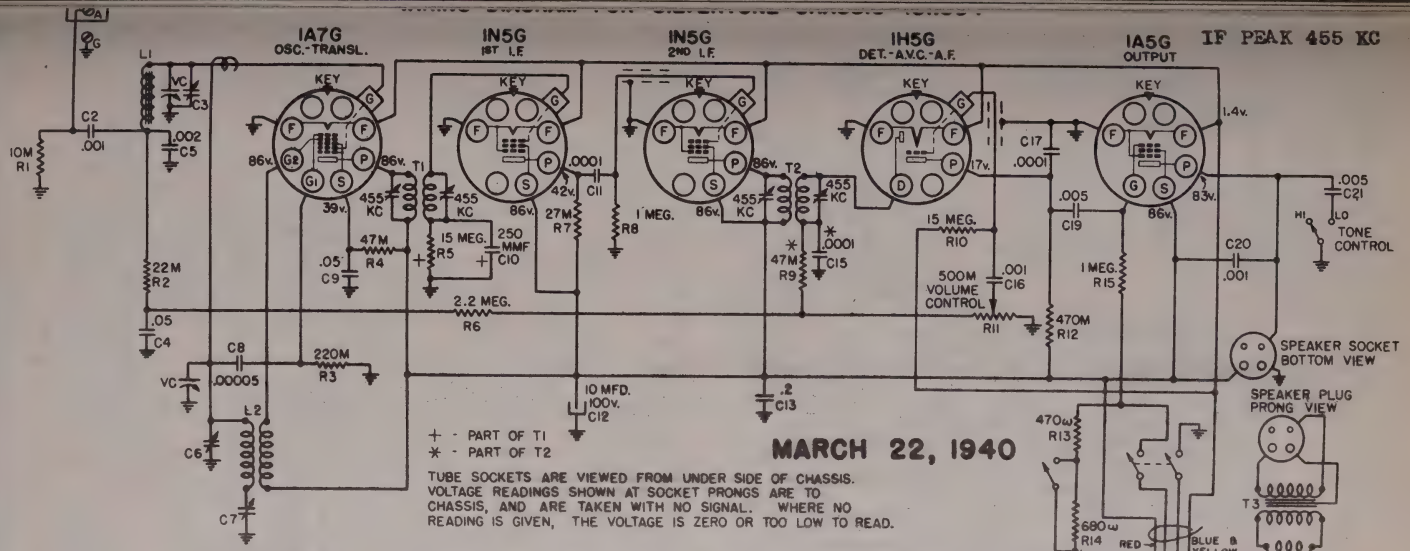


LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATION OF PARTS UNDER CHASSIS 101.603

MODELS 2551,2751
Chassis 101.604
MODEL 2761
Chassis 101.606



+ - PART OF T1
✱ - PART OF T2

MARCH 22, 1940

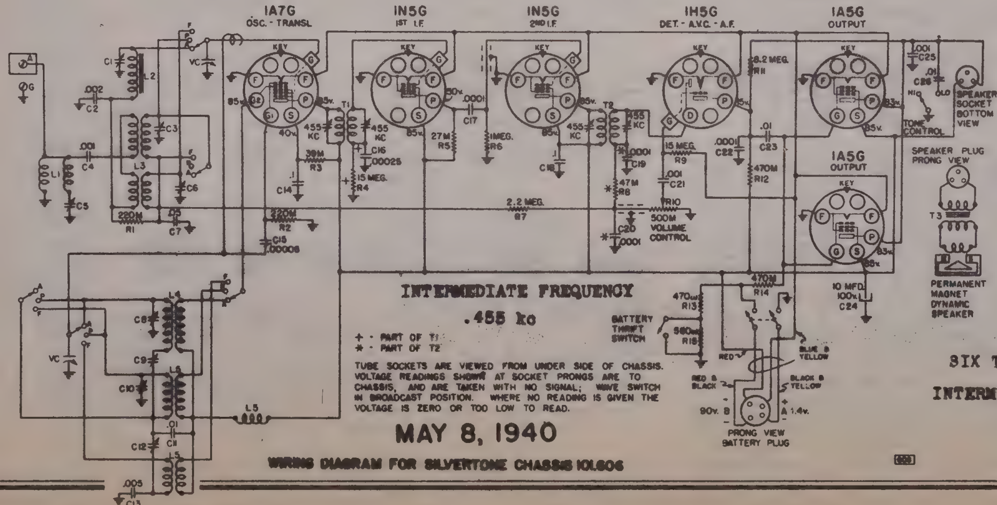
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MODEL 2551, 2651, 2751

FIVE TUBE, BATTERY POWERED SUPERHET

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . .0.1 watts
Maximum . . . . . 0.18 watts

FOR OTHER DATA, SEE INDEX



INTERMEDIATE FREQUENCY

.455 kc

+ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MAY 8, 1940

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.606

MODEL 2761

SIX TUBE, BATTERY POWERED SUPERHET

INTERMEDIATE FREQUENCY . . . . . .455 kc

POWER OUTPUT
Type . . . . Pentodes
Undistorted . .0.155 watts
Maximum . . . . 0.35 watts

MODELS 3051,3151,3251
Chassis 109352-A
109352-B

SEARS ROEBUCK & CO.

MODELS 2551,2751
Chassis 101.604

ALIGNMENT PROCEDURE

PRELIMINARY: MODELS 2551, 2751, Chassis 101.604

Output meter connections . . . . .Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.3 volts
Approximate microvolts input to indicate 50 milliwatts output . . . . .See chart below
Generator ground lead connection . . . . .Receiver chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . .Fully on
Position of Tone Control . . . . .HI
Position of pointer with variable fully closed . . . . .Horizontal (To fall on block below 550 kc calibration mark.)

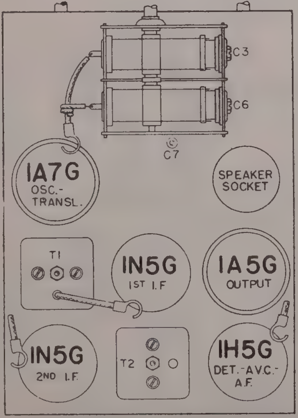
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	1A7G Translator Grid	T2,T1	IF	--
Fully open	1750 kc	.0002 mfd.	Ant. Term.	C6	Oscillator	--
1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C3	Translator	15
600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder	15

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

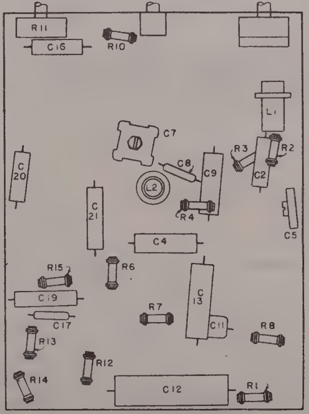
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATIONS OF PARTS ON TOP OF CHASSIS

POWER SUPPLY:
#5170. .A-B block (1.5v. "A", 90v."B")
or
#5200 . . . . 2v. Storage "A"
2 - #5150 . . . . 45v. "B" battery
#5071 . . . . . . Adaptor necessary with 2v. Storage "A"



LOCATION OF PARTS UNDER CHASSIS 101.604

"A" Drain . . . . 0.25 Amperes
"B" Drain . . . . 10.25 ma

LOUD SPEAKER:
Type . . . . .PM Dynamic
Size . . . . .5 inch

THE LOOP ANTENNA: MODELS 3051,3151,3251, Chassis 109.352-A,-B

The loop antenna built into the receiver cabinet is directional in its reception characteristics. Therefore, reception may be improved or interference reduced by turning the set to a particular position. In locations where the signal strength is too low to give satisfactory reception from the loop antenna alone, an outside antenna may be connected to the wire projecting from the rear of the receiver. No attempt should be made to use a ground connection.

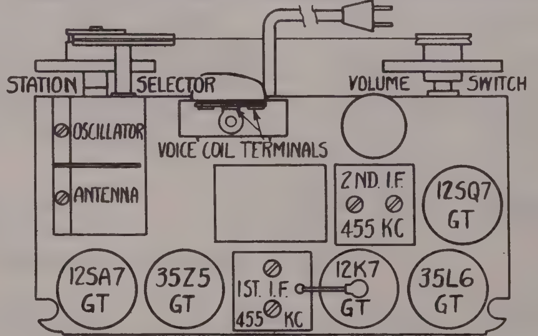
REMOVING THE CHASSIS FROM THE CABINET:

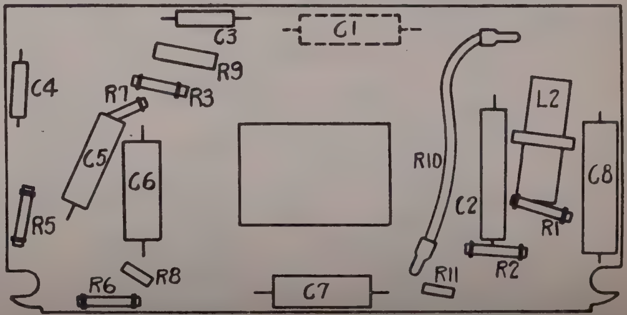
The chassis is held in the cabinet by two ordinary machine screws near the top edge of the chassis and by two fiber machine screws through the bottom of the cabinet. Since the power line is connected to the chassis the fiber screws should never be replaced with metal screws. Care should be exercised when inserting or removing the fiber screws not to damage them since they are not as strong as metal screws.

ALIGNMENT PROCEDURE

See tube layout diagram for location of trimmers. Alignment may be made without removing the set from the cabinet. Connect the output meter to the two terminals shown in the tube layout diagram. These terminals are mounted on an insulated terminal strip on top of the output transformer. These terminals connect to the voice coil.

Connect the signal generator ground to the receiver chassis through a 0.1 MFD condenser. Using a .05 to .25 MFD condenser in series with the high side of the generator output, apply a 455 KC signal to the grid of the 12K7GT I.F. amplifier tube and align the 2nd IF transformer. Repeat for the first I.F. transformer, applying the signal to the antenna section of the tuning condenser. Using a 50 MMF condenser as a dummy antenna apply the RF signal to the antenna lead. Turn the tuning condenser to minimum capacity, set the generator to 1580 KC and trim the oscillator section. Set the generator to 1400 KC, tune in the signal and adjust the antenna trimmer. (the antenna and oscillator trimmers are located on top of the tuning condenser.) NOTE: Best alignment is obtained with the volume control at maximum and the applied signal only strong enough to give satisfactory indications on the output meter. Alignment with high signal input and retarded volume control setting is seldom accurate.





SEARS ROEBUCK & CO.

MODEL 2761
Chassis 101.606

ALIGNMENT PROCEDURE

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts	0.36 volts
Approximate microvolts input for 50 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	HI
Position of Dial Pointer with variable fully closed	On mark past 550 kc
Position of Battery Thrift Switch	Right

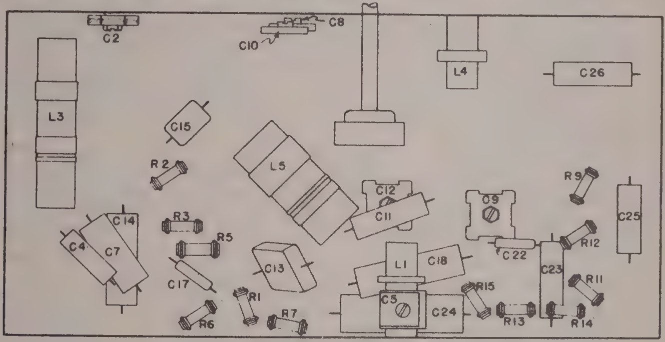
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	1A7G Grid	T2,T1	IF	75
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C5*	Wave Trap	--
"AM"	Fully open	1720 kc	.0002 mfd.	Ant. Term.	C8	Oscillator	--
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1	Translator	30
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	15
"POL"	4.5 mc	4.5 mc	400 ohms	Ant. Term.	C10,C3	Osc., Transl.	30
"FOR"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C6	Translator	10

IMPORTANT ALIGNMENT NOTES

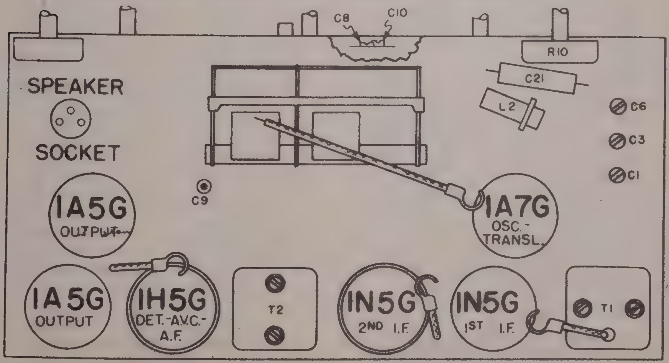
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



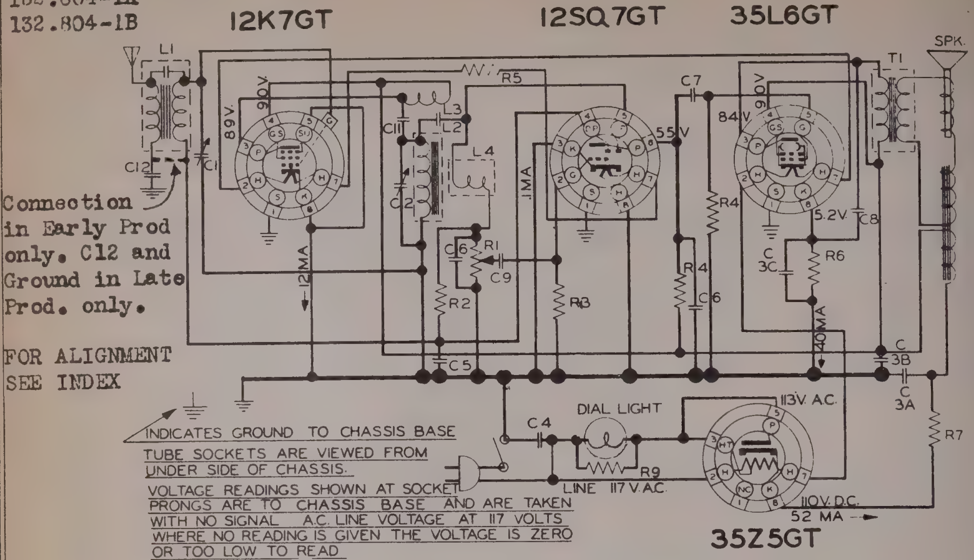
LOCATIONS OF PARTS UNDER CHASSIS 101.606



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.606

MODELS 3041,3141,3241
Chassis 132.804
132.804-1
132.804-1A
132.804-1B

SEARS ROEBUCK & CO.



Connection in Early Prod only. C12 and Ground in Late Prod. only.

FOR ALIGNMENT SEE INDEX

INDICATES GROUND TO CHASSIS BASE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS BASE AND ARE TAKEN WITH NO SIGNAL A.C. LINE VOLTAGE AT 117 VOLTS WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ

AUGUST 8, 1940

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	1325514464	Antenna Hank	.15
L1	1325516769	Antenna Coil (includes blocking cond.	.90
	1324916378	Bulb-Dial Light #47 (C-12).	.10
	1326016941	Cabinet Assembly (Black)	1.25
	1326016942	Cabinet Assembly (Walnut)	1.35
	1326016943	Cabinet Assembly (Ivory)	1.60
L3&4	1323016771	Choke-Diode & Plate	.24
	1325413053	Grid Clip	.01
L2	1322817009	Coil-R.F.	.90
C1&2	1321616767	Condenser-Variable	1.40
C3	1322016838	Condenser-Electrolytic 40-20 mfd. 150 V. 20 mfd. 25 V.	.86
C4		Condenser .05 mfd. 400 V.	.10
C5		Condenser ,05 mfd. 200 V.	.09
C6		Condenser .00025 mfd. 600 V.	.10
C7		Condenser .002 mfd. 400 V.	.10
C8		Condenser .04 mfd. 400 V.	.10
C9		Condenser .002 mfd. 400 V. metal-clad	.17
C11	1321914358	Condenser .000014 mfd. 600 V.	.08
C12		Condenser .01 mfd. 400 V.	.10
R1	1322416763	Control-Volume & Switch	.60
	1325516805	Cord-Power	.29
	1324016765	Dial Scale Plate (Maroon)	.45
	1324016773	Dial Scale Plate (Green)	.45
	1323916831	Knob-(Black)	.07
	1323916768	Knob-(walnut)	.07
	1323916830	Knob-(Ivory)	.07
R2		Resistor 2 megohm $\frac{1}{4}$ watt	.12
R3		Resistor 15 megohm $\frac{1}{4}$ watt	.12
R4		Resistor 500,000 ohm $\frac{1}{4}$ watt	.12
R5	1322114372	Resistor 154 ohm 3.5 watt	.25
R6		Resistor 150 ohm $\frac{1}{4}$ watt	.12
R7		Resistor 30 ohm $\frac{1}{4}$ watt	.12
R9		Resistor 100 ohm $\frac{1}{4}$ watt	.12
	1321816709	Socket-Tube-Wafer type	.09
	1321816353	Socket-Dial Light	.15
	1325816725	Speaker 4"	2.50
T1	1321316817	Transformer-Speaker	.75
	1326016766	Pyra lin Window	.15
	132603366	Carton (Complete with fillers)	.20

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
12K7GT . . . R.F. Amp.
12SQ7GT . . Detector-AVC-AF
35L6GT . . . . . . Output
35Z5GT . . . . Rectifier

POWER SUPPLY:
All models available . .
105-125 volts, AC-DC, 30 watts

ALIGNMENT FREQUENCIES:
R.F. - 1400 kc
Ant. - 1400 kc

LOUD SPEAKER:
Type . . . Electro dynamic
SIZE . . . . 4 inch

FREQUENCY RANGE: 540 1725 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted .800 Milliwatts
Maximum . . . 1.58 watts

OPERATING FEATURES:
Automatic Volume Control
AC-DC

CONTROL OPERATION:
Turning right: On; Volume increase.
Tuning ratio: . . . 3:1

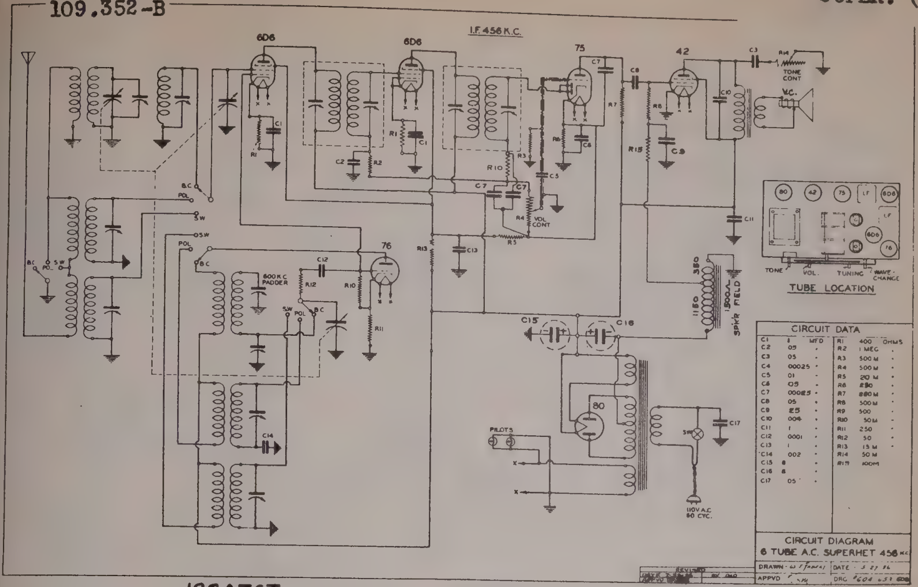
OPERATING CONTROLS:
Left Knob . . . On-Off switch & Volume
Right Knob . . . . Tuning

©John F. Rider, Publisher

ODELS 3051,3151,3251
hassis 109.352-A
109.352-B

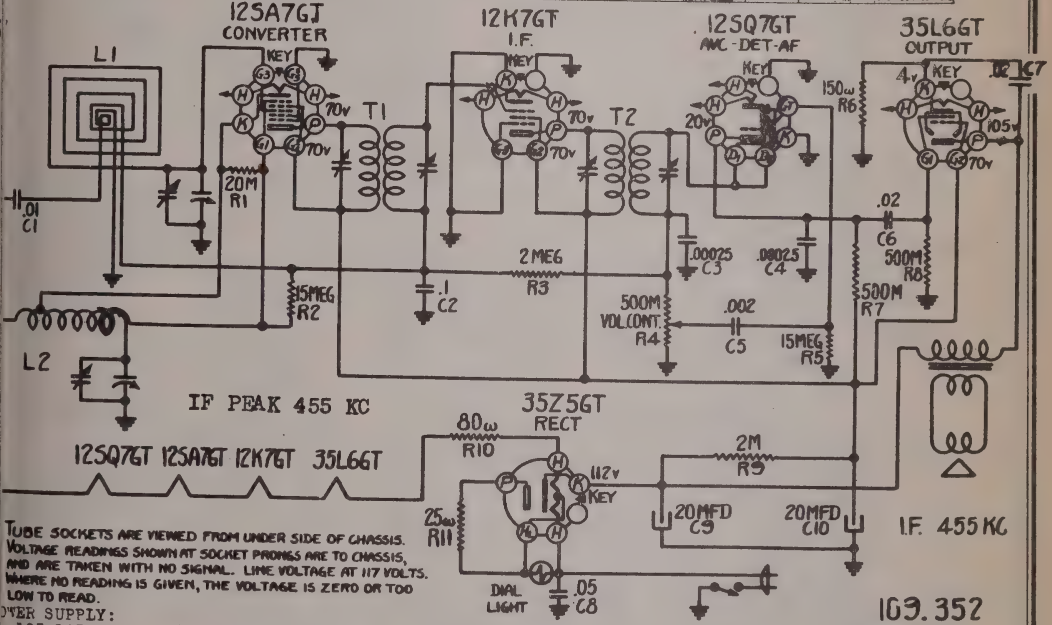
SEARS ROEBUCK & CO.

MODEL 6 TUBE A.C.
SUPER. (1936)



CIRCUIT DATA					
C1	1	MFD	R1	400	OHMS
C2	05	"	R2	1 MEG	"
C3	05	"	R3	500 M	"
C4	00025	"	R4	500 M	"
C5	01	"	R5	20 M	"
C6	05	"	R6	250	"
C7	00025	"	R7	880 M	"
C8	05	"	R8	500 M	"
C9	25	"	R9	500	"
C10	004	"	R10	50 M	"
C11	1	"	R11	250	"
C12	0001	"	R12	50	"
C13	1	"	R13	15 M	"
C14	002	"	R14	50 M	
C15	8	"	R15	100M	
C16	8	"			
C17	05	"			

CIRCUIT DIAGRAM
6 TUBE A.C. SUPERHET 456 KC
DRAWN - W. S. [illegible] DATE - 5 27 36
APPVD [illegible] DRG #604 657 [illegible]



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

OWER SUPPLY:
105-125 volts 50-60 cycle or DC . . . . 30 Watts

REQUENCY RANGE . . . . 535kc-1580kc ALIGNMENT FREQUENCIES Osc. 1580 Ant 1400 kc

NTERMEDIATE FREQUENCY . . . . 455 kc

OWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . . .7 Watts
Maximum . . . . . . 1.2 Watts

LOUD SPEAKER:
Type . . . . P.M.Dynamic
Size . . . . 4 inch
Field Permanent Magnet

FIVE TUBE, AC-DC, SUPERHETERODYNE

CHASSIS FEATURES:
Number IF stages . . . . one
Condenser tuned. Built-in loop with provision for external antenna

MODELS 3051, 3151, 3251

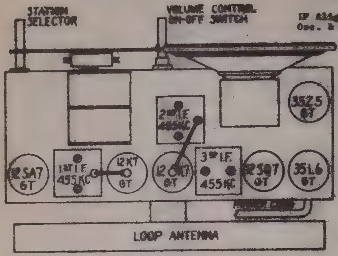
JULY 11, 1940

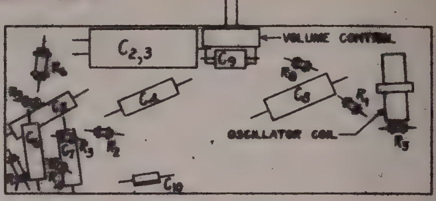
Chassis 109.354-A
109.354-B
109.354-C

SEARS-ROEBUCK & CO.

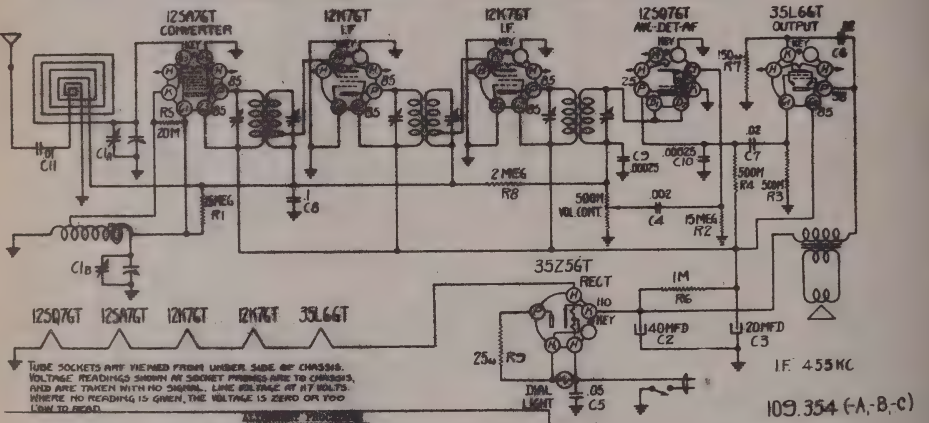
MODELS 3061,3161,3261 1521
MODELS 3041,3141,3241
Chassis 132.804 to
132.804-1B

IF Alignment frequency 455 kc
Osc. & Ant. Align & Calibrate 1400 kc





MODELS 3061,3161,3261, Chassis 109.354-A,-B,-C



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

109.354 (-A,-B,-C)

ALIGNMENT PROCEDURE

MODELS 3041,3141,3241, Chassis 132.804

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.28 volts
Dummy antenna value to be in series with generator output . . . . See chart below.
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Dial Pointer with variable fully closed . . . . See note below

POSITION OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (in order shown)	TRIMMER FUNCTION
1400 kc	1400 kc	.000075 mfd.	Ant. hook	C2, C1	R.F. Amp.
600 kc	600 kc	.000075 mfd.	Ant. hook	Check point	-----

IMPORTANT ALIGNMENT NOTES

With the variable condenser closed the pointer should point to the horizontal line just below the fig. "55".

The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

SEPTEMBER 16, 1940

ELECTRICAL SPECIFICATIONS

POWER OUTPUT:
Tube. . . . . Beam Tube
Undistorted . . . . 0.8 Watt
Maximum . . . . 1.4 Watt

OPERATING FEATURES:
Automatic Volume Control
AC-DC

LOUD SPEAKER:
Type . . Permanent Magnet Dynamic
Size . . . . 5 inch
Field . . . . . . Permanent Magnet

CHASSIS FEATURES:
Number of IF Stages . . . . . . two
Condenser tuned. Built in loop for broadcast reception with provision for external antenna for better reception where signals are weak.

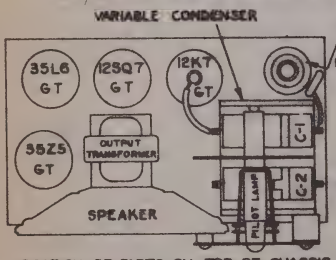
POWER SUPPLY. . . .
105-125 volts 50-60 cycles,
or DC. 30 Watts

ALIGNMENT FREQUENCY. . . . . 1400 kc

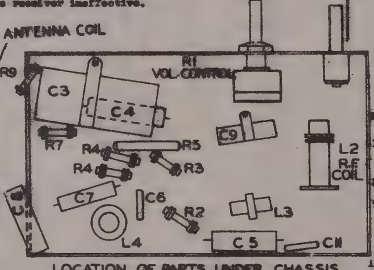
INTERMEDIATE FREQUENCY . . . . 455 kc

FREQUENCY RANGE . . . . . 540-1600 kc

TUBES AND FUNCTIONS:
12 SA7GT . . . . . Oscillator-Trans
12 K7GT. . . . . . . First IF Ampl
12 K7GT. . . . . . . Second IF Ampl
12 SQ7GT . . . . Detector-AVC-AF
35 L6GT. . . . . Output
35 Z5GT. . . . . Rectifier



LOCATION OF PARTS ON TOP OF CHASSIS

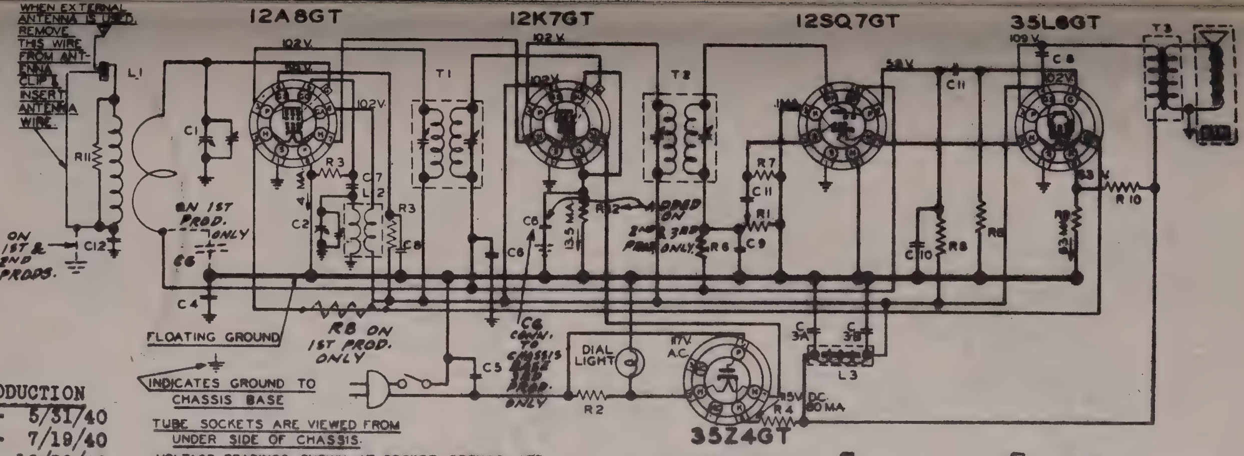


LOCATION OF PARTS UNDER CHASSIS 132.804

SEARS ROEBUCK & CO.

MODELS 3311,3411,3511
Chassis 132.803,-A,-B
132.803,-1A,-1B
132.803,-2C,-2D,-2E

PUSH BUTTON ADJUSTMENT: Each button is set up by loosening screw (under PB key), tuning in station, depressing button, and then tightening screw.



INDICATES GROUND TO CHASSIS BASE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

132595586
132.803

PRODUCTION
1st - 5/31/40
2nd - 7/19/40
3rd - 10/30/40

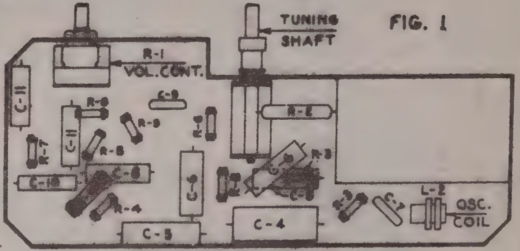


FIG. 1

LOCATION OF PARTS UNDER CHASSIS

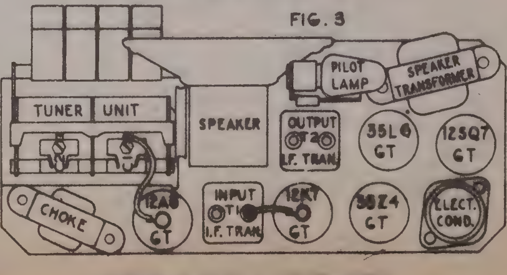


FIG. 3

LOCATION OF PARTS ON TOP OF CHASSIS

ADD.of SUFFIX -1 to CHASSIS NO., CIRCUIT DIAGRAM CHANGES - 7/19/40 - To minimize variation in overall I.F. gain bet.receivers of this model 2 circuit changes were made,and -1 added to chassis no. Variation in I.F. gain was due to operating 12K7GT tube under "no bias" condition. Ref.to diagram in RL supp.shows bias has been applied to 12K7GT by addition of R-12 bypassed by C-6. Also R-8 and C-6 were unnecessary and eliminated. In a few receivers bias was placed on the 12K7GT and also the 12A8GT by conn. 15 megohm resistor from grid end of 50,000 ohm osc.leak to AVC cir. This did not produce uniform results and was abandoned.

ADD.of SUFFIX -2C,-2D,-2E to CHASSIS NO. 132.803 - CIRCUIT DIAGRAM & PARTS LIST CHANGES FOR ALL MODELS - 9/30/40 - Circuit change amounts to add.of C-12 to increase impedance bet.ant.clip and power line. To elim. discoloration of control knobs,push button caps,and dial background, the knobs and caps were moulded out of gold tenite and dial background paper changed to match. To reduce common coupling, bypass cond.C-6 was returned to chassis base instead of to ground.

ALIGNMENT

POS.OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONN(high)	GENERATOR CONN(low)	TRIM.ADJ. (ord.shown)	TRIMMER FUNC.
Closed	455 kc	.1mf.	12A8GT Grid	Floating Gnd.	T2, T1	IF
1400 kc	1400 kc	.00005mf.	Ant. clip	Chassis base	C2, C1	Translator
600 kc	600 kc	.00005mf.	Ant. clip	Chassis base	Check Point	----

MODELS 3321,3421,3521,3721
Chassis 109.357,-A,-B,-C

SEARS ROEBUCK & CO.

POWER SUPPLY . . . 105-125 volts 50-60 cycles or DC 30 Watts. 25 cycle models available

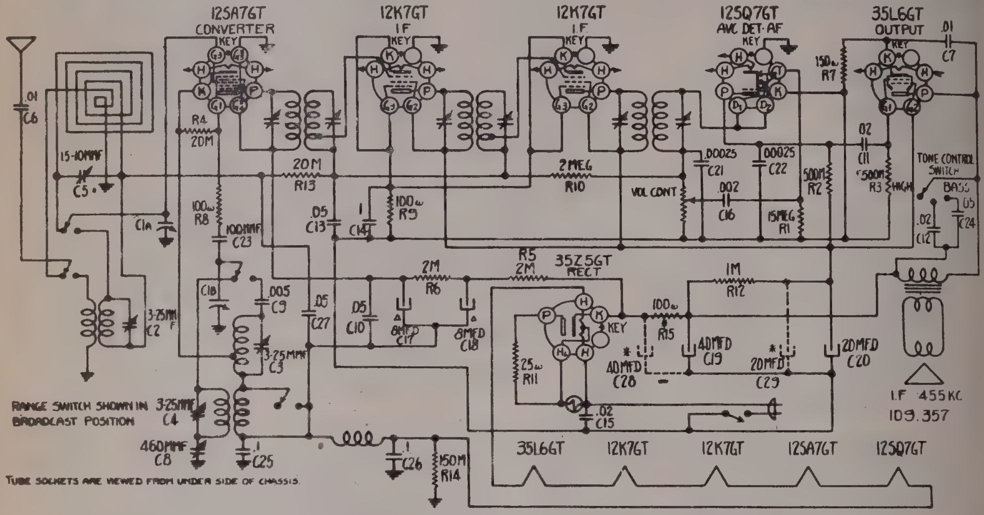
FREQUENCY RANGE. . . . . 540-1600 kc
5500-18500 kc

ALIGNMENT FREQUENCIES: . . 1400-600 kc
16000 kc

INTERMEDIATE FREQUENCY . . . . 455 kc

POWER OUTPUT:
Type. . . . . Beam Tube
Undistorted . . . . .0.8 Watt
Maximum . . . . .1.4 Watt

LOUD SPEAKER:
Type . . Permanent Magnet Dynamic
Size . . . . 5 inch
Field . . . . . Permanent Magnet



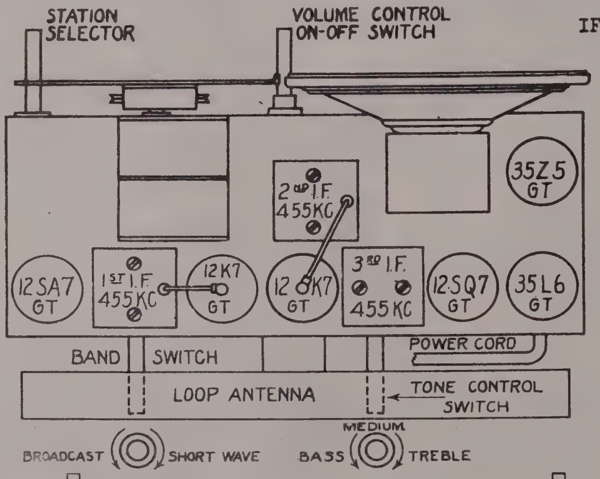
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

*USED ON 25 CYCLE ONLY.

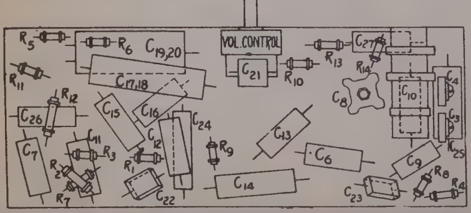
▲ THESE CONDENSERS 20MFD ON 25 CYCLE

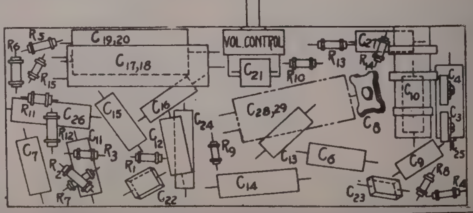
FOR ALIGNMENT SEE INDEX

IF PEAK 455 KC



SEPTEMBER 16, 1940



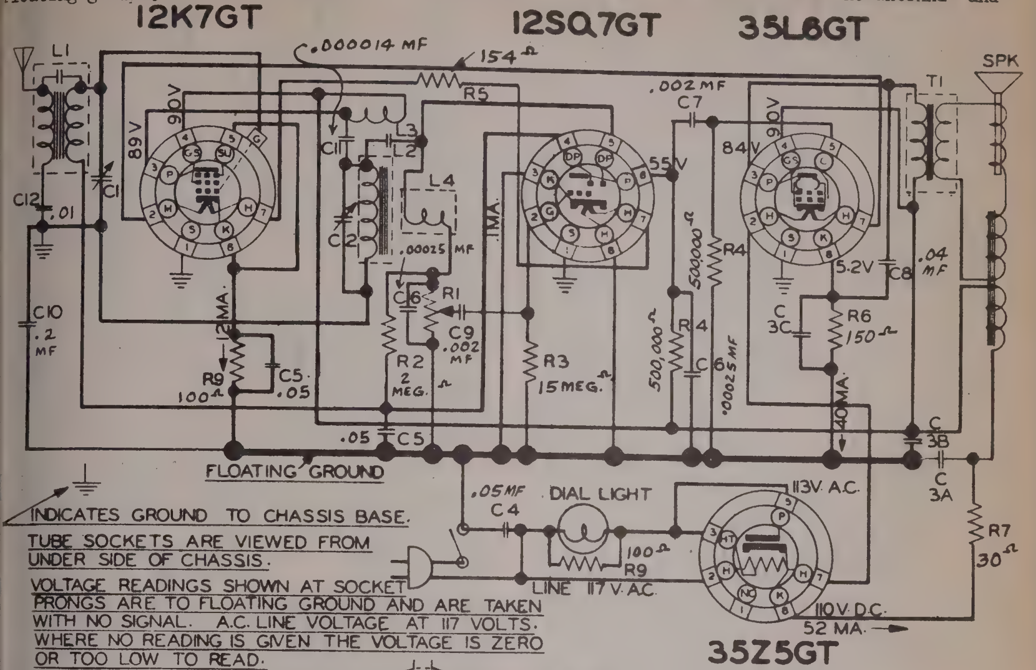


Chassis 132.805-1.-1A,-1B
(late)

SEARS-ROEBUCK & CO.

MODELS 3341,3441,3541
Chassis 132.805,-A,-B
(early)

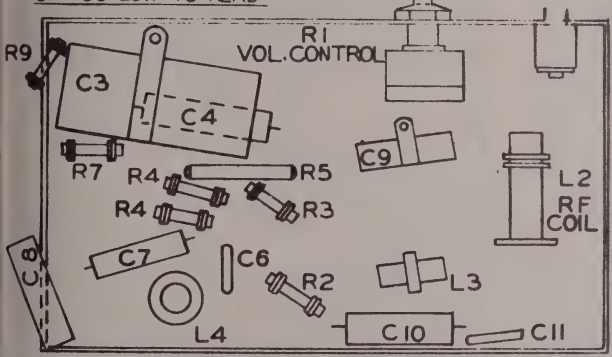
To comply with the requirements of the Underwriters Laboratories, a .01 mfd., 400 V. paper tubular condenser (C-12), was added in the antenna circuit, as isolation between the antenna and floating ground.



INDICATES GROUND TO CHASSIS BASE.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.



LOCATION OF PARTS UNDER CHASSIS

TUBES AND FUNCTIONS:

12K7GT	R.F. Amp.
12SQ7GT	Detector-AVC-AF
35L6GT	Output
35Z5GT	Rectifier

POWER SUPPLY:
All models available

105-125 volts, AC-DC, 30 watts

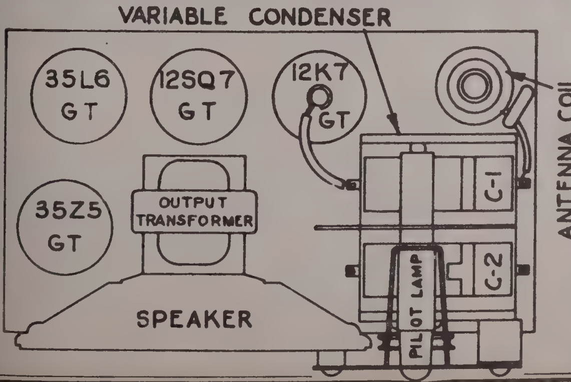
POWER OUTPUT:

Type.	Beam Tube
Undistorted . .	800 Milliwatts
Maximum	1.58 watts

FREQUENCY RANGE: . 540 - 1725 kc.

ALIGNMENT FREQUENCIES: R.F. - 1400 kc
Ant. - 1400 kc
POINTER AT 55 CHECK 600 K.C.

LOUD SPEAKER:
Type . . . .
Size . . . .

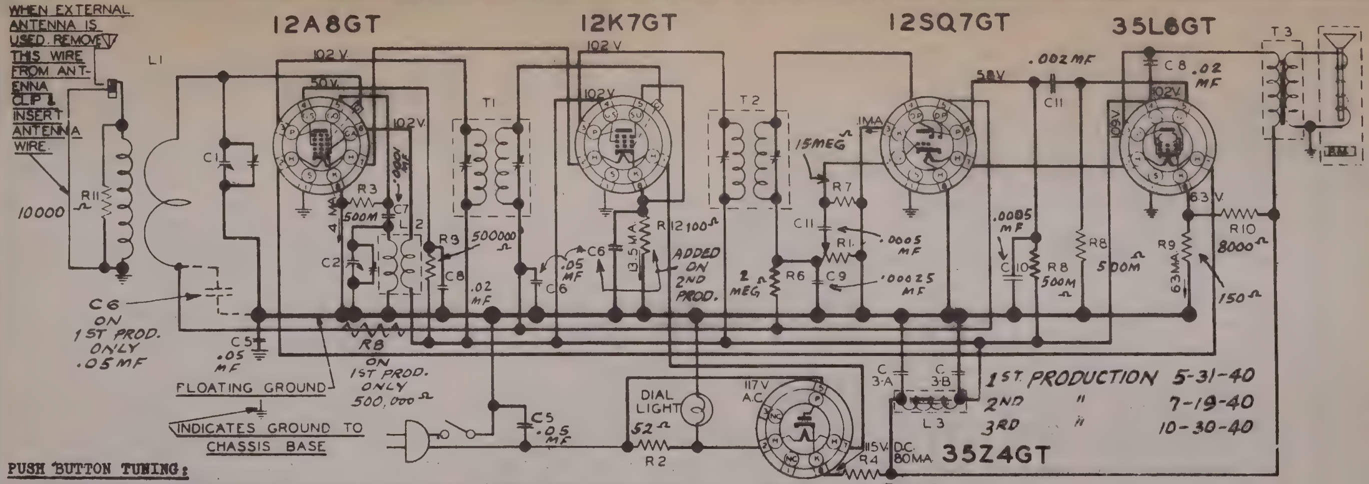


LOCATION OF PARTS ON TOP OF CHASSIS

SEPTEMBER 30, 1940

MODELS 3351, 3451, 3551
Chassis 132.802, -A, -B
132.802-1, -1A, -1B
132.802-1C, -1D, -1E

SEARS-ROEBUCK & CO.



PUSH BUTTON TUNING:

Each button is set up by loosening the screw (under the push button key), tuning in the station, depressing the button and then tightening the screw.

INTERMEDIATE FREQUENCY . . . . . . .455 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT NOTES

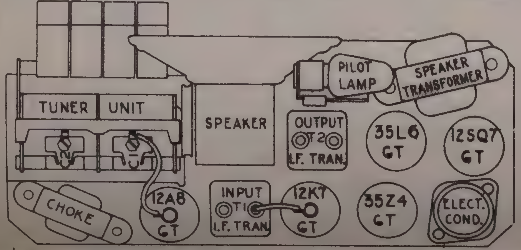
With the variable condenser closed the pointer should point vertically upward. When properly set with the variable condenser closed the pointer will point just to the right of the "54" calibration mark.

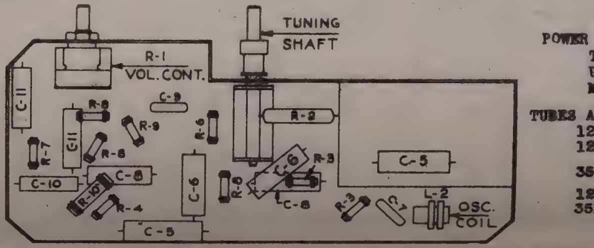
Position of Volume Control . . . . Fully clockwise
Position of Dial Pointer with variable fully closed . . . . See note below
Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.38 volts

POSITION OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (High)	GENERATOR CONNECTION (Low)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION
Closed	455 kc	.1 mfd.	12A8GT Grid	Var. Cond. Frame	T2, T1	IF
1400 kc	1400 kc	.00005 mfd.	Ant. clip	Chassis Base	C2, C1	Translator
600 kc	600 kc	.00005 mfd.	Ant. clip	Chassis Base	Check Point	- - - -

POWER SUPPLY:
All models available 105-125 volts, AC-DC, 35 watts

LOUD SPEAKER:
Type . . . . . . Permanent Magnet
Size . . . . 4 inch





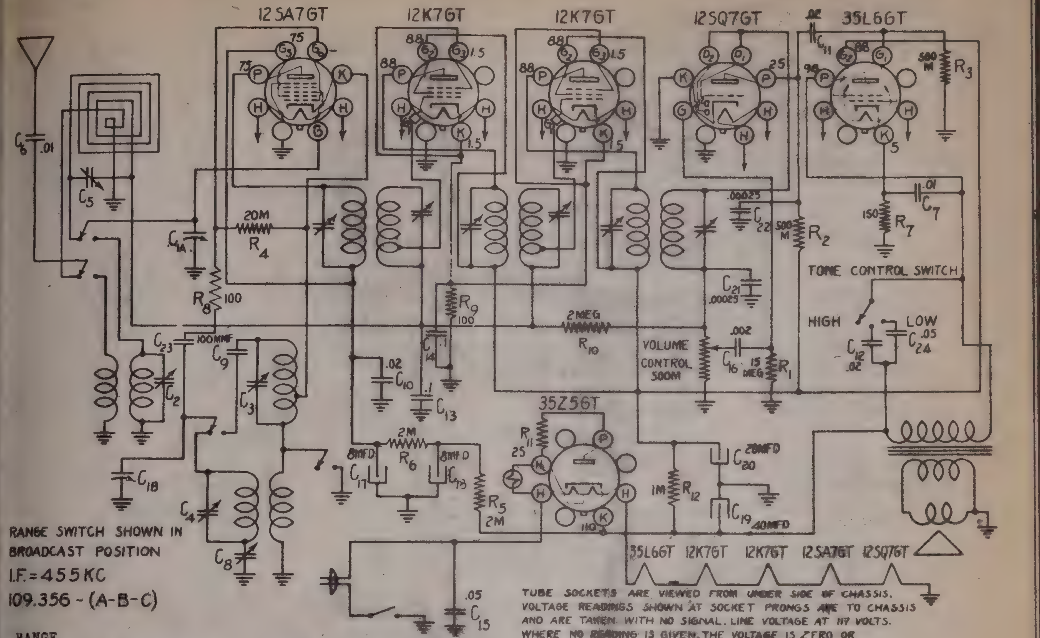
POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . 1.0 watts
Maximum . . . . 2.6 watts

TUBES AND FUNCTIONS:
12A8GT Oscillator-Translator
12K7GT . . . . .IF
35Z4GT . . . . . Rectifier
12SQ7GT . . Detector-AVC-AF
35L6GT . . . . Output

DELS 3321,3421,3521,3721
assis 109.357,-A,-B,-C

SEARS-ROEBUCK & CO.

MODELS 3361,3461,3561,3621
Chassis 109.356-A,-B,-C



RANGE SWITCH SHOWN IN BROADCAST POSITION
I.F.=455KC
109.356-(A-B-C)

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

RANGE SWITCH SETTING	GENERATOR FREQUENCY	DUMMY ANTENNA	DUMMY CONNECTED TO	FUNCTION	OPERATION
Broadcast	455 KC exact	.1 MFD	2nd IF Grid	IF Trim	Align
Broadcast	455 KC exact	.1 MFD	1st IF Grid	IF Trim	Align
Broadcast	455 KC exact	.1 MFD	Ant. Gang	IF Trim	Align
Broadcast	1400 KC exact	50 MMF	Ant. lead	Osc. trim	Adjust gang to indicate 1400 KC and align osc. trimmer for max. response.
Broadcast	1400 KC exact	50 MMF	Ant lead	Loop trim	With gang as above, adjust loop trimmer for max. response. See Note 1.
Broadcast	600 KC approx.	50 MMF	Ant lead	Osc. pad	Adjust broadcast padding condenser while rocking gang condenser.
Short Wave	16000 KC exact	400 ohms	Ant lead	S.W. osc. trim	Set condenser to indicate 16000 KC and adjust osc. trimmer for max. response See Note 2.
Short Wave	16000 KC exact	400 ohms	Ant lead	S.W. ant. trim	Rock gang condenser through signal while adjusting antenna trimmer.

SEPTEMBER 16, 1940

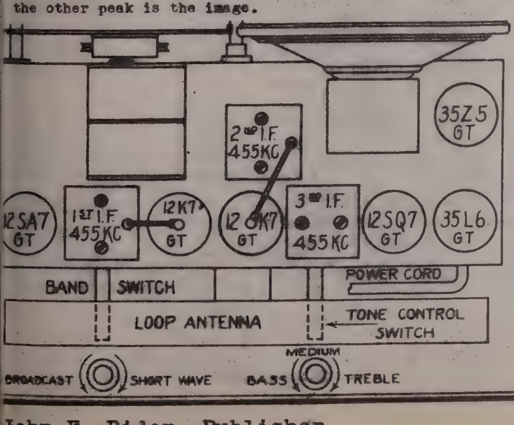
ALSO ALIGNMENT FOR MODELS 3321, 3421,3521 and 3721.

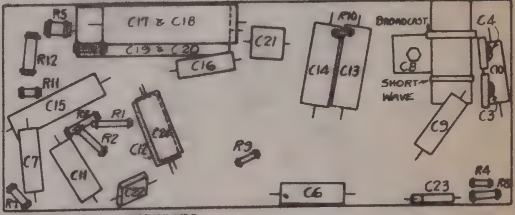
NOTE 1:

Due to productions variations in wiring and in condenser construction, a few loop trimmer condensers may peak wide open. Retrimming the oscillator to a 1400 KC signal when the pointer is set at a frequency slightly above 1400 KC may permit the loop trimmer to pass through a "peak".

NOTE 2:

If two peaks can be had, the correct one is with the trimmer screw further out (minimum capacity); the other peak is the image.





TUBES AND FUNCTIONS:
12 SA7GT . . . . . . Oscillator-Translator
12 K7GT. . . . . . . First IF Amplifier
12 K7GT. . . . . . . Second IF Amplifier
12 SQ7GT . . . . Detector-AVC-AF
35 L6GT. . . . . Output
35 Z5GT. . . . . Rectifier

POWER OUTPUT:
Type. . . . . Beam Tube
Undistorted . . . . 0.8 Watt
Maximum . . . . 1.4 Watt

MODELS 3651,3751,3851
Chassis 109.353.-A.-B

SEARS-ROEBUCK & CO.

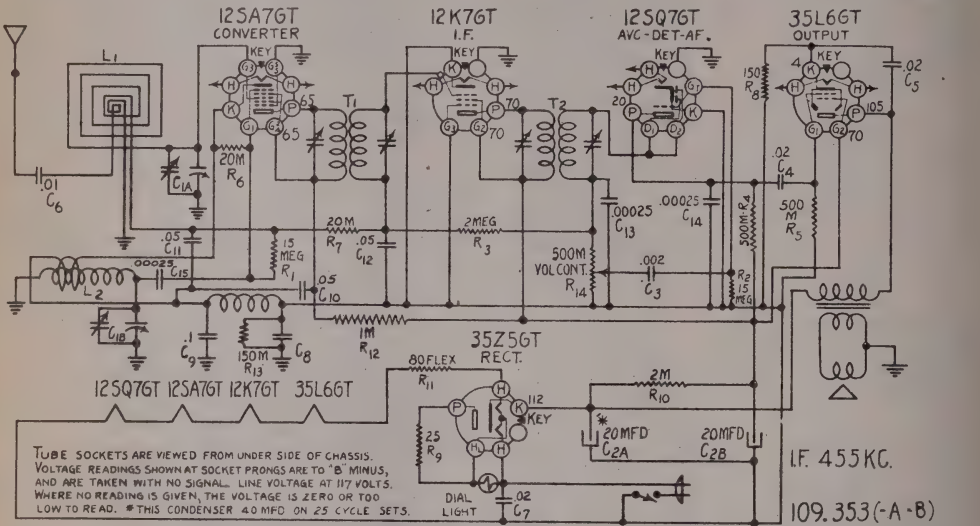
POWER SUPPLY:
105-125 volts 50-60 cycle or DC (25 cycle model available) . . . . . . 30 Watts

FREQUENCY RANGE . . . . . 535kc-1580kc ALIGNMENT FREQUENCIES Osc. 1580 Ant. 1400 kc

INTERMEDIATE FREQUENCY . . . . 455 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . .7 Watts
Maximum . . . . .1.2 Watts

LOUD SPEAKER:
Type . . . . P.M.Dynamic
Size . . . . 4 inch
Field . . . . Permanent Magnet



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO "B" MINUS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. *THIS CONDENSER 40 MFD ON 25 CYCLE SETS.

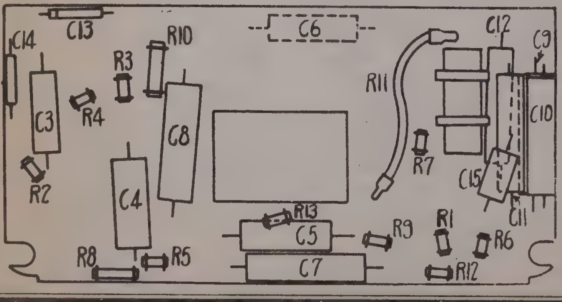
ALIGNMENT PROCEDURE

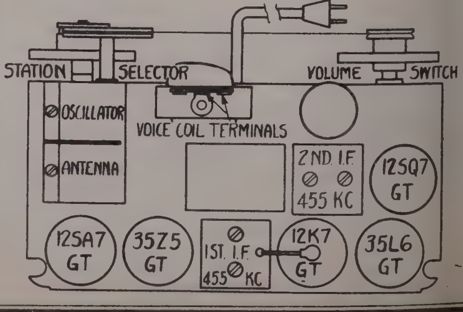
See tube layout diagram for location of trimmers. Alignment may be made without removing the set from the cabinet. Connect the output meter to the two terminals shown in the tube layout diagram. These terminals are mounted on an insulated terminal strip on top of the output transformer. These terminals connect to the voice coil.

Connect the signal generator ground to the receiver chassis through a 0.1 MFD condenser. Using a .05 to .25 MFD condenser in series with the high side of the generator output, apply a 455 KC signal to the grid of the 12K7GT I.F. amplifier tube and align the 2nd IF transformer. Repeat for the first I.F. transformer, applying the signal to the antenna section of the tuning condenser. Using a 50 MMF condenser as a dummy antenna apply the RF signal to the antenna lead. Turn the tuning condenser to minimum capacity, set the generator to 1580 KC and trim the oscillator section. Set the generator to 1400 KC, tune in the signal and adjust the antenna trimmer. (the antenna and oscillator trimmers are located on top of the tuning condenser.) NOTE: Best alignment is obtained with the volume control at maximum and the applied signal only strong enough to give satisfactory indications on the output meter. Alignment with high signal input and retarded volume control setting is seldom accurate.

THE LOOP ANTENNA:

The loop antenna built into the receiver cabinet is directional in its reception characteristics. Therefore, reception may be improved or interference reduced by turning the set to a particular position. In locations where the signal strength is too low to give satisfactory reception from the loop antenna alone, an outside antenna may be connected to the wire projecting from the rear of the receiver. No attempt should be made to use a ground connection.





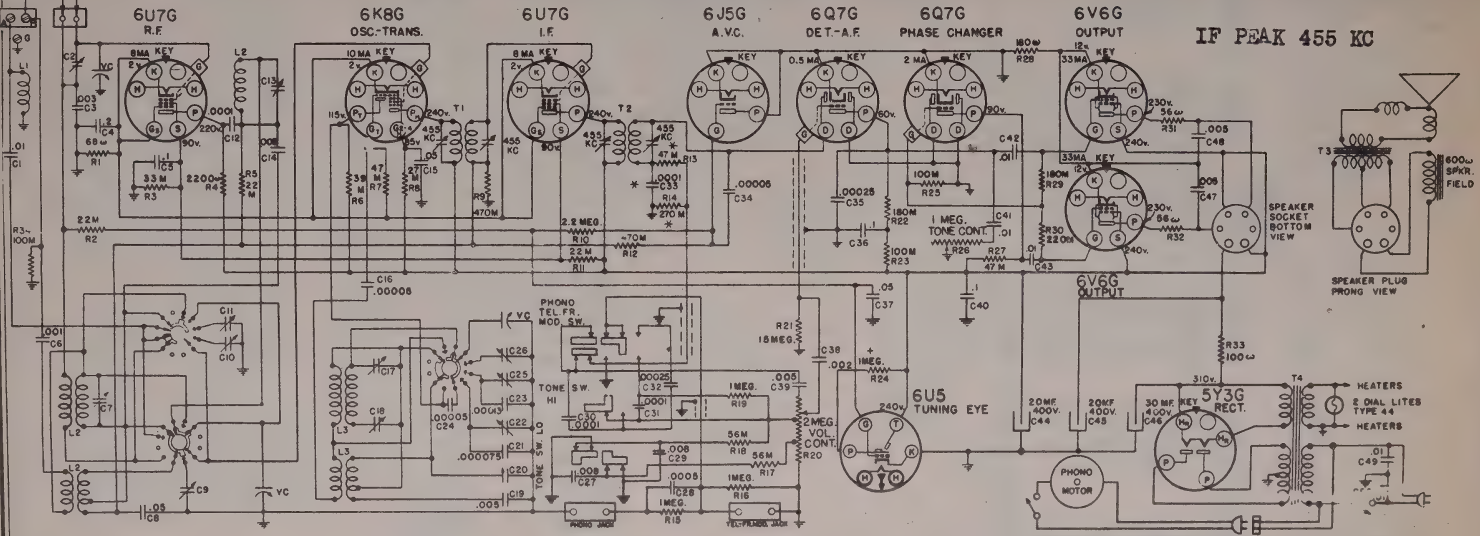
SEARS ROEBUCK & CO. MODELS R5501, R5501-A,
Chassis R5501-B
101.618.
101.618-1A

DIFFERENCES BETWEEN 101.618 AND 101.618-1A CHASSIS:

101.618-1A is identical with 101.618 except for different shaft lengths and different cabinet and appearance items.

SEPTEMBER 16, 1940

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.618, -1A



IF PEAK 455 KC

+ - IN TUNING EYE SOCKET * -PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1650 kc	1500 kc	600 kc
2.4 mc	2.4 mc	Fixed
18.3 mc	16 mc	Fixed
9.55 mc	9.55 mc	Fixed
11.71 mc	11.71 mc	Fixed

FREQUENCY RANGES:

Band "A"	540-1650 kc
Band "B"	1475-2510 kc
Band "C"	5.95-18.3 mc
Band "D"	9.3-9.85 mc
Band "E"	11-12 mc

INTERMEDIATE FREQUENCY . . . . 455 kc

LOUDSPEAKER:

Type	Dynamic
Size	12 inch
Approx. field coil res.	600 ohms
Approx. field coil voltage drop.	70 v.

POWER OUTPUT:

Type	Push-Pull beam
Undistorted	5 watts
Maximum	10 watts

PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment.

RECORD CHANGER:

101.320, 321, 322 Record Changer Unit.

POWER SUPPLY:

All models available	105-125 volt AC; 60 cycle: 140 watts
All models available	105-125 volt AC; 50 cycle; 140 watts
All models available	105-125 volt AC; 25 cycle; 150 watts

MODELS R5501,R5501-A
R5501-B

SEARS-ROEBUCK & CO.

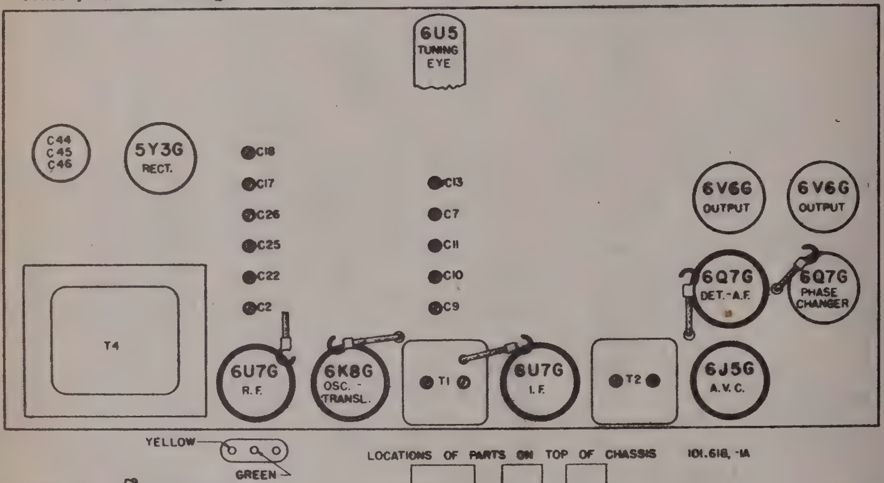
Chassis 101.618
101.618-1A

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.6 volts
Approximate microvolts input for 500 milliwatts output . . . . See chart below
Generator ground lead connection . . . . .Receiver chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . Both buttons out
Position of Dial Pointer with variable fully closed . . . . .On first mark to left of 560 kc calibration mark.

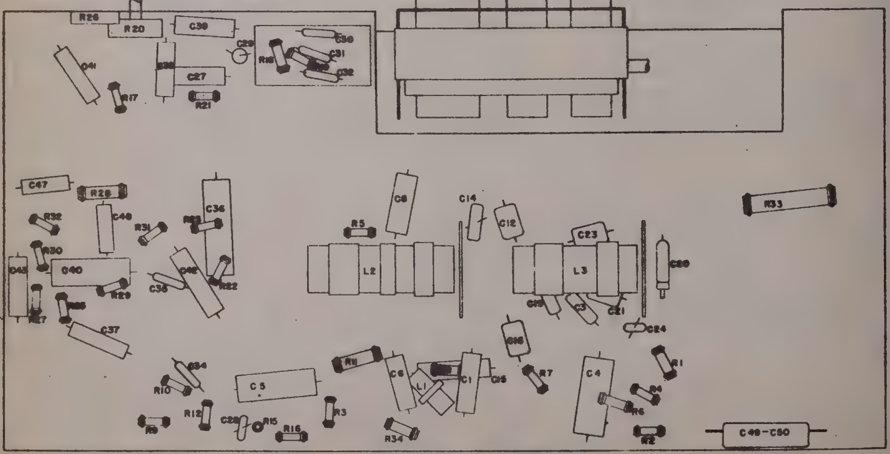
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2, T1	IF	--
"A"	Fully open	1650 kc	.00005 mfd.	Ant. Term.	C17	Oscillator	--
"A"	1500 kc	1500 kc	.00005 mfd.	Ant. Term.	C2, C13	Ant, Transl.	180
"A"	600 kc(rock)	600 kc	.00005 mfd.	Ant. Term.	C18	Padder	55
"B"	2.4 mc	2.4 mc	400 ohms	Ant. Term.	C7	Translator	130
"C"	Open	18.3 mc	400 ohms	Ant. Term.	C26*	Oscillator	--
"C"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C11	Translator	36
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C25*	Oscillator	--
"D"	9.55 mc(rock)	9.55 mc	400 ohms	Ant. Term.	C10	Translator	75
"E"	11.71 mc	11.71 mc	400 ohms	Ant. Term.	C22*	Oscillator	--
"E"	11.71 mc(rock)	11.71 mc	400 ohms	Ant. Term.	C9	Translator	75

IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.



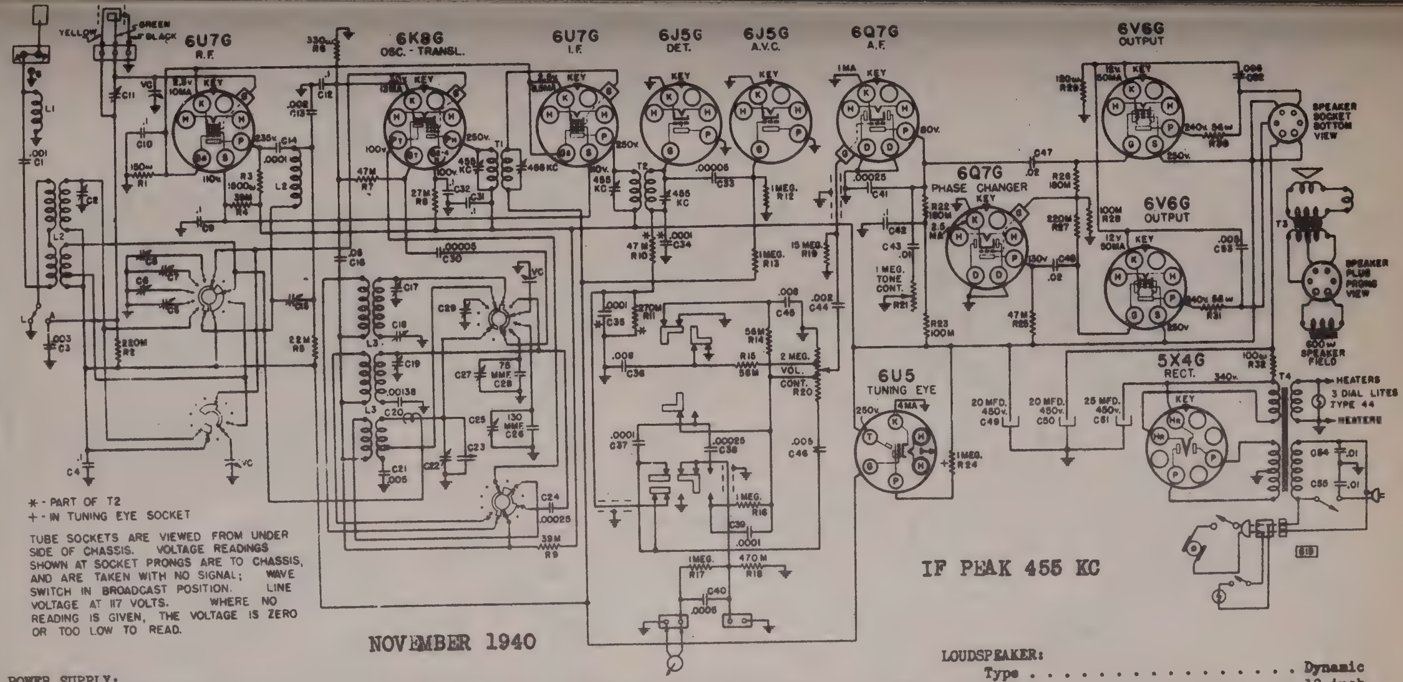
LOCATIONS OF PARTS ON TOP OF CHASSIS 101.618, -1A



LOCATIONS OF PARTS UNDER CHASSIS - 101.618, -1A

SEARS ROEBUCK & CO.

MODELS 5511,5611-A
Chassis 101.619
101.519-A



* - PART OF T2
+ - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 455 KC

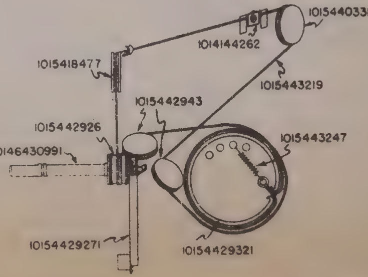
NOVEMBER 1940

LOUDSPEAKER:

Type	Dynamic
Size	12 inch
Approx. field coil resistance	600 ohms
Approx. field coil voltage drop.	75 volts

POWER SUPPLY:

All models available	105-125 volts, 50-60 cycles; 150 watts
All models available	105-125 volts, 25-60 cycles; 160 watts



ALIGNMENT FREQUENCIES:

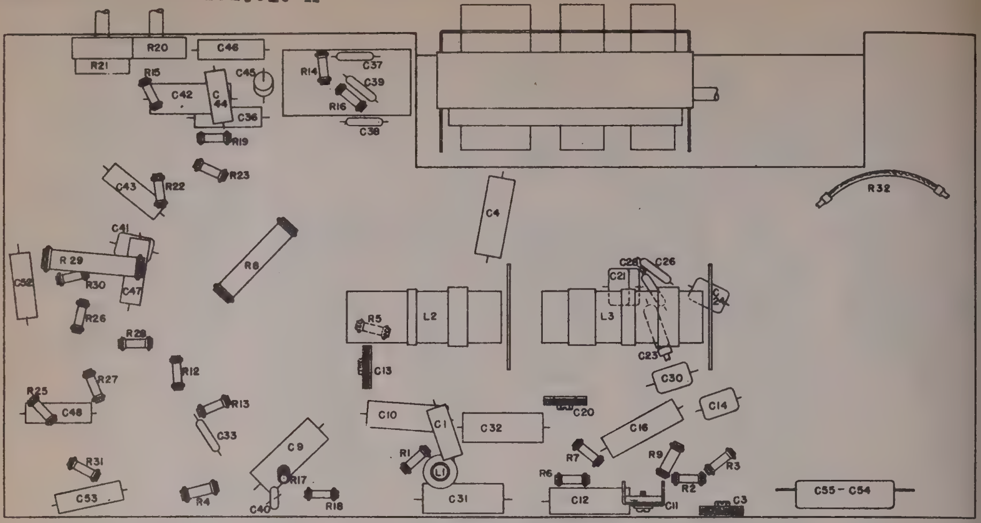
FREQUENCY RANGES:		Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
Band "A"	538-1620 kc	1620 kc	1400 kc	600 kc
Band "B"	1.66-5.2 mc	5.2 mc	4 mc	Fixed
Band "C"	5.83-18.2 mc	18.3 mc	15 mc	Fixed
Band "D"	9.36-9.87 mc	9.55 mc	9.55 mc	Fixed
Band "E"	10.93-12.1 mc	11.71 mc	11.71 mc	Fixed
Band "F"	12.72-16 mc	15.5 mc	15.5 mc	Fixed

INTERMEDIATE FREQUENCY . . . 455 kc

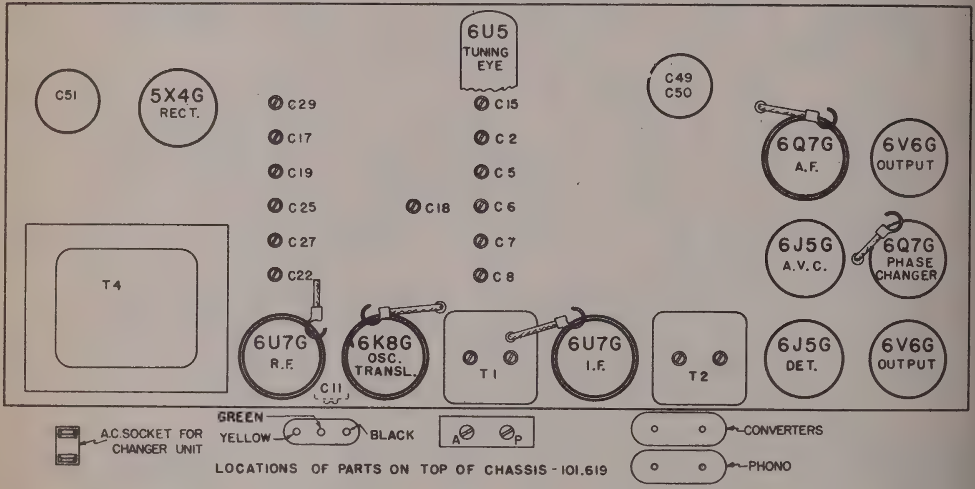
The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment.

MODELS 5511,5511-A
Chassis 101.619 101.619-A

SEARS ROEBUCK & CO.



LOCATIONS OF PARTS UNDER CHASSIS 101.619



LOCATIONS OF PARTS ON TOP OF CHASSIS - 101.619

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	—
"A"	Fully open	1620 kc	.00005 mfd.	Ant. Term.	C17	Oscillator	—
"A"	1400 kc	1400 kc	.00005 mfd.	Ant. Term.	C11,C15	Loop,Transl.	150
"A"	600 kc (rock)	600 kc	.00005 mfd.	Ant. Term.	C18	Padder	60
"B"	5.2 mc	5.2 mc	400 ohms	Ant. Term.	C19	Oscillator	—
"B"	4 mc	4 mc	400 ohms	Ant. Term.	C2	Translator	90
"C"	Open	18.3 mc	400 ohms	Ant. Term.	C22*	Oscillator	—
"C"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator	35
"D"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C25*	Oscillator	—
"D"	9.55 mc (rock)	9.55 mc	400 ohms	Ant. Term.	C6	Translator	70
"E"	11.71 mc	11.71 mc	400 ohms	Ant. Term.	C27*	Oscillator	—
"E"	11.71 mc (rock)	11.71 mc	400 ohms	Ant. Term.	C7	Translator	60
"F"	15.5 mc	15.5 mc	400 ohms	Ant. Term.	C29*	Oscillator	—
"F"	15.5 mc (rock)	15.5 mc	400 ohms	Ant. Term.	C8	Translator	40

IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

SEARS ROEBUCK & CO.

MODELS 3661,3761,3861,1621
Chassis 109.355,-A,-B,-C

POWER SUPPLY. . . . 105-125 volts 50-60 cycles or DC - 30 Watts. 25 cycle models available.
FREQUENCY RANGE . . . . 540-1600 kc
ALIGNMENT FREQUENCIES: . . . . 1400 kc
INTERMEDIATE FREQUENCY . . . . 455 kc

I.F. Alignment frequency	455 kc
Osc. & Ant. Align & Calibrate	1400 kc

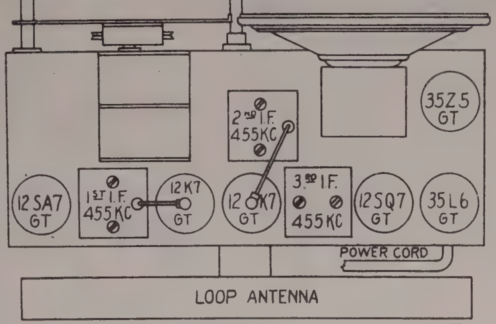
POWER OUTPUT:

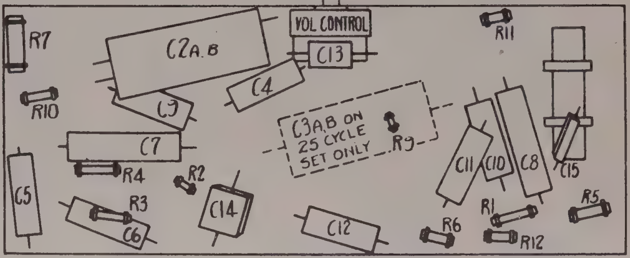
Type.	Beam Tube
Undistorted	.0.8 Watt
Maximum	.1.4 Watt

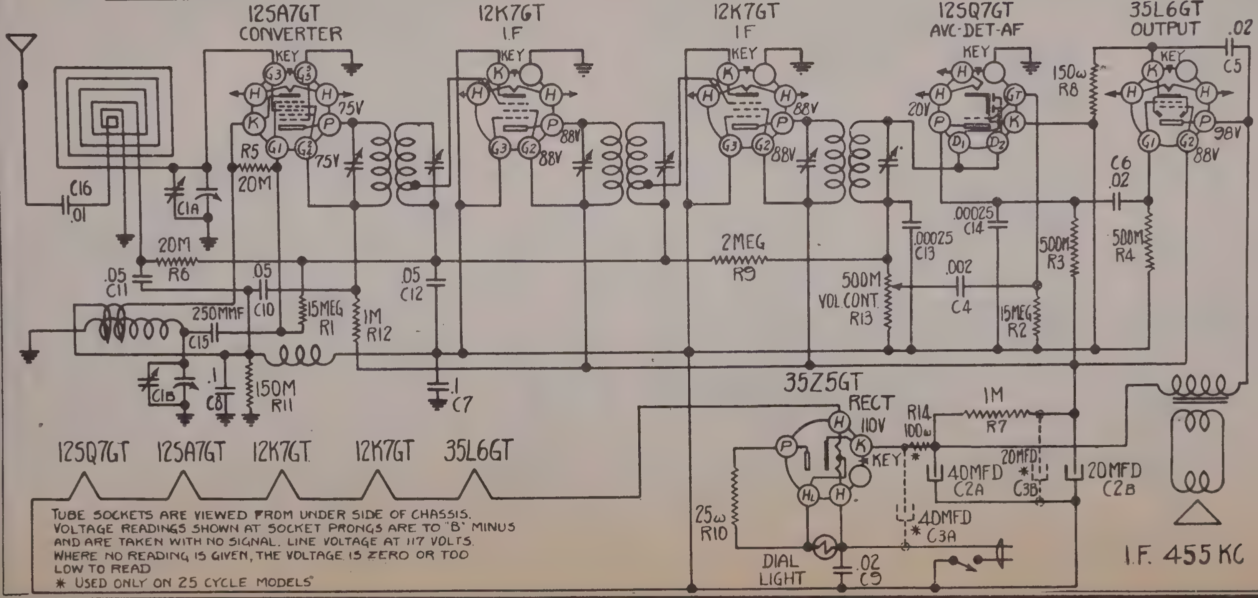
This receiver covers the broadcast band 540-1600 KC. A "tracking section" oscillator condenser is used to accomplish tracking without a padding condenser. The only adjustments provided on the RF portion of the receiver are the loop and oscillator trimmers. The circuit is quite conventional.

It is recommended that the aligning signal be induced from another loop into the loop on the set rather than to follow the conventional practice of introducing the signal through a dummy antenna into the antenna lead. A loop 5 or 6 inches in diameter made of ordinary hook-up wire, and placed 3 or 4 inches behind the loop of the set and fed through a carbon resistor of 400 to 2000 ohms is the recommended device for inducing the aligning signal into the receiver loop.

SEPTEMBER 16, 1940



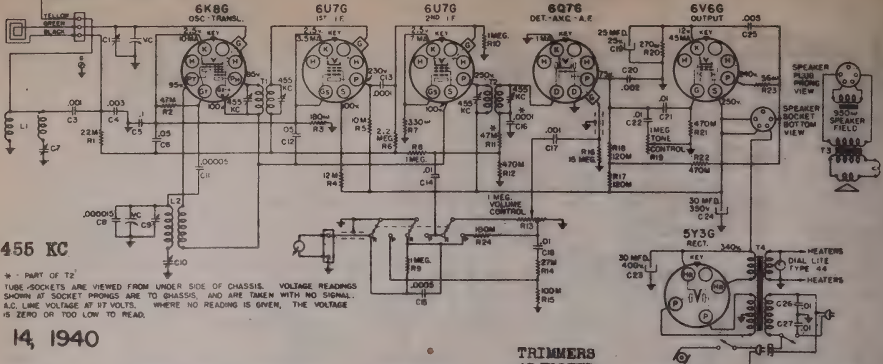




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO "B" MINUS AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ
* USED ONLY ON 25 CYCLE MODELS

MODEL R5561
Chassis 101.617

SEARS ROEBUCK & CO.



IF PEAK 455 KC

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

AUGUST 14, 1940

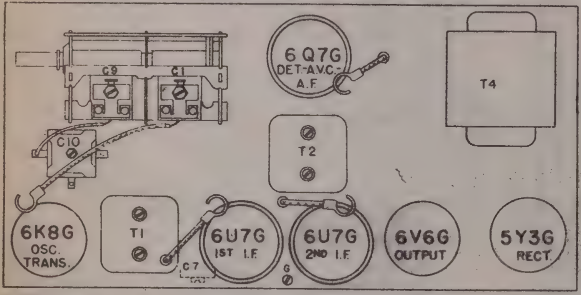
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
600 kc	455 kc	.00005 mfd.	Ant. Clip	C7*	Wave Trap	--
Fully open	1620 kc	.00005 mfd.	Ant. Clip	C9	Oscillator	--
1400 kc	1400 kc	.00005 mfd.	Ant. Clip	C1	Translator	150
600 kc(rock)	600 kc	.00005 mfd.	Ant. Clip	C10	Padder	65

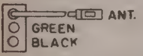
Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . .1.9 volts
Approximate microvolts input for 500 milliwatts output . . . . See chart below
Position of Tone Control . . . . .Counter-clockwise (HI)
Position of Dial Pointer with variable fully closed . . . . On mark to left of 550 kc calibration mark

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

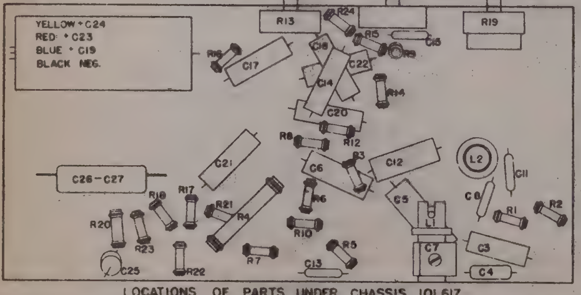
PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment by holding the screw driver lightly in the screwhead allowing the spring tension to hold the plunger against the screw driver.





LOCATIONS OF PARTS ON TOP OF CHASSIS 101.617



LOCATIONS OF PARTS UNDER CHASSIS 101.617

INTERMEDIATE FREQUENCY . . . . . . .455 kc

POWER SUPPLY:
All models available . . . . . .
105-125 v. 60 cycle AC, 70 watts
105-125 v. 50 cycle AC, 70 watts
105-125 v. 25 cycle AC, 75 watts

POWER OUTPUT:
Type . . . . Beam tube
Undistorted . . . . 4 watts
Maximum . . . . 6 watts

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1620 kc	1400 kc	600 kc

FREQUENCY RANGE: . . . . .540-1620 kc

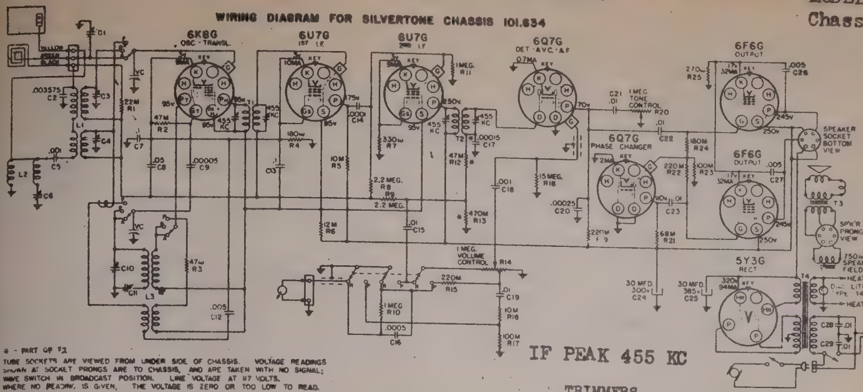
LOUDSPEAKER:
Type . . . . Dynamic
Size . . . . 10 inch
Field coil resistance . . . . 950 ohms
Approx. field coil voltage drop. 90 V.

OPERATING FEATURES:
Tone Control. . .Continuously variable
Automatic Volume Control
Push Button Tuning (5 Button)
Combined with Automatic Record Changer

CHASSIS FEATURES:
Number IF stages . . . . Two
Number condensers in gang . . . . .Two
Antenna. .Built-in loop with provision for external antenna.

SEARS ROEBUCK & CO.

MODEL 5581
Chassis 101.634



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 455 KC

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
"AM"	600 kc	455 kc	.00005 mfd.	Ant. Clip	C6*	Wave Trap	--
"AM"	Fully open	1620 kc	.00005 mfd.	Ant. Clip	C10	Oscillator	--
"AM"	1400 kc	1400 kc	.00005 mfd.	Ant. Clip	C1	Translator	200
"AM"	600 kc(rock)	600 kc	.00005 mfd.	Ant. Clip	C11	Padder	100
"POL"	2.4 mc	2.4 mc	400 ohms	Ant. Clip	C3	Translator	35
"FOR"	15 mc(rock)	15 mc	400 ohms	Ant. Clip	C4	Translator	10

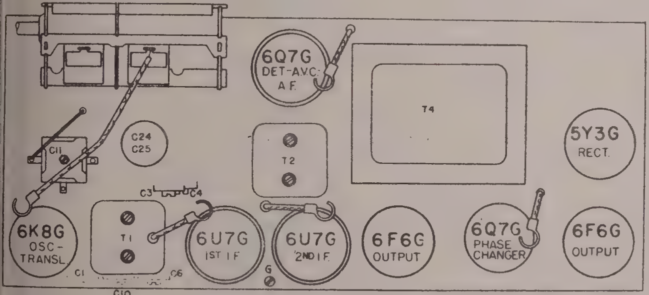
Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . .1.1 volts
Approximate microvolts input to indicate 500 milliwatts output . . . . See chart below
Position of Tone Control . . . . .Treble
Position of Dial Pointer with variable fully closed . . . . On mark to left of 550 kc calibration mark

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

SEPTEMBER 6, 1940

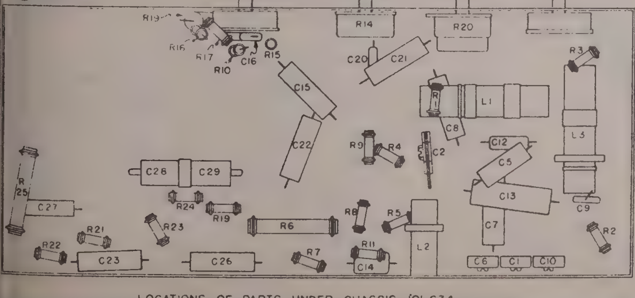
PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), releasing the plunger, then securely locking the adjustment.



○ YELLOW
○ GREEN
○ BLACK

LOCATIONS OF PARTS ON TOP OF CHASSIS 101.634



LOCATIONS OF PARTS UNDER CHASSIS 101.634

INTERMEDIATE FREQUENCY . . . . 455 kc

POWER SUPPLY:
All models available . . . . . .
105-125 volt, 60 cycles AC: 115 watts
105-125 volt, 50 cycles AC: 115 watts
105-125 volt, 25 cycles AC: 120 watts

POWER OUTPUT:
Type . . . . .Pentode
Undistorted . . . . 4 watts
Maximum . . . . 7 watts

FREQUENCY RANGES:
Band "A" . . . . 540-1620 kc
Band "B" . . . . 1450-2530 kc
Band "C" . . . . 5.8-18.5 mc

ALIGNMENT FREQUENCIES:

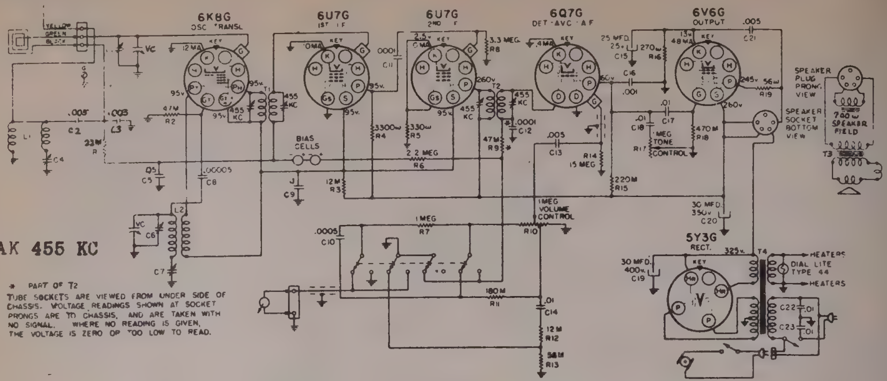
Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1620 kc	1400 kc	600 kc
None	2.4 mc	Fixed
None	15 mc	Fixed

OPERATING FEATURES:
Automatic Volume Control
Push Button Tuning (5 buttons)
Tone Control. . . Continuously variable
Combined with Automatic Record Changer

LOUDSPEAKER:
Type . . . . .Dynamic
Size . . . . .10 inch
Field coil resistance . . . . 750 ohms
Approx. field coil voltage drop. . 70 v.

CHASSIS FEATURES:
Number IF stages . . . . .Two
Number condensers in gang . . . . Two
Underwriters Approved
Built-in rotatable loop for Broadcast band and plate for Short Wave bands (RADIONET Antenna System).
Built-in IF Wave Trap

MODEL 5661 | SEARS ROEBUCK & CO. | Chassis 101.633



IF PEAK 455 KC

* PART OF T2

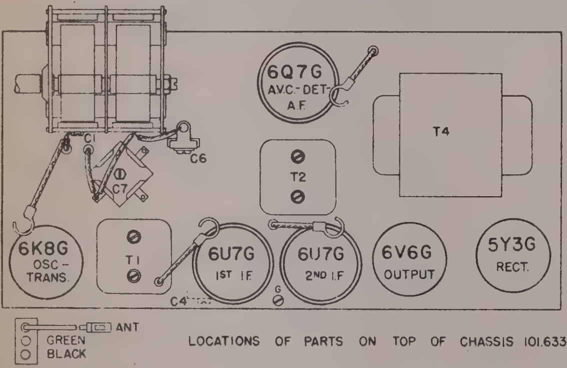
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	6K8G Grid	T2,T1	IF	--
600 kc	455 kc	.00005 mfd.	Ant. Clip	C4*	Wave Trap	--
Fully open	1630 kc	.00005 mfd.	Ant. Clip	C6	Oscillator	--
1400 kc	1400 kc	.00005 mfd.	Ant. Clip	C1	Translator	135
600 kc (rock)	600 kc	.00005 mfd.	Ant. Clip	C7	Padder	55

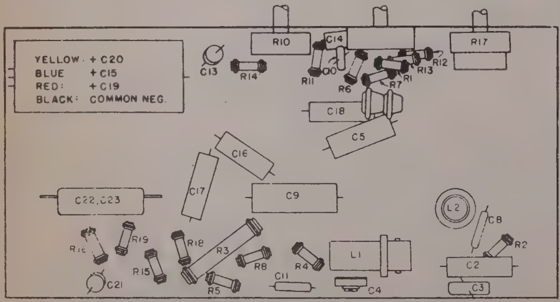
IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.9 volts
Approximate microvolts input for 500 milliwatts output . . . . See chart below
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . .Counter-clockwise (HI)
Position of Dial Pointer with variable fully closed . . . . On mark to left of 550 kc calibration mark



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.633



LOCATIONS OF PARTS UNDER CHASSIS 101.633

SEPTEMBER 17, 1940

INTERMEDIATE FREQUENCY . . . . 455 kc

FREQUENCY RANGE: . . . . 540-1620 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Translator Trimmer	Padder
1620 kc	1400 kc	600 kc

POWER SUPPLY:
All models available
105-125 v. 60 cycle AC, 85 watts
105-125 v. 50 cycle AC, 85 watts
105-125 v. 25 cycle AC, 90 watts

POWER OUTPUT:
Type . . . . Beam tube
Undistorted . . . . 2.5 watts
Maximum . . . . 5 watts

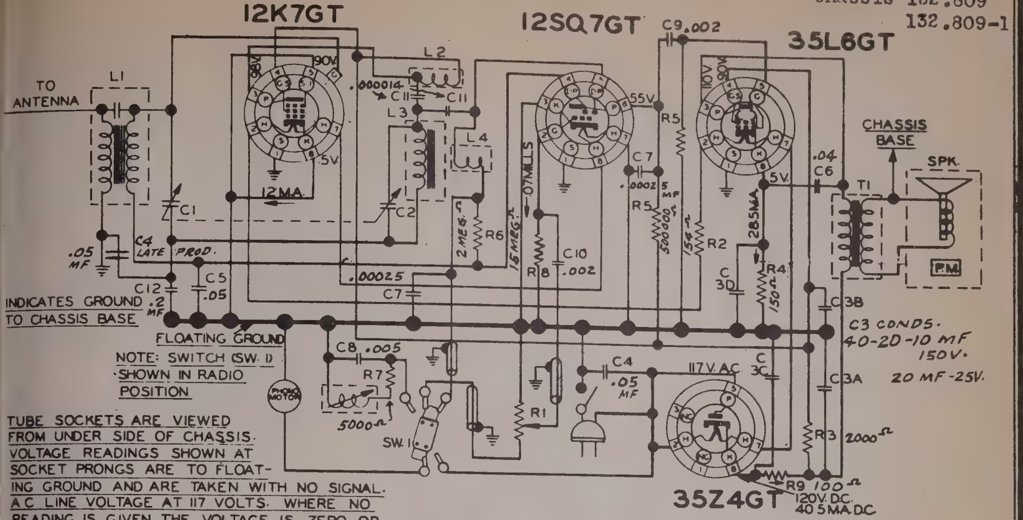
OPERATING FEATURES:
Tone Control. . .Continuously variable
Automatic Volume Control
Combined with Automatic Record Changer

LOUDSPEAKER:
Type . . . . Dynamic
Size . . . . 10 inch
Field coil resistance . . . . 700 ohms
Approx.field coil voltage drop... 65 v.

CHASSIS FEATURES:
Number IF stages . . . . Two
Number condensers in gang . . . . . .Two
Antenna...Built-in loop with provision for external antenna

SEARS ROEBUCK & CO.

MODEL 5701
Chassis 132.809
132.809-1



NOTE: SWITCH (SW. 1) SHOWN IN RADIO POSITION

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT PROCEDURE

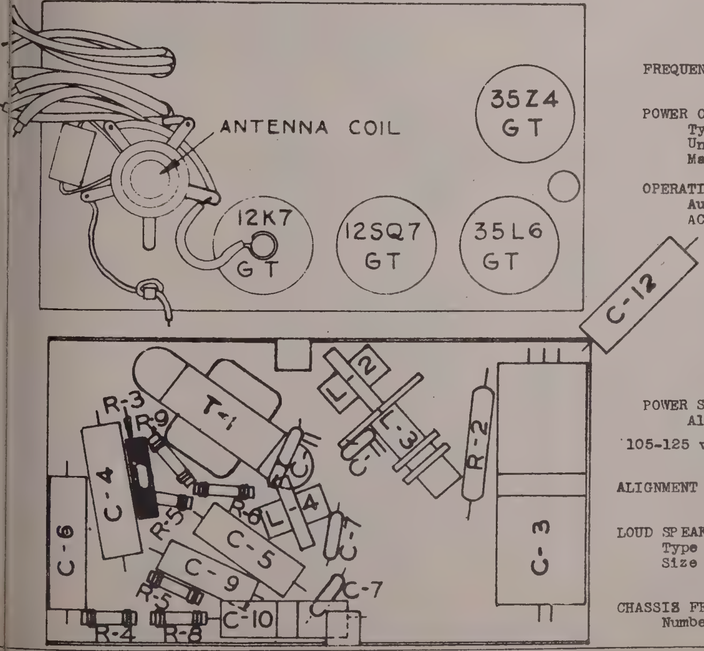
POSITION OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (high)	GENERATOR CONNECTION (Low)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION
1400 kc	1400 kc	.00005 mfd.	Ant. hank	Chassis base	C2, C1	R.F. Tank
600 kc	600 kc	.00005 mfd.	Ant. hank	Chassis base	Check Point	R.F. Tank

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.38 volts

When properly set with the variable condenser closed the pointer will point to the "54" calibration mark.

The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

Position of Volume Control . . . . Fully clockwise
Position of Dial Pointer with variable fully closed . . . . See note



FREQUENCY RANGE . . . . . . 540-1720 kc

POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . 1.0 watts
Maximum . . . 2.6 watts

OPERATING FEATURES:
Automatic Volume Control
AC only; 60 cycles & 50 cycles #

JUNE 18, 1940

TUBES AND FUNCTIONS:

12K7GT	RF
12SQ7GT	Dectector-AVC-AF
35L6GT	Output
35Z4GT	Rectifier

POWER SUPPLY:
All models available . . . .
105-125 volts, AC-only-60 cycles, 45 watts
50 cycles

ALIGNMENT FREQUENCIES: Ant.- 1400 kc
R.F.-1400 kc

LOUD SPEAKER:
Type . . . . . . Permanent Magnet
Size . . . . 4 inch

CHASSIS FEATURES:
Number TRF stages . . . . . two

MODEL 5711
Chassis 110.409

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available. . . . . .110-125 volts, 25-60 cycle AC or DC,30 watt

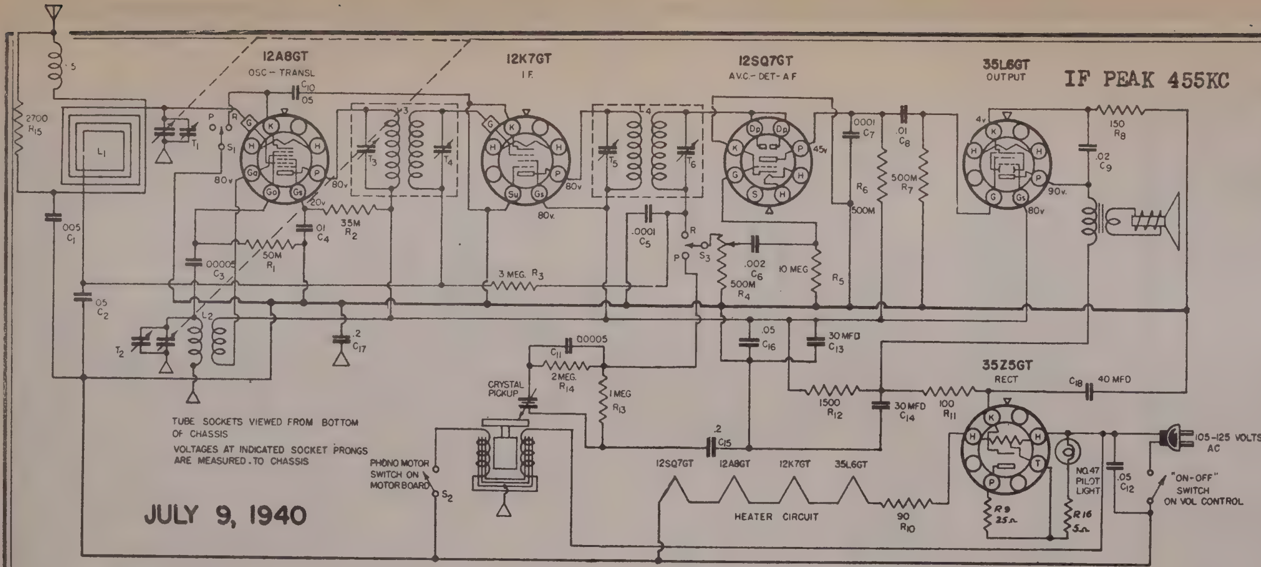
FREQUENCY RANGE:
Broadcast . . . . .540-1730 KC

ALIGNMENT FREQUENCIES:
Broadcast . . . . .1500 KC (Oscil. Trimmer)

Osc
Pad
Fi

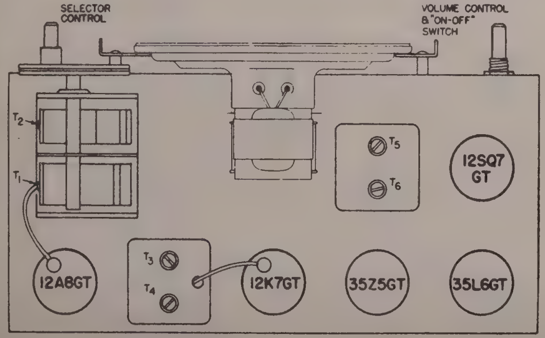
POWER OUTPUT:
Type...........................Beam Power
Undistorted 1.0
Maximum........................1.5

LOUD SPEAKER:
Type......................................Dyna
Size......................................
Field.....................................P



TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS
VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS

JULY 9, 1940



ALIGNMENT PROCEDURE

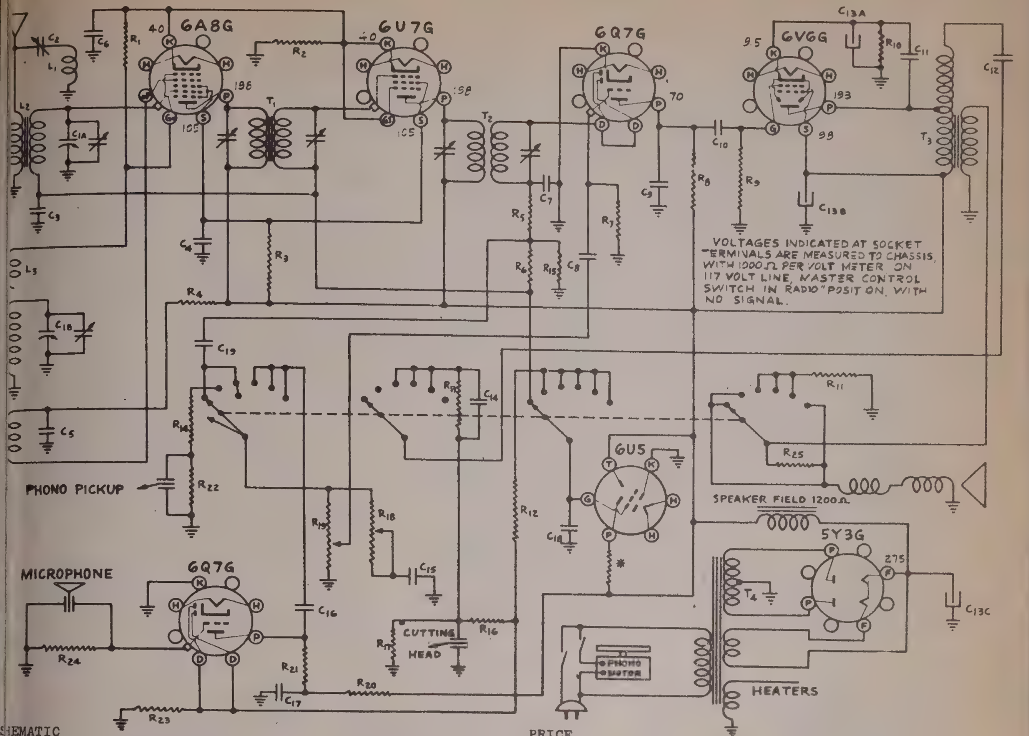
Output meter conn. ... Across primary o.p. transf.
Dummy ant. in series with gen. o.p. ... 100 mmfds.
Conn. of gen. ground .... B Minus Bus
Gen. Modulation .... App. 30% @ 400 cycles
Pos. of vol. control .... Fully clockwise

Always keep o.p. from test oscillator at its lowest possible value. As sensitivity is increased by alignment, the gen. o.p. should be reduced correspondingly. **Short Oscillator section of variable condenser. ***Connect gen. o.p. to a separate radiating loop and pickup 1500 KC signal on receiver.

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
**	455 KC	12K7GT,Grid	T5, T6	I.F.
**	455 KC	12A8GT,Grid	T3, T4	I.F.

SEARS-ROEBUCK & CO.

MODELS 5731,5761
Chassis 109.359



VOLTAGES INDICATED AT SOCKET TERMINALS ARE MEASURED TO CHASSIS, WITH 1000Ω PER VOLT METER ON 117 VOLT LINE, MASTER CONTROL SWITCH IN RADIO POSITION, WITH NO SIGNAL.

HEMATIC CATION	PART NUMBER	DESCRIPTION	PRICE EACH
R19	109288260	Control, Volume and Switch	1.25
R18	109258519	Control, Tone	.80
	109542562	Cap, Tube Shield	.10
1	109288624	Coil, Wave Trap	.40
2	109288261	Coil, Antenna	1.15
3	109288446	Coil, Oscillator	.75
1a,b	109168472	Condenser, Variable	2.75
2	109173272	Condenser, Trimmer	.30
3,17,18		Condenser, .1 mfd. 200 volt	.20
4,6		Condenser, .2 mfd. 200 volt	.25
5,16		Condenser, .01 mfd. 400 volt	.20
7,9		Condenser, 250 mmf. mica	.25
10		Condenser, .02 mfd. 400 volt	.20
11,15,18		Condenser, .002 mfd. 600 volt	.20
12		Condenser, .01 mfd. 600 volt	.20
13a,b,c	109208339	Condenser, Electrolytic	1.65
14		Condenser, .001 mfd. 400 volt	.20
1,5,13		Resistor, 50 M 1/3 watt	.15
2		Resistor, 200 ohm 1/3 watt	.15
3		Resistor, 15 M 1 watt	.20
4		Resistor, 20 M 1/3 watt	.15
6,15		Resistor, 1 meg 1/3 watt	.15
7		Resistor, 10 meg 1/3 watt	.15
16,24		Resistor, 5 meg 1/3 watt	.15
8,14,21,22		Resistor, 200 M 1/3 watt	.15
9,20		Resistor, 500 M 1/3 watt	.15
10		Resistor, 300 ohm 1/3 watt	.15
11		Resistor, 5 ohm 1 watt	.15
17		Resistor, 300 M 1/3 watt	.20
12,23		Resistor, 2 meg 1/3 watt	.15
25		Resistor, 20 ohm 1 watt	.15
1	109338415	Transformer, 1st LF	.20
2	109358456	Transformer, 2nd IF	2.25
3	109138278	Transformer, Output	2.25
4	109108455	Transformer, Power 60 cycle	2.00
	109108625	Transformer, Power 50 cycle	4.50
	109408448	Dial Chart	5.50
	109418451	Pointer	.35
	109542541	Tube Shield	.35
	109548298	Shaft, Pointer	.15
	109544313	Bracket, Tuning Tube	.20
	109598461	Book, Instruction	.20
	109598283	Dial Crystal	.30
	109668285	Microphone	.25
	109448477	Plate, Motor Switch	.25
	109388454	Switch, Motor	.65
	109588295	Speaker, 6½" Dynamic	5.00

IF PEAK 455 KC

TUBES AND FUNCTIONS
6A8G.............Oscillator-Translator
6U7G.......................IF Amplifier
6Q7G...............Detector-AVC-Audio

6Q7G......Pre-amplifier for Microphone
6V6G......................Power Output
5Y3G...........................Rectifier

6U5....Tuning/Volume Indicator

POWER SUPPLY.......

105-125 volts AC 78 Watts

50 and 60 cycle models available.

FREQUENCY RANGE... .... 540 to 1720 KC.

ALIGNMENT FREQUENCIES

Intermediate frequency 455 kc., Wave Trap 455 kc.
Oscillator 1720 kc., Antenna 1400 kc.

POWER OUTPUT
Type.......................Beam Tube
Undistorted.............. 2.0 Watts
Maximum.................. 3.5 Watts

SPEAKER
Type.........................Dynamic
Size..........................6½ Inch
Field Resistance...........1150 Ohms

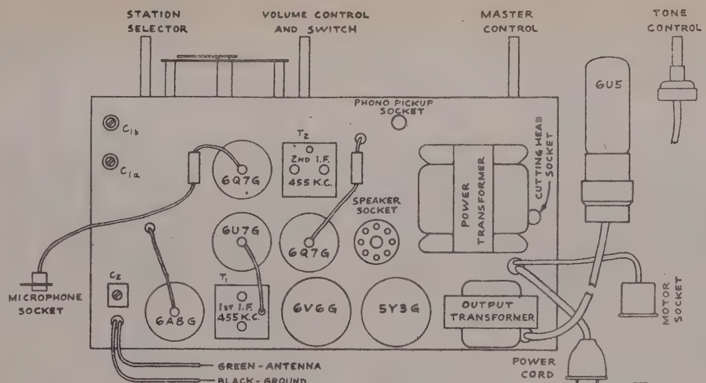
OPERATING FEATURES
Automatic Volume Control
Tuning Eye
Crystal Phono Pickup
Crystal Recording Head

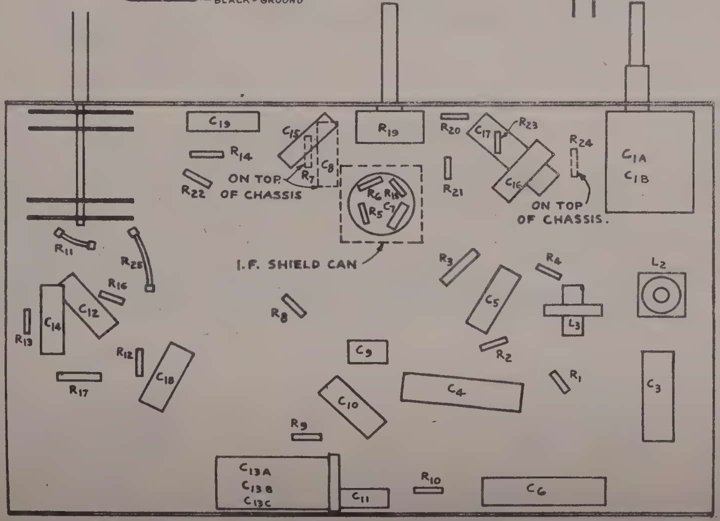
SEPTEMBER 16, 1940

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 5731,5761
Chassis 109.559

SEARS ROEBUCK & CO.





ALIGNMENT PROCEDURE

Output meter connection .... Across speaker voice coil
Connection of generator lead .... See chart below
Connection of generator ground lead .... To chassis
Dummy antenna value .... See chart below
Position of volume control .... Fully clockwise
Position of Master Control Switch ...."Radio" (Position No.1)

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
Open (Minimum capacity)	455 kc	.1 Mfd.	Grid of 6A8G	T2, T1	IF
Open	1720 kc	200 MMF.	Antenna lead	C1b	Oscillator
Tune in signal from generator	1400 kc	200 MMF.	Antenna lead	C1a	Antenna
Closed	455 kc	200 MMF.	Antenna lead	C2**	Wave trap

** Adjust C2 for minimum response.

The alignment procedure should be repeated stage by stage in the origional order for greatest accuracy.

Always keep the output from the generator at the lowest possible level so that the AVC action will be ineffective.

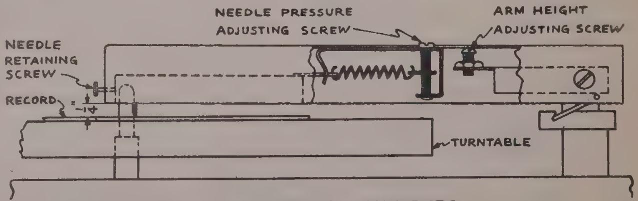
The location of all the alignment adjustments is shown on the top view of the chassis on the next page.

RECORDING ARM ADJUSTMENTS

The bottom of the recording arm should be exactly 1/4 inch from the surface of the record. This should be measured beside the needle retaining screw on the end of the arm. the screw for making this adjustment can be found when the arm is raised, on a small platform near the hinge. Turning the adjusting screw to the left raises the arm, turning to the right lowers it. In making an adjustment turn the screw only a small fraction of a turn at a time.

Make a cut of at least ten turns to see whether or not the needle is exerting the correct pressure on the record. This is correct when the groove cut by the needle is of approximately the same width as the space between grooves. On top of the recording arm is a flat head screw. Turning this screw to the right increases the depth of cut, to the left decreases it. This adjustment is quite critical and the screw should be turned not more than 1/4 turn at a time.

The diagram below shows the location of these adjustments.



RECORDING ARM ADJUSTMENTS

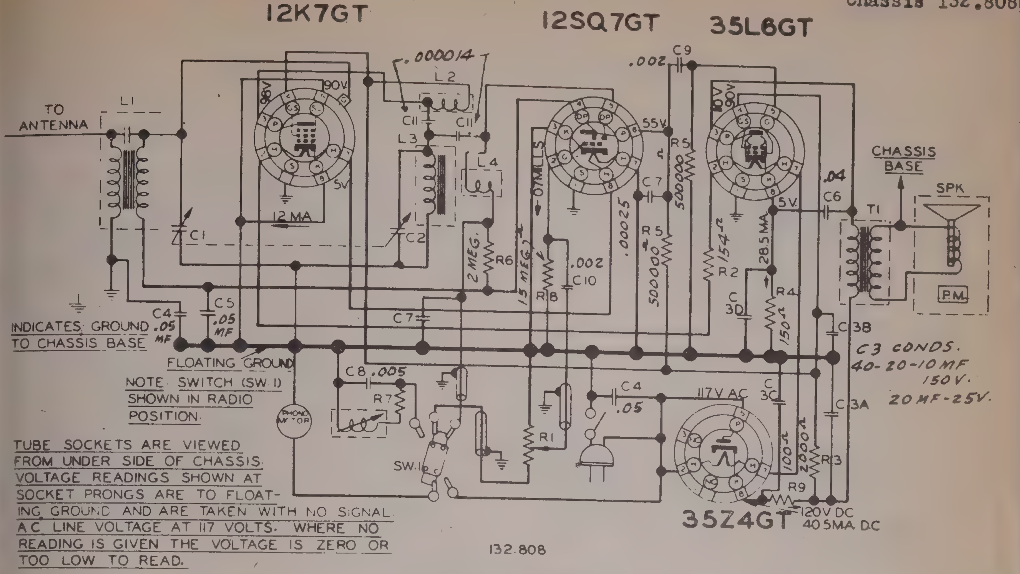
In the recording positions (Positions 3,4, and 5 of the Master Control Switch) the volume from the speaker is reduced. This is done automatically by the switch for three reasons, some of the power from the output tube is needed for operating the recording head, the volume level necessary for recording is too high for the average room, and to prevent the sound from the speaker from reaching the microphone.

If the recording needle is not very sharp the quality of the recording will be poor. A needle which has become dull through use or which has been otherwise damaged should be replaced.

The Master Control Switch should always be turned to the No. 1 (Radio) position when listening to radio programs.

SEARS-ROEBUCK & CO.

MODEL 5741
Chassis 132.808



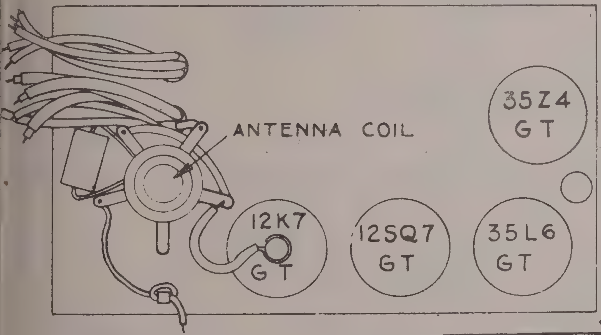
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POSITION OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (High)	GENERATOR CONNECTION (Low)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION
1400 kc	1400 kc	.00005 mfd.	Ant. hank	Chassis base	C2, C1	R.F. Tank
600 kc	600 kc	.00005 mfd.	Ant. hank	Chassis base	Check Point	R.F. Tank

IMPORTANT ALIGNMENT NOTES

When properly set with the variable condenser closed the pointer will point to the "54" calibration mark.

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.38 volts
Dummy antenna value to be in series with generator output . . . . See chart below
Position of Volume Control . . . . Fully clockwise
Position of Dial Pointer with variable fully closed . . . . See note below



JUNE 18, 1940

TUBES AND FUNCTIONS:
12K7GT . . . . R.F.
12SQ7GT . . Detector-AVC-AF

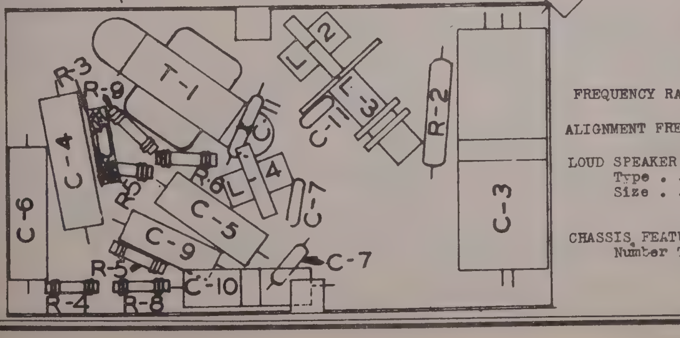
35L6GT . . . . Output
35Z4GT . . . . Rectifier

POWER SUPPLY:
All models available

105-125 volts, AC-only -60 cycles
45 watts

POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . .1.0 watts
Maximum . . . .2.6 watts

OPERATING FEATURES:
Automatic Volume Control
AC only; - 60 cycles



FREQUENCY RANGE . . . . 540-1720 kc.

ALIGNMENT FREQUENCIES. Ant.- 1400 kc; RF.- 1400 kc;

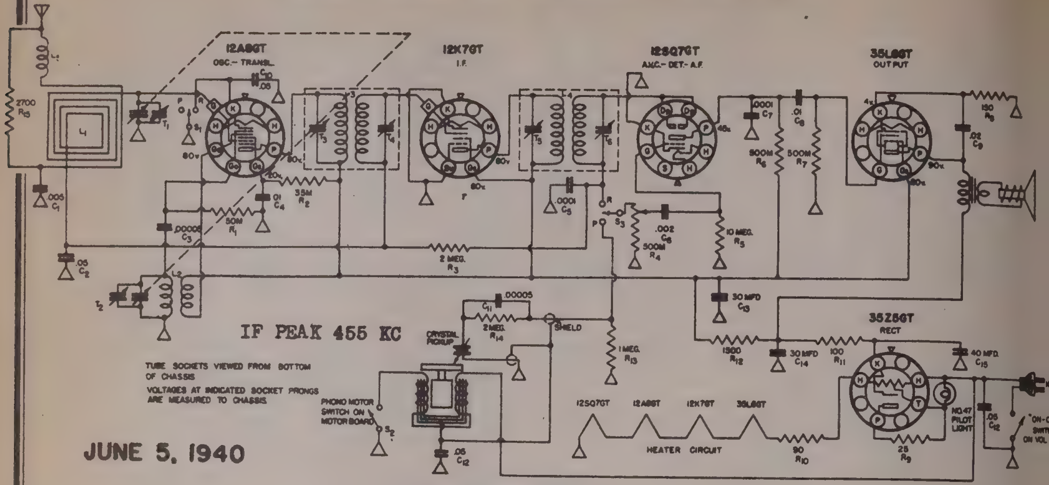
LOUD SPEAKER:
Type . . . . Permanent Magnet
Size . . . . 4 inch

CHASSIS FEATURES:
Number TRF stages . . . . two

MODEL 5751
Chassis 110.403

SEARS-ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 110.403



IF PEAK 455 KC

TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS

VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS

JUNE 5, 1940

ALIGNMENT PROCEDURE

Output meter connections. . . . . .Across primary output transformer

Connection of generator ground. . . . . .chassis

Generator modulation. . . . . .App. 30% @400 cycles

Position of volume control. . . . . .Fully clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
**	45 5KC	12K7GT,Grid	T5,T6	I.F.
**	455 KC	12A8GT,Grid	T3,T4	I.F.
1500 KC	1500 KC	***	T2,T1	Osc.,R.F.

IMPORTANT ALIGNMENT NOTES

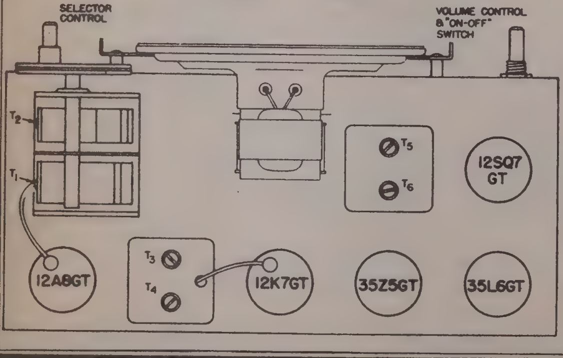
It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

** Short oscillator section of variable condenser.

*** Connect generator output to a separate radiating loop and pickup 1500 KC signal on receiver.

LOCATION OF TUBES



FREQUENCY RANGE

Broadcast . . . . .540-1730 KC

POWER OUTPUT:
Type. . . . . .Beam Power
Undistorted. 1.0
Maximum. 1.5

POWER SUPPLY:
All models available

110-125 volts, 25-60 cycle AC or DC, 30 watts

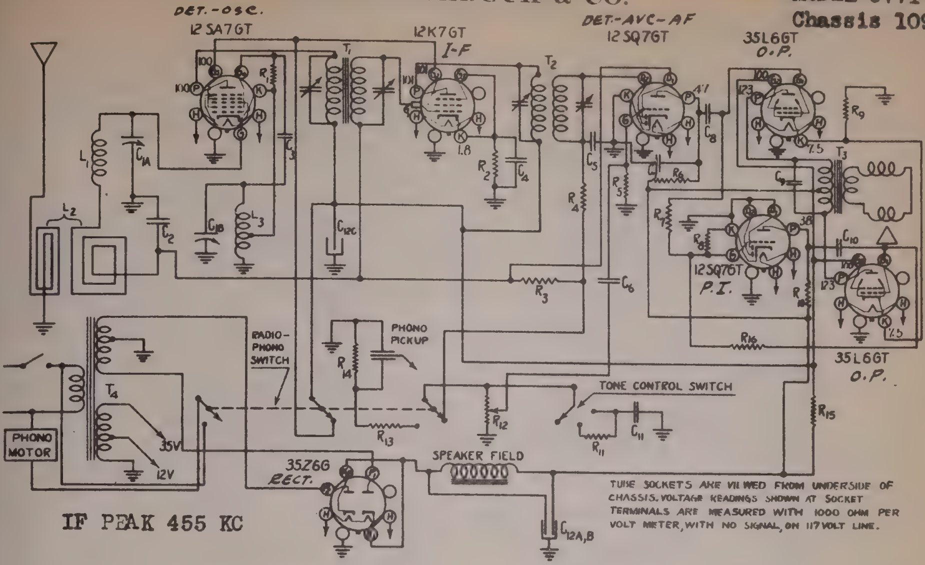
ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padde
Broadcast	1500 KC	Fixe

LOUD SPEAKER:
Type. . . . . .Dynami
Size. . . . . .5"
Field. . . . . .P.M.

SEARS-ROEBUCK & CO.

MODEL 5771
Chassis 109.358



IF PEAK 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET TERMINALS ARE MEASURED WITH 1000 OHM PER VOLT METER, WITH NO SIGNAL, ON 117 VOLT LINE.

PARTS LIST-

AUGUST 21, 1940

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	109544417	Button, Snap (Dial mounting)	.02
	109542163	Cable, Drive	.05
	109543227	Cap, Grid	.03
R12	109248421	Control, Volume & Switch	1.25
	109551732	Cord, Line	.45
	109546424	Clamp, Line Cord	.10
L3	109288422	Coil, Oscillator	1.00
L1	109288423	Coil, Tracking	1.00
	109178504	Condenser, Dual Trimmer	.70
C1a,b	109168424	Condenser, Tuner (With pulley)	5.00
C12a,b,c	109208425	Condenser, Electrolytic	1.50
C10		Condenser, .05 mfd. 400 volt	.20
C9		Condenser, .001 mfd. 600 volt	.20
C2		Condenser, .1 mfd. 200 volt	.20
C8		Condenser, .01 mfd. 400 volt	.20
C6,11		Condenser, .002 mfd. 600 volt	.20
C4		Condenser, .05 mfd. 200 volt	.20
C3		Condenser, 100 mmf. Mica	.25
C5,7		Condenser, 250 mmf. Mica	.25
	109408436	Dial Chart	.35
	109542729	Grommet, Rubber (Dial bracket Mtg.)	.05
	109456244	Pulley, Idler	.10
	109415026	Pointer	.35
	109541207	Retainer ("C" washer)	.01
R2		Resistor, 200 ohm 1/3 watt	.15
R11		Resistor, 100 M ohm 1/3 watt	.15
R1		Resistor, 20 M ohm 1/3 watt	.15
R6,7,8,10 13,14,16		Resistor, 200 M ohm 1/3 watt	.15
R5		Resistor, 10 meg. 1/3 watt	.15
R9		Resistor, 120 ohm flexohm ½ watt	.20
R15		Resistor, 1000 ohm 1 watt	.25
	109188440	Socket, Dual Dial Lamp	.30
	109548648	Spring, Drive Cable	.10
	109388428	Switch, Tone Control	.50
	109388429	Switch, Radio/Phono	1.00
	109188267	Socket, 1 prong (For phono pickup)	.10
	109588442	Speaker, 6½ inch Dynamic	5.50
T4	109108433	Transformer, Power 60 cycle	5.00
	109108496	Transformer, Power 50 cycle	5.75
	109118501	Transformer, Power 25 cycle	7.50
T3	1091384421	Transformer, Output	1.25
T1	109338434	Transformer, 1st IF	2.25
T2	109358435	Transformer, 2nd IF	2.25
	109638481	Arm, Phono pickup (Complete)	6.00
		Crystal Cartridge only	5.00

MODEL 5771
Chassis 109.358

SEARS ROEBUCK & CO.

PUSH BUTTON TUNING

Pull the button off its shaft. Loosen the mechanism by turning the locking screw a turn or two counterclockwise. Continue to press in firmly with the screwdriver holding the shaft in as far as it will go. Carefully tune in the desired station while holding the shaft in. Continue to press in firmly with the screwdriver and lock the mechanism by turning the screw clockwise until it is tight. Tighten the screw just enough so that the adjustment is held firmly. If the screw is turned too tight the shaft may be forced out of line and make the buttons rub together.

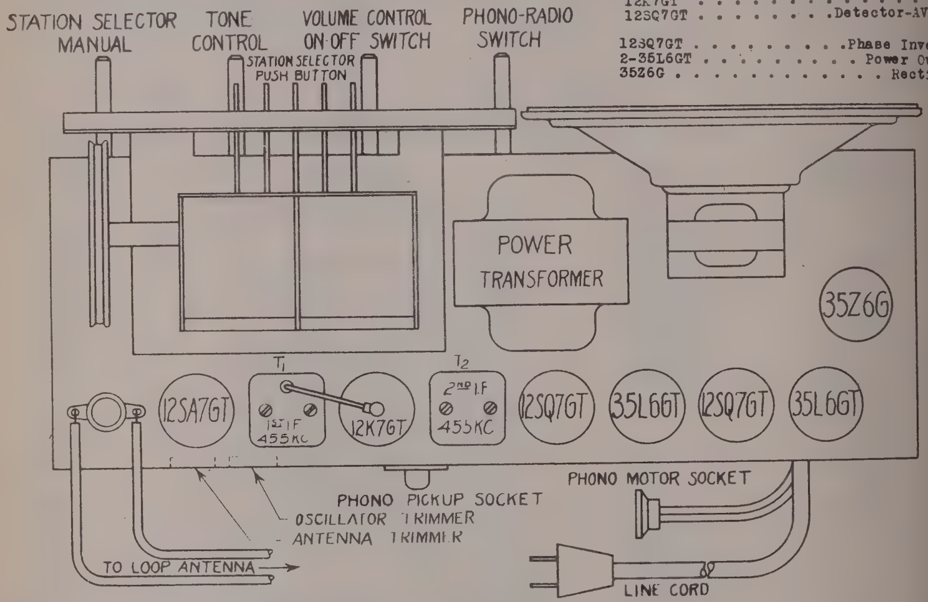
ALIGNMENT PROCEDURE

See diagram at the bottom of this page for the location of all trimmers.

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)
OPEN (Minimum capacity)	455 kc.	.1 Mfd.	Antenna section of variable	T2, T1.
MINIMUM CAPACITY	1720 kc.	50 mmf.	Antenna terminal	Oscillator Trimmer
TUNE IN SIG. FROM GENERATOR	1400 kc.	50 mmf.	Antenna terminal	Antenna Trimmer

The alignment procedure should be repeated stage by stage, in the origional order for greatest accuracy. Always keep the output from the generator at the lowest possible level so that the AVC action of the receiver is ineffective.

TUBES AND FUNCTIONS
12SA7GT . . . . .Oscillator-Translato
12K7GT I
12SQ7GT . . . . .Detector-AVC-A
12SQ7GT . . . . .Phase Inverte
2-35L6GT . . . . Power Outpu
35Z6G . . . . Rectifie



POWER SUPPLY . . . . 105-125 volts AC 65 watts
25,50 and 60 cycle models available.

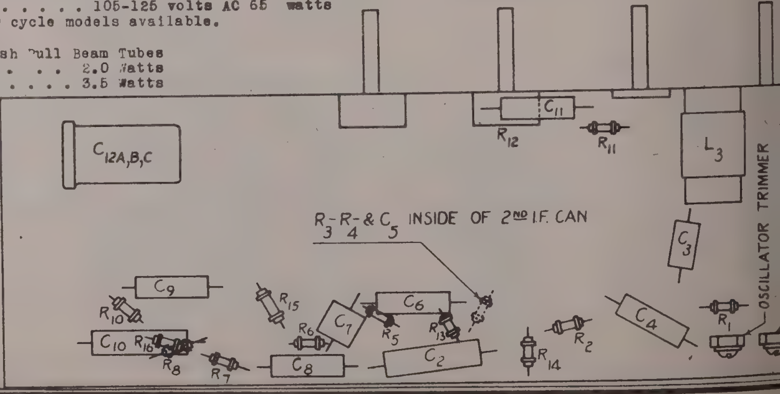
POWER OUTPUT
Type . . . . . . Push Pull Beam Tubes
Undistorted . . . . 2.0 Watts
Maximum . . . . 3.5 Watts

SPEAKER
Type . . . . Dynamic
Size 6½ Inch
Field Resistance 500 Ohms

FREQUENCY RANGE

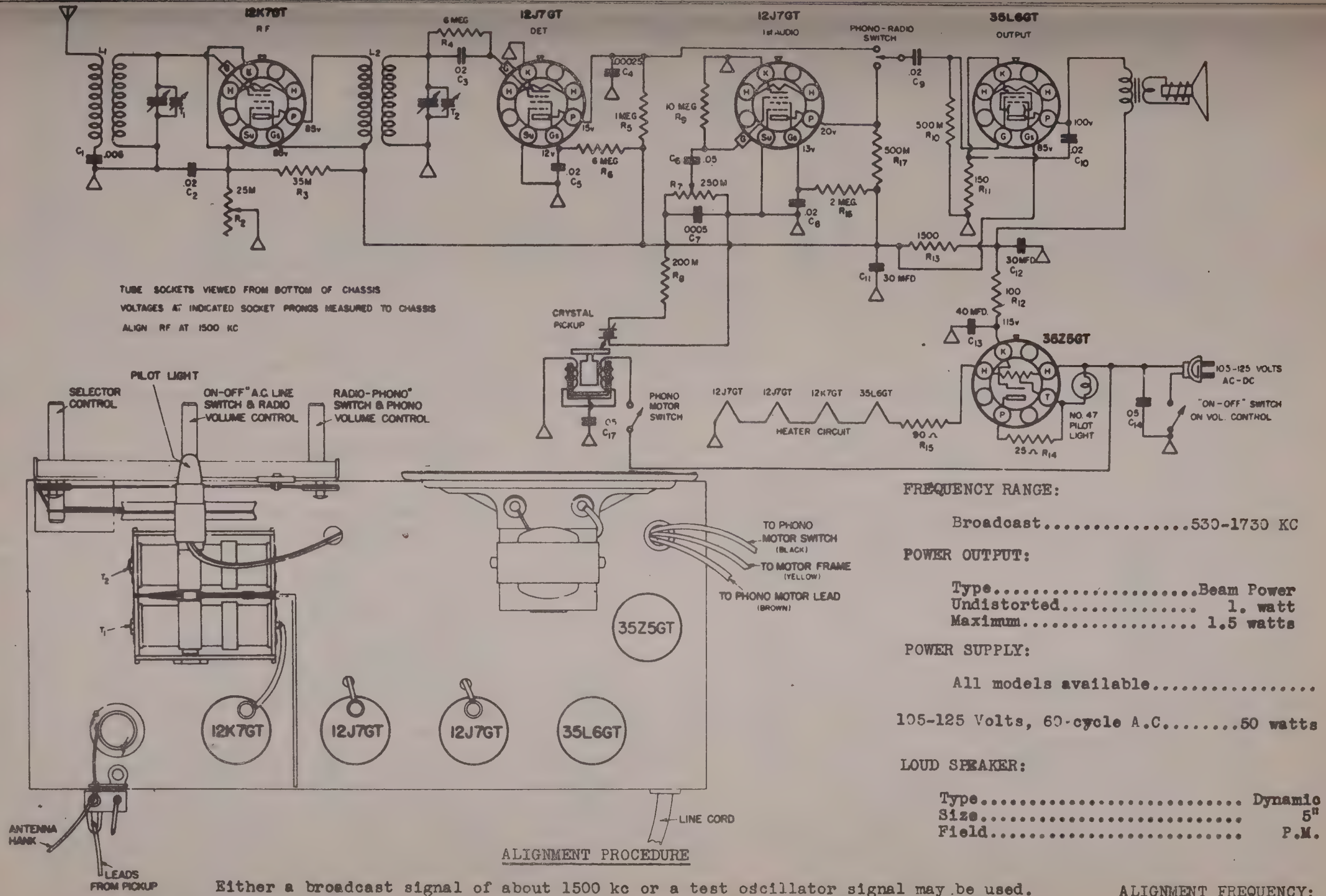
540 to 1720 kc.

LOCATION OF PARTS UNDER CHASSIS



SEARS-ROEBUCK & CO.

MODEL 6326A
Chassis 110.987-1



TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS
VOLTAGES AT INDICATED SOCKET PRONGS MEASURED TO CHASSIS
ALIGN RF AT 1500 KC

FREQUENCY RANGE:

Broadcast..............530-1730 KC

POWER OUTPUT:

Type....................Beam Power
Undistorted............. 1. watt
Maximum................. 1.5 watts

POWER SUPPLY:

All models available................

105-125 Volts, 60-cycle A.C........50 watts

LOUD SPEAKER:

Type.......................... Dynamic
Size.......................... 5"
Field......................... P.M.

ALIGNMENT FREQUENCY:

1500 KC

APRIL 30, 1940

ALIGNMENT PROCEDURE

Either a broadcast signal of about 1500 kc or a test oscillator signal may be used. If abroadcast signal is used, the antenna of the receiver should be extended as in a normal installation. If a test oscillator signal is used, a wire should be connected to the test oscillator output and run parallel to but isolated from the receiver's antenna wire. The generator ground connection should be connected to ground.

Tune in the 1500 kc signal and adjust the trimmers for maximum loud speaker response. This can be done accurately if the volume control setting is reduced to give a low volume level. The location of this trimmer is shown in the tube socket location diagram.

MODEL 6491-A
Chassis 110.410

SEARS ROEBUCK & CO.

POWER SUPPLY:

All models available . . . . 105-125 volts, 60 cycle AC, 50 Watts

FREQUENCY RANGE:

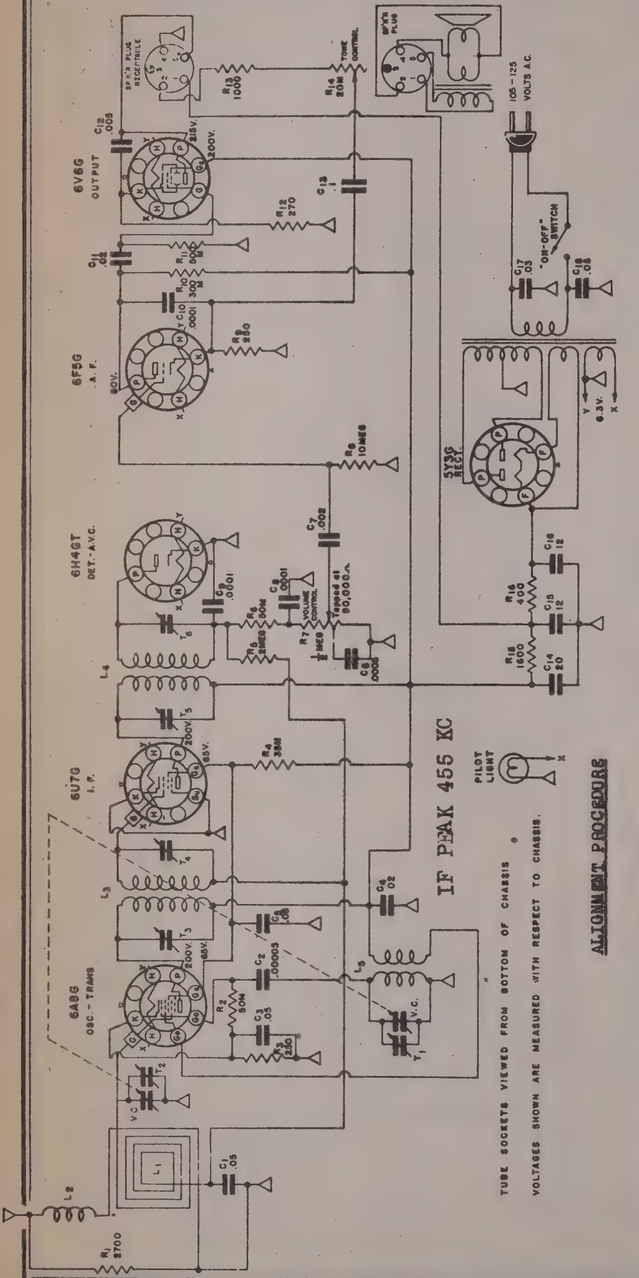
Broadcast . . . . 535 - 1700 KC

POWER OUTPUT:

Type...................... Beam Power
Undistorted...................... 2.5
Maximum...................... 3.75

LOUD SPEAKER:

Type.......................... Dynamic
Size.......................... 6 1/2"
Field .... P.M.



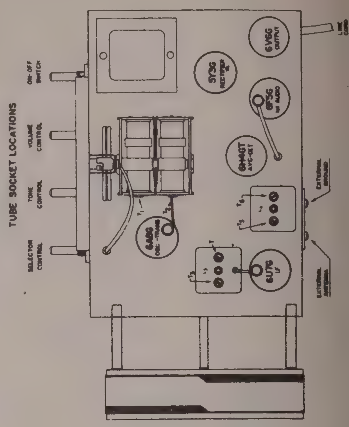
IF PEAK 455 KC

TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS.

VOLTAGES SHOWN ARE MEASURED WITH RESPECT TO CHASSIS.

NOVEMBER 4, 1940

TUBE SOCKET LOCATIONS



ALIGNMENT PROCEDURE

Output meter connection.......... Across primary output transformer

Connection of generator ground.......... To chassis

Generator modulation.......... App. 30% @ 400 cycles

Position of volume control.......... Fully clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
* *	455 kc	6A8G, Grid	T3, T4, T5, T6	I.F.
1500 kc	1500 kc	* * *	T1, T2	Osc., R.F.

See note below

IMPORTANT ALIGNMENT NOTES

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

**Short oscillator section of variable condenser

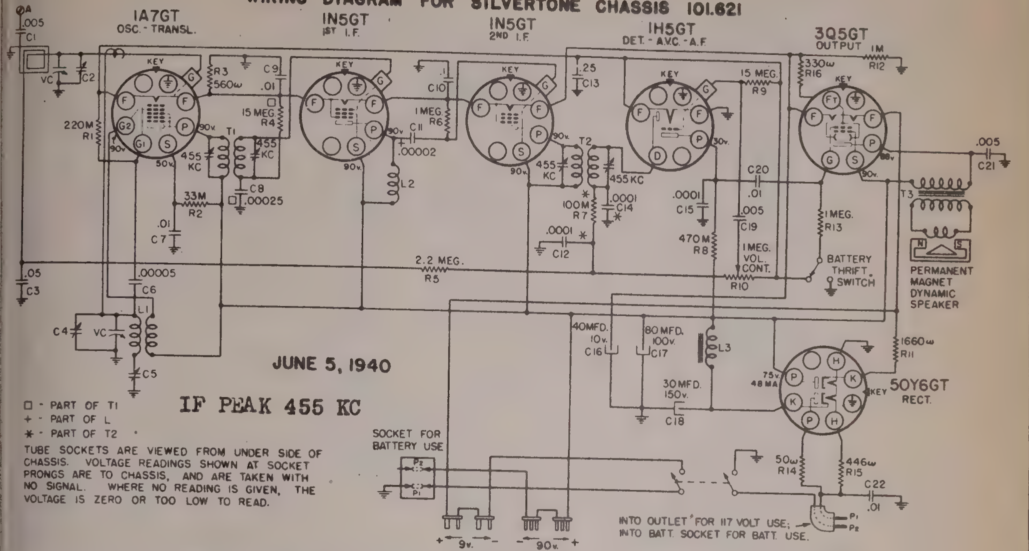
***Run a wire from the output terminal of the generator, having it come near the receiver. However, no metallic connection is made between the signal

assis 101.621-1,-1A, -1B,-1C (late)

SEARS ROEBUCK & CO.

MODELS 6561,6661,6961, 6521
Chassis 101.621,101.621-A (early)

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.621



JUNE 5, 1940

IF PEAK 455 KC

□ - PART OF T1
+ - PART OF L
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

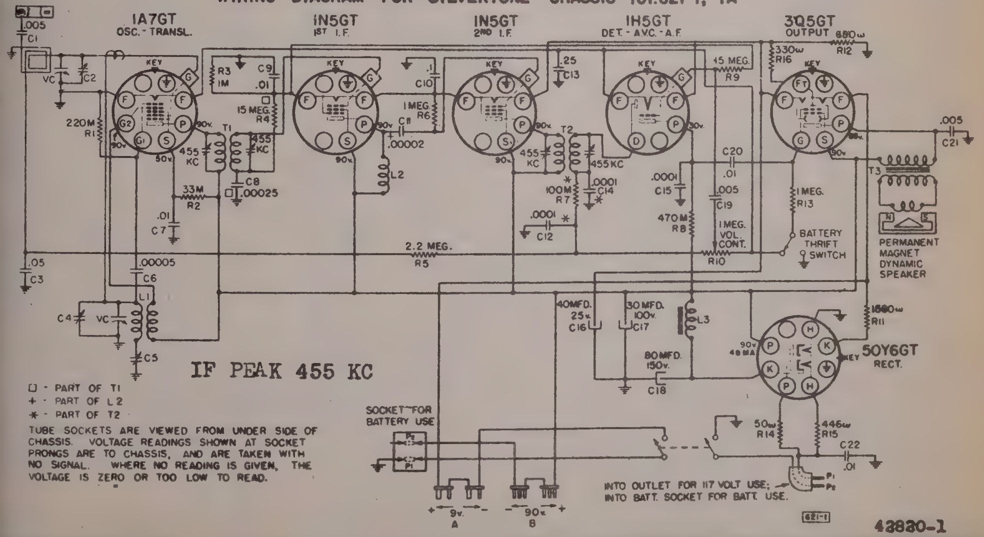
FOR ALIGNMENT SEE INDEX

SUBJECT: ADDITION OF SUFFIX NUMBER -1 TO 101.621 CHASSIS:

Chassis identified as 101.621-1, -1A, -1B, or -1C use a different loop than the original 101.621 chassis. On these chassis, the antenna terminal connection is accessible by opening the hinged part of the back cover. Be sure to order the correct loop on replacement orders. There are also filament circuit differences as shown in the following Wiring Diagram.

AUGUST 21, 1940

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.621-1,-1A



IF PEAK 455 KC

□ - PART OF T1
+ - PART OF L2
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

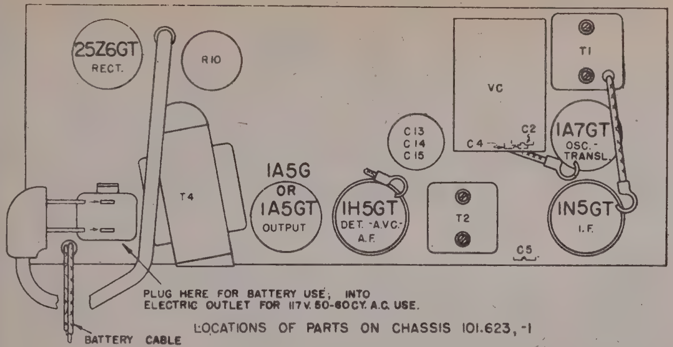
43820-1

MODEL 6751
Chassis 101,623,
101,623-1

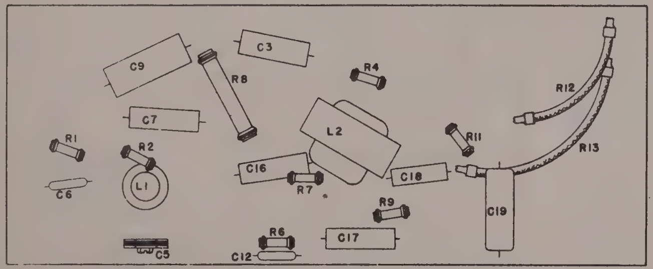
SEARS ROEBUCK & CO.

MODELS 6521,6561,6661,6961
Chassis 101.621 (early,late)

MODEL 6751



LOCATIONS OF PARTS ON CHASSIS 101.623,-1



LOCATIONS OF PARTS UNDER CHASSIS-101.623,-1

FREQUENCY RANGE:
Broadcast . . . . 550-1600 kc

INTERMEDIATE FREQUENCY

. .455 kc

POWER SUPPLY:
"A" Battery (6 volt) . . . . 1 - #5080
Service rating - 250 Hours
105-125 v., 60 cycle, AC, 30 watts
"A" Drain: 50 ma.

"B" Batteries . . . . 2 - #5079
Service rating - 250 Hours
"B" Drain: 8.7 ma.

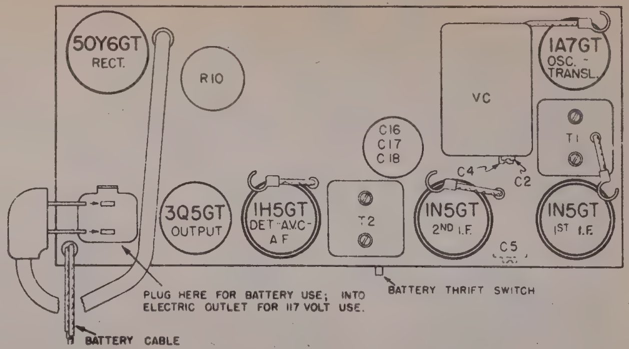
POWER OUTPUT:
Type . . . . . . Pentode
Undistorted 0.09 watts
Maximum . . .0.2 watts

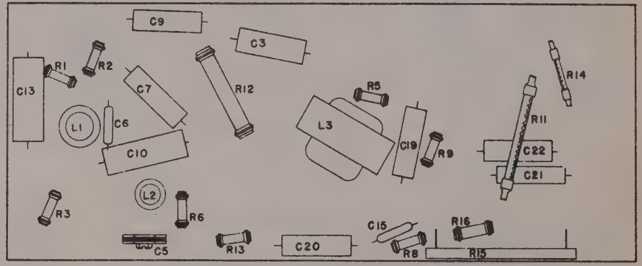
ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

LOUDSPEAKER:
Type . . . .PM Dynamic
Size . . . . .5 inch

MODELS 6521,6561,6661,6961





LOCATIONS OF PARTS UNDER CHASSIS-101.621

FREQUENCY RANGE:
Broadcast . . . . 540-1620 kc

INTERMEDIATE FREQUENCY

. . .455 kc

POWER SUPPLY:
"A" Battery (4-1/2 volt). . . 2 - #5085
Service rating - 250 Hours, with thrift switch
105-125 volts AC or DC - 30 watts

"B" Batteries . . . . .2 - #5090
Service rating - 250 Hours with thrift switch

POWER OUTPUT:
Type . . . . Beam
Undistorted 0.165 watts
Maximum . . . 0.3 watts

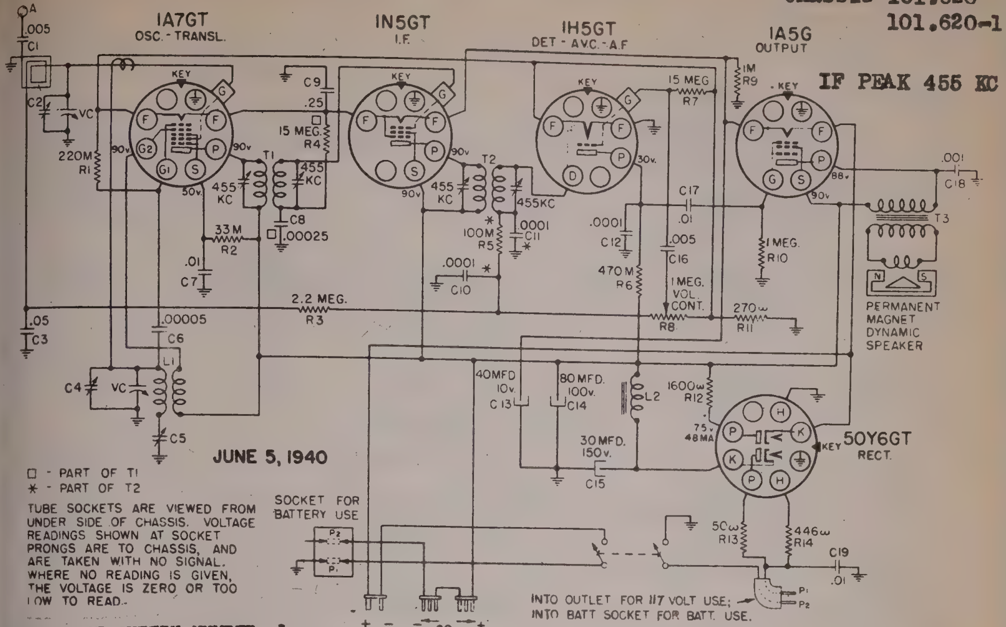
ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

LOUDSPEAKER:
Type . . PM Dynamic
Size . . . . .5 inch

SEARS-ROEBUCK & CO.

MODEL 6551
Chassis 101.620
101.620-1



□ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

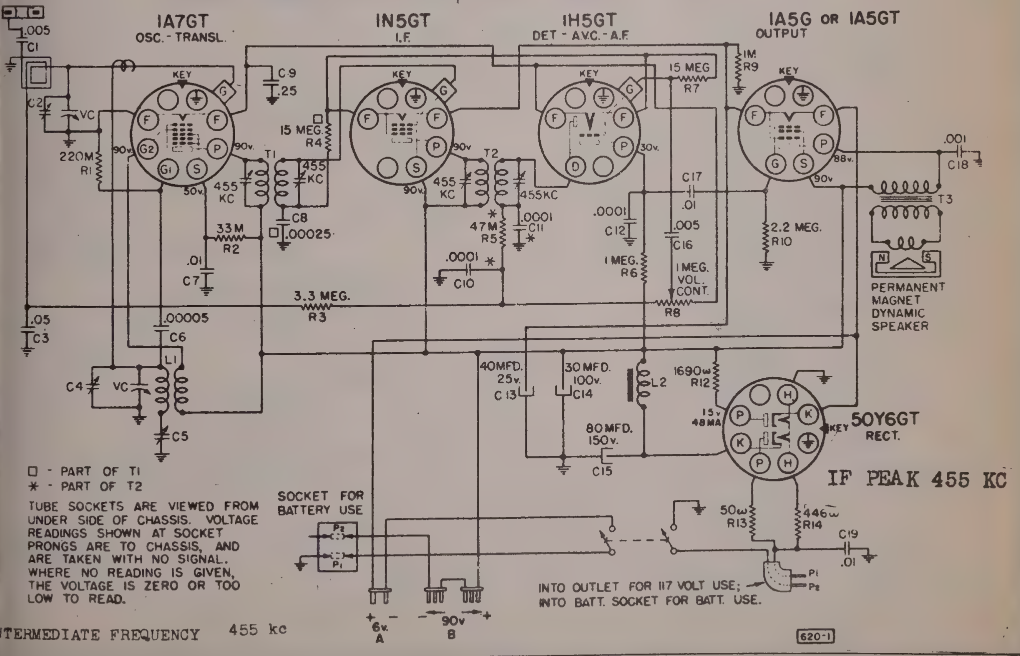
ADDITION OF SUFFIX NUMBER -1:

Chassis identified by the addition of suffix number -1 use a different loop. On these chassis, the antenna terminal connection is accessible by opening the hinged part of the back cover. Be sure to order the correct loop on replacement orders. There are also filament circuit differences as shown in the following Wiring Diagram.

JULY 30, 1940

Changes in the Parts

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.620-1



□ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

NTERMEDIATE FREQUENCY 455 kc

620-1

MODEL 6751
Chassis 101.623,-1
MODELS 6521,6561,6661,6961
Chassis 101.621 (early,late)

SEARS ROEBUCK & CO.

MODEL 6551
Chassis 101.620,-1

ALIGNMENT PROCEDURE MODELS 6521,6561,6661,6961

MODEL 6751

MODEL 6551

PRELIMINARY:

Output meter connections	Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts	0.39 volts
Generator ground lead connection	To chassis through 0.1 mfd. cond.
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully on
Position of pointer with variable fully closed	On mark to left of 550 kc calibration mark.

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 kc	.1 mfd.	1A7GT Translator Grid	T2,T1	IF
1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C2,C4	Translator Oscillator
600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C5	Padder

IMPORTANT ALIGNMENT NOTES

The chassis is removed from the case in order to align the IF but the loop antenna must be left connected.

The trimmer and padder condensers are accessible by dropping the hinged part of the back cover.

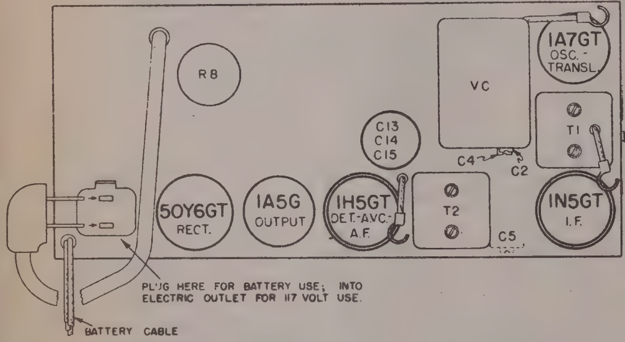
The chassis must be in place in the cabinet during alignment. If battery supply is used, the batteries must be in place in the cabinet.

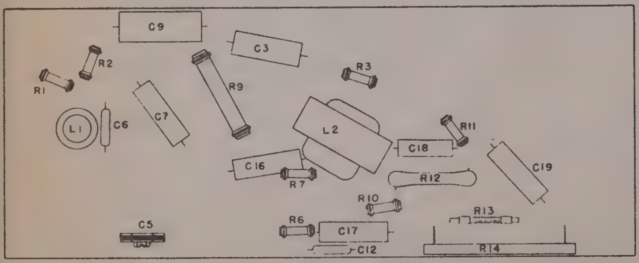
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

Whenever batteries are replaced, C2 should be repeaked using a weak signal at about 1400 kc.





LOCATION OF PARTS UNDER CHASSIS-101.620

TUBES AND FUNCTIONS:

1A7GT	Osc.-Transl.
1N5GT	IF
1H5GT	Detector-AVC-AF
1A5G	Output
50Y6GT	Rectifier

FREQUENCY RANGE:

Broadcast	540-1620 kc

POWER SUPPLY:

"A" Battery (6 volt) . . . . . 1 - #5080
Service rating - 250 Hours
105-125 v. AC or DC, 30 watts

"B" Batteries . . . . 2 - #5079
Service rating - 250 Hours

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

POWER OUTPUT:

Type	Pentode
Undistorted	0.09 watts
Maximum	0.2 watts

OPERATING FEATURES:

Automatic Volume Control
Battery or AC-DC Powered

LOUDSPEAKER:

Type	PM Dynamic
Size	5 inch

CHASSIS FEATURES:

Number IF stages . . . . One
Self-contained loop antenna

SEARS-ROEBUCK & CO.

MODEL 6541
Chassis 110.401

MODEL 6651
Chassis 110.402

Alignment Notes

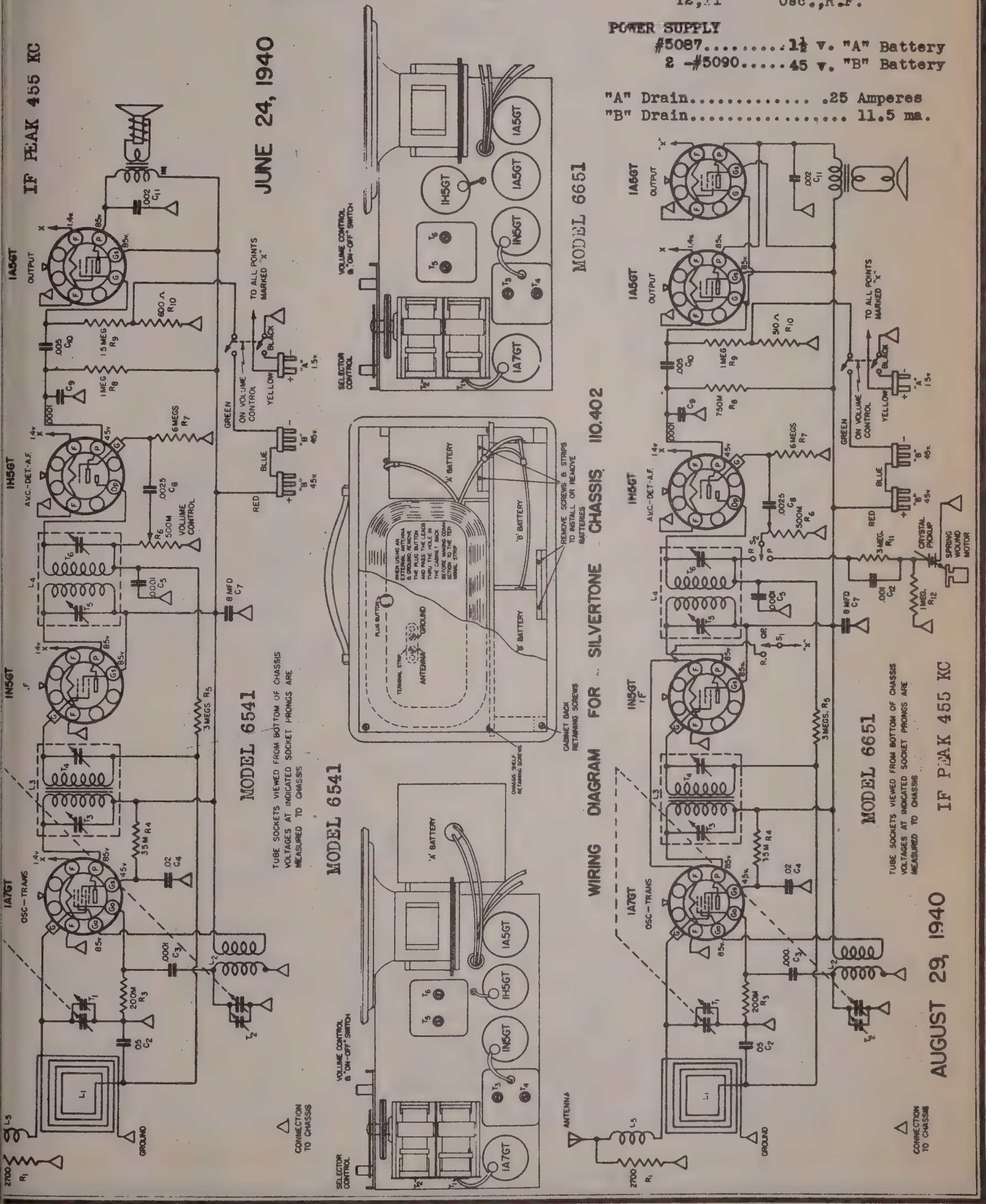
** Short oscillator section of variable condenser.

*** Connect generator output to a separate radiating loop and pickup 1500 kc signal on receiver.

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
**	455 kc	1N5GT,Grid	T5,T6	I.F.
**	455 kc	1A7GT,Grid	T3,T4	I.F.
1500 kc	1500 kc	***	T2,T1	Osc.,R.F.

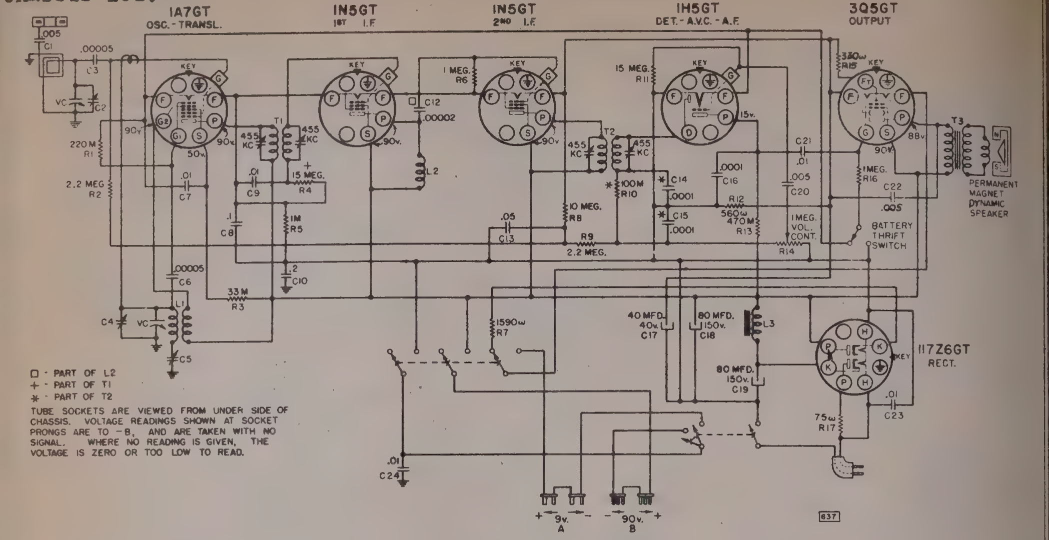
POWER SUPPLY
#5087..........1½ v. "A" Battery
2 -#5090.....45 v. "B" Battery

"A" Drain............. .25 Amperes
"B" Drain................. 11.5 ma.


IF PEAK 455 KC
JUNE 24, 1940
MODEL 6541
TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS
1A5GT OUTPUT
1H5GT AVC-DET-A.F.
1N5GT I.F.
1A7GT OSC-TRANS
TO ALL POINTS MARKED "X"
VOLUME CONTROL & "ON-OFF" SWITCH
SELECTOR CONTROL
MODEL 6651
WIRING DIAGRAM FOR SILVERTONE CHASSIS 110.402
'A' BATTERY
'B' BATTERY
REMOVE SCREWS & STRIPS TO INSTALL OR REMOVE BATTERIES
CABINET BACK RETAINING SCREWS
CHASSIS SHELF RETAINING SCREWS
PLUG BUTTON
TERMINAL STRIP
ANTENNA
GROUND
CRYSTAL PICKUP
SPRING WOUND MOTOR
CONNECTION TO CHASSIS
MODEL 6651
TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS VOLTAGES AT INDICATED SOCKET PRONGS ARE MEASURED TO CHASSIS
IF PEAK 455 KC
AUGUST 29, 1940

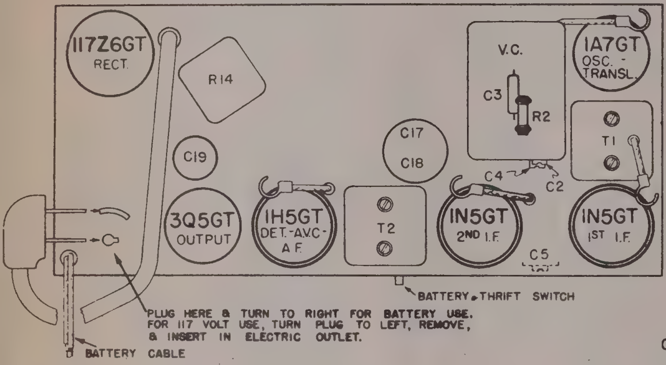
MODELS 6621,6761A,6921
Chassis 101.637

SEARS ROEBUCK & CO.



□ - PART OF L2
+ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO -B, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



PLUG HERE & TURN TO RIGHT FOR BATTERY USE. FOR 117 VOLT USE, TURN PLUG TO LEFT, REMOVE, & INSERT IN ELECTRIC OUTLET.

SEPTEMBER 30, 1940

INTERMEDIATE FREQUENCY . . . . 455 kc

POWER SUPPLY:
"A" Battery (4-1/3 volt). . . 2 - #50
Service rating - 200 Hours,
Drain: 50 ma.
105-125 volts, AC-DC - 25 watts

"B" Batteries . . . . 2 - #5090
Service rating - 200 Hours,
Drain: 13.9 ma.

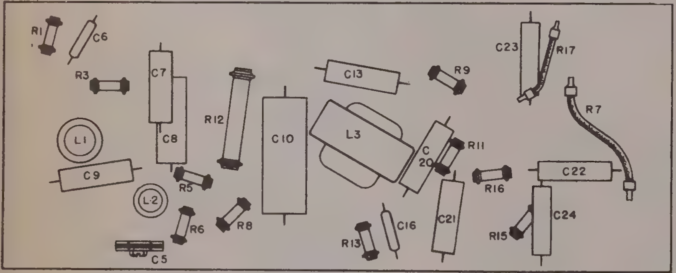
ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1630 kc	1400 kc	600 kc

FREQUENCY RANGE:
Broadcast . . . . 540-1630 kc

LOUDSPEAKER:
Type . . . . PM Dynamic
Size . . . . 5 inch

POWER OUTPUT:
Type . . . . Beam
Undistorted . . . . 0.165 watts
Maximum . . . . 0.3 watts



LOCATIONS OF PARTS UNDER CHASSIS-101.637

ALIGNMENT PROCEDURE

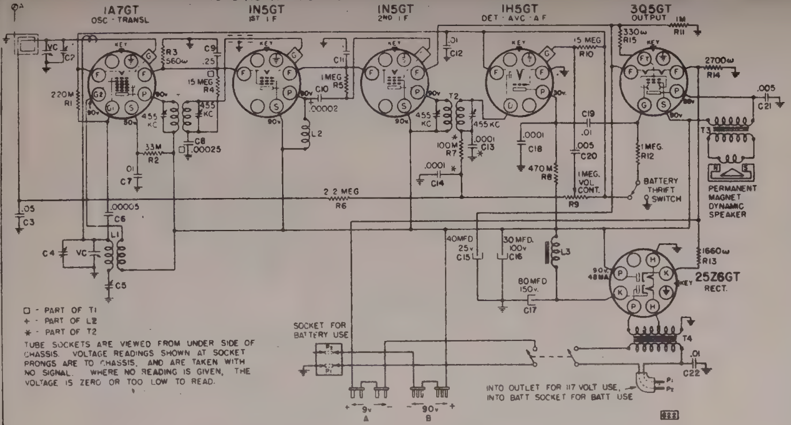
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 kc	.1 mfd.	1A7GT Translator Grid	T2,T1	IF
Open	1630 kc	.0002 mfd.	Ant. Term.	C4	Oscillator
1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C2	Translator
600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C5	Padder

position of Volume Control . . . . .Fully on
Position of Pointer with variable fully closed . . . . .On mark to left of 550 kc calibration mark.
Output meter connections . . . . Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts . . . . .0.37 volts

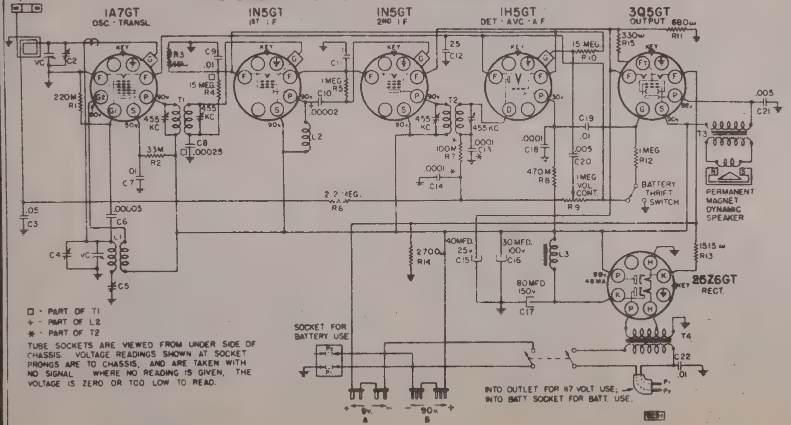
SEARS ROEBUCK & CO.

MODELS 6721,6761
Chassis 101.622
101.622-1

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.622

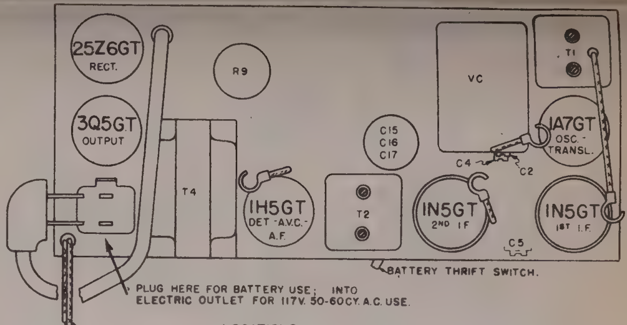

1A7GT OSC - TRANSL
1N5GT 1ST I F
1N5GT 2ND I F
1H5GT DET - AVC - A F
3Q5GT OUTPUT
25Z6GT RECT.
PERMANENT MAGNET DYNAMIC SPEAKER
BATTERY THRIFT SWITCH
SOCKET FOR BATTERY USE
INTO OUTLET FOR 117 VOLT USE, INTO BATT SOCKET FOR BATT USE
9v A
90v B
□ - PART OF T1
+ - PART OF L2
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.622-1

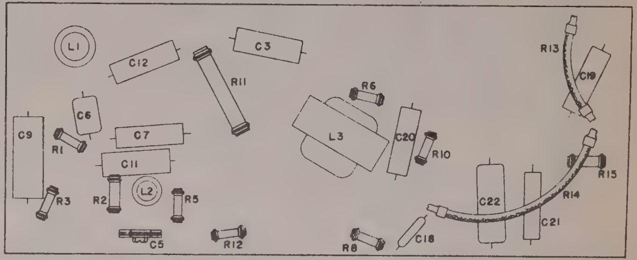

1A7GT OSC - TRANSL
1N5GT 1ST I F
1N5GT 2ND I F
1H5GT DET - AVC - A F
3Q5GT OUTPUT
25Z6GT RECT.
PERMANENT MAGNET DYNAMIC SPEAKER
BATTERY THRIFT SWITCH
SOCKET FOR BATTERY USE
INTO OUTLET FOR 117 VOLT USE; INTO BATT SOCKET FOR BATT. USE.
9v A
90v B
□ - PART OF T1
+ - PART OF L2
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

INTERMEDIATE FREQUENCY . . . . .455 kc

LOUDSPEAKER:
Type . . . . PM Dynamic
Size . . . . 5 inch



LOCATIONS OF PARTS ON CHASSIS 101.622,-1



LOCATIONS OF PARTS UNDER CHASSIS-101.622,101.622-A,-1

FREQUENCY RANGE:
Broadcast . . . . 550-1600 kc

POWER SUPPLY:
"A" Battery (4-1/2 volt). . . 2 - #5085
Service rating - 250 Hours, with
Thrift Switch. Drain: 50 ma.
105-125 volts, 60 cycle AC - 30 watts

"B" Batteries . . . . 2 - #5090
Service rating - 350 Hours, with
Thrift Switch. Drain: 13.9 ma.

CONVENTIONAL
ALIGNMENT

JULY 3, 1940

ALIGNMENT FREQUENCIES:

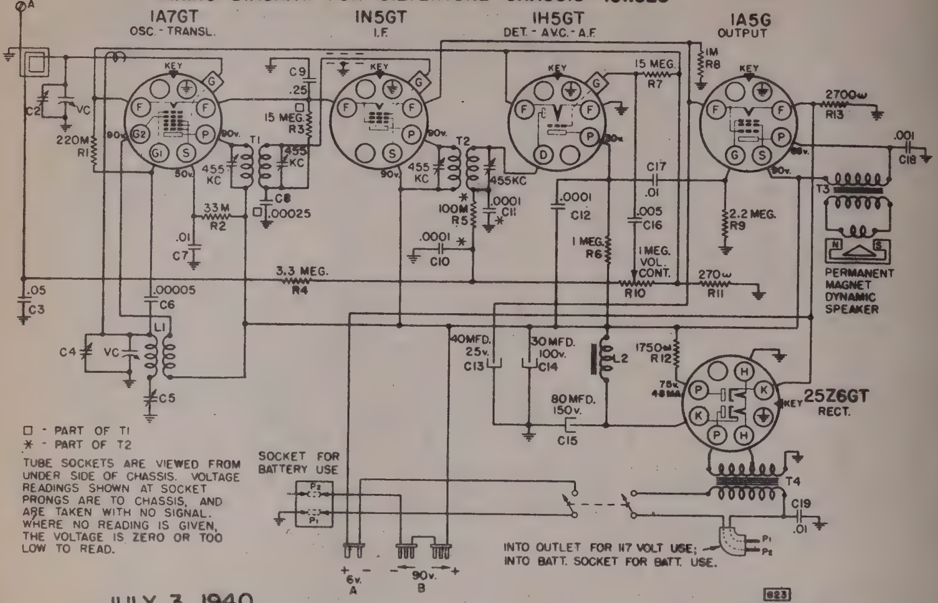
Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

POWER OUTPUT:
Type . . . . Beam
Undistorted . . . . 0.165 watts
Maximum . . . . 0.3 watts

MODEL 6751
Chassis 101.623
101.623-1

SEARS ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.623



□ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

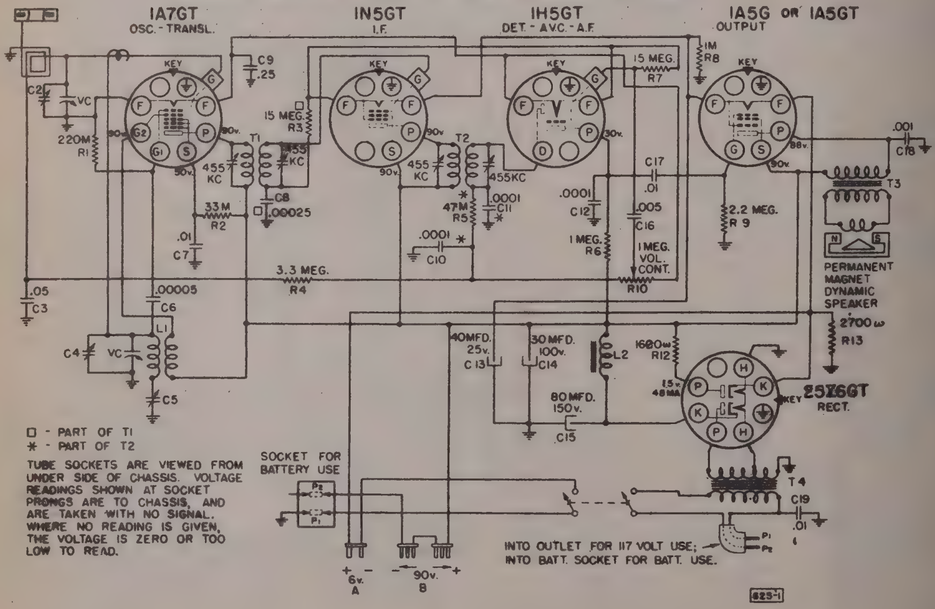
SOCKET FOR BATTERY USE

INTO OUTLET FOR 117 VOLT USE; INTO BATT. SOCKET FOR BATT. USE.

JULY 3, 1940

IF PEAK 455 KC FOR OTHER DATA, SEE INDEX

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.623-1



□ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

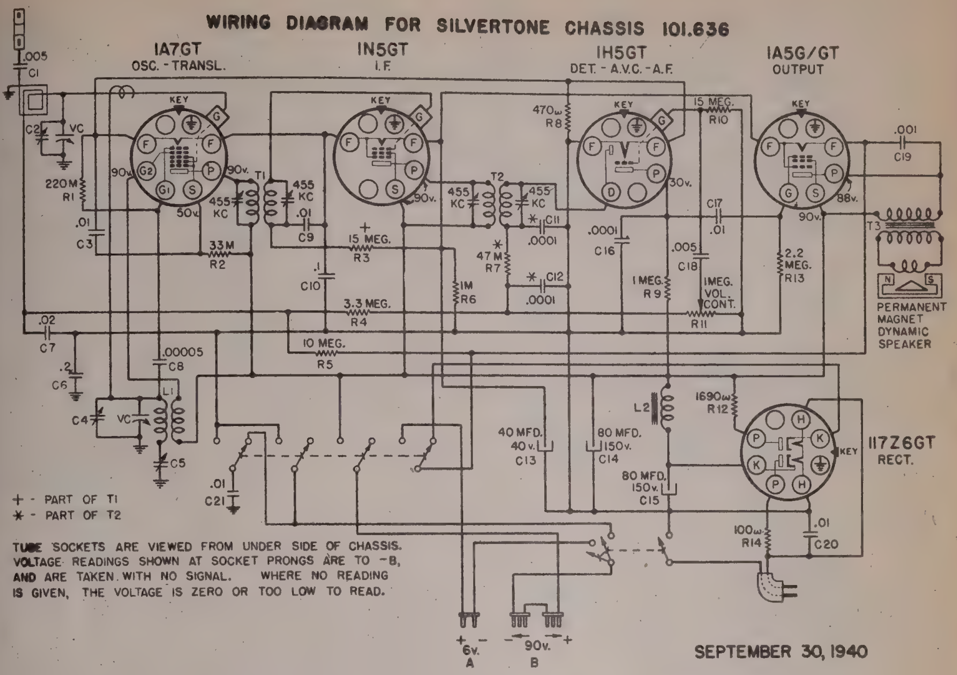
SOCKET FOR BATTERY USE

INTO OUTLET FOR 117 VOLT USE; INTO BATT. SOCKET FOR BATT. USE.

SEARS ROEBUCK & CO.

MODEL 6751-A
Chassis 101.636

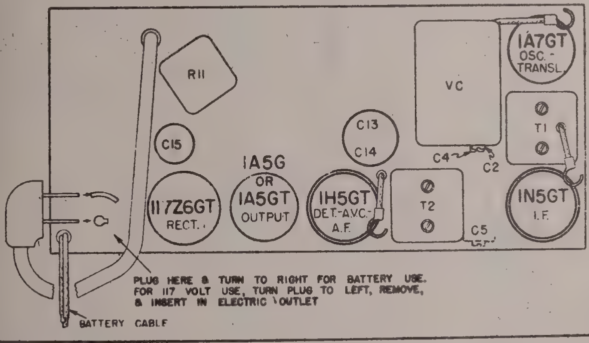
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.636



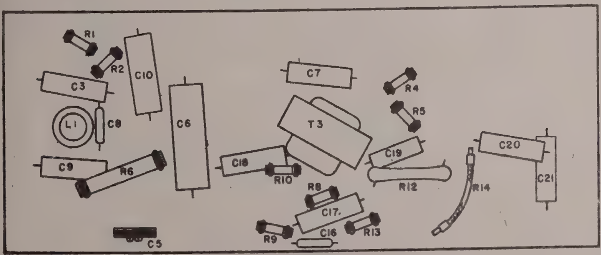
+ - PART OF T1
✱ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO −B, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SEPTEMBER 30, 1940



PLUG HERE & TURN TO RIGHT FOR BATTERY USE. FOR 117 VOLT USE, TURN PLUG TO LEFT, REMOVE, & INSERT IN ELECTRIC OUTLET



LOCATIONS OF PARTS UNDER CHASSIS - 101.636

INTERMEDIATE FREQUENCY . . .

. . . . 455 kc

FREQUENCY RANGE:
Broadcast . . . . 540-1620 kc

POWER SUPPLY:
"A" Battery (6 volt) . . . . . 1 - #5080
Service rating - 200 hours
105-125 v., AC-DC, 25 watts
"A" Drain: 50 ma.

"B" Batteries . . . . 2 - #5079
Service rating - 200 hours
"B" Drain: 9.1 ma.

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1620 kc	1400 kc	600 kc

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 0.09 watts
Maximum . . . . .0.3 watts

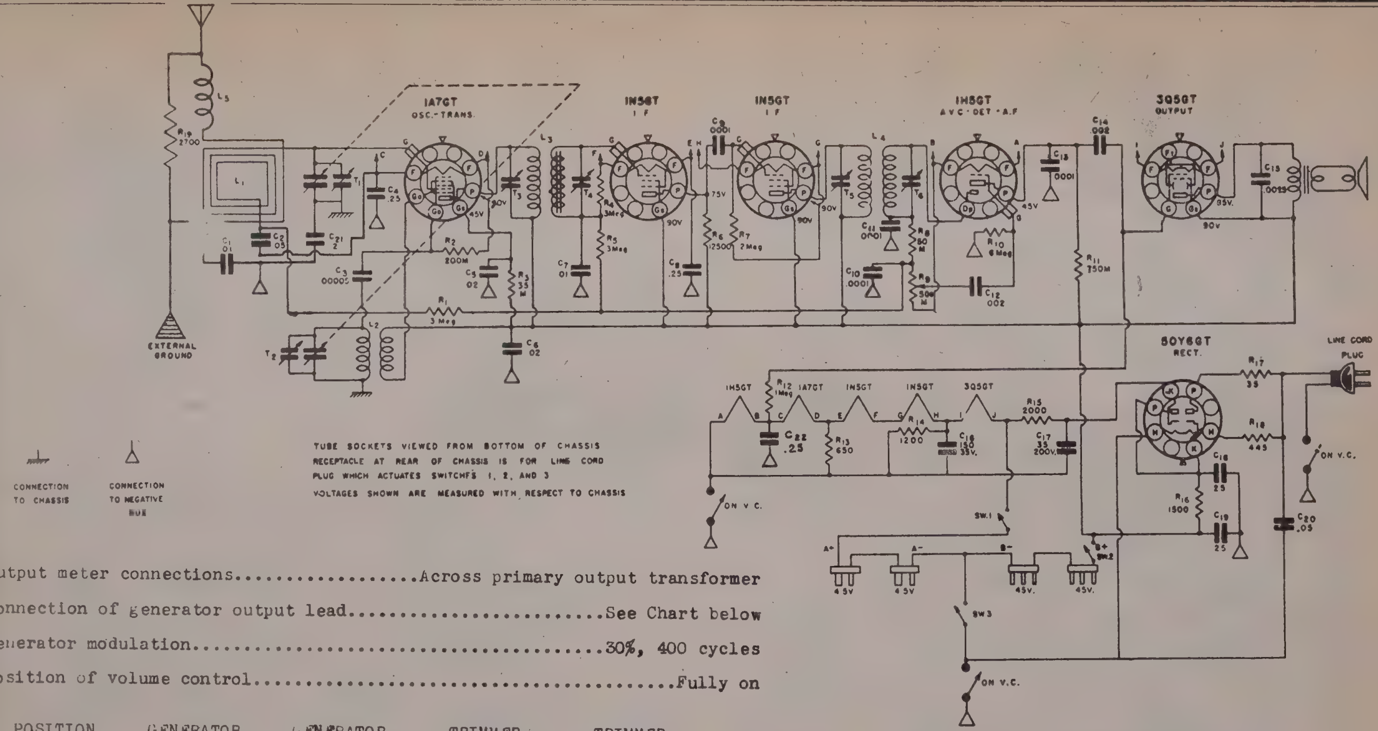
LOUDSPEAKER:
Type . . . . .PM Dynamic
Size . . . . 5 inch

CHASSIS FEATURES:
Number IF stages . . . . One
Self-contained loop antenna
Underwriters Approved

OPERATING FEATURES:
Automatic Volume Control
Battery or AC-DC Powered

MODEL 6821
Chassis 110,416,110.416A

SEARS-ROEBUCK & CO.



TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS
RECEPTACLE AT REAR OF CHASSIS IS FOR LINE CORD PLUG WHICH ACTUATES SWITCHES 1, 2, AND 3
VOLTAGES SHOWN ARE MEASURED WITH RESPECT TO CHASSIS

Output meter connections................Across primary output transformer

Connection of generator output lead........................See Chart below

Generator modulation.....................................30%, 400 cycles

Position of volume control...Fully on

IF PEAK 455 KC

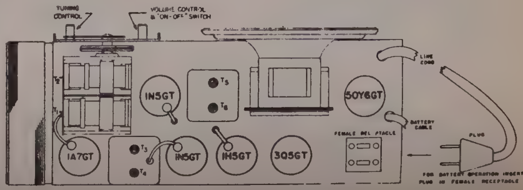
POSITION OF VARIABLE	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS	TRIMMER FUNCTION
Closed	455 KC	1A7GT Grid	T3,T4,T5,T6	I.F.
1500 KC	1500 KC	*	T2, T1	Osc. R.F.

The complete assembly of loop mounting and chassis shelf should be removed as a unit in order to align the receiver.

The batteries should be in the proper position when aligning the receiver.

* Run a wire from the output terminal of the generator, having it come near the receiver. However, no electrical connection is made between the signal generator and the receiver.

Always keep the output power from the generator at its lowest possible value

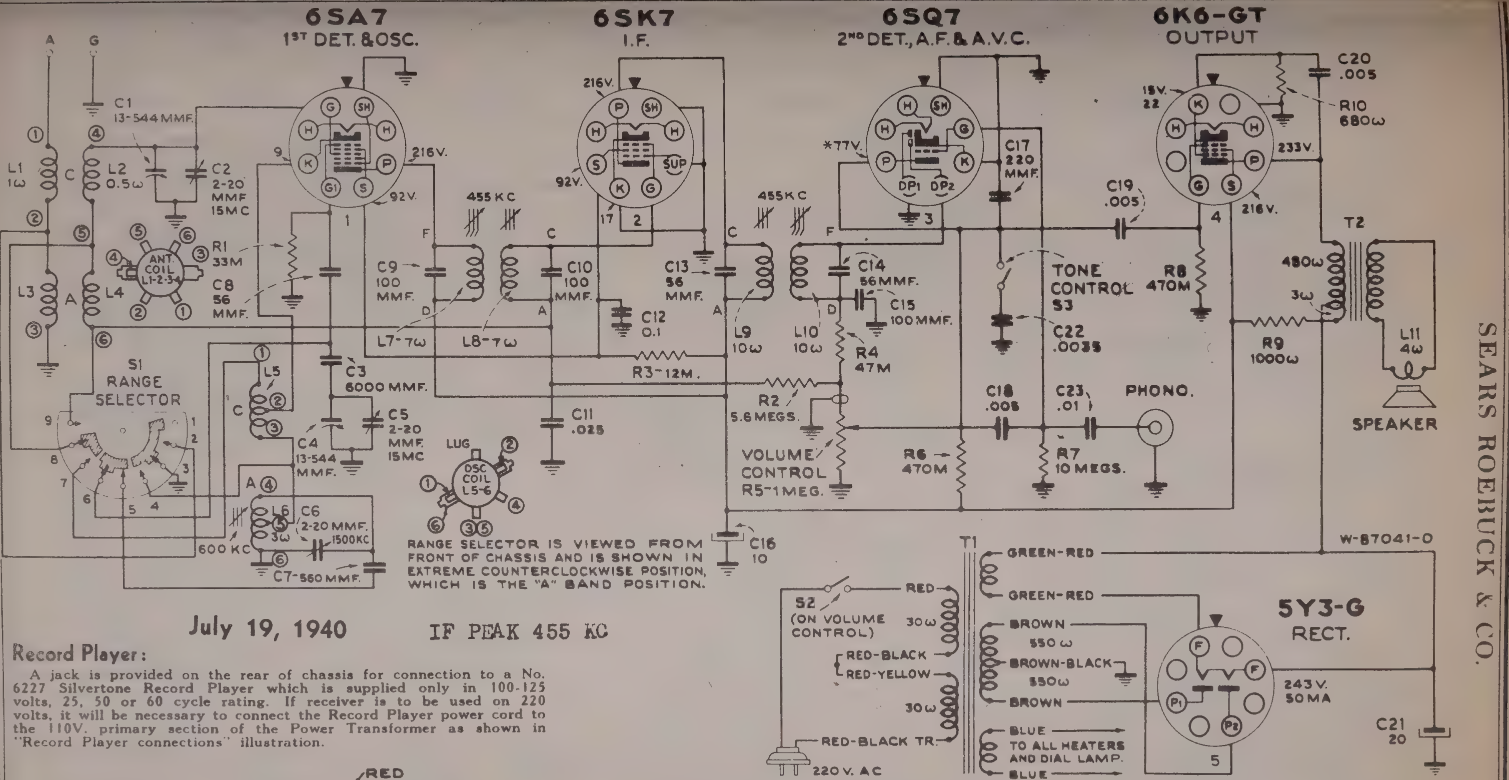


NOVEMBER 12, 1940

©John F. Rider, Publisher

SEARS ROEBUCK & CO.

MODEL 7315 Export
Chassis 126,224



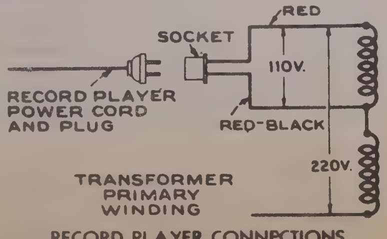
RANGE SELECTOR IS VIEWED FROM FRONT OF CHASSIS AND IS SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE "A" BAND POSITION.

July 19, 1940

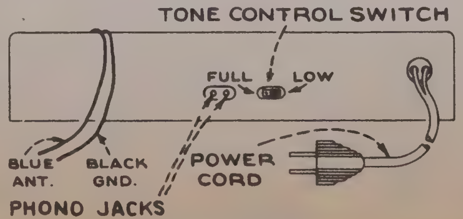
IF PEAK 455 KC

Record Player:

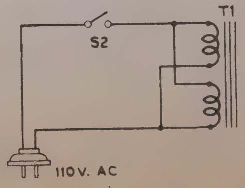
A jack is provided on the rear of chassis for connection to a No. 6227 Silvertone Record Player which is supplied only in 100-125 volts, 25, 50 or 60 cycle rating. If receiver is to be used on 220 volts, it will be necessary to connect the Record Player power cord to the 110V. primary section of the Power Transformer as shown in "Record Player connections" illustration.


RED
SOCKET
110V.
RECORD PLAYER POWER CORD AND PLUG
RED-BLACK
220V.
TRANSFORMER PRIMARY WINDING

RECORD PLAYER CONNECTIONS
(220 V—110 V)



REAR OF CHASSIS



MODEL 7315
Chassis 126.224

SEARS-ROEBUCK & CO.

Frequency Ranges:
Standard Broadcast (A)................... 540-1,800 kc (555-166m)
Short Wave (C)................................4.5-18 mc (66.7-16.6m)

Loudspeaker:
Type............................ 5-inch permanent-magnet dynamic
Voice Coil Impedance......................... 4.5 ohms at 400 cycles

Power Output:
Type.. Pentode
Undistorted.. 1.5 watts
Maximum... 2.3 watts

Power Supply
A.............................. 105 to 125 volts, 50 to 60 cycles, 40 watts
B.............................. 105 to 125 volts, 25 to 60 cycles, 40 watts
C.............................. 200 to 250 volts, 50 to 60 cycles, 40 watts

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
Broadcast	Low End	455 kc	0.1 mfd.	6SK7 I-F Grid	L9, L10	2nd I-F Transformer	5200
Broadcast	Low End	455 kc	0.1 mfd.	6SA7 Grid	L7, L8	1st I-F Transformer	92
Short Wave	15 mc	15 mc	300 ohms	Ant.	C5	Osc.*	
Short Wave	15 mc (Rock)	15 mc	300 ohms	Ant.	C2	Ant.**	50
Broadcast	1,500 kc	1,500 kc	0.0002 mfd.	Ant.	C6	Osc.	13
Broadcast	600 kc (Rock)	600 kc	0.0002 mfd.	Ant.	L6	Osc.	16
Broadcast	1,500 kc	1,500 kc	0.0002 mfd.	Ant.	C6	Osc.	

Output meter connections.. Across speaker voice coil
Output meter reading to indicate 1.0 watt output................................ 2 volts

* Use minimum capacity peak if two peaks can be obtained.

** Use maximum capacity peak if two peaks can be obtained.

Values shown under "Microvolts" are only approximate.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

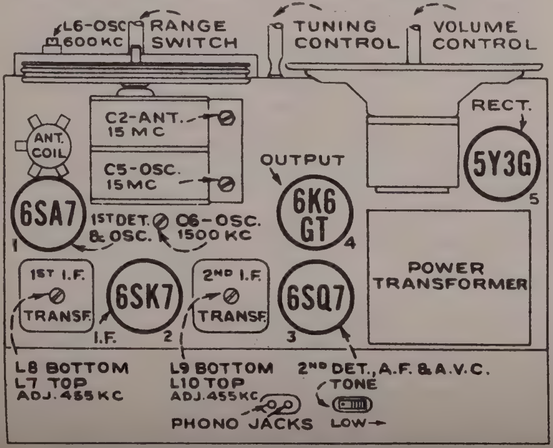
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output of the generator at its lowest possible value to prevent the AVC action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

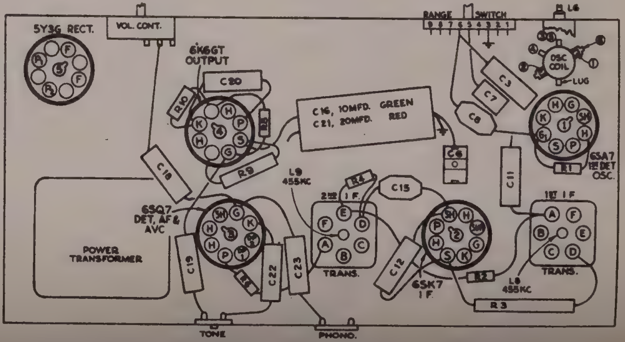
Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Position of Volume Control.................................... Fully clockwise
Position of Tone Control.. Full position
Position of Dial Pointer with variable tuning condenser fully closed.............. Horizontal

Chassis Features:
Jack for Phonograph Attachment
Magnetite-Core Adjusted I-F Transformers, and "A" Band Oscillator Coil
Automatic Volume Control
Two-point Tone Control
Tuning Drive Ratio.. 25 to 1



TUBE, TRIMMER AND PARTS LOCATION—TOP VIEW

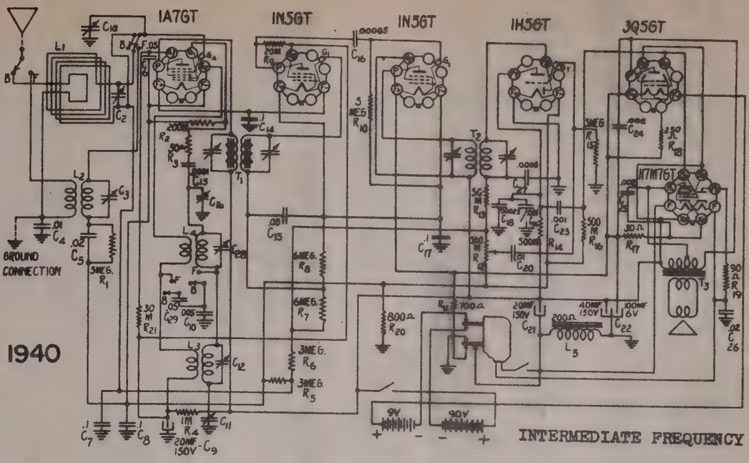


TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

©John F. Rider, Publisher

SEARS-ROEBUCK & CO.

MODEL 7318
Chassis 109.369



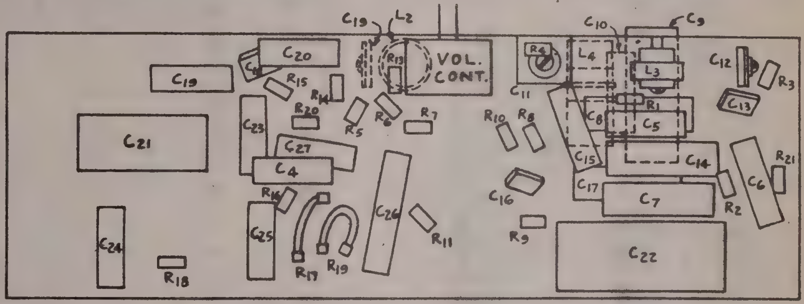
NOVEMBER 4, 1940

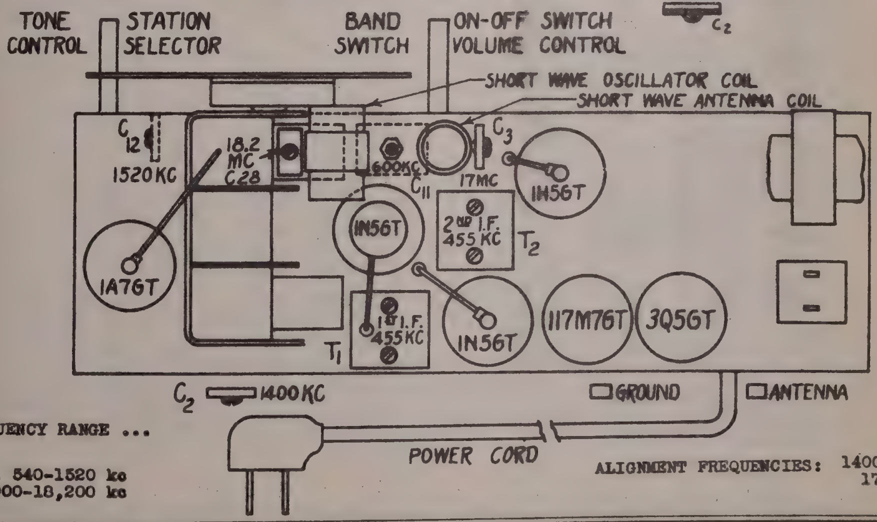
INTERMEDIATE FREQUENCY . . 455 kc

POWER SUPPLY . . . . Battery, 105-125 Volts 50-60 cycles or DC 20 Watts.

TUBES AND FUNCTIONS:

1A7GT	Oscillator-Translator	1H5GT	Detector-AVC-1st AF
1N5GT	First IF Amplifier	3Q5GT	Output, Battery
1N5GT	Second IF Amplifier	117M7GT	Rectifier-Output, Power





FREQUENCY RANGE ...

..... 540-1520 kc
5900-18,200 kc

ALIGNMENT FREQUENCIES: 1400-600 kc
17,000 kc

MODEL 7318 ALIGNMENT PROCEDURE

This receiver is a two band set covering the broadcast band 540-1520 kc, and the short wave band 5900-18,200 kc. The circuit is conventional. Two padding condensers are used for tracking. The broadcast padder is adjustable over a narrow range. The short wave padder is a fixed condenser of close tolerance. The gang condenser has both sections alike.

The normal alignment frequencies are shown below. It is to be noted that after aligning according to instructions, the top frequency of the set may not agree with the calibration. If an important station that should be received at the top end of the dial cannot be tuned in, the condenser should be opened and the oscillator trimmer adjusted to permit the reception of the desired signal, then the antenna circuit aligned at the specified aligning frequency.

PRELIMINARY:
Output meter connection . . . . Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 4 volts
Dummy to be used between high side of generator and receiver . . . . See chart below
Position of volume control . . . . fully on
Position of tone control . . . . maximum high response
Position of band switch . . . . as required.

RANGE SWITCH	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	DUMMY CONNECTED TO	TRIMMERS ADJUSTED (in order shown)	FUNCTION
Broadcast	closed	455 kc	.1 mfd	Grid of 1A7GT	T2, T1	IF
Short Wave	open	18,200 kc	400 ohms	Antenna clip	C28	Oscillator
Short Wave	17,000 kc	17,000 kc*	400 ohms	Antenna clip	C3	RF Transl.
Broadcast	open	1520 kc	.1 mfd	Grid of 1A7GT	C12	Oscillator
Broadcast	1400 kc	1400 kc	Note	Note	C2	RF Transl.
Broadcast	600 kc	600 kc*	Note	Note	C11	Oscillator

* The variable condenser should be rocked back and forth a degree or two while making the adjustment.

NOTE In making the broadcast band adjustments (1400 kc and 600 kc), the loop antenna should be in the same position in relation to the chassis and batteries that it will be in the cabinet. Do not align the broadcast band with the loop near a large metal object such as the top of a metal workbench.

Connect a one turn loop to the terminals of the signal generator and couple this loop very loosely to the receiver loop.

If two peaks can be had, the correct one is with the trimmer screw further out (minimum capacity); the other peak is the image.

The alignment procedure should be repeated stage by stage in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value in order to make the AVC action of the receiver ineffective.

THE LOOP ANTENNA:

The self contained loop antenna is directional in its characteristic, therefore, reception may sometimes be improved, or interference reduced, by turning the set in a particular direction. In locations where the signal strength is too low to give satisfactory reception, either because of distance from the station, or because of shielding resulting from metal lath, steel girders or equivalent metal objects in the building, an outside antenna is necessary. This antenna should be connected to the clip in the rear of the receiver.

SHORT WAVE ANTENNA:

A reel antenna is provided for the short wave range of this receiver. This antenna should be fully unwound and may be strung around a picture moulding or under a rug. Where greater signal pickup is necessary a good outdoor antenna should be used.

GROUND:

When either the reel antenna or an outdoor antenna is used, a good ground is necessary for best reception when the receiver is operated on batteries. Do not connect a ground to this receiver when it is operating on a power line.

THE HEATER CIRCUIT:

The heater of the 117M7GT tube is connected directly across the power line. The 1A7GT, 1N5GT, 1H5GT, filaments in series are heated by the cathode current of the 117M7GT output section on AC-DC operation. The 1A7GT, 1N5GT, 1H5GT and 3Q5GT filaments in series are heated by a nine volt battery on battery operation. If any one of the battery tubes burn out it can be located through th[illegible] fact that the full "A" battery voltage will appear across its filament terminals.

P[illegible] OF THE POWER CORD PLUG:

[illegible]C, the power cord should be tried in both its possible positions in the receptacle and left in [illegible]e position that gives the least hum. On DC, the receiver will work at only one position of t[illegible] plug in its receptacle.

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted, 3Q5GT . . . . 0.12 watt
Undistorted, 117M7GT . . . . 0.53 watt
Maximum 3Q5GT . . . . 0.25 watt
Maximum 117M7GT . . . . 1.00 watt

LOUD SPEAKER:
Type. . . . . Permanent Magnet Dynamic
Size. . . . . 5 inch
Field. . . . . Permanent Magnet

ALIGNMENT PROCEDURE

MODEL 7814

PRELIMINARY

MARCH 28, 1940

Output meter connections . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.4 volts
Generator ground lead connection . . . . Receiver chassis
Connection of generator output lead . . . . See chart below
Dummy antenna value to be in series with generator output. . . . . See chart below
Approximate microvolts input to indicate 50 milliwatts output . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . Fully on
Position of pointer with variable fully closed . . . . . .Over first heavy line below 550 kc
Position of electric battery switch . . . . Battery

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROX. MICROVOLTS
Open	465 kc.	.05 Mfd.	1A7G Grid	T2, T1	I.F.	150
Open	1650 kc.	.00005 Mfd.	Antenna	C2	Oscillator	200
1400 kc.	1400 kc.	.00005 Mfd.	Antenna	C1	Translator	150
600 kc. (Rock)	600 kc.	.00005 Mfd.	Antenna	C3	Padder	150

Important Alignment Notes

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The chassis is removed from the case in order to make alignment adjustments, however, the loop antenna should be placed in the same relative position to the chassis as it occupies in the case.

Alignment should be done with the receiver operating from batteries.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment.

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
1A7G. . . . . . . Translator-Oscillator
1N5G. . . . . IF
1H5G. . . . . Detector-AVC-AF
1A5G. . . . . Output
35Z4GT. . . . . Rectifier

POWER SUPPLY:
105 - 120 Volts, A.C.-D.C. . . . . 35 Watts
Batteries
#5086. . . . . 6v."A" battery
2 - #5090. . . . . . 45v."B" battery
"A" Drain. . . . . 56 ma
"B" Drain. . . . . 8.5 ma

FREQUENCY RANGE:
Broadcast . . . . 540-1650 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1650 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type. . . . . Pentode
Undistorted . . . . 0.095 watts
Maximum . . . . 0.15 watts

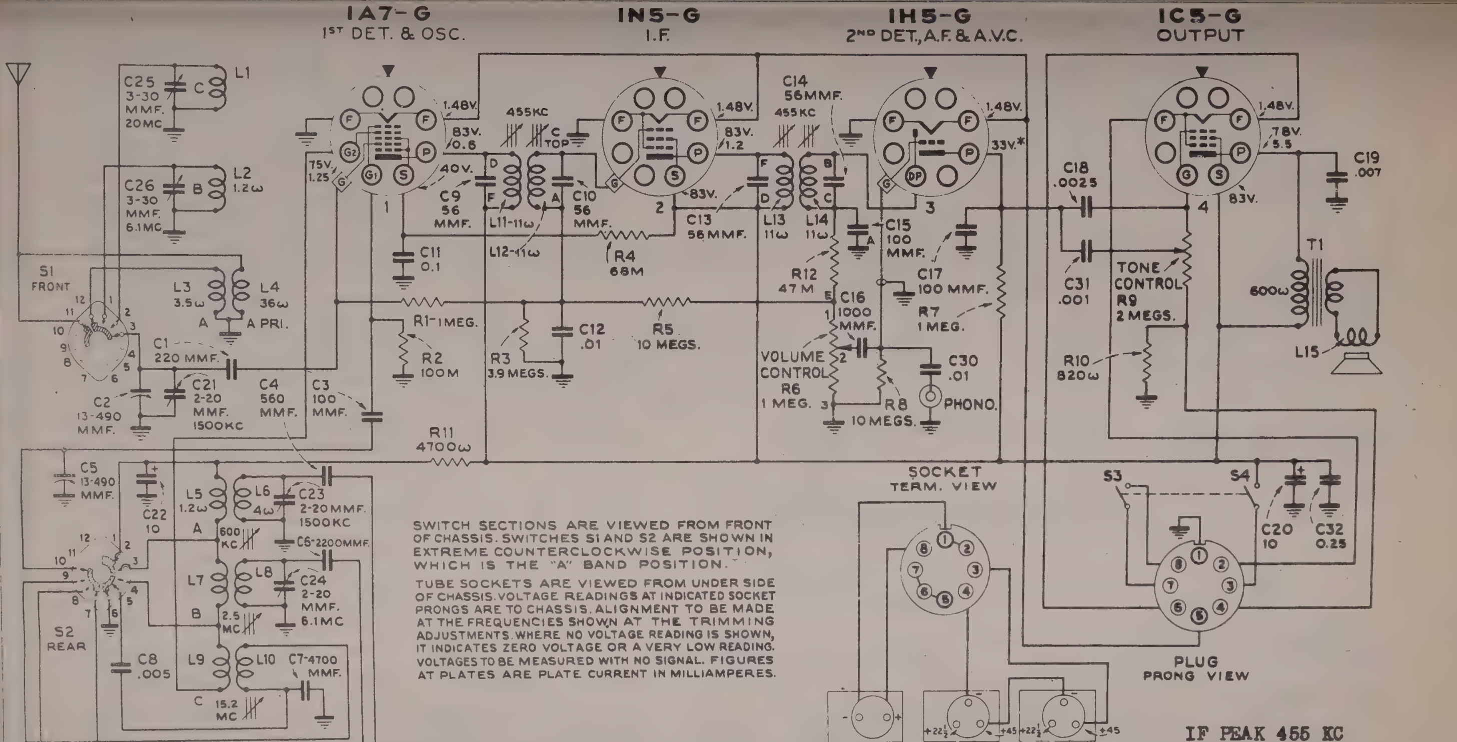
LOUD SPEAKER:
Type. . . . . PM Dynamic
Size. 5 inch

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob. . . . . Volume
2. Center knob. .Batt.-Off-AC-DC Switch
3. Right knob. . . . .Station Selector

CONTROL OPERATION:
Turning right . . . . Volume increase
Turning right . . . . . Battery: Off: AC-DC
Tuning ratio. 5½:1

MODEL 7321 Export
Chassis 126.229



SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES S1 AND S2 ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE "A" BAND POSITION.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT PLATES ARE PLATE CURRENT IN MILLIAMPERES.

IF PEAK 455 KC

Frequency Ranges:

Standard Broadcast.... 540-1,720 kc (555-174 m)
Medium Wave........ 2.3-7.0 mc (130-42.8 m)
Short Wave........... 7.0-22 mc (42.8-13.6 m)

Loudspeaker:

Type......... 5-inch permanent-magnet dynamic
Voice Coil Impedance...... 3 ohms at 400 cycles

Power Output:	Undistorted	Maximum
With Battery Supply...	0.13 watt.....	0.23 watt
With A-C Unit.......	0.20 watt.....	0.46 watt

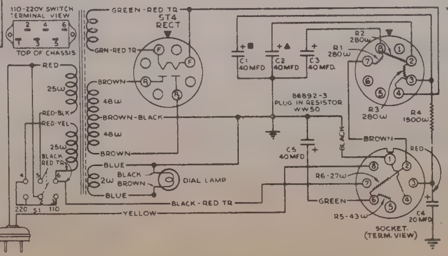


FIG. 7. POWER UNIT WIRING DIAGRAM

Socket Voltages, with the A-C Power Supply Unit.
(Line Supply Voltages, 117 or 234 Volts)

Tube	Filament Voltage	Plate Voltage	Screen Voltage	Plate Mils.	Bias Voltage
1A7-G	1.3	Det. 95 Osc. 85	45	Det. 0.4 Osc. 1.5	
1N5-G	1.3	95	95	1.5	
1H5-G	1.3	40*		.03	
1C5-G	1.28	92	95	9	6.1

Total "B" current, 15 mils.
Total filament current, 146 mils.
* With 750,000 ohm voltmeter.

NOVEMBER 1940

MODEL 7321 Export
Chassis 126.229

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate 0.05 watt output	0.4 volts
Approximate average sensitivity in microvolts for 0.05 watt output	See chart below
Dummy antenna value to be inserted in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully Clockwise
Position of Tone Control	Fully Clockwise

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
"Broadcast"	High End	455 kc	.001 mfd.	1N5-G I-F Grid Cap	L13, L14	2nd I-F Trans.	4,000
"Broadcast"	High End	455 kc	.001 mfd.	1A7-G Det. Grid Cap	L11, L12	1st I-F Trans.	50
"Broadcast"	1,500 kc (152.5°)	1,500 kc	.0002 mfd.	Ant.	C23, C21	Osc., Ant.	12
"Broadcast"	600 kc (33°) (Rock)	600 kc	.0002 mfd.	Ant.	L6	Osc.	6
"Medium Wave"	6.1 mc (151°)	6.1 mc	300 ohms	Ant.	C24, C26	Osc.,* Ant.	12
"Medium Wave"	2.5 mc (29.5°) (Rock)	2.5 mc	300 ohms	Ant.	L8	Osc.	18
"Short Wave"	15.2 mc (122°)	15.2 mc	300 ohms	Ant.	L10	Osc.	15
"Short Wave"	20 mc (155.5°) (Rock)	20 mc	300 ohms	Ant.	C25	Ant.**	18
"Broadcast"	1,500 kc (152.5°)	1,500 kc	.0002 mfd.	Ant.	C23	Osc.	12

IMPORTANT ALIGNMENT NOTES

*Use minimum capacity peak if two peaks can be obtained.

**Use maximum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band. Grid cap leads should remain in place during alignment.

Note.—Oscillator tracks 455 kc above signal on all bands.

Values shown under, "Microvolts," are only approximate.

Calibration Scale on Variable Condenser Drive Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment when chassis is out of cabinet; therefore, a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45° mark on the drum scale (see "Dial Drive Drawing") must be in a horizontal position when the plates are fully meshed. The distance from the edge of the chassis to the drum must not exceed ⅛-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

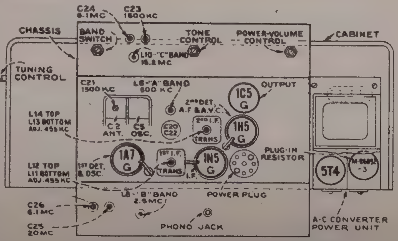
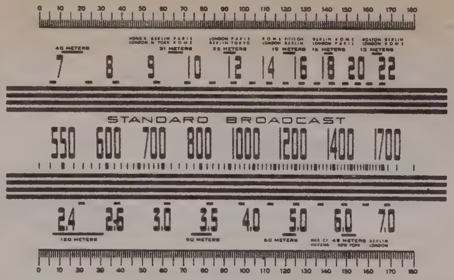


FIG. 2. TUBE TRIMMER AND PARTS LOCATION



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 88° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

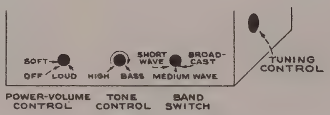


FIG. 3. CONTROLS

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial pointer to the drive cable with variable condenser fully closed and pointer on last calibration mark at 550 kc end of Broadcast "A" band. The dial pointer has a spring clip for attachment to the cable.

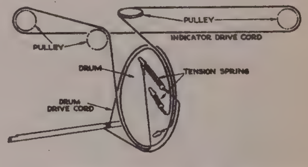


FIG. 4. CONDENSER AND INDICATOR DRIVE CORDS

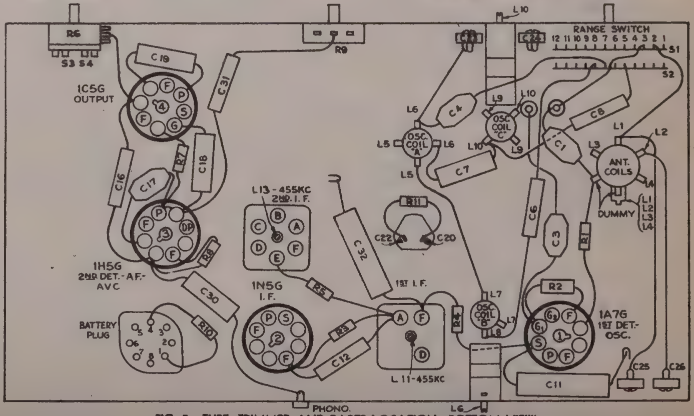
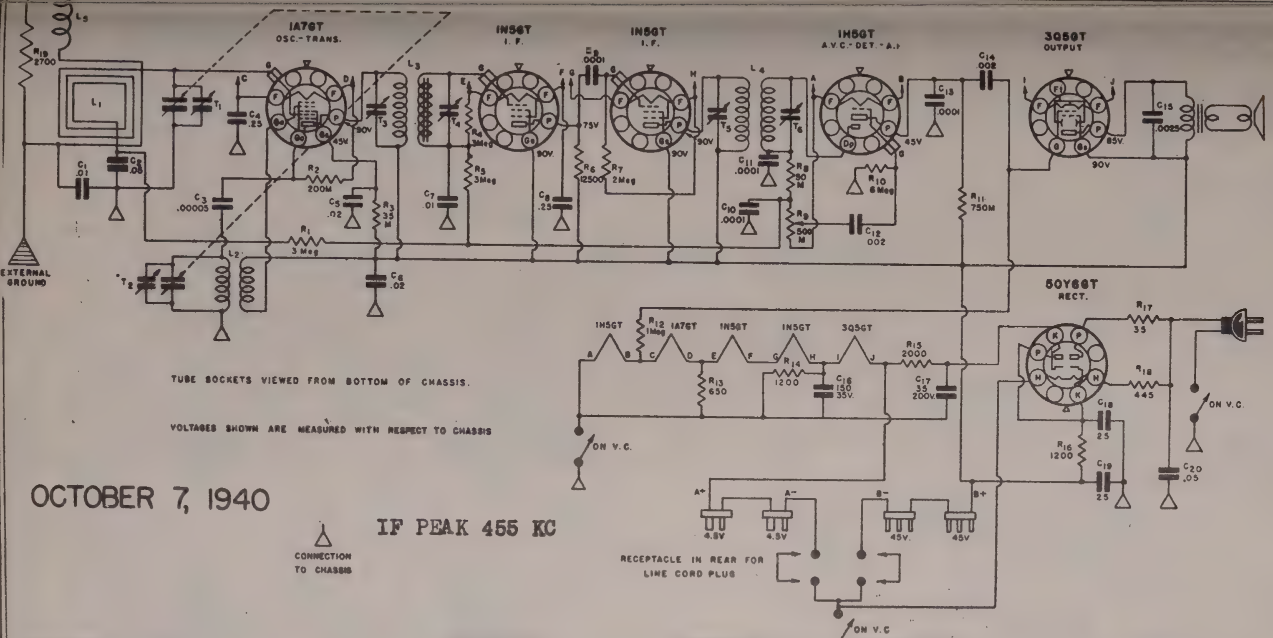


FIG. 5. TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

SEARS ROEBUCK & CO.

MODEL 6861
Chassis 110.412



TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS.

VOLTAGES SHOWN ARE MEASURED WITH RESPECT TO CHASSIS

OCTOBER 7, 1940

IF PEAK 455 KC

FREQUENCY RANGE
Broadcast........535-1730

POWER SUPPLY:
All models available....

BATTERY AND 110-125 VOLTS AC-DC

LOUD SPEAKER:
Type........ ...Dynamic
Size........ ....5"
Field....... ......P.M.

POWER OUTPUT
Type........ Beam Pentode
Undistorted........175 MW
Maximum...........350 MW

POSITION OF VARIABLE	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS	TRIMMER FUNCTION
Closed	455 KC	1A7GT Grid	T3,T4 T5,T6	I.F.
1500 KC	1500 KC	*	T2,T1	Osc. R.F.

The complete assembly of loop mounting and chassis shelf should be removed as a unit in order to align the receiver.

The batteries should be in the proper position when aligning the receiver.

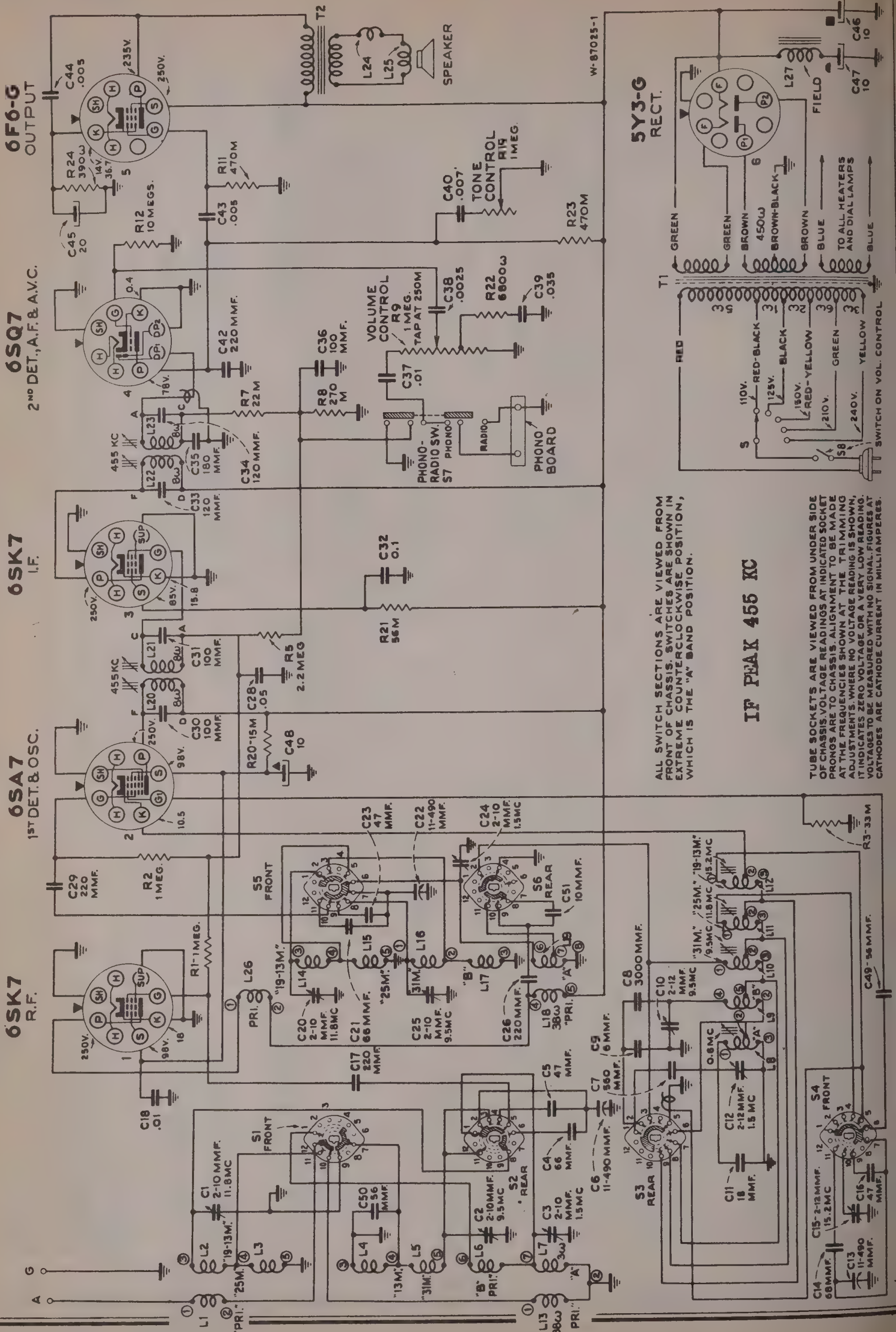
* Run a wire from the output terminal of the generator, having it come near the receiver. However, no electrical connection is made between the signal generator and the receiver.

Always keep the output power from the generator at its lowest possible value to prevent the avc of the receiver from interfering with accurate alignment.

MODEL 7325 Export
Chassis 126.226

SEARS ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS — 126.226



ALL SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE "A" BAND POSITION.

IF PEAK 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections........ Across speaker voice coil
Output meter reading to indicate 1.0 watt output........ 1.8 volts
Approximate average sensitivity in microvolts for 1.0 watt output........ See chart below
Dummy antenna value to be inserted in series with generator output........ See chart below
Connection of generator output lead........ See chart below
Connection of generator ground lead........ To chassis
Generator modulation........ 30%, 400 cycles
Position of Volume Control........ Fully clockwise
Position of Tone Control........ Fully clockwise

LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
"A"	Low End	455 kc	.001 mfd.	6SK7 I-F Grid	L22, L23	2nd I-F Trans.	4,000
"A"	Low End	455 kc	.001 mfd.	6SA7 Det.-Osc. Grid	L20, L21	1st I-F Trans.	70
"25 Meter"	11.8 mc (138.5°)	11.8 mc	300 ohms	Ant.	L11, C1, C20	Osc.,* Ant., Det.	7
"25 Meter"	15.2 mc (18.5°)	15.2 mc	300 ohms	Ant.	C15	Osc.*	8.5
"19-13 Meter"	15.2 mc (156°)	15.2 mc	300 ohms	Ant.	L12	Osc.*	7
"31 Meter"	9.5 mc (156°)	9.5 mc	300 ohms	Ant.	L10, C2, C25	Osc.,* Ant., Det.	5.6
"Medium Band"	9.5 mc (11.5°)	9.5 mc	300 ohms	Ant.	C10	Osc.*	3
"Standard Band"	1,500 kc (27°)	1,500 kc	.0002 mfd.	Ant.	C12, C3, C24	Osc., Ant., Det.	2
"Standard Band"	600 kc (149.5°) (Rock)	600 kc	.0002 mfd.	Ant.	L8	Osc.	1.5

IMPORTANT ALIGNMENT NOTES

* Use minimum capacity peaks if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

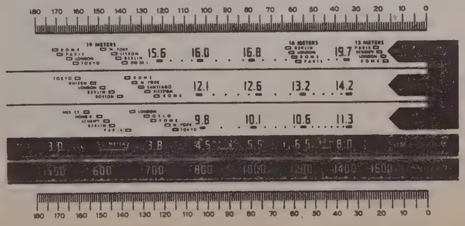
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Note.—Oscillator tracks 455 kc above signal on all bands.

Values shown under, "Microvolts," are only approximate.



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 180-0° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetic-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetic-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

Calibration Scale on Variable Condenser Drive Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment when chassis is out of cabinet; therefore, a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale (see "Dial Drive Drawing") must be in a vertical position when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet attach the dial pointer to the drive cable with variable condenser fully closed and pointer on last calibration mark at 550 kc end of Broadcast "A" band. The dial pointer has a spring clip for attachment to the cable.

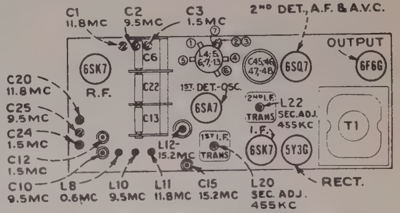


FIG. 3. TUBE, TRIMMER AND PARTS LOCATION

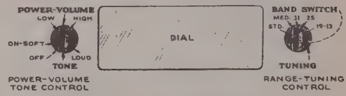


FIG. 4. CONTROLS

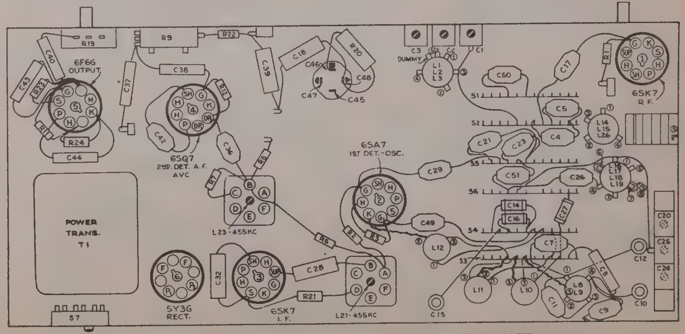


FIG. 5. TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

SEARS ROEBUCK & CO.

Electrical and Mechanical Specifications

Tubes and Functions:

6SK7 .... R-F Amplifier
6SA7 .... First Detector-Oscillator
6SK7 .... I-F Amplifier
6SQ7 .... Second Detector, A-F Amplifier and A.V.C.
6F6-G .... Power Output
5Y3-G .... Rectifier

Frequency Ranges:

Standard Broadcast .... 540-1,720 kc (555-174 m)
Medium Wave .... 3,000-9,500 kc (100-31.5 m)
31 Meter Spread Band .... 9,500-12,500 kc (31.5-24.0 m)
25 Meter Spread Band .... 11,800-16,000 kc (25.5-18.8 m)
19-16-13 Meter Spread Band. 15,500-22,500 kc (19.5-13.3 m)

Chassis Features:

Jack and Switch for Phonograph Attachment
Magnetite-Core Adjusted I-F Transformers, and Oscillator Coils
Automatic Volume Control
High-Frequency Tone Control
Aural-Compensated Volume Control
No. R-F Stages (all bands) .... one
No. I-F Stages .... one
Spread Bands for Short Wave Reception

Intermediate Frequency .... 455 kc

Alignment Frequencies:

Standard Broadcast... 1,500 kc (osc.)—(ant.) 600 kc (osc.)
Medium Band .... 9.5 mc (osc.)
31 Meter Spread Band .... 9.5 mc (osc.) (det.) (ant.)
25 Meter Spread Band .... 11.8 mc (osc.) (det.) (ant.)
15.2 mc (osc.)
19-13 Meter Spread Band .... 15.2 mc (osc.)

Loudspeaker:

Type .... 6-inch electrodynamic
Voice Coil Impedance at 400 Cycles .... 3.4 ohms
Field Coil Resistance .... 1,060 ohms

Power Output:

Type .... Pentode
Undistorted .... 2.5 watts
Maximum .... 4.5 watts

Power Supply Rating:

105-120 volts, 25 cycle .... 75 watts
105-120 volts, 50-60 cycle .... 75 watts
105-130, 140-160, 200-250 volts, 50-60 cycle .... 75 watts

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Schematic Location	Part No.	DESCRIPTION	Selling Price Each
	1265434502	Arm—Operating arm between knob shaft and range switch.	.25
	1265537053	Board—"Antenna-Ground" board	.20
	1265037153	Book—Instruction book	.25
	1265437054	Bracket—Pulley support bracket complete with pulley—fastened on bracket, Stock No. 1265434131	.20
	1265434130	Bracket—pulley support bracket complete with pulley—located on left hand side of chassis	.30
	1265434131	Bracket—Pulley support bracket complete with 2 pulleys—located on right hand side of chassis	.55
	1264035795	Calibrator—Drive drum calibrator	.25
L4, L5, L6, L7, L13	1262837055	Coil—Antenna coil—"A," "B" and "31 meter" bands	1.80
L1, L2, L3	1262837056	Coil—Antenna coil—"25, 19, 13 meter" band	1.00
L8, L9	1262837093	Coil—Oscillator coil—"A," and "B" bands	.85
L12	1262835624	Coil—Oscillator coil — "19-13 meter" band—25 meter	.45
L11	1262835625	Coil—Oscillator coil — "25 meter" band	.50
L10	1262835626	Coil—Oscillator coil — "31 meter" band	.45
L14, L15	1262837058	Coil—R.F. coil—"25 meter" and "19-13 meter" bands	.80
L16, L17, L18, L19	1262837057	Coil—R.F. coil—"A," "B" and "31 meter" bands	1.60
C45, C46, C47, C48	1262033014	Condenser—Electrolytic comprising three sections of 10 mfd.—450 volts each and one section of 20 mfd.—25 volts	1.90
C18, C38	126194239	Condenser—0.1 mfd., 400 volts, tubular	.30
C28	1261932787	Condenser—.05 mfd., 400 volts, tubular	.20
C39	1261936248	Condenser—.035 mfd., 400 volts, tubular	.20
C37	126194937	Condenser—.01 mfd., 1,000 volts, tubular	.25
C40	126195148	Condenser—.007 mfd., 500 volts, tubular	.20
C43, C44	1261933584	Condenser—.005 mfd., 1,200 volts, tubular	.25
C8	1261935643	Condenser—.003 mfd., tubular	.55
C38	1261934459	Condenser—.0025 mfd., 1,400 volts, tubular	.20
C7	1261931433	Condenser—.00056 mfd., silvered mica	.35
C35	1261936618	Condenser—.00022 mfd., mica	.30
C17, C26, C29, C42	[illegible]	Condenser—.00022 mfd., moulded	.35
C33, C34	1261931813	Condenser—.00012 mfd., mica.	.30
C30, C31	1261930904	Condenser—.0001 mfd., mica	.25
C36	1261912720	Condenser—.0001 mfd., moulded	.35
C14	1261935645	Condenser—.000068 mfd., ceramic	.35
C4, C21	1261936072	Condenser—.000066 mfd., silvered mica	.30
C49, C50	1261912723	Condenser—.000066 mfd., moulded	.35
C16	1261935644	Condenser—.000047 mfd., ceramic	.35
C5, C23	1261937329	Condenser—.000047 mfd., silvered mica	.35
C11	1261931350	Condenser—.000018 mfd., silvered mica	.30
C51	1261913200	Condenser—.00001 mfd., moulded	.35
C9	1261935646	Condenser—.000006 mfd., moulded	.35
C27	1261933097	Condenser—.0000047 mfd., ceramic	.35
C10, C12, C15	1261712714	Condenser—Air trimmer—medium, 2-12 mmfd.	.50
C20, C24, C25	1261737059	Condenser—Mica trimmer comprising 3 sections each, 2-10 mmfd.	.60
C1, C2, C3	1261737059	Condenser—Mica trimmer comprising 3 sections of 2-10 mmfd., each	.60
C6, C13, C22	1261637151	Condenser—Variable tuning condenser	6.35
R19	1262537052	Control—Tone control	1.00
R9, S8	1262437051	Control—Volume control and power switch	2.00
	1264534662	Cord—Indicator drive cord	.25
	1265432634	Cord—Tuning condenser drive cord	.10
	1261731259	Core—Adjustable core and stud	.15
	1261735788	Core—Adjustable core and stud for "A," "B" and "C" band oscillator coil	.15
	1261731259	Core—Adjustable core and stud for the 25 meter and 31 meter bands oscillator coils	.15
	1265435387	Decalcomania—"Power-Volume" decalcomania	.05
	1265437152	Decalcomania—"Range" decalcomania	.15
	[illegible]	Decalcomania—"Tone" decalcomania	.05
	1265436909	Decalcomania—Trade mark decalcomania	.15
	1265436391	Decalcomania—"Tuning" decalcomania	.05
	1264037116	Dial—Glass dial scale	1.35
	1264633770	Drive—Planetary tuning drive less balls, shafts, and shaft retainer	.90
	1264533773	Drum—Tuning condenser drive drum	.90
	1265437216	Frame—Dial frame complete, less pointer and carriage, pointer carriage guide shafts and dial	2.00
	1265433185	Gear—Volume control gear and hub	.50
	1264911765	Lamp—Dial lamp—Mazda No. 55	.17
	1265433767	Link—Operating link between knob shaft and range switch.	.60
	1265435653	Mounting—Rubber mounting for speaker	.20
	126195119	Plug—3-contact female plug for speaker cable	.25
	1264137217	Pointer—Station selector pointer and carriage	.40
	1264536627	Pulley—Drive cord pulley only fastened to bracket, Stock No. 1265434130	.10
	1264535630	Pulley—Drive cord pulley only—fastened to brackets, Stock Nos. 1265434131 and 1265437054	.10
R12	1262313601	Resistor—10 megohm, ½ watt	.20
R5	1262312679	Resistor—2.2 megohm, ½ watt.	.20
R1, R2	1262313730	Resistor—1 megohm, ½ watt	.20
R23	1262330648	Resistor—470,000 ohms, ½ watt	.20
R11	1262312285	Resistor—470,000 ohms, ½ watt	.20
R8	1262312199	Resistor—270,000 ohms, ½ watt	.20
R21	1262330650	Resistor—56,000 ohms, ½ watt.	.20
R3	1262318454	Resistor—33,000 ohms, ½ watt.	.20
R7	1262313998	Resistor—22,000 ohms, ½ watt.	.20
R20	1262335875	Resistor—15,000 ohms, 2 watt.	.35
R22	1262312265	Resistor—6.8,000 ohms, ½ watt	.20
R24	1262331338	Resistor—390 ohms, 1 watt	.32
	1265414348	Ring—Retaining ring for tone control	.03
	1265431611	Screw—No. 8-32 milled head set screw for gear, Stock No. 1265433185	.02
	1265414350	Screw—No. 8-32 square head set screw for drive drum	.03
	1265434491	Shaft—Pointer carriage guide shaft	.15
	1265434134	Shaft—Range switch shaft	.50

General Information and Service Hints

Record Player:

A jack is provided on the rear of chassis for connection to a No. 6227 Silvertone Record Player which is supplied only in 100-125 volts, 25, 50 or 60 cycle rating. If receiver is to be used on 220 volts, it will be necessary to connect the Record Player power cord to the 110V. primary section of the Power Transformer as shown in "Record Player connections" illustration.

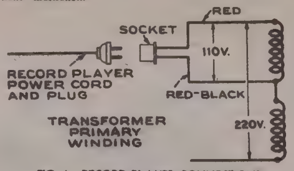

RED
SOCKET
110V.
RECORD PLAYER POWER CORD AND PLUG
RED-BLACK
TRANSFORMER PRIMARY WINDING
220V.

FIG. 1. RECORD PLAYER CONNECTIONS (220V—110V)

Loudspeaker:

The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

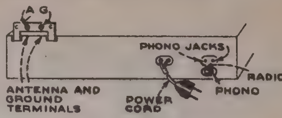


FIG. 2. REAR OF CHASSIS

Tuning Dial:

The tuning shaft is connected through a cord drive to a drum on the condenser shaft. A second cord drives the dial indicator by passing over a pulley on the chassis. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and condenser drum.

Schematic Location	Part No.	DESCRIPTION	Selling Price Each
	1265434132	Shaft—Shaft and gear for tone control	.55
	1264634135	Shaft—Tuning shaft	.70
	1261931884	Socket—Dial lamp socket	.20
	1261884187	Socket—Phono input socket	.15
	1261831251	Socket—Tube socket	.15
		Always show number on speaker when ordering replacement parts.	
	1265835848	Speaker—6-inch dynamic speaker complete—less output transformer and plug	3.50
	1265732907	Cap—Dust cap	.02
L27	1261533966	Coil—Field coil	1.70
L24	1265732906	Coil—Neutralizing coil	.25
L25	1265735441	Cone—Cone complete with voice coil, suspension and dust cap	1.25
	126575118	Plug—3-prong male speaker plug	.25
T2	1261332905	Transformer—Output transformer	1.35
	1265431418	Spring—Drive cord spring	.05
	1264632769	Spring—Planetory tuning drive spring	.15
	1265413638	Spring—Pointer cord spring	.08
	1265431281	Spring—Retaining spring for cores and studs	.01
	1265421281	Spring—Retaining spring for oscillator coil, No. 1262835624	.01
S7	1263838491	Switch—Radio-phono switch	.35
S1, S2, S3, S4, S5, S6	1262737050	Switch—Range switch	3.50
L20, L21, C30, C31	1263335636	Transformer—First I.F. transformer	1.70
L22, L23, C32, C34, C35	1263536615	Transformer—Second I.F. transformer	1.60
T1	1261131734	Transformer—Power transformer—105-120 volts, 25 cycle	10.35
T1	1261031733	Transformer—Power transformer—105-120 volts, 50-60 cycle	4.75
T1	1261031735	Transformer—Power transformer—105-130, 140-160, 200-250 volts, 50-60 cycle	10.80
	126462017	Washer—"C" washer for tuning drive	.08

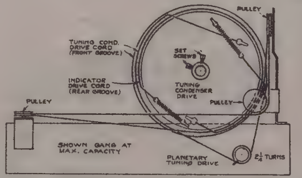

PULLEY
TUNING COND. DRIVE CORD (FRONT GROOVE)
SET SCREWS
INDICATOR DRIVE CORD (REAR GROOVE)
TUNING CONDENSER DRIVE
PULLEY
PULLEY
SHOWN GANG AT MAX. CAPACITY
PLANETARY TUNING DRIVE
2¼ TURNS

FIG. 6. CONDENSER AND INDICATOR DRIVE CORD

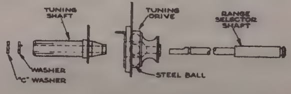


FIG. 7. PLANETARY TUNING DRIVE ASS'Y

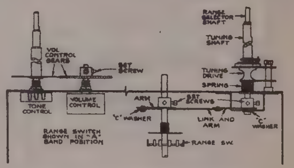
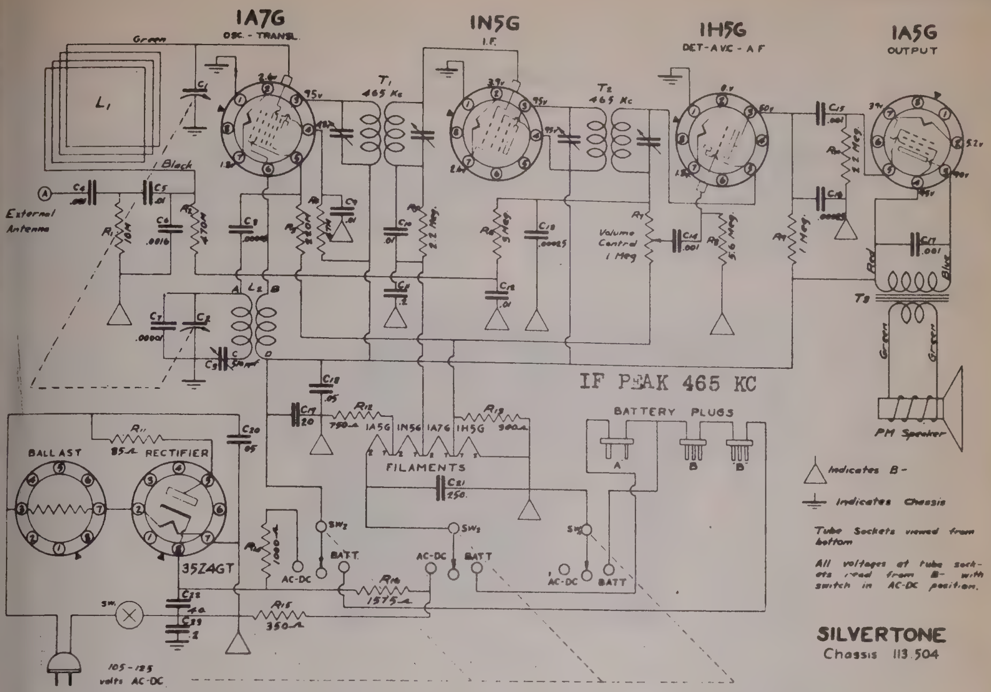


FIG. 8. BOTTOM VIEW OF CONTROLS

SEARS-ROEBUCK & CO.

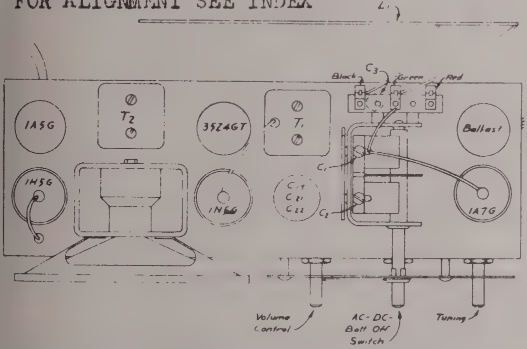
MODEL 7814
Chassis 113.304

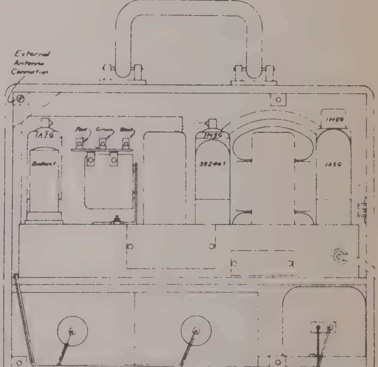


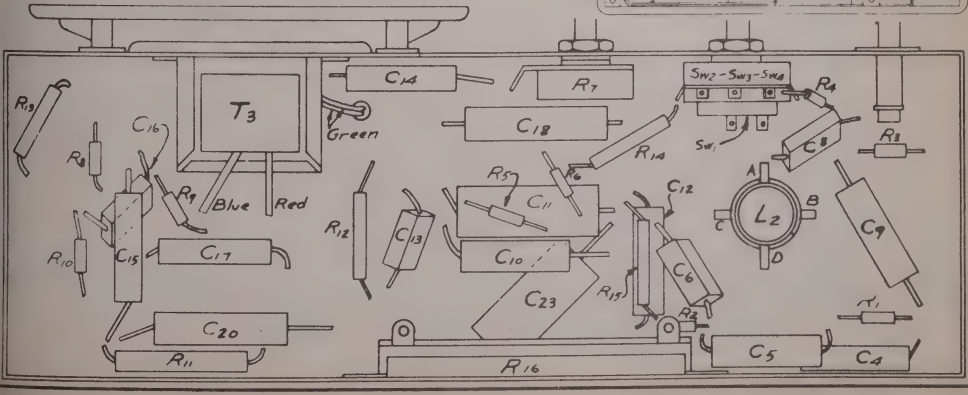
IF PEAK 465 KC

SILVERTONE
Chassis 113.504

FOR ALIGNMENT SEE INDEX







MODEL 7245
Chassis 107.375

SEARS-ROEBUCK & CO.

AUTOMATIC RECORD CHANGER

ADJUSTMENTS

A. MAIN LEVER.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

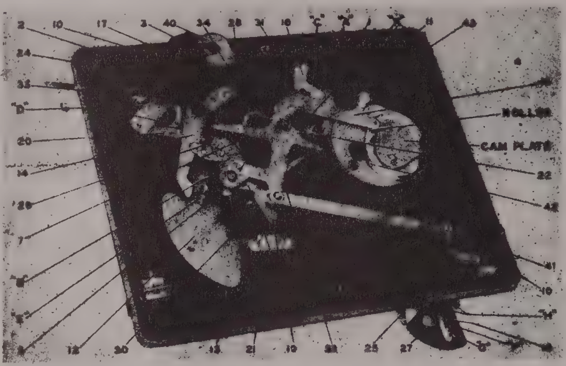
B. FRICTION CLUTCH.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5". If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B". If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. PICKUP LIFT CABLE SCREW.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D.& E. NEEDLE LANDING ON RECORD.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17". The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hob of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.



NOTE: Numbers refer to parts—letters refer to adjustments

F.& G. RECORD SEPARATING KNIFE.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .005 -.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072-.078 inch.

H. RECORD SUPPORT SHELF. —The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15", and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H", run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. TONE ARM REST SUPPORT (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. TRIP PAWL STOP PIN.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

LUBRICATION.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

MISCELLANEOUS SERVICE HINTS

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

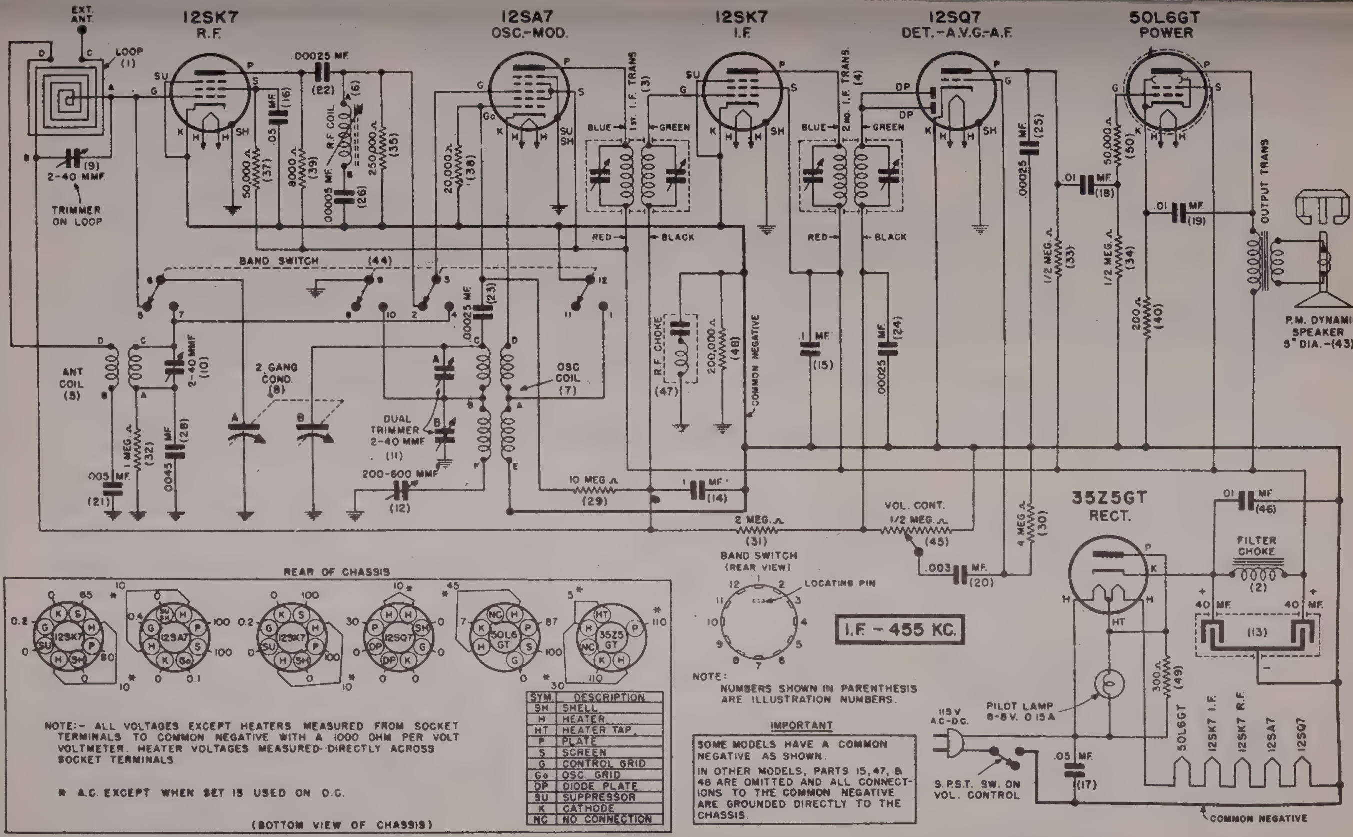
The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34".

SENTINEL RADIO CORP.

MODELS 1U-212UL
212UL



I.F. – 455 KC.

NOTE: NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

IMPORTANT

SOME MODELS HAVE A COMMON NEGATIVE AS SHOWN.

IN OTHER MODELS, PARTS 15, 47, & 48 ARE OMITTED AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	CONTROL GRID
Go	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS

* A.C. EXCEPT WHEN SET IS USED ON D.C.

VOLTAGE TABLE

PART NO.- 1U-212UL, 212UL

DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance — also on very loud signals the light may fluctuate.

Always use a 6.3 volt .15 ampere dial light.

OUTSIDE AERIAL

When the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of stations operating in the 540-1600 K.C. band may not be ample in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF THIS CHASSIS to obtain satisfactory results.

Printed in U.S.A.—4-40—

MODELS 1U-212UL,212UL ALIGNMENT PROCEDURE

PART NO. A12050—212 & 1U-212

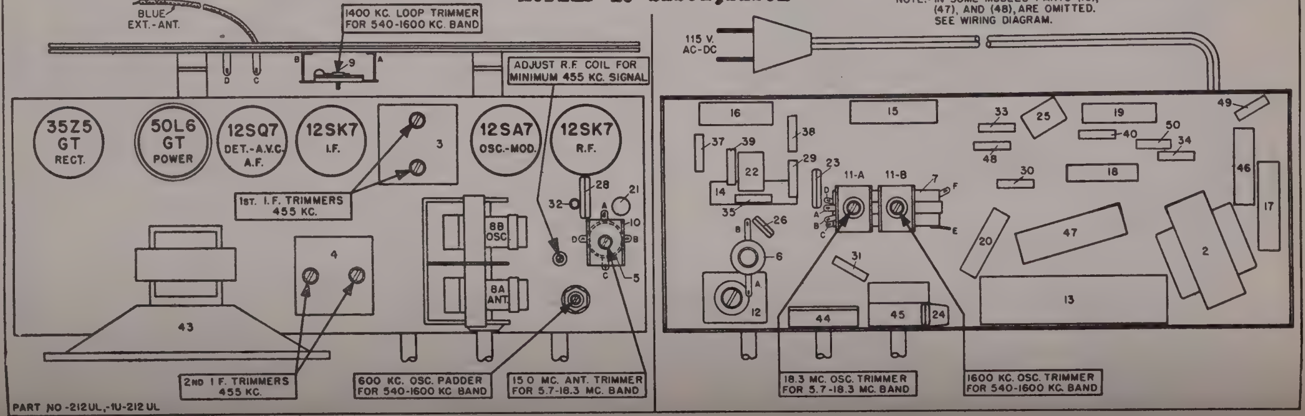
For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1600 kilocycle oscillator trimmer 600 K.C. padder, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

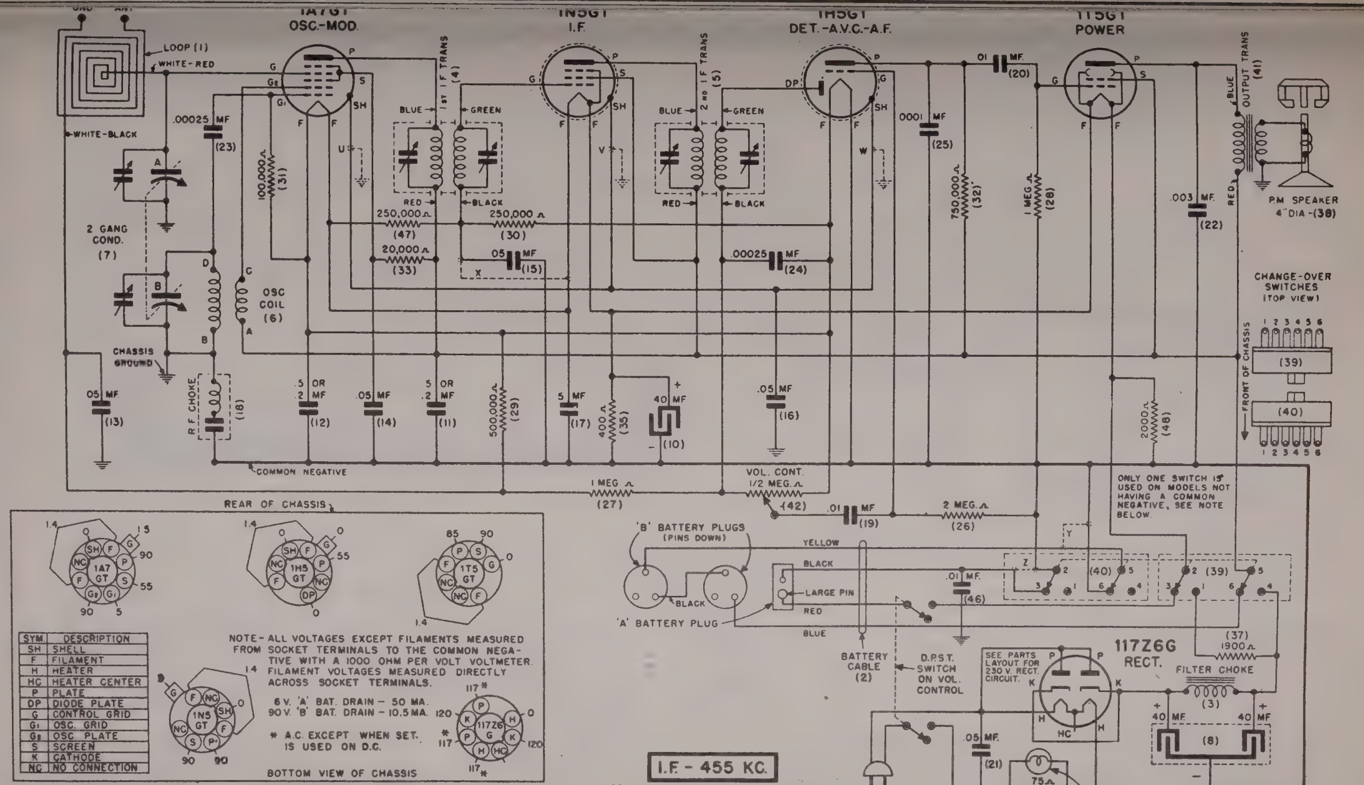
FOLLOW THIS PROCEDURE FOR MODELS 1U-214UL,214UL. FOR TRIMMERS SEE PAGE 12-14

		TEST OSCILLATOR			
Place band switch for operation on:	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 12SA7 tube. Low side to frame of condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmer for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1600 to 540 K.C. Band	1 Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	Adjust R.F. coil for minimum 455 K.C. signal.
	2 Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	Adjust 1600 K. C. oscillator trimmer for maximum output.
	3 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test Oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	4 Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	1 Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to Blue Ant. Lead, Low side to frame of gang condenser through .01 Mfd. condenser.	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak —which is the proper one to use is tuned in.
	2 Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to Blue Ant. Lead, Low side to frame of gang condenser.	While rocking gang condenser adjust 15 M. C. antenna trimmer for maximum output.

MODELS 1U-212UL,212UL


BLUE-EXT.-ANT.
1400 KC. LOOP TRIMMER FOR 540-1600 KC. BAND
ADJUST R.F. COIL FOR MINIMUM 455 KC. SIGNAL
35Z5 GT RECT.
50L6 GT POWER
12SQ7 DET.-A.V.C. A.F.
12SK7 I.F.
12SA7 OSC.-MOD.
12SK7 R.F.
1ST. I.F. TRIMMERS 455 KC.
8B OSC.
8A ANT.
2ND I.F. TRIMMERS 455 KC.
600 KC. OSC. PADDER FOR 540-1600 KC BAND
15.0 MC. ANT. TRIMMER FOR 5.7-18.3 MC. BAND
PART NO -212UL,-1U-212 UL
115 V. AC-DC
NOTE:- IN SOME MODELS PARTS (15), (47), AND (48), ARE OMITTED. SEE WIRING DIAGRAM.
11-A
11-B
18.3 MC. OSC. TRIMMER FOR 5.7-18.3 MC. BAND
1600 KC. OSC. TRIMMER FOR 540-1600 KC. BAND
2
3
4
5
6
7
9
10
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
28
29
30
31
32
33
34
35
37
38
39
40
43
44
45
46
47
48
49
50

SENTINEL RADIO CORP. MODELS 1U-213XL, 213XL



SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
H	HEATER
HC	HEATER CENTER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G1	OSC. GRID
G2	OSC. PLATE
S	SCREEN
K	CATHODE
NC	NO CONNECTION

NOTE- ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

6 V. 'A' BAT. DRAIN – 50 MA.
90 V. 'B' BAT. DRAIN – 10.5 MA.

* A.C. EXCEPT WHEN SET. IS USED ON D.C.

VOLTAGE TABLE

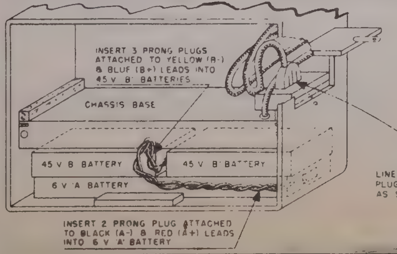
PART NO. 1U-213 XL, 213 XL

I.F. - 455 KC.

NOTE-

NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS

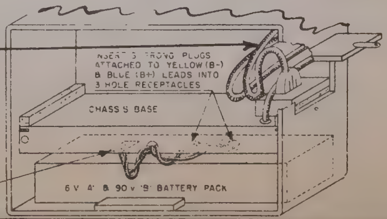
SOME MODELS HAVE A COMMON NEGATIVE AS SHOWN. IN OTHER MODELS, PARTS 15, 16, 18, 30 40, 46 & 47 ARE OMITTED AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS, ALSO CONNECTIONS ARE MADE AT POINTS U, V, W, X, Y & Z AS SHOWN BY DOTTED LINES.


INSERT 3 PRONG PLUGS ATTACHED TO YELLOW (B-) & BLUE (B+) LEADS INTO 45 V. 'B' BATTERIES
CHASSIS BASE
45 V. B BATTERY
45 V. 'B' BATTERY
6 V. 'A' BATTERY

INSERT 2 PRONG PLUG ATTACHED TO BLACK (A-) & RED (A+) LEADS INTO 6 V. 'A' BATTERY

LINE CORD FOR 115 V. A.C.-D.C. OPERATION PLUG MUST BE INSERTED INTO RECEPTACLE AS SHOWN FOR BATTERY OPERATION

LINE CORD FOR 115 V. A.C.-D.C. OPERATION PLUG MUST BE INSERTED INTO RECEPTACLE AS SHOWN FOR BATTERY OPERATION


INSERT 3 PRONG PLUGS ATTACHED TO YELLOW (B-) & BLUE (B+) LEADS INTO 3 HOLE RECEPTACLES
CHASSIS BASE
6 V. 'A' & 90 V. 'B' BATTERY PACK
B

INSERT 2 PRONG PLUG ATTACHED TO BLACK (A-) & RED (A+) LEADS INTO 2 HOLE RECEPTACLE

MODELS 1U213XL,
213XL

SENTINEL RADIO CORP.

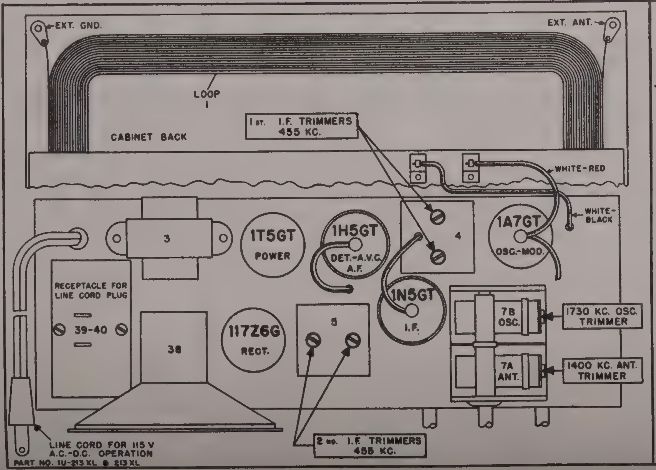
-1-41-

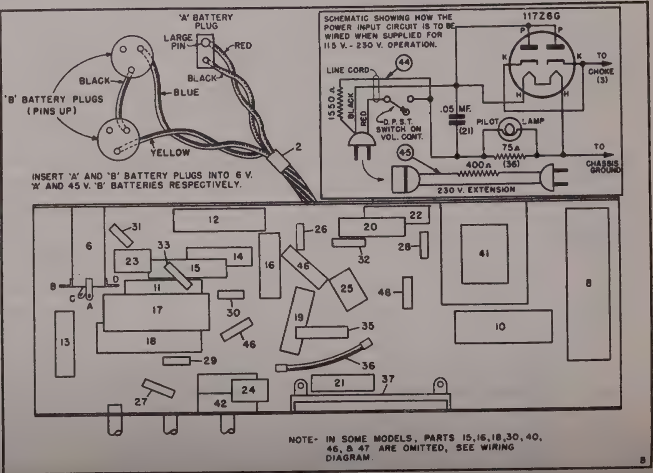
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:		Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.		Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1730 K. C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.

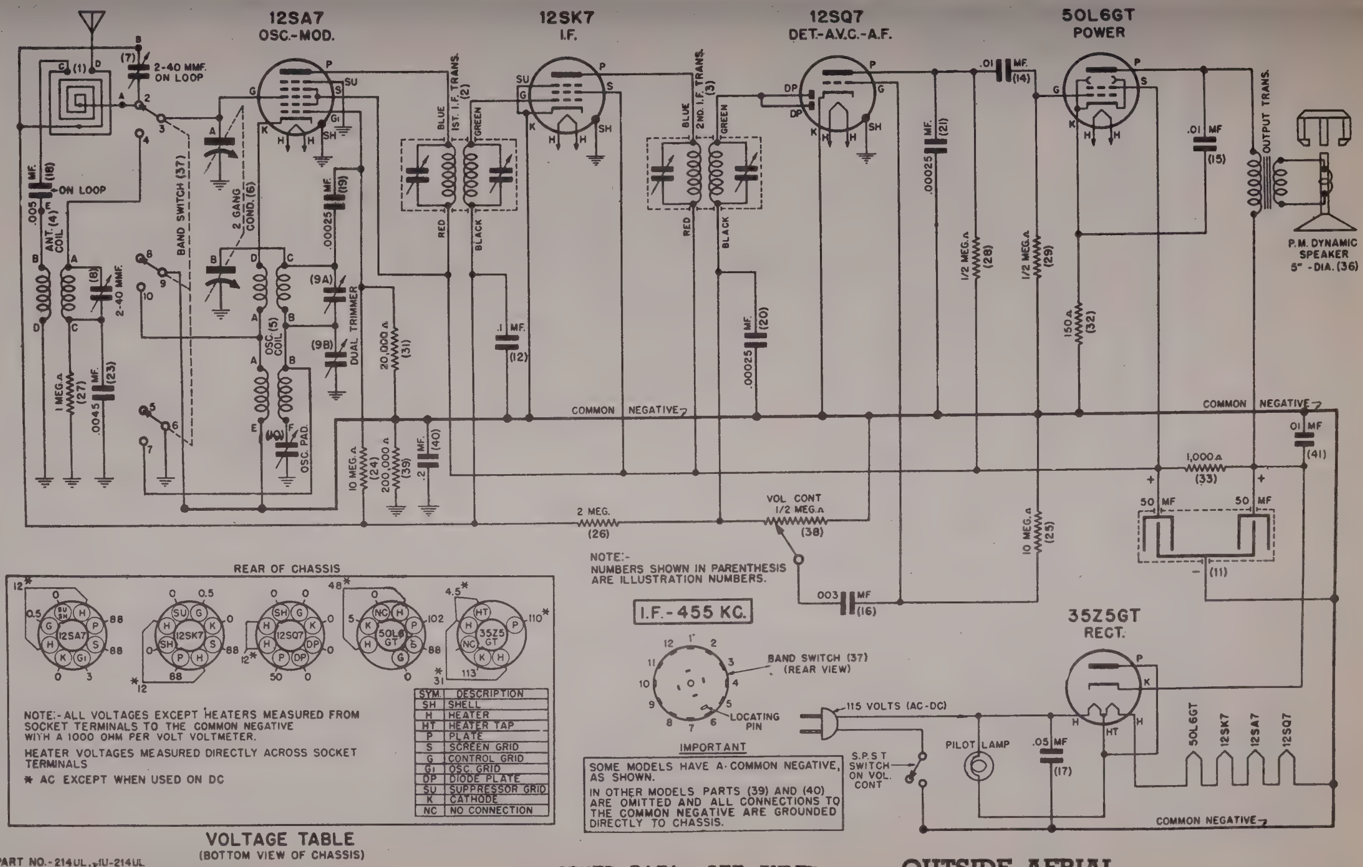



'A' BATTERY PLUG
LARGE PIN
RED
BLACK
BLACK
BLUE
'B' BATTERY PLUGS (PINS UP)
YELLOW
2
INSERT 'A' AND 'B' BATTERY PLUGS INTO 6 V. 'A' AND 45 V. 'B' BATTERIES RESPECTIVELY.
SCHEMATIC SHOWING HOW THE POWER INPUT CIRCUIT IS TO BE WIRED WHEN SUPPLIED FOR 115 V. - 230 V. OPERATION.
117Z6G
LINE CORD
44
1550 Ω
BLACK
RED
D.P.S.T. SWITCH ON VOL. CONT.
.05 MF. (21)
PILOT LAMP
75 Ω
400 Ω (36)
45
TO CHOKE (3)
TO CHASSIS GROUND
230 V. EXTENSION
P
K
H
12
22
20
31
33
23
15
14
26
32
28
6
16
46
41
25
8
11
17
30
19
48
18
35
10
13
29
46
36
27
24
42
21
37
B
C
A
D

NOTE- IN SOME MODELS, PARTS 15, 16, 18, 30, 40, 46, & 47 ARE OMITTED, SEE WIRING DIAGRAM.

SENTINEL RADIO CORP.

MODELS 1U-214UL, 214UL



NOTE:-
NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

IMPORTANT

SOME MODELS HAVE A COMMON NEGATIVE, AS SHOWN.

IN OTHER MODELS PARTS (39) AND (40) ARE OMITTED AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO CHASSIS.

NOTE:-ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER.

HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS

* AC EXCEPT WHEN USED ON DC

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN GRID
G	CONTROL GRID
G1	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR GRID
K	CATHODE
NC	NO CONNECTION

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO.-214UL, 1U-214UL

FOR OTHER DATA, SEE INDEX

DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance — also, on very loud signals the light may fluctuate.

Always use a 6.3 volt .15 ampere dial light.

OUTSIDE AERIAL

When the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of stations operating in the 540-1600 K.C. band may not be ample in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF THIS CHASSIS to obtain satisfactory results.

MODEL 170-BL

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1400 kilocycle antenna and R. F. trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

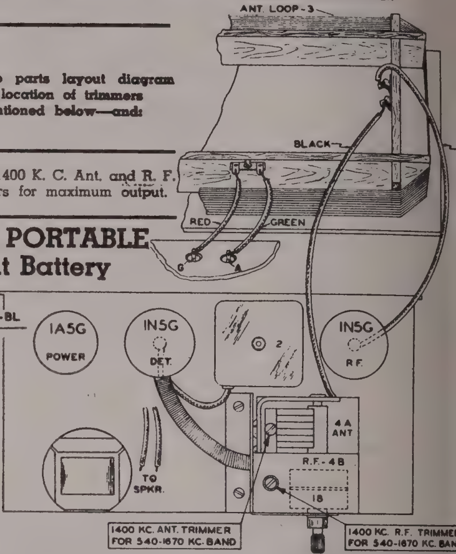
a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

		Set receiver dial to:	TEST OSCILLATOR Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below—and:
(1)	Exactly 1400 K. C.	Exactly 1400 K. C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1400 K. C. Ant. and R. F. trimmers for maximum output.

3 TUBE PORTABLE
1½ Volt Battery

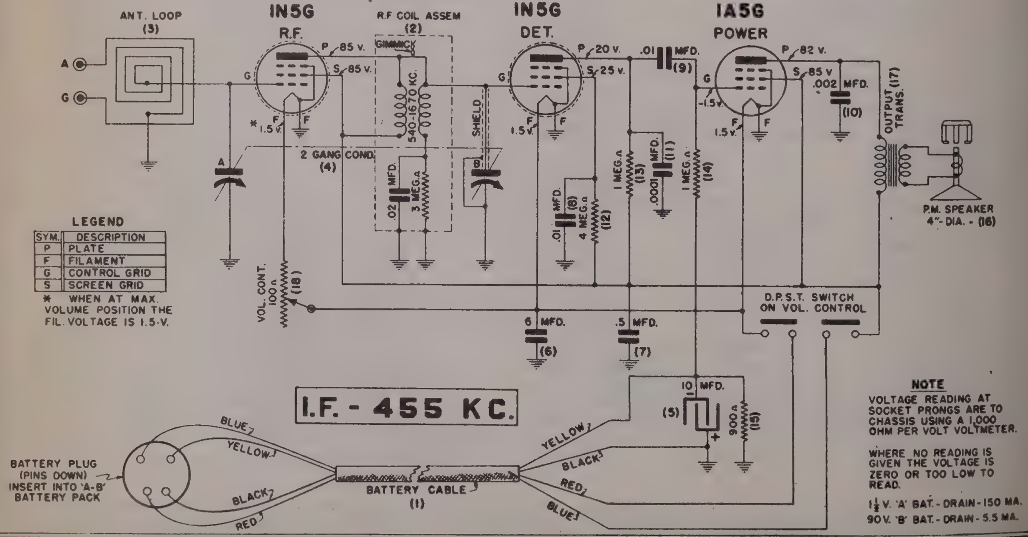
PART N°-170-BL



Because of the directional effect of the loop aerial, it is important TO TUNE IN THE SIGNAL TO THE POINT OF LOUDEST VOLUME AND CLEAREST TONE WITH THE TUNING KNOB AND THEN ROTATE THE RADIO TO THE POSITION OF GREATEST VOLUME.

THE DAYLIGHT RANGE OF THIS RADIO IS APPROXIMATELY 50 MILES—NIGHT TIME RANGE WILL BE GREATER THAN THIS. When the radio is used in a location a great distance from broadcast stations, or when the volume of the stations received is not ample, or when it is operated in boats, buildings, etc., constructed with a large amount of steel, IT MAY BE NECESSARY TO USE AN OUTSIDE AERIAL. The outside aerial should be 35 to 50 feet in length erected as high as possible and must be attached to the terminal post marked "A" mounted on the bottom of back cover.

WHEN USING AN EXTERNAL AERIAL A GROUND MUST BE ATTACHED TO OTHER POST ON BOTTOM OF BACK COVER MARKED "G." A wire attached to a metal stake driven two to four feet in moist ground or to a water pump or to a nail driven in a tree, or a bare wire thrown in any large body of water such as a stream, lake, brook, creek, well, etc., will provide a suitable ground.



LEGEND

SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID

* WHEN AT MAX. VOLUME POSITION THE FIL. VOLTAGE IS 1.5-V.

NOTE

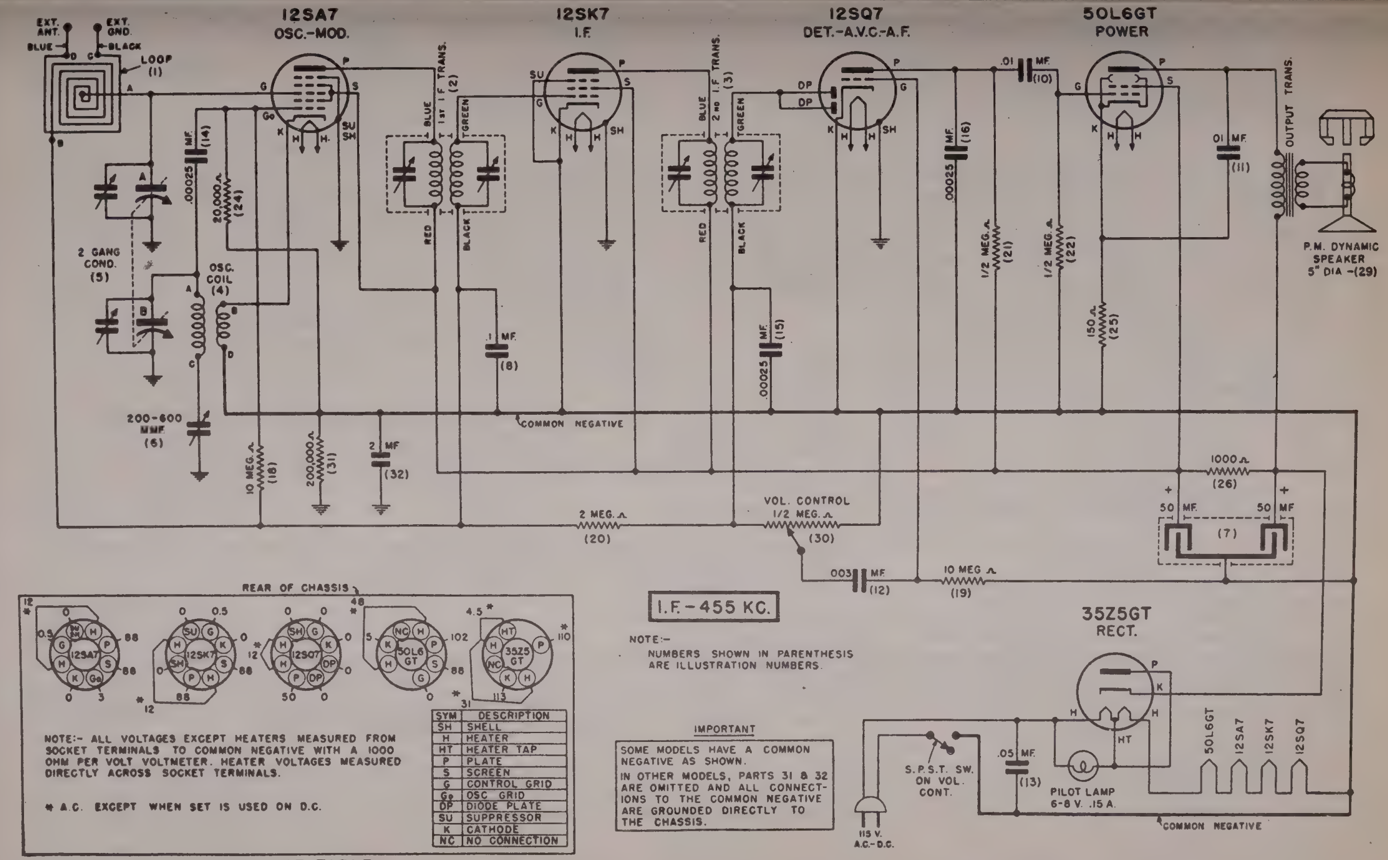
VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER.

WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

1½ V. 'A' BAT. - DRAIN - 150 MA.
90 V. 'B' BAT. - DRAIN - 5.5 MA.

SENTINEL RADIO CORP.

MODEL 1U-218UL,
218UL



I.F. - 455 KC.

NOTE:-
NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

IMPORTANT

SOME MODELS HAVE A COMMON NEGATIVE AS SHOWN.
IN OTHER MODELS, PARTS 31 & 32 ARE OMITTED AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.

NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

* A.C. EXCEPT WHEN SET IS USED ON D.C.

SYM	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	CONTROL GRID
Go	OSC GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO. 218UL, 1U-218UL

WARNING—Do not attach a ground direct to the radio chassis—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance—also, on very loud signals the light may fluctuate.

Always use a 6.3 volt .15 ampere dial light.

MODELS 1U-218UL,
218UL

SENTINEL RADIO CORP.

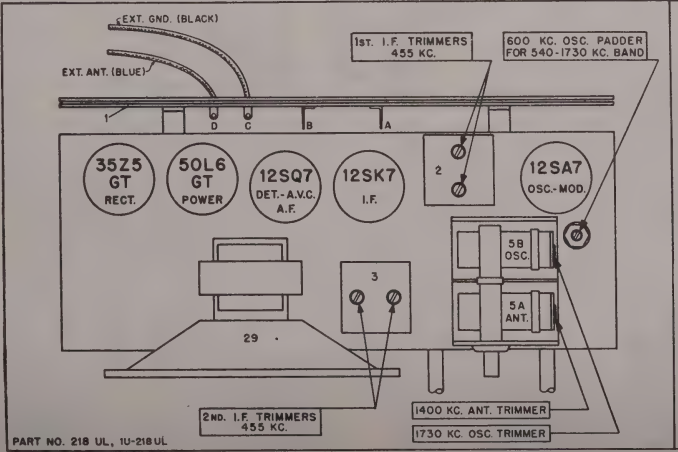
–10-40–

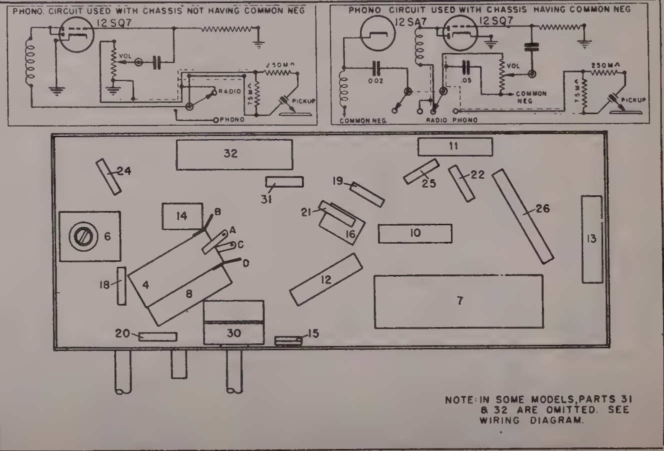
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer, 600 K.C. padder and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:		Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position		Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid of 12SA7 tube. Low side to frame of gang condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of gang condenser through .01 Mfd. condenser.	Adjust 1730 K. C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of gang condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of gang condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.

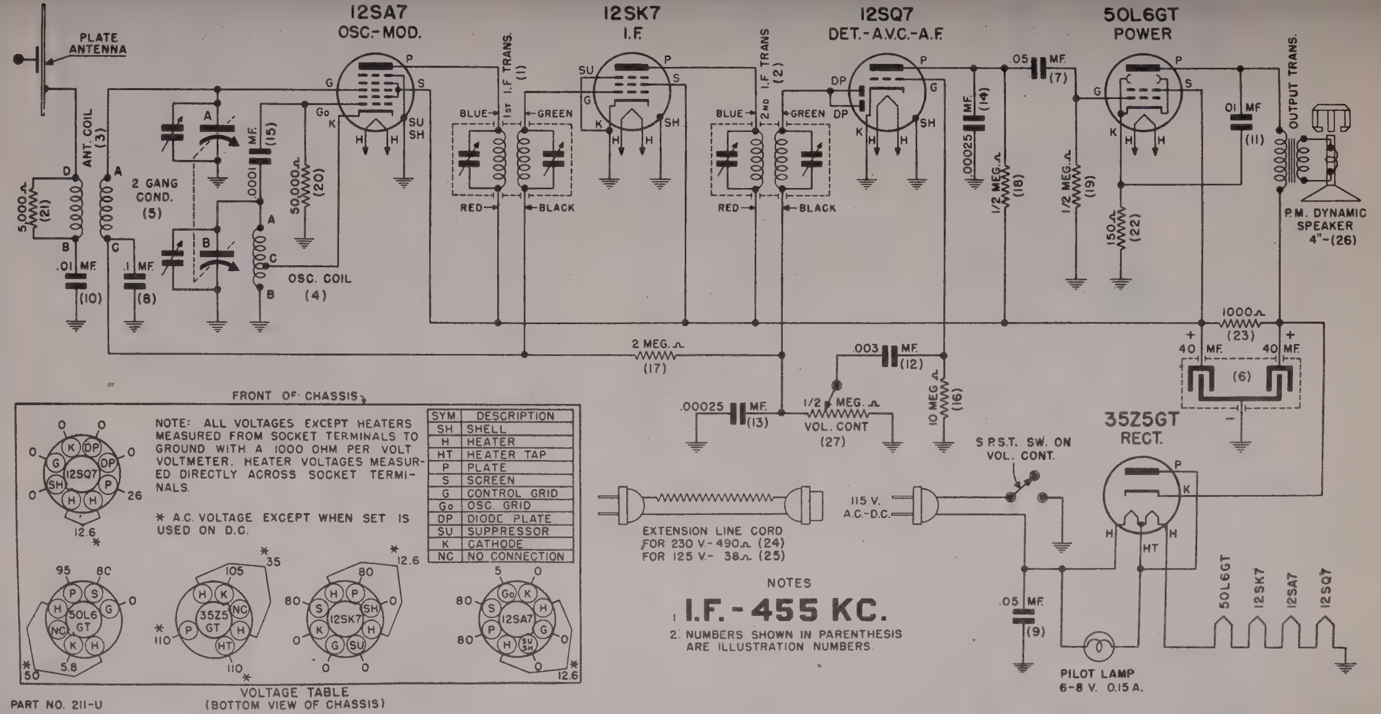




NOTE: IN SOME MODELS, PARTS 31 & 32 ARE OMITTED. SEE WIRING DIAGRAM.

SENTINEL RADIO CORP.

MODEL 211U



NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

* A.C. VOLTAGE EXCEPT WHEN SET IS USED ON D.C.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	CONTROL GRID
Go	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO. 211-U

NOTES

1. I.F. - 455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

PARTS LIST

Illus. No.	Part No.		Description	List Price
1	11347	Coil	1st I.F. Transformer	.90
2	11376	Coil	2nd I.F. Transformer	.80
3	11386	Coil	Antenna	.50
4	11387	Coil	Oscillator	.45
5	11378	Condenser	Tuning Two Gang	1.75
6	11493	Condenser	Tubular Dry Electrolytic 40-40 Mfd. 150 Volt	1.00
7	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
8	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
9	9457	Condenser	Tubular .05 Mfd. 400 Volt	.18
10	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
11	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
12	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
13	9458	Condenser	Mica .00025 Mfd.	.21
14	9458	Condenser	Mica .00025 Mfd.	.21
15	7934	Condenser	Mica .0001 Mfd.	.21
16	4804	Resistor	Carbon 10 Megohm ⅓ Watt	.19
17	2705	Resistor	Carbon 2 Megohm ⅓ Watt	.19
18	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
19	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
20	6879	Resistor	Carbon 50,000 Ohm ⅓ Watt	.19
21	9693	Resistor	Carbon 5,000 Ohm ⅓ Watt	.19
22	9018	Resistor	Carbon 150 Ohm ⅓ Watt	.19
23	4998	Resistor	Carbon 1,000 Ohm 1 Watt	.21
24	11860	Resistor	230 Volt Line Cord Extension	1.50
25	11861	Resistor	125 Volt Line Cord Extension	1.50
26	11390	Speaker	P.M. Dynamic 4 in.	2.70
27	11389	Volume Control	With S.P.S.T. Switch	.80

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

WHEN ORDERING PARTS BE SURE TO ORDER BY PART NUMBER

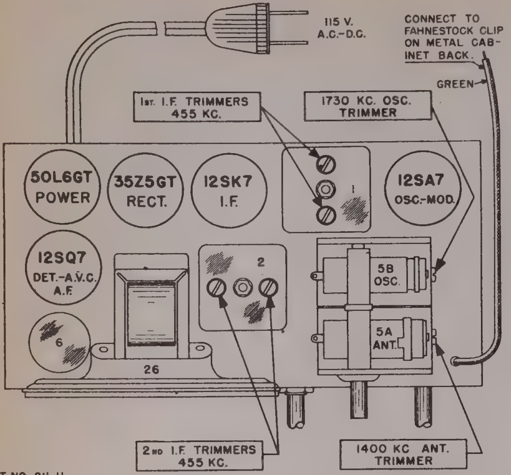
MISCELLANEOUS PARTS

Part No.		Description	List Price
11304	Bulb	6-8 Volt .150 Ampere Dial Light No. 47 Bayonet Base	.10
11381	Dial Scale	Calibrated Scale	.30
8184	Dial Cord	Dial Drive Cord 12 in. of No. 18 lb. Drive	.10
11379	Dial Shaft	Dial Drive Shaft	.12
11985	Dial Pointer	For Dial—Red Enamel	.20
11384	Dial Pointer	For Dial	.15
11391	Dial Crystal	For Dial	.22
11733	Knob	Bakelite for Walnut Plastic Cabt.	.10
10207	Knob	Bakelite for Ivory Plastic Cabt.	.08
	Cabinet	Walnut Plastic	1.80
	Cabinet	Ivory Plastic	2.15
11968	Cabinet Back	Metal Back	.10

W. 3M 4-40 PART NO. 211U

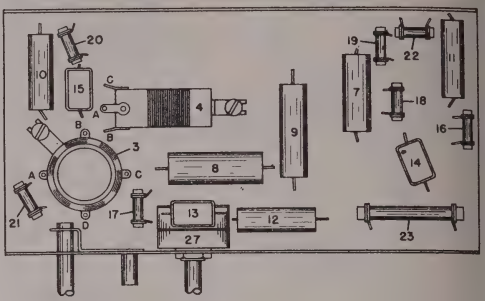
MODEL 211U
MODELS 1U-214UL, 214UL

SENTINEL RADIO CORP.



PART NO. 211-U

MODEL 211U



ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

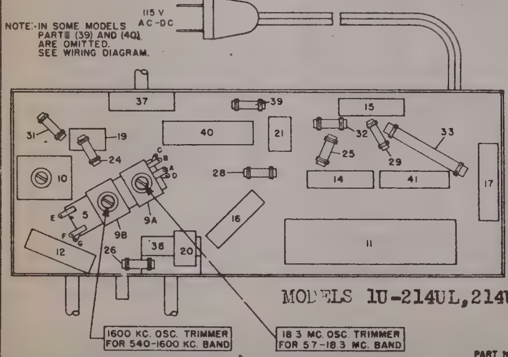
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

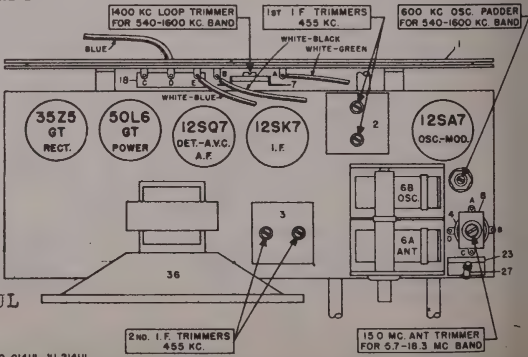
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to gang condenser frame through .01 MFD Condenser.

	TEST OSCILLATOR			
Set receiver dial to:	**Adjust test oscillator frequency to:**	**Use dummy antenna in series with output of test oscillator consisting of:**	**Attach output of test oscillator to:**	**Refer to parts layout diagram for location of trimmers mentioned below:**
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 12SA7 tube DO NOT REMOVE CAP.	Adjust the second I. F. transformer trimmers for maximum output then adjust each of the first I. F. trimmers for maximum output
1 Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Post on metal back	Adjust 1730 K. C. oscillator trimmer for maximum output.
2 Approx. 1400 K. C.	Approx. 1400 K. C.	.00025 MFD condenser	Post on metal back	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.

FOR ALIGNMENT SEE INDEX

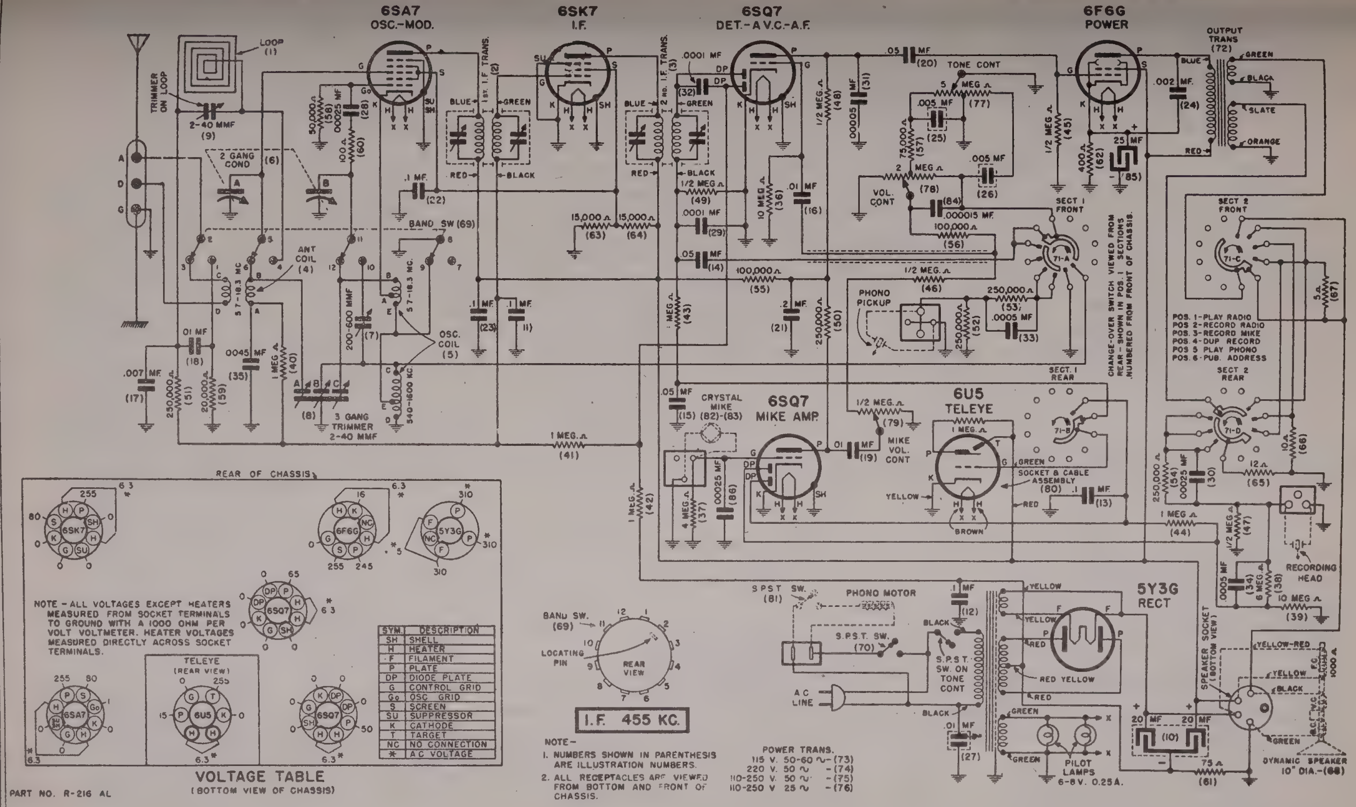

NOTE:-IN SOME MODELS PARTS (39) AND (40) ARE OMITTED. SEE WIRING DIAGRAM.
115 V AC-DC
37
39
31
19
40
21
15
32
33
24
10
28
25
29
14
41
17
E
5
F
6
9B
9A
16
12
26
38
20
11
1600 KC. OSC. TRIMMER FOR 540-1600 KC. BAND
18.3 MC. OSC TRIMMER FOR 5.7-18.3 MC. BAND



MODELS 1U-214UL, 214UL

PART NO. 214UL,-1U-214UL

SENTINEL RADIO CORP.



VOLTAGE RATING

WHILE THE RADIO MAY BE OPERATED ON EITHER 50 OR 60 CYCLE 100-120 VOLT ALTERNATING CURRENT (A.C.), THE PHONOGRAPH MOTOR MUST BE USED ON THE FREQUENCY DESIGNATED ON THE PAPER LICENSE TAG, which will be found attached to the cabinet.

AERIAL

THE LOOP AERIAL SUPPLIED with the radio should provide ample 540-1600 kilocycle band reception in average locations.

LOOP AERIALS ARE NOT SATISFACTORY FOR SHORT WAVE RECEPTION, AND BECAUSE OF THIS AN EXTERNAL AERIAL MUST BE ATTACHED TO THE RADIO WHEN TUNING FOR SHORT WAVE STATIONS. Also, if the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of the stations operating in the 560-1600 kilocycle band may not be ample, in which case it would be necessary to attach a 35 to 50 foot outdoor aerial to the receiver to obtain satisfactory results.

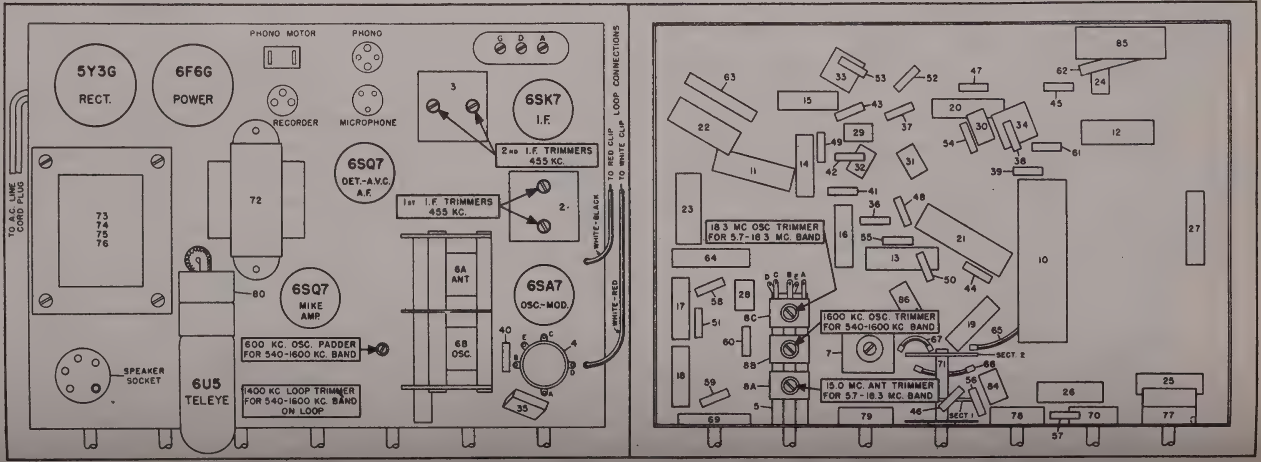
When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET, AND HAVE CHANGE OVER SWITCH KNOB IN "PLAY RADIO" POSITION.

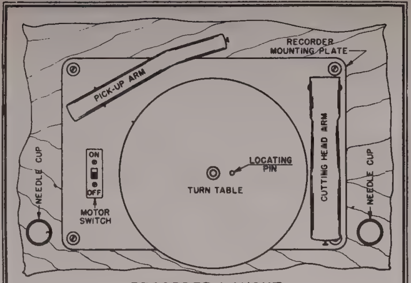
When adjusting 1600 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set Receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0 2 Mfd. condenser	High side to grid of 6SA7 tube.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1600 to 540 K.C. Band	1 Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1600 K. C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	3 * Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	1 Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to "A" Post, Low side to chassis.	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to "A" Post, Low side to chassis.	While rocking gang condenser adjust 15 M. C. antenna trimmer for maximum output.



RECORDING INSTRUCTIONS

Properly made recordings will supply many satisfactory playings with quality equal to that of commercial phonograph recordings. Remember there is only one right way to make recordings—for best results carefully read all of the following instructions.



RECORDER LAYOUT

RECORDING NEEDLES

Handle cutting needles carefully—needle edges are razor sharp and can be easily damaged. Do not rest needle on table top or other metal surface.

When cutting edge becomes dull or if needle is dropped on metal surface and edge is damaged, the **needle must** be replaced. To install cutting needle in cutting head just:

1. Loosen needle retaining screw on front of cutting head arm and place cutting head needle all the way in hole on the underside of cutting head arm, with the flat portion of the needle shank towards the front and placed directly under the head of retaining screw. **IF NEEDLE IS IN BACKWARDS OR AT WRONG ANGLE, IT WILL NOT CUT PROPERLY.**
2. Each time a new needle is used, cut a few grooves on a test record, listening closely to be sure it is cutting quietly. IF EXCESSIVE HISSING OR SCRAPING NOISES ARE HEARD, THE NEEDLE IS DULL OR SET AT THE WRONG ANGLE. Remember, any noises made by the needle will be recorded on blank disc and will be heard when the record is replayed.

PLAY BACK NEEDLES

Use only soft steel needles to play recordings—never use thorn or wooden needles. A needle that has been used to play a regular commercial record should never be used on a recorded disc.

CUTTING ARM AND HEAD ADJUSTMENT

The cutting arm and head is properly adjusted when the recorder leaves the factory, and unless altered or damaged should not be touched. If it is believed that the cutting arm adjustment is not correct proceed to check by:

a) Place cutting needle on blank record and measure distance from top of record to bottom of front end of cutting head arm—this should be EXACTLY ONE-QUARTER OF AN INCH.
b) If less than one-quarter of an inch, lift cutting arm and turn the adjusting screw located underneath arm to the left.
If more than one-quarter of an inch, turn adjusting screw to right.

THIS ADJUSTMENT IS VERY CRITICAL AND SHOULD BE CAREFULLY MADE—THE DISTANCE BETWEEN THE TOP OF THE RECORD AND THE BOTTOM OF THE CUTTING ARM SHOULD BE EXACTLY ONE-QUARTER OF AN INCH.

c) Next cut five to ten grooves on the blank record and examine the grooves made with magnifying glass. If depth screw is properly adjusted, the groove and the space between the groove will be approximately equal in width.
If groove width is not correct—turn the screw on top of the cutting arm to the right to increase width of groove, and to the left to decrease. This is a critical adjustment and should be made by adjusting the screw in quarter turns, only, never full turn adjustments.

When the groove is properly made, the thread cut from record will be straight and black and about the thickness of a human hair.

When the groove is too wide, the thread will be coarse and kinky and there will be little or no space between the grooves.

If the groove is too narrow, the thread will be thin, silky, and grayish in color, and there will be more space between the grooves than the grooves occupy.

USE TUNING EYE IN DETERMINING CORRECT VOLUME LEVEL FOR RECORDING

As it is very important that neither too little nor too much volume be used when recording, the unit is so designed that the tuning eye can be used as a guide in selecting proper volume level for recordings.

IT IS A SIMPLE MATTER TO SET VOLUME TO PROPER RECORDING LEVEL—BEFORE STARTING TO CUT DISC, ALWAYS ROTATE THE "VOLUME CONTROL" OR THE "MIKE CONTROL" KNOBS SO THAT THE TWO ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE APPROXIMATELY TOUCH ON SIGNAL PEAKS. Do not set controls so that the ends overlap on the peaks, as this will be too much volume for recordings—never adjust controls to compensate for loud and soft passages when recording orchestras, otherwise orchestra expression will be lost and the volume will increase and decrease when record is played back.

TO RECORD RADIO PROGRAMS

FIRST ROTATE "TONE-ON-OFF SWITCH" KNOB TO "BRILLIANT"—MAXIMUM RIGHT HAND POSITION AND "MIKE CONTROL" KNOB TO MAXIMUM LEFT HAND MINIMUM MICROPHONE VOLUME POSITION.

a) Place a blank disc on turn table so that small locating pin on turn table protrudes through small hole in blank disc.
b) Place "CHANGE OVER SWITCH" knob to maximum left hand position—small indicator needle will point to "PLAY RADIO" printed on dial.
c) Carefully tune in the radio program which is to be recorded.
d) Rotate "CHANGE OVER SWITCH" knob to the next to maximum left hand position — small needle on dial will point to "RECORD RADIO." NOTE: VOLUME OF SIGNAL WILL DROP.
e) Set volume to proper recording level by adjusting "VOLUME CONTROL" knob until the ends of the green inverted "V" on the tuning eye approximately touch ON SIGNAL PEAKS.
f) Turn "MOTOR SWITCH" knob on front panel of radio to the right hand "ON" position and the "MOTOR SWITCH" adjacent to the recorder turn table to the "ON" position. The turn table will now start to revolve.
g) Carefully lift up needle end of cutting head arm to an angle of approximately 45°, swing arm to edge of record and gently place cutting needle on blank disc ⅛ of an inch from outer edge.

Just before needle reaches paper label on inside of disc, reduce volume to zero and cut three to five blank grooves in record, then lift cutting arm. Be sure to lift the cutting arm from disc before needle reaches the label, and always place it on arm rest. Failure to lift arm in time will cause needle to cut into the paper label with possible injury to the needle.

MICROPHONE RECORDING

Voice or music that can be picked up by the microphone with sufficient volume can be recorded. Remember, all extraneous noises picked up by the microphone will be recorded on the disc.

Any explanatory or introductory announcements, giving date, description, data, title, etc., can be faded into the recording being made from a radio program or from another record. To do this turn "VOLUME CONTROL" knob towards minimum volume position while at the same time speaking into the microphone and turning "MIKE VOLUME" knob towards right. To use the microphone for recording just:

1. Rotate "CHANGE OVER SWITCH" knob to the third position from the left, small needle will point to "RECORD MIKE" on dial.
2. Turn radio "VOLUME CONTROL" knob to minimum volume position.
3. Set volume to proper recording level by holding lips 4 to 6 inches from microphone and speaking into the microphone with a normal tone of voice and adjusting "MIKE VOLUME" knob until the two ends of the green inverted "V" on the tuning eye approximately touch on signal peaks.
4. Place blank disc on turn table.
5. Turn "MOTOR SWITCH" knob and "OFF AND ON SWITCH" adjacent to recorder turn table to "ON" position.
6. Lay cutting needle on revolving blank disc ⅛ of an inch from outer edge.
7. Talk in normal tone of voice into microphone keeping lips approximately 4 to 6 inches away.

Microphone can be placed near point where music or other subject to be recorded will be picked up by the microphone—be sure to adjust "MIKE VOLUME" control knob to proper level.

TO MAKE A RECORD FROM ANOTHER RECORD

Some models of this series are equipped with automatic record changer in addition to the regular recording unit and with this model duplicate records can be made of home recordings or commercial records by:

a) Place blank disc on recording turn table.
b) Place the record which you wish to duplicate on automatic record changer turn table.
c) Rotate "CHANGE OVER SWITCH" to third position from right—needle will point to "DUPLICATE RECORD" printed on dial.
d) Place automatic record changer pickup needle in outside groove of the record to be duplicated.
e) Lift cutting head arm and place needle on blank disc ⅛ of an inch from outer edge.
f) The recorder and automatic record changer turn tables must start to revolve at the same time. To do this simultaneously turn recorder and automatic record changer to "ON" position—then turn "MOTOR SWITCH" TO "ON" position.
g) Adjust "VOLUME CONTROL KNOB" until the two ends of the green inverted "V" on the tuning eye approximately TOUCH ON SIGNAL PEAKS.

A record from another record can be made with the type recorder not equipped with an automatic record changer providing another combination radio and phonograph is available. To do this:

1. Place a blank disc on recorder turn table.
2. Lift cutting head arm and place ⅛ of an inch from outer edge of blank disc.
3. Place the record you wish to duplicate on the combination radio-phonograph turn table.
4. Place the combination radio-phonograph pick-up needle in outside groove of record to be duplicated.
5. Rotate "CHANGE OVER" switch to third position from the left—indicator needle will point to "RECORD MIKE" printed on the dial.
6. Place microphone approximately one-half foot from other radio speaker.
7. Turn recorder "VOLUME CONTROL" knob to minimum volume position, and combination radio-phonograph volume control to approximately half volume position.
8. Adjust "MIKE VOLUME" control until the two ends of the green inverted "V" on the tuning eye approximately touch on signal peaks.
9. Turn recorder "MOTOR SWITCH" and "MOTOR SWITCH" of combination radio to "ON" position simultaneously so that the recorder and the combination radio turn tables start to revolve at the same time.

TO PLAY BACK RECORDINGS

To play home recordings or commercial records just:

(a) Rotate "CHANGE OVER SWITCH" to the next to the maximum right hand position—indicator needle will point to "PLAY PHONO" printed on the dial.
(b) Place record on turn table.
(c) Insert needle in pickup arm and place needle in the outside groove on record.
(d) Turn "MOTOR SWITCH" knob to "ON" position.
(e) Adjust "VOLUME" knob for desired volume.

USING MICROPHONE AND RADIO AS PUBLIC ADDRESS SYSTEM

The radio and microphone may be used as a public address system by:

(1) Turn the "CHANGE OVER SWITCH" knob to maximum right hand position—needle will point to "PUBLIC ADDRESS" printed on the dial.
(2) Speak into the microphone in a normal tone of voice or place microphone near point where it can pick up voice, music, or other subject to be amplified.
(3) Adjust "MIKE VOLUME" control knob for desired volume level.

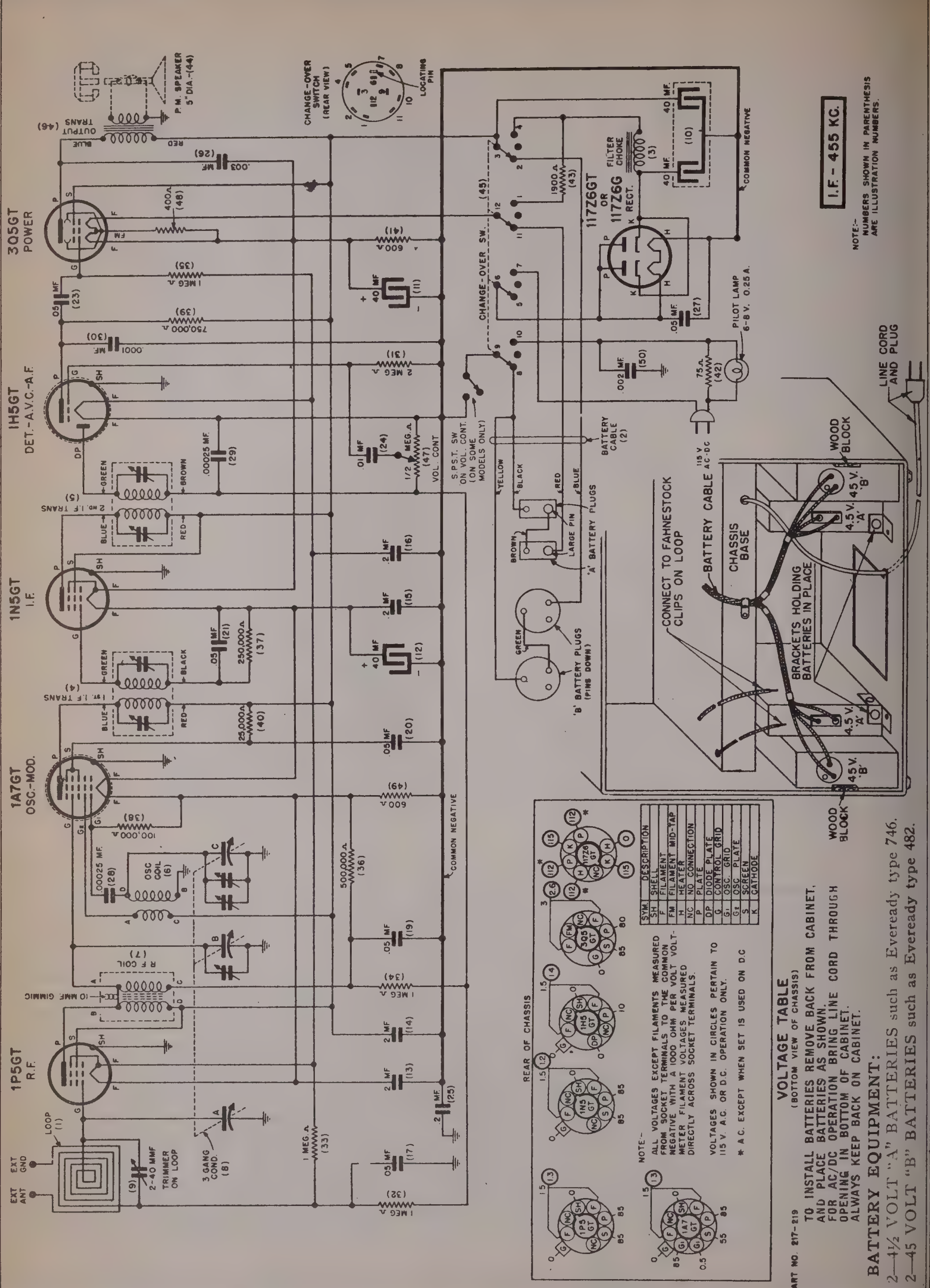
IF ACOUSTICAL FEEDBACK BETWEEN LOUD SPEAKER AND MICROPHONE—HEARD AS A HOWLING SOUND—IS ENCOUNTERED, place microphone as far to the side or rear of recorder as possible.

CAUTION: MICROPHONE VOLUME CONTROL KNOB MUST ALWAYS BE IN MINIMUM VOLUME—LEFT HAND POSITION—WHEN MICROPHONE IS NOT BEING USED. FAILURE TO DO THIS WILL RESULT IN A HOWLING SOUND AND THE MICROPHONE WILL PICK UP EXTRANEOUS AND UNWANTED VOICES, NOISES, ETC., ALL OF WHICH WILL BE RECORDED ON THE DISC.

WHEN RECORDING ALWAYS HAVE THE "TONE CONTROL" KNOB IN THE MAXIMUM RIGHT HAND "BRILLIANT" POSITION.

MODELS 217, 219

SENTINEL RADIO CORP.



NOTE:-

ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

VOLTAGES SHOWN IN CIRCLES PERTAIN TO 115 V. A.C. OR D.C. OPERATION ONLY.

* A.C. EXCEPT WHEN SET IS USED ON D.C

SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
FM	FILAMENT MID-TAP
H	HEATER
NC	NO CONNECTION
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G₁	OSC. GRID
G₂	OSC. PLATE
S	SCREEN
K	CATHODE

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

TO INSTALL BATTERIES REMOVE BACK FROM CABINET, AND PLACE BATTERIES AS SHOWN. FOR AC/DC OPERATION BRING LINE CORD THROUGH OPENING IN BOTTOM OF CABINET. ALWAYS KEEP BACK ON CABINET.

BATTERY EQUIPMENT:

2—4½ VOLT "A" BATTERIES such as Eveready type 746.
2—45 VOLT "B" BATTERIES such as Eveready type 482.

©John F. Rider, Publisher

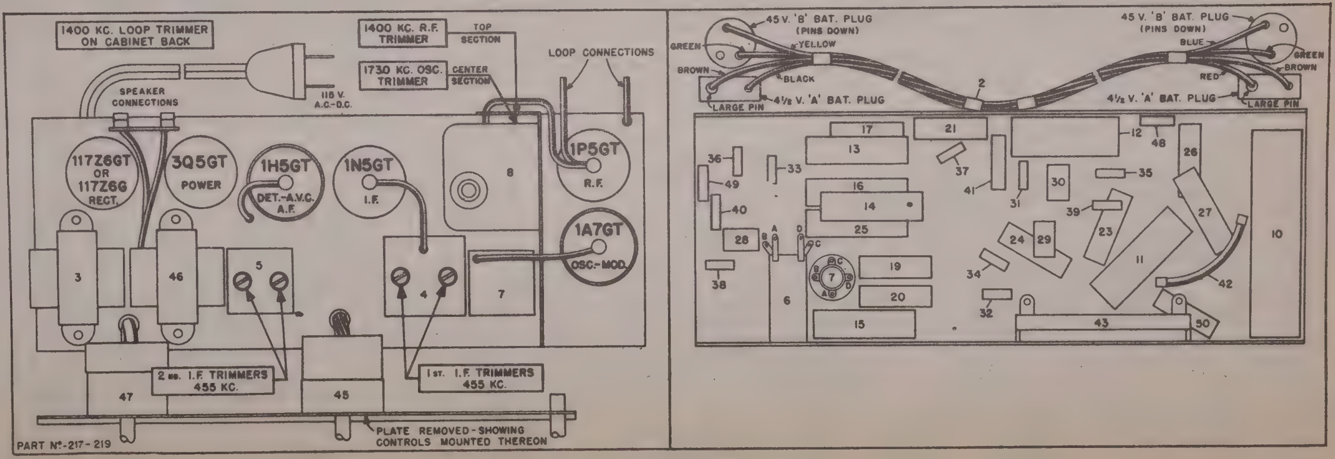
—10-40—

ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

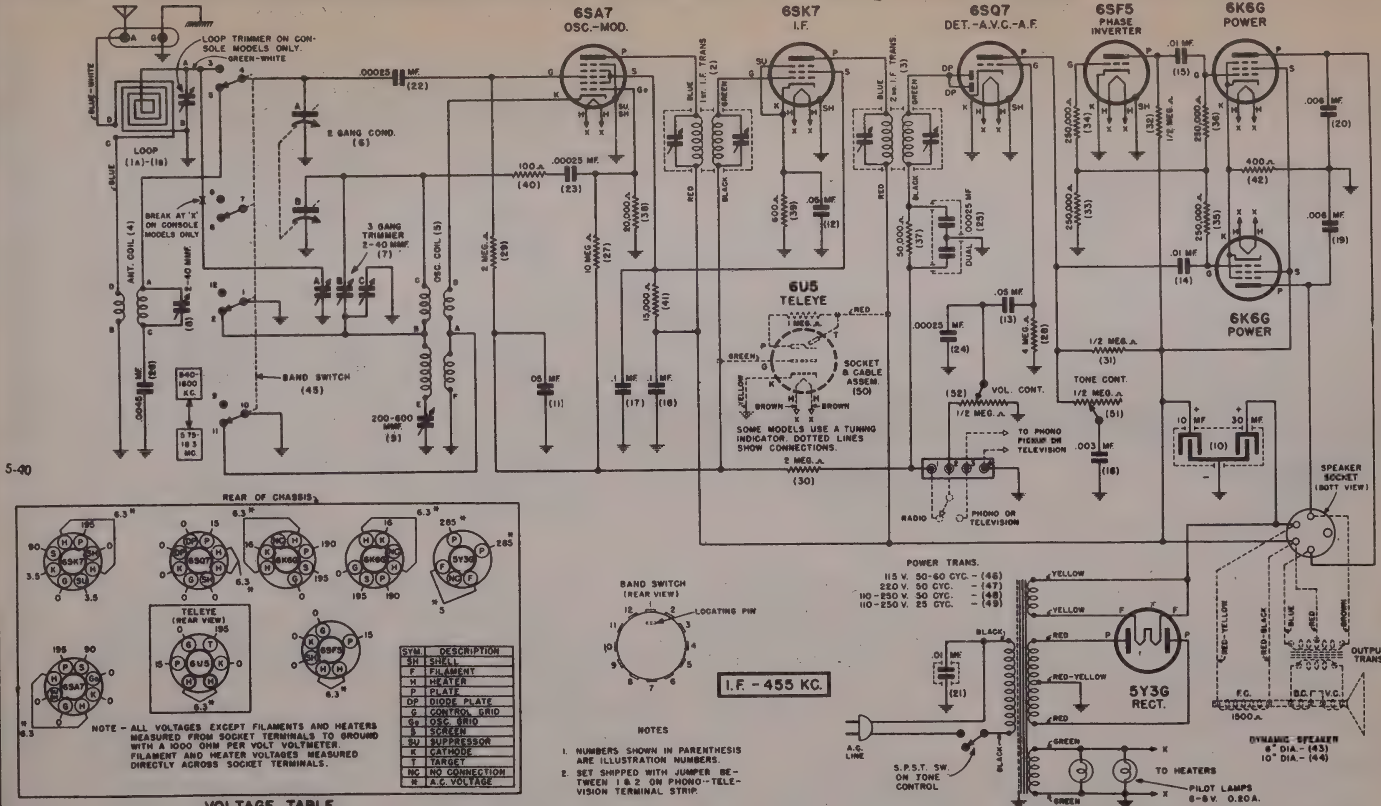
When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:		Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.		Any point where no interfering signal is received.	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1730 K. C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1400 K.C. loop and R.F. trimmers for maximum output.



MODEL 220

SENTINEL RADIO CORP.



NOTE - ALL VOLTAGES EXCEPT FILAMENTS AND HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT AND HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
H	HEATER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
Go	OSC. GRID
S	SCREEN
SU	SUPPRESSOR
K	CATHODE
T	TARGET
NC	NO CONNECTION
*	A.C. VOLTAGE

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

NOTES

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. SET SHIPPED WITH JUMPER BETWEEN 1 & 2 ON PHONO--TELEVISION TERMINAL STRIP.

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT—unless the marking on the white paper license notice which will be found attached either to bottom or inside the cabinet is marked differently, in which case the radio must only be used on the type of current shown on this notice.

BE SURE THAT THE CURRENT RATING GIVEN ON THE LICENSE TAG IS THE SAME AS THE HOUSE CURRENT SUPPLY.

OUTSIDE AERIAL

When the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of stations operating in the 540-1600 K.C. band may not be ample in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE "A" TERMINAL ON THE REAR OF THIS CHASSIS to obtain satisfactory results.

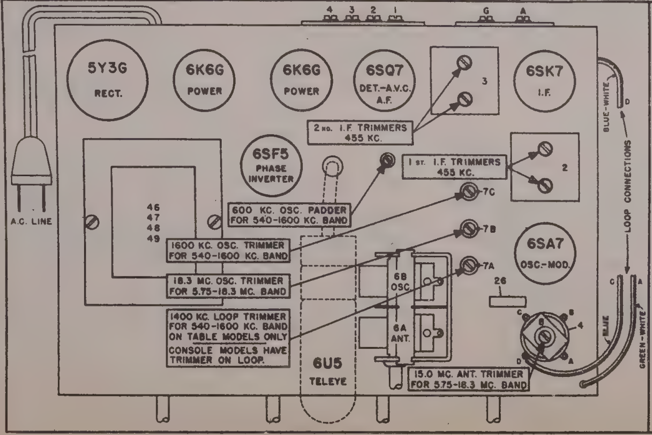
-10-40-

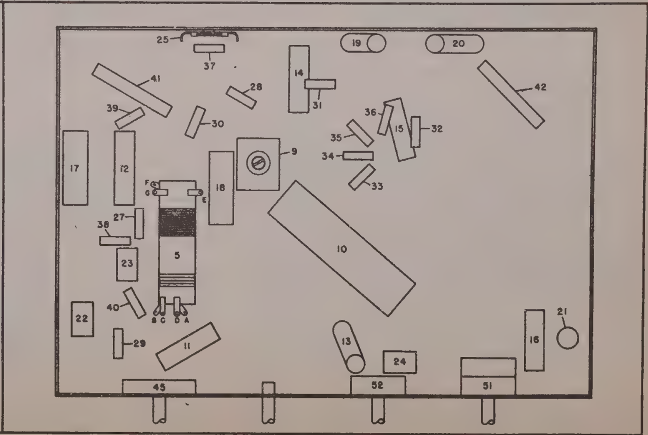
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1600 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid of 12SA7 tube. Low side to frame of gang condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1600 to 540 K.C. Band	1 Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1600 K. C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	3 Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	1 Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to "A" Post. Lead, Low side to frame of gang condenser.	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to "A" Post. Lead, Low side to frame of gang condenser.	While rocking gang condenser adjust 15 M. C. antenna trimmer for maximum output.


4 3 2 1
G A
5Y3G RECT.
6K6G POWER
6K6G POWER
6SQ7 DET.-A.V.C. A.F.
3
6SK7 I.F.
2ND. I.F TRIMMERS 455 KC.
6SF5 PHASE INVERTER
1 ST. I.F. TRIMMERS 455 KC.
2
BLUE-WHITE
D
LOOP CONNECTIONS
A.C. LINE
46
47
48
49
600 KC. OSC. PADDER FOR 540-1600 KC. BAND
7C
7B
7A
1600 KC. OSC. TRIMMER FOR 540-1600 KC. BAND
18.3 MC. OSC. TRIMMER FOR 5.75-18.3 MC. BAND
1400 KC. LOOP TRIMMER FOR 540-1600 KC. BAND ON TABLE MODELS ONLY CONSOLE MODELS HAVE TRIMMER ON LOOP.
6B OSC.
6A ANT.
6SA7 OSC.-MOD.
26
C
B
4
D
A
BLUE
GREEN-WHITE
6U5 TELEYE
15.0 MC. ANT. TRIMMER FOR 5.75-18.3 MC. BAND



ELIMINATION OF INTERFERENCE CAUSED BY A 32-VOLT LIGHT PLANT

GENERAL

Two kinds of static-like noise may be heard when you operate your 32 volt radio at the same time the generating plant is charging the plant batteries.

Static-like noise, due to the action of the brushes on the commutator, may reach the set through the supply lines. Such noise can generally be eliminated by the use of .5 Mfd, 200 volt condensers, as shown in Figs. 1 and 3.

Static-like noise, due to the operation of the high tension circuit may radiate through the air to the antenna of the set. Radiation has been found to extend a half mile in extreme cases. Proper placement of the antenna, along with the use of a spark plug suppressor and correct shielding will entirely eliminate this type of noise.

When eliminating these electrical disturbances always apply the remedies given in the order in which they appear.

USUAL INSTALLATIONS

Install spark plug suppressor on the spark plug and connect the high tension lead to the suppressor, as shown in Figure 3.

For four cylinder plants use four spark plug suppressors, one attached to each spark plug.

CAUTION: Disconnect batteries from generator before attaching suppressor equipment.

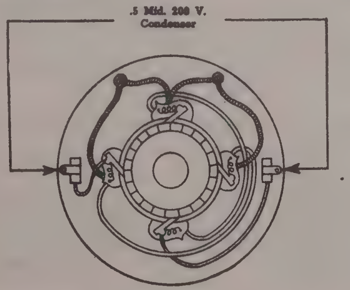


Fig. 1

Connect one .5 Mfd. 200 volt condenser between one positive brush and the generator frame and one condenser btween one negative brush and the generator frame as shown in Figure 1.

FOUR CYLINDER PLANTS. For four cylinder plants attach a condenser to the positive and negative brushes as shown in Figure 2.

EXTREME CASES

To determine if the high tension wiring is radiating into the antenna disconnect the antenna and ground from the receiver and if the noise is eliminated or materially reduced, the noise is being picked up by the antenna. In such a case, obtain a piece of electrician's loom which will just slide over the high tension wire and a piece of copper braid shielding which will just slip over the loom. Cut a piece of loom just long enough to cover the high tension wire from the coil to the spark plug suppressor. Cut a piece of shielding that will be one inch shorter than the loom when the shielding is extended over the loom.

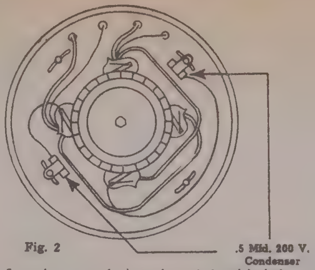


Fig. 2

Slip the loom over the high tension lead. Slip the shielding over the loom so that it is one-half inch from each end of the loom. Wrap some fine copper wire around the shielding near the end of the shielding to hold the shielding in place. Solder the wire to the shielding so it will not slip due to plant vibration. The shield may be taped in place if the tape is very adhesive. DO NOT USE FRICTION TAPE.

Solder a short braid pig-tail to the shielding and ground it under the nearest screw in the generator frame.

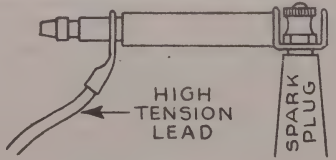


Fig. 3

IGNITION NOISE ON BATTERY LEADS

Sometimes the ignition interference will travel up the battery leads. This condition can be corrected as follows: Attach a .5 Mfd. condenser between the POSITIVE terminal at the top of the control box and the frame of the box. (Be sure the frame of the box is well grounded to the generator frame). Attach a .5 Mfd. condenser between the NEGATIVE terminal at the top of the control box and the control box frame.

IGNITION INTERFERENCE ON SUPPLY LEADS

In extreme cases the ignition interference will travel up the supply leads to the radio receiver. This condition can be corrected by attaching a .5 Mfd. condenser between the ungrounded side of the line (in the main switch box) and ground (or the grounded side of the line if one side of the line is grounded).

GROUNDING

Some cases may require a thorough ground of the system. This may be accomplished by running a No. 12 B. & S. gauge wire from the generator frame to a good ground. Conduit and metal switch boxes should also be grounded.

If it is necessary to ground one side of the supply lines, first ground them temporarily, one at a time through a 32 volt lamp. One side of the line will light the light, the other will not. The side which WILL NOT light the light should be grounded.

DO NOT apply any of the remedies listed under "Extreme Cases," before trying the ones listed under "Usual Cases."

IF RECEIVER SHOULD FAIL TO OPERATE, CHECK FOR:

1. Defective tubes.
2. Tubes not properly inserted in the sockets.
3. Grid caps not connected on grid terminal of tubes.
4. Not sufficient aerial.
5. Supply cord plug reversed.
6. Defective fuse.

MODEL 221

PUSH BUTTON TUNING

SIX STATIONS OPERATING IN THE 1500-540 K.C. BAND MAY, BE "AUTOMATIC PUSH BUTTON" TUNED BY PROPERLY SETTING THE 6 SETS OF TRIMMER SCREWS LOCATED UNDERNEATH PUSH BUTTON ESCUTCHEON ON FRONT OF CABINET.

As the push buttons are not preset at the factory for any definite stations, be sure to set them by:

(a) It is important to have the aerial; if an outdoor antenna is to be used, attached to the radio when adjusting the trimmers.

(b) BE SURE TO OPERATE THE RADIO AT LEAST ONE-HALF HOUR BEFORE ADJUSTING TRIMMERS. If set is not thoroughly warmed up when trimmers are adjusted, the trimmers may shift position after they do become warm, resulting in poor tone, weak signals and excessive background noise.

(c) Obtain the transmitter frequency—number of kilocycles—and call letters of the six stations you wish to "Push Button" tune. FOR BEST RESULTS SET PUSH BUTTONS FOR LOCAL OR STRONG NEAR-BY STATIONS ONLY.

(d) Remove push button escutcheon from front of cabinet by unscrewing small wood screws that hold this in place.

(e) Rotate band switch to the next to the maximum right hand position.

(f) Using manual tuning knob, carefully tune in to the point of clearest tone, one of the selected stations whose transmitter frequency is somewhere between 540 and 900 kilocycles.

(g) Rotate band switch knob to the maximum right hand position.

(h) Press in either one of the two push buttons indicated on label adjacent to trimmers marked 540 to 900 K.C. Note: Station signal will disappear, or may be distorted and in some instances another station may be heard.

(i) Using a screwdriver ADJUST THE LARGE 540 TO 900 KILOCYCLE ADJUSTING SCREW, LOCATED ABOVE THE PUSH BUTTON THAT IS PUSHED IN—until the 540 to 900 kilocycle station that had been previously tuned in with the manual tuning knob, is heard with maximum volume and clearest tone. AFTER ADJUSTING THE LARGE SCREW CAREFULLY ADJUST THE SMALL SCREW DIRECTLY BELOW THE LARGE ONE FOR CLEAREST TONE AND MAXIMUM VOLUME.

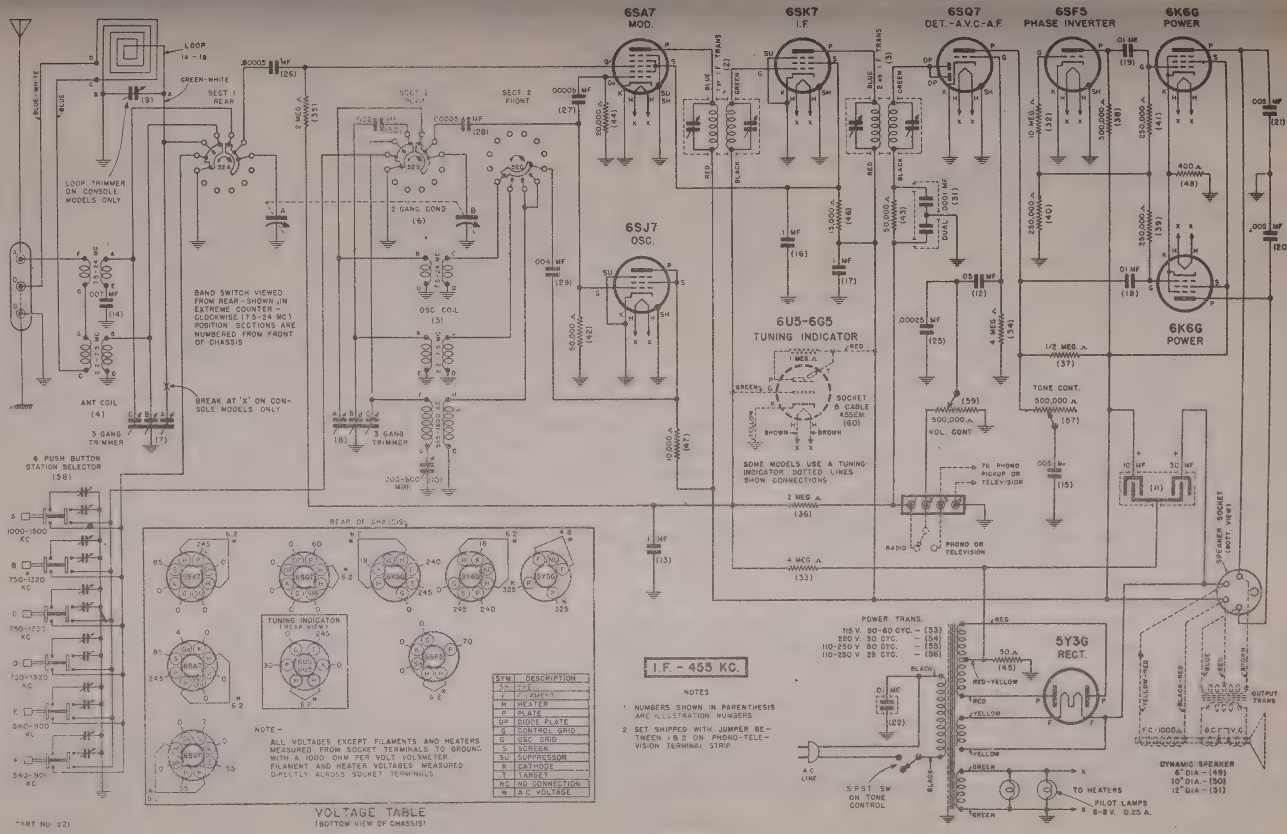
(j) Remove the printed tab, having the call letters of the station tuned in, from the paper call letter sheet. Press this into the depression in the push button escutcheon that will be adjacent to the push button just adjusted when the escutcheon is remounted in place on the cabinet.

(k) Set other trimmers for selected stations operating between the frequency range of the trimmers, as indicated on the label.

IMPORTANT: THE WAVE SWITCH KNOB MUST BE IN THE MAXIMUM RIGHT HAND POSITION FOR PUSH BUTTON TUNING.

In some instances it may be necessary, after the set is operated for a period of time, to reset the trimmers as they may drift due to heat, humidity, etc.

SENTINEL RADIO CORP.



AERIAL

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G." When a straight aerial is used this wire should be left in this position and the aerial lead-in connected to the post marked "A."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT—unless the marking on the white paper license notice which will be found attached either to bottom or inside the cabinet is marked differently, in which case the radio must only be used on the type of current shown on this notice.

BE SURE THAT THE CURRENT RATING GIVEN ON THE LICENSE TAG IS THE SAME AS THE HOUSE CURRENT SUPPLY.

Printed in U.S.A.—S.P.—7-40—1100

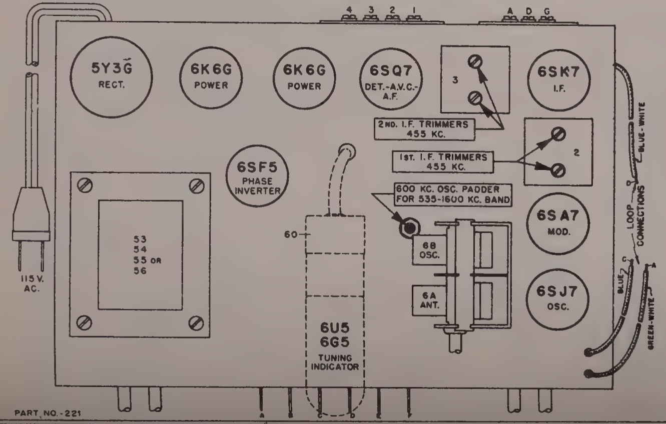
ALIGNMENT PROCEDURE

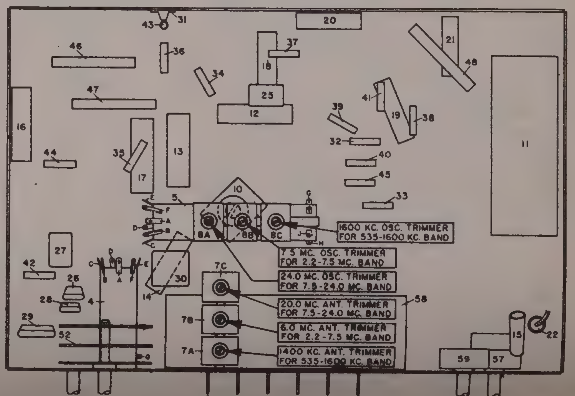
PART NO. 12407-221

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1600 kilocycle oscillator trimmer, 600 K.C. Padder and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

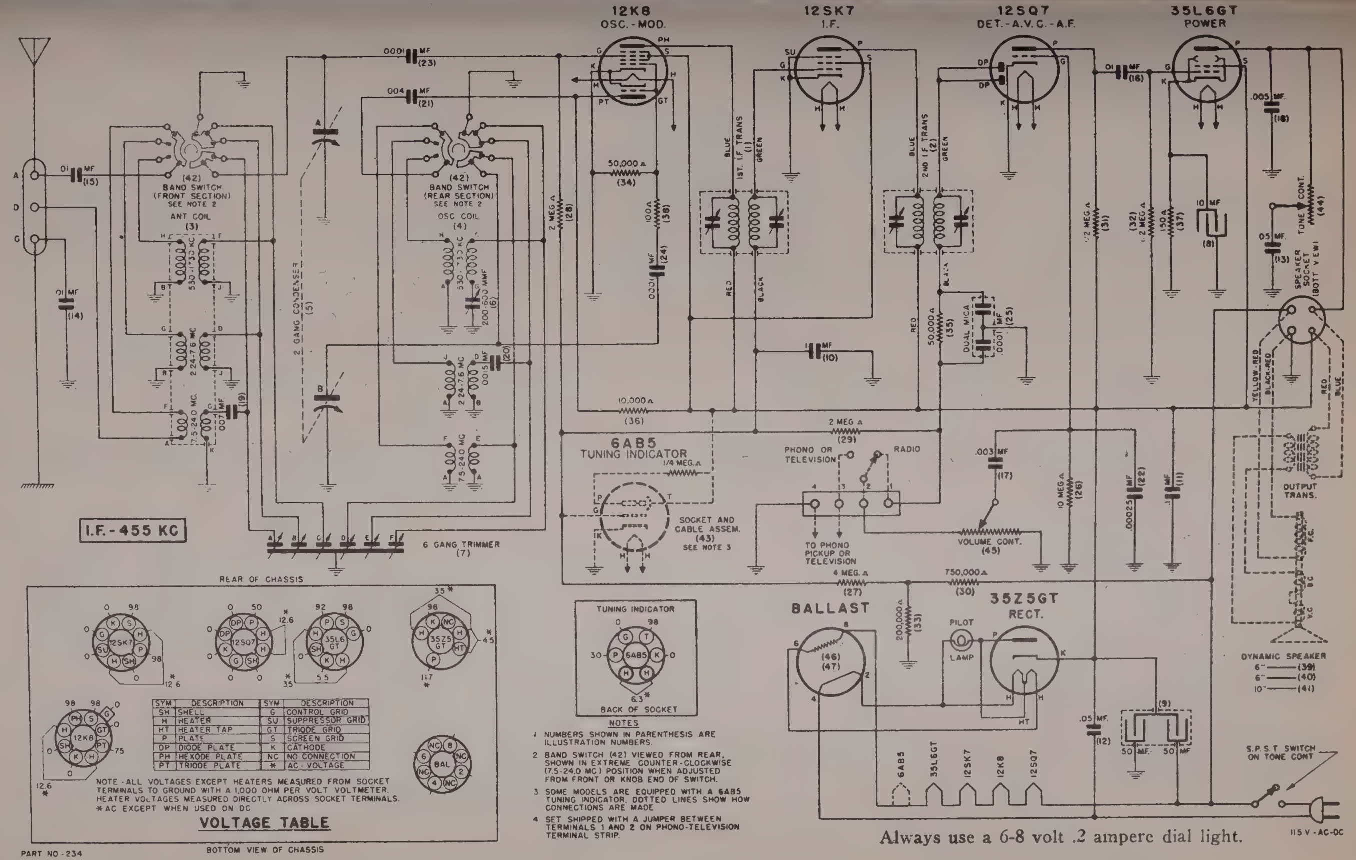
Place band switch for operation on:	Set receiver dial to:		TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position		Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 6SA7 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1600 to 535 K.C. Band Using Loop Aerial	1	Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1600 K. C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop antenna trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 600 K. C. loop oscillator padder for maximum output.
2.2 to 7.6 M.C. Band	1	Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.6 M. C. oscillator trimmer for maximum output.
	2	Approx. 6. M.C.	Approx. 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M. C. antenna trimmer for maximum output.
7.4 to 24 M.C. Band	1	Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M. C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2	Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M. C. antenna trimmer for maximum output.




43 31
20
46
36
37
18
34
25
12
21
48
47
16
11
41
19
38
39
32
40
45
35
13
17
44
10
33
5
8A
8B
8C
1600 KC. OSC. TRIMMER FOR 535-1600 KC. BAND
27
42
26
28
29
52
4
30
14
7C
7B
7A
7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
1400 KC. ANT. TRIMMER FOR 535-1600 KC. BAND
58
59
57
15
22

SENTINEL RADIO CORP.

MODEL 234



SYM	DESCRIPTION	SYM	DESCRIPTION
SH	SHELL	G	CONTROL GRID
H	HEATER	SU	SUPPRESSOR GRID
HT	HEATER TAP	GT	TRIODE GRID
P	PLATE	S	SCREEN GRID
DP	DIODE PLATE	K	CATHODE
PH	HEXODE PLATE	NC	NO CONNECTION
PT	TRIODE PLATE	*	AC-VOLTAGE

NOTE-ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
*AC EXCEPT WHEN USED ON DC

VOLTAGE TABLE

NOTES

1 NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

2 BAND SWITCH (42) VIEWED FROM REAR. SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.

3 SOME MODELS ARE EQUIPPED WITH A 6AB5 TUNING INDICATOR. DOTTED LINES SHOW HOW CONNECTIONS ARE MADE

4 SET SHIPPED WITH A JUMPER BETWEEN TERMINALS 1 AND 2 ON PHONO-TELEVISION TERMINAL STRIP.

Always use a 6-8 volt .2 ampere dial light.

AERIAL

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

VOLTAGE RATING

THIS RECEIVER MAY BE OPERATED ON 100-120 VOLT DIRECT CURRENT (D.C.) and 100-120 volts, 50-60 cycle alternating current (A.C.) by using a No. 11222 line voltage regulator tube in regulator socket on top of radio chassis.

FOR 210-240 VOLT D.C. or 210-240 VOLT 50-60 CYCLE A.C. OPERATION, a No. 11223 line voltage regulator tube must be used in the regulator socket.

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

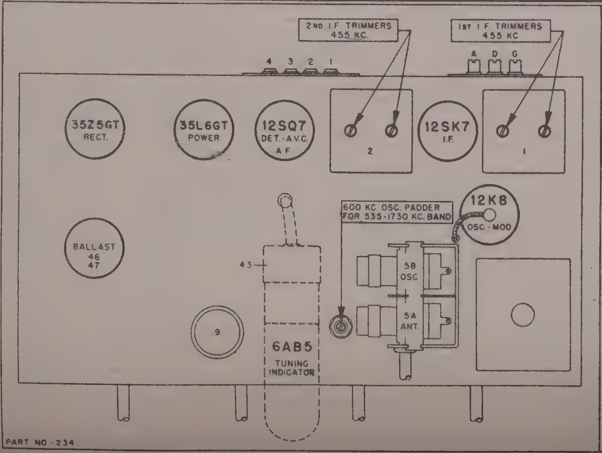
Before starting alignment:

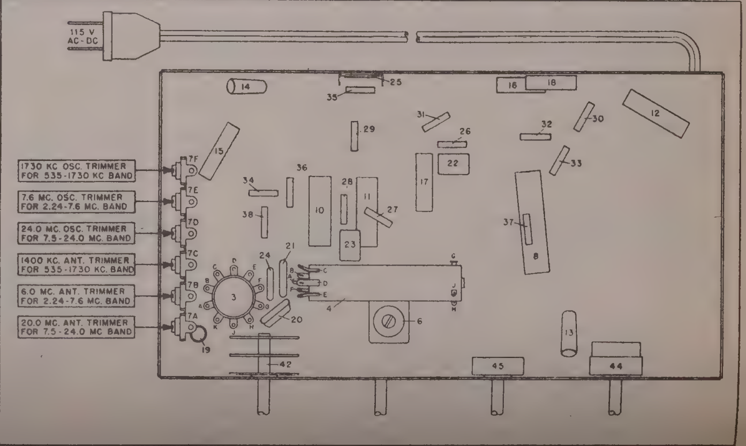
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

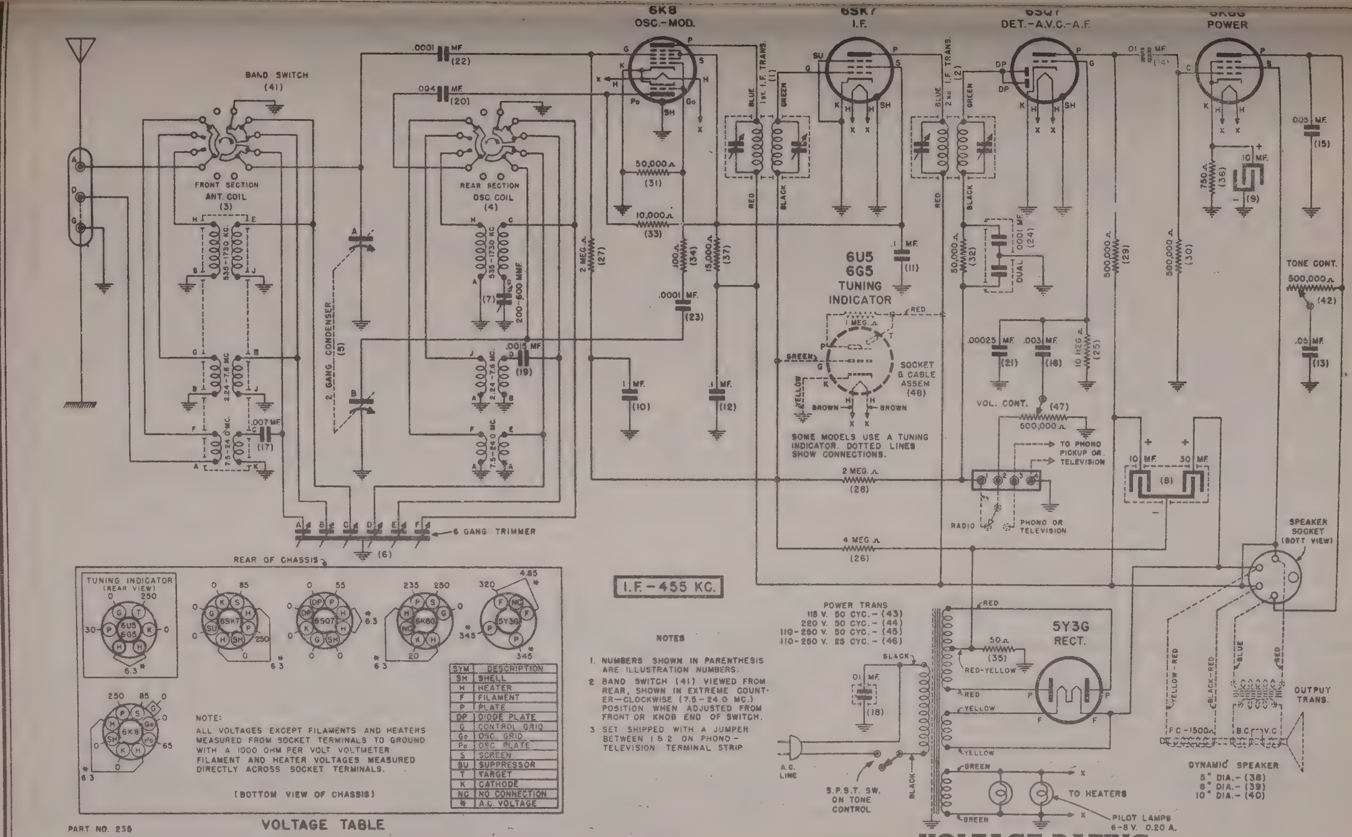
(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:		TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator: consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.		Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 12K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.24 to 7.6 M.C. Band	1	Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.6 M.C. oscillator trimmer for maximum output.
	2	Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna trimmer for maximum output.
7.5 to 24 M.C. Band	1	Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2	Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna trimmer for maximum output.




115 V AC-DC
1730 KC OSC. TRIMMER FOR 535-1730 KC BAND
7.6 MC. OSC. TRIMMER FOR 2.24-7.6 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
1400 KC. ANT. TRIMMER FOR 535-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC BAND
7F
7E
7D
7C
7B
7A
14
35
25
16
18
12
15
29
31
26
32
30
33
22
17
36
34
28
11
27
10
38
24
21
23
37
8
3
4
6
20
19
42
13
45
44

SENTINEL RADIO CORP



NOTE:

ALL VOLTAGES EXCEPT FILAMENTS AND HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER FILAMENT AND HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

SYM	DESCRIPTION
SH	SHELL
H	HEATER
F	FILAMENT
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
Go	OSC. GRID
Po	OSC. PLATE
S	SCREEN
SU	SUPPRESSOR
T	TARGET
K	CATHODE
NC	NO CONNECTION
*	A.C. VOLTAGE

VOLTAGE TABLE

NOTES

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH (41) VIEWED FROM REAR, SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
3. SET SHIPPED WITH A JUMPER BETWEEN 1 & 2 ON PHONO-TELEVISION TERMINAL STRIP

PART NO. 235

Printed in U. S. A.—7-40

AERIAL

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT—unless the marking on the white paper license notice which will be found attached either to bottom or inside the cabinet is marked differently, in which case the radio must only be used on the type of current shown on this notice.

BE SURE THAT THE CURRENT RATING GIVEN ON THE LICENSE TAG IS THE SAME AS THE HOUSE CURRENT SUPPLY.

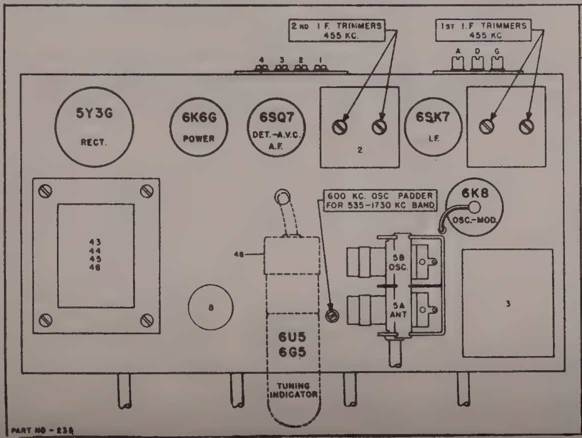
-11-40-

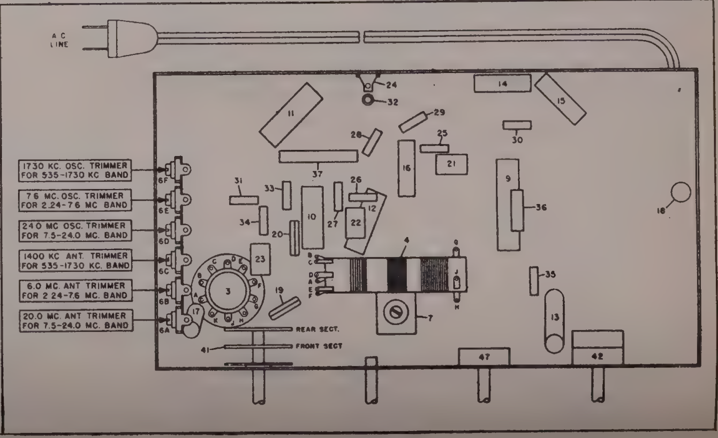
ALIGNMENT PROCEDURE

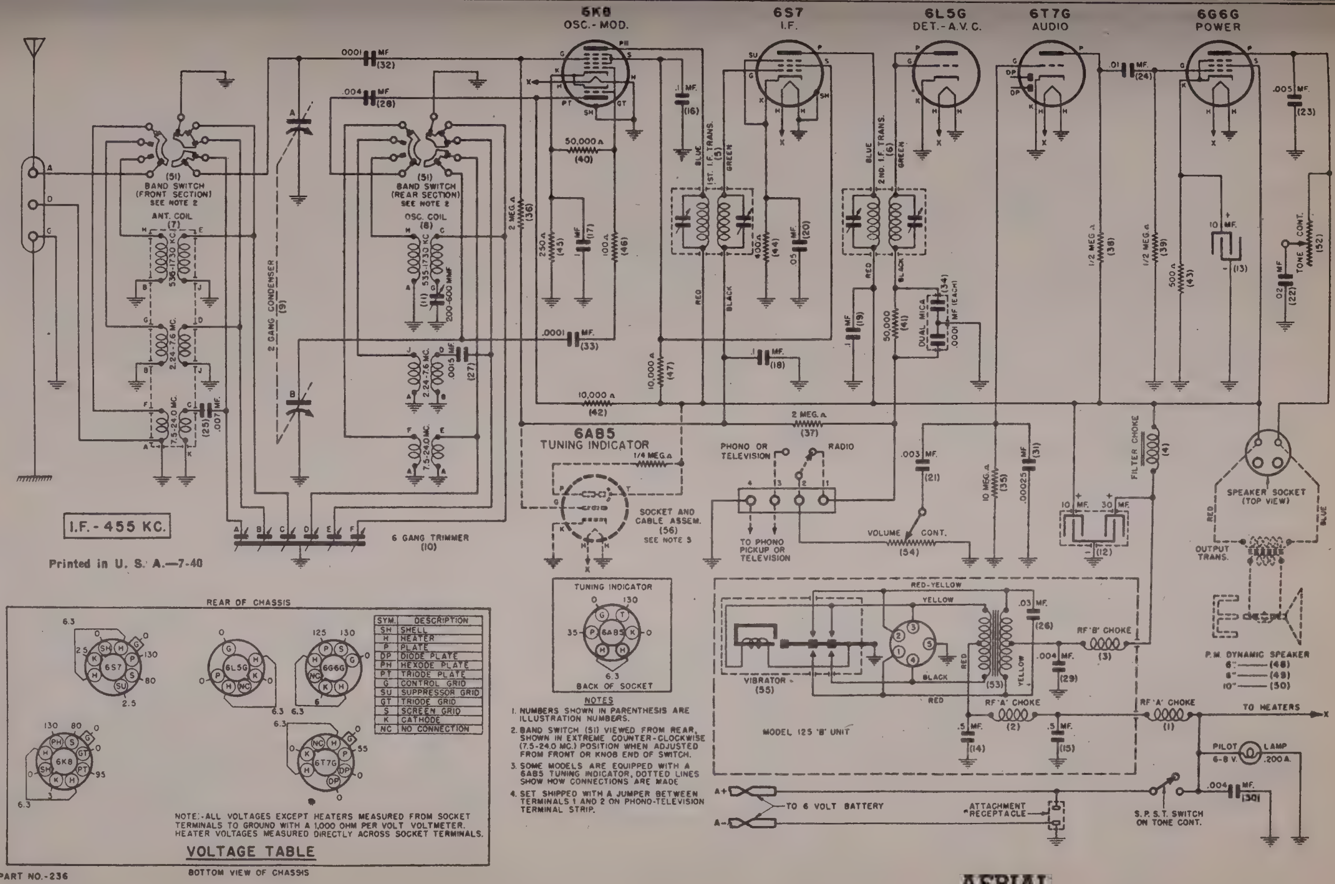
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.	Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 535 K.C. Band	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	3 Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.24 to 7.6 M.C. Band	1 Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.6 M.C. oscillator trimmer for maximum output.
	2 Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna trimmer for maximum output.
7.5 to 24 M.C. Band	1 Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna trimmer for maximum output.




A C LINE
1730 KC. OSC. TRIMMER FOR 535-1730 KC BAND
7.6 MC. OSC. TRIMMER FOR 2.24-7.6 MC BAND
24.0 MC OSC. TRIMMER FOR 7.5-24.0 MC. BAND
1400 KC ANT. TRIMMER FOR 535-1730 KC. BAND
6.0 MC. ANT TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT TRIMMER FOR 7.5-24.0 MC. BAND
6F
6E
6D
6C
6B
6A
REAR SECT.
FRONT SECT
3
4
7
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
41
42
47



NOTES

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH (51) VIEWED FROM REAR, SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
3. SOME MODELS ARE EQUIPPED WITH A 6AB5 TUNING INDICATOR, DOTTED LINES SHOW HOW CONNECTIONS ARE MADE
4. SET SHIPPED WITH A JUMPER BETWEEN TERMINALS 1 AND 2 ON PHONO-TELEVISION TERMINAL STRIP.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
P	PLATE
DP	DIODE PLATE
PH	HEXODE PLATE
PT	TRIODE PLATE
G	CONTROL GRID
SU	SUPPRESSOR GRID
GT	TRIODE GRID
S	SCREEN GRID
K	CATHODE
NC	NO CONNECTION

NOTE:-ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

VOLTAGE TABLE

THE RECEPTACLE ON BACK of chassis is connected to the storage battery operating the radio. A single six volt 15 or 25 watt light may be run on the battery by inserting male plug on end of light into receptacle. Light cord wire must not be smaller than No. 18 nor longer than six feet, and only one six volt light should be used, otherwise the light will be dim.

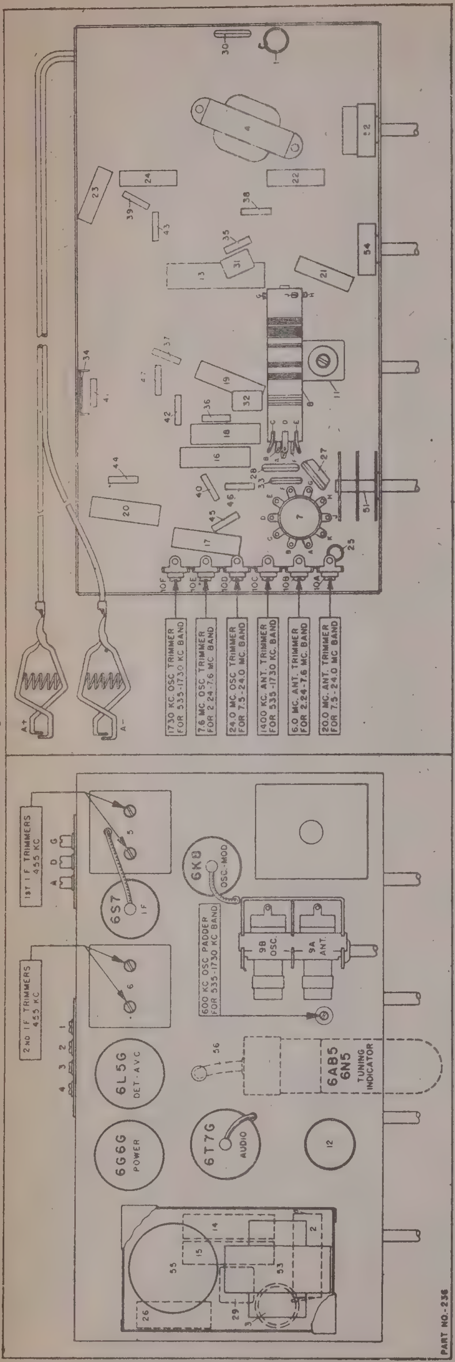
AERIAL

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G."

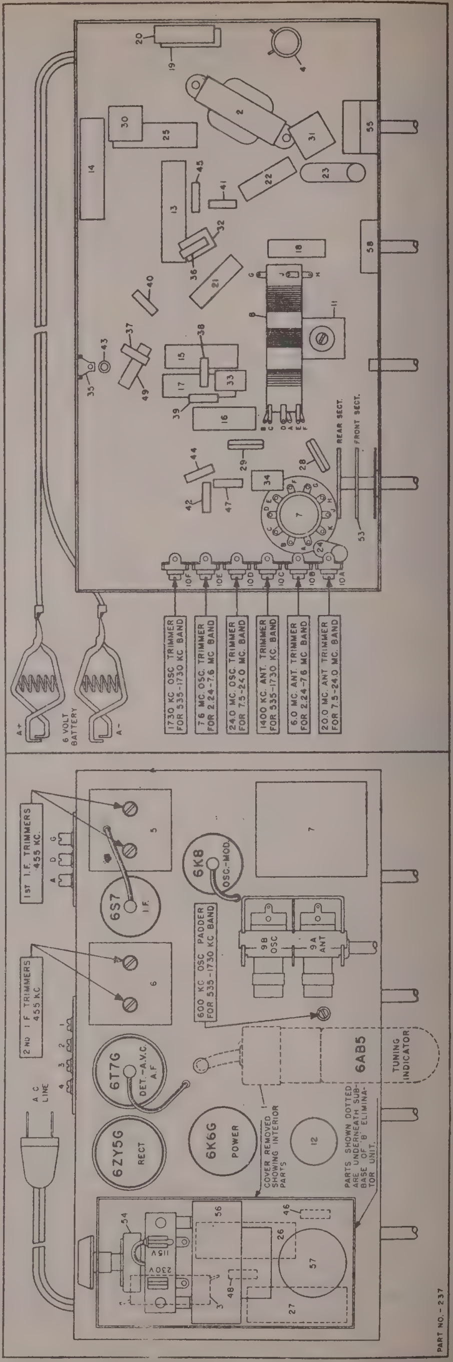
When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

MODEL 236
MODEL 237

SENTINEL RADIO CORP.

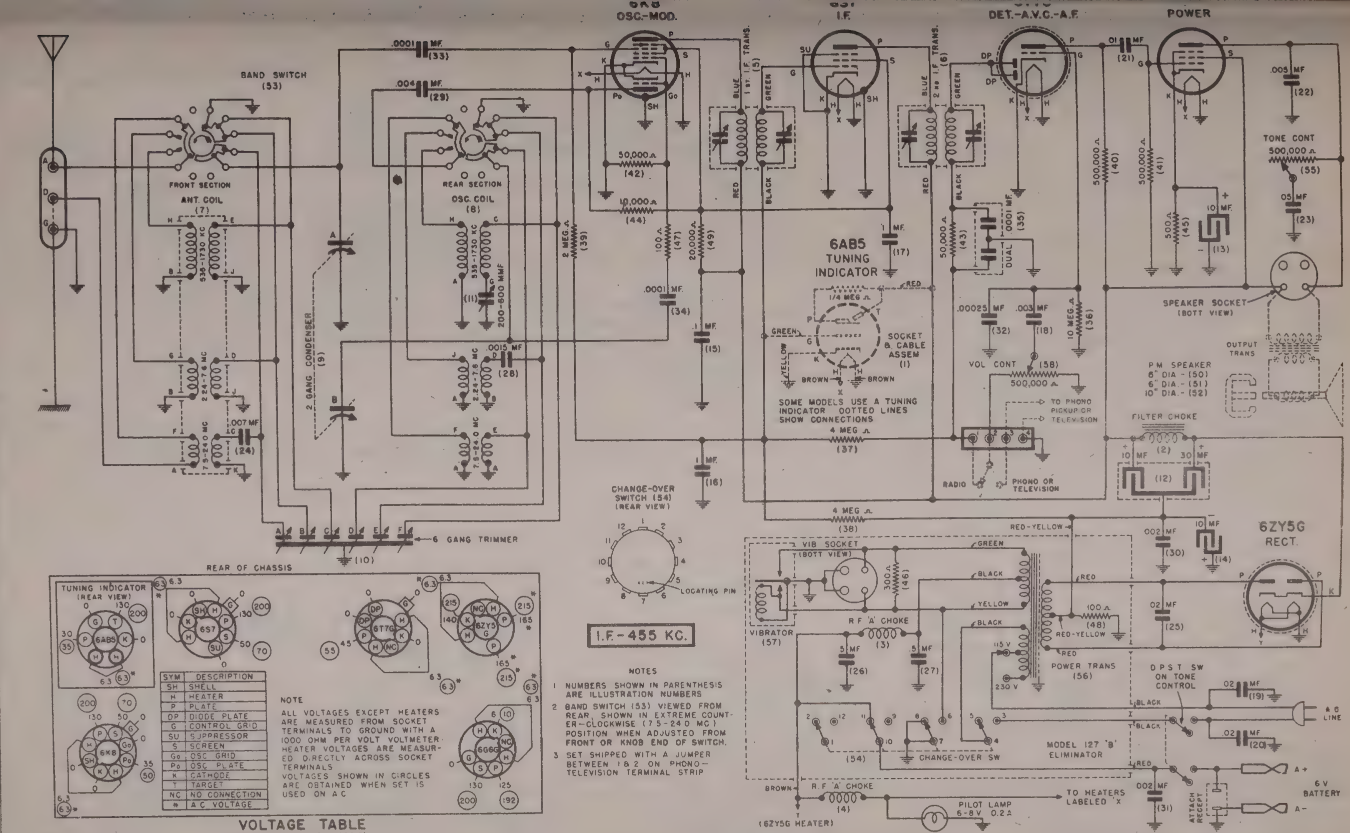

MODEL 236
A+
A-
1730 KC. OSC TRIMMER FOR 535-1730 KC BAND
7.6 MC. OSC TRIMMER FOR 2.24-7.6 MC BAND
24.0 MC. OSC TRIMMER FOR 7.5-24.0 MC. BAND
1400 KC. ANT. TRIMMER FOR 535-1730 KC BAND
6.0 MC. ANT. TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC BAND
10F
10E
10D
10C
10B
10A
1ST I F TRIMMERS 455 KC
2ND I F TRIMMERS 455 KC
A D G
4 3 2 1
6S7 I F
6K8 OSC-MOD
600 KC OSC PADDER FOR 535-1730 KC BAND
9B OSC
9A ANT
6L5G DET-AVC
6G6G POWER
6T7G AUDIO
6AB5 6N5 TUNING INDICATOR
PART NO.-236

FOR ALIGNMENT AND OTHER DATA, SEE INDEX


MODEL 237
A+
A-
6 VOLT BATTERY
1730 KC. OSC TRIMMER FOR 535-1730 KC BAND
7.6 MC. OSC. TRIMMER FOR 2.24-7.6 MC BAND
24.0 MC. OSC TRIMMER FOR 7.5-24.0 MC BAND
1400 KC. ANT. TRIMMER FOR 535-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
10F
10E
10D
10C
10B
10A
REAR SECT.
FRONT SECT.
1ST I.F. TRIMMERS 455 KC.
2ND I F TRIMMERS 455 KC
A D G
4 3 2 1
A C LINE
6S7 I.F.
6K8 OSC.-MOD.
600 KC OSC PADDER FOR 535-1730 KC BAND
9B OSC
9A ANT
6T7G DET.-A.V.C. A.F.
6ZY5G RECT
6K6G POWER
6AB5 TUNING INDICATOR
COVER REMOVED SHOWING INTERIOR PARTS
PARTS SHOWN DOTTED ARE UNDERNEATH SUB-BASE OF B ELIMINATOR UNIT.
115V
230V
PART NO.-237

SENTINEL RADIO CORP.

MODEL 237



I.F.-455 KC.

NOTES

1 NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS

2 BAND SWITCH (53) VIEWED FROM REAR, SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.

3 SET SHIPPED WITH A JUMPER BETWEEN 1 & 2 ON PHONO-TELEVISION TERMINAL STRIP

SYM	DESCRIPTION
SH	SHELL
H	HEATER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
SU	SUPPRESSOR
S	SCREEN
Go	OSC GRID
Po	OSC PLATE
K	CATHODE
T	TARGET
NC	NO CONNECTION
*	A C VOLTAGE

NOTE

ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET TERMINALS

VOLTAGES SHOWN IN CIRCLES ARE OBTAINED WHEN SET IS USED ON A C

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO 237

Printed in U. S. A.—7-40

VOLTAGE RATING

THIS RECEIVER CAN BE OPERATED WITH A SIX VOLT STORAGE BATTERY OR FROM 115 OR 230 VOLT 50 TO 60 CYCLE CURRENT.

NEVER ATTEMPT TO OPERATE THE RECEIVER WITH A 12 VOLT STORAGE BATTERY OR ON 25 CYCLE CURRENT OR ON DIRECT CURRENT (D.C.) OR WITH THE METAL TIPPED LEAD IN THE WRONG TERMINAL SOCKET BECAUSE THE SET WILL BE DAMAGED.

FOR AC OPERATION obtain from the Electric Supply Company the voltage and current rating of the local Electric Service and — — — remove top cover from power unit and insert metal tipped lead into proper terminal socket that will be found underneath top cover of power unit.

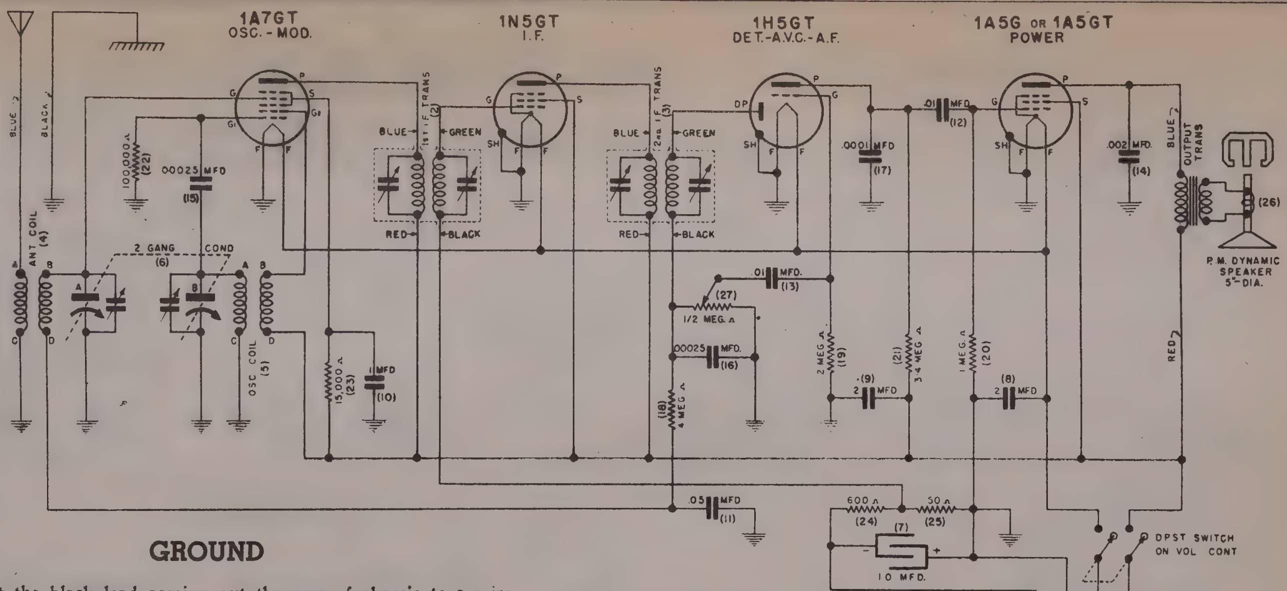
Place voltage selector switch knob in "115—230" position and plug set power cord plug into house lighting outlet.

WITH 6 VOLT STORAGE BATTERY:

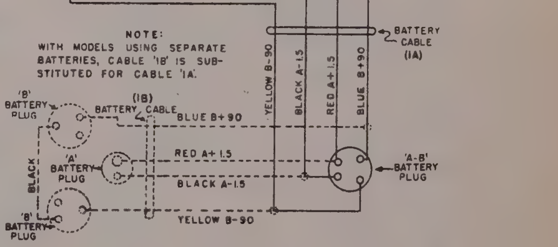
Place voltage selector switch on back of the "B" unit and accessible from the rear of the chassis to position marked 6.V.

MODEL 240

SENTINEL RADIO CORP.



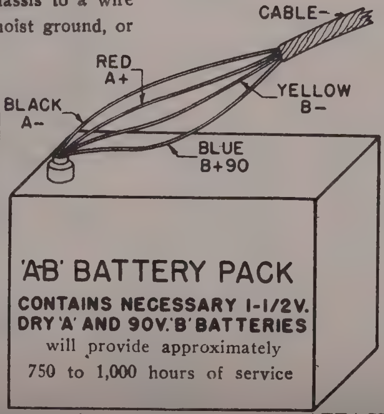
5e40--



NOTE:
WITH MODELS USING SEPARATE BATTERIES, CABLE '1B' IS SUBSTITUTED FOR CABLE '1A'.

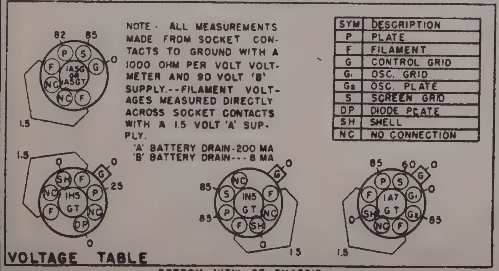
GROUND

Connect the black lead coming out the rear of chassis to a wire attached to a metal stake driven two to four feet in moist ground, or to a cold water pipe.



'AB' BATTERY PACK
CONTAINS NECESSARY 1-1/2V. DRY 'A' AND 90V. 'B' BATTERIES
will provide approximately
750 to 1,000 hours of service

FRONT OF CHASSIS



NOTE · ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLT 'B' SUPPLY.--FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET CONTACTS WITH A 1.5 VOLT 'A' SUPPLY.

'A' BATTERY DRAIN-200 MA
'B' BATTERY DRAIN---8 MA

SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
G_1	OSC. GRID
G_2	OSC. PLATE
S	SCREEN GRID
DP	DIODE PLATE
SH	SHELL
NC	NO CONNECTION

VOLTAGE TABLE

BOTTOM VIEW OF CHASSIS

PART NO:-240

I.F.-455 KC.

NOTE·
NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

BATTERY PLUGS SHOWN PINS DOWN.

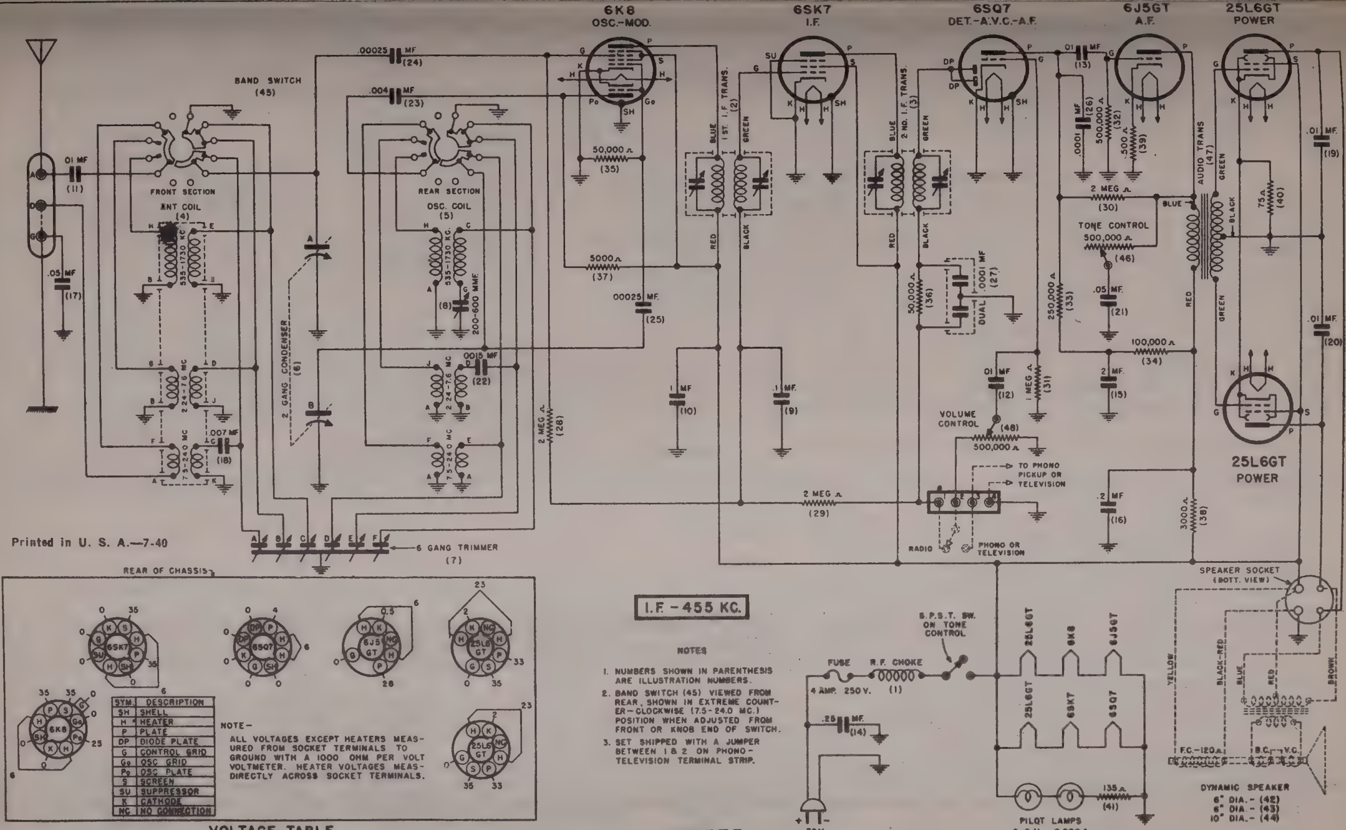
AERIAL

ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF CHASSIS.

SHOWING 4 PRONG PLUG ON END OF SET BATTERY CABLE INSERTED INTO RECEPTACLE ON TOP OF "AB" BATTERY PACK

SENTINEL RADIO CORP.

MODEL 239



Printed in U. S. A.—7-40

NOTES

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH (45) VIEWED FROM REAR, SHOWN IN EXTREME COUNTER-CLOCKWISE (7.5-24.0 MC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
3. SET SHIPPED WITH A JUMPER BETWEEN 1 & 2 ON PHONO-TELEVISION TERMINAL STRIP.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
Go	OSC GRID
Po	OSC PLATE
S	SCREEN
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

NOTE—
ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEAS. DIRECTLY ACROSS SOCKET TERMINALS.

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO. 239

The power plug attached to the end of the power cord must be inserted correctly IN THE 32 VOLT POWER SUPPLY OUTLET OR RECEPTACLE, OTHERWISE THE SET WILL NOT OPERATE. If after inserting the plug and turning the receiver on, the set does not operate after approximately two minutes, remove this plug and turn it half-way around and reinsert it in the power receptacle. If set still does not operate examine the fuse on back of chassis.

FUSE: A 4 ampere fuse is located on the back of the chassis adjacent to the speaker plug and protects the receiver from damage should a defect occur in the set or if it is connected to the improper power supply.

AERIAL

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

WARNING—Do not attach a ground direct to the radio chassis—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS MAY CAUSE A SHORT AND POSSIBLE DAMAGE.

MODEL 239
MODELS 236, 237

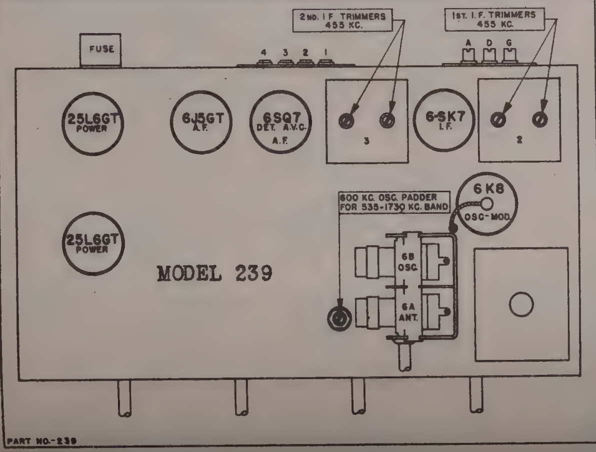
SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE MODELS 236, 237, 239

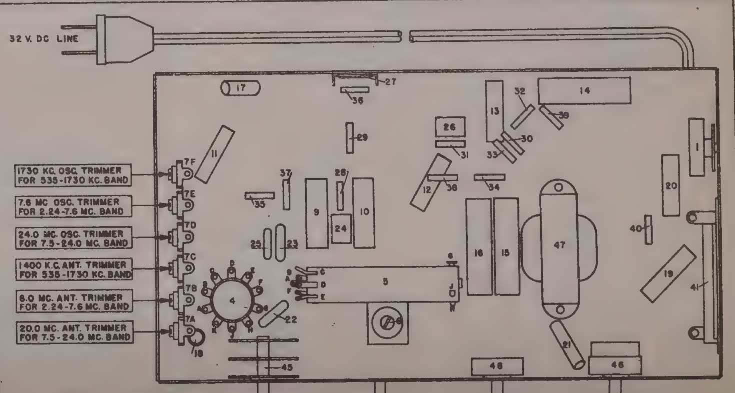
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.

			TEST OSCILLATOR			
Place band switch for operation on:		Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator: consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.		Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.24 to 7.6 M.C. Band	1	Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.6 M.C. oscillator trimmer for maximum output.
	2	Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna trimmer for maximum output.
7.5 to 24 M.C. Band	1	Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2	Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna trimmer for maximum output.



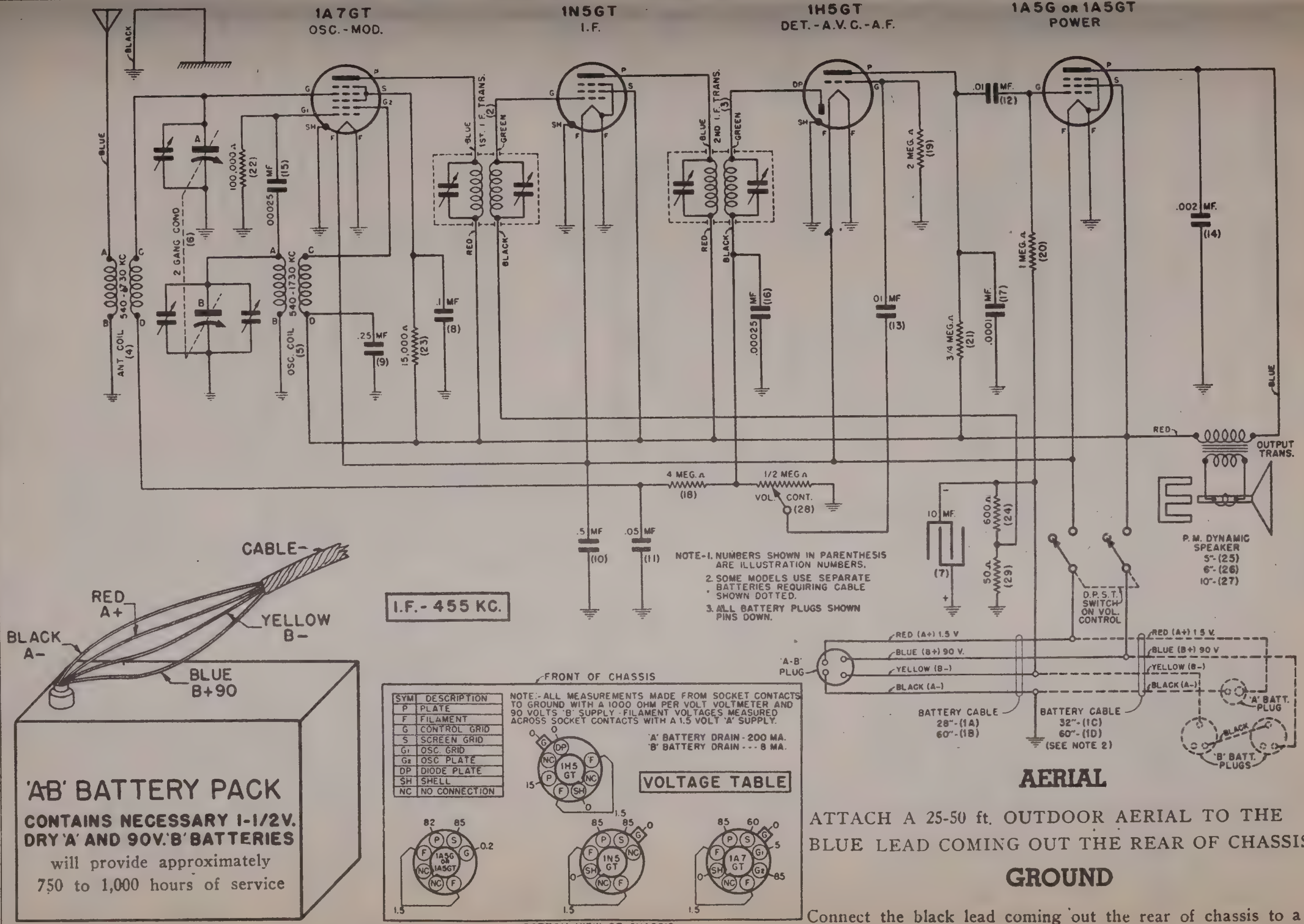
MODEL 239


32 V. DC LINE
1730 KC. OSC. TRIMMER FOR 535-1730 KC. BAND
7.6 MC OSC. TRIMMER FOR 2.24-7.6 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
1400 K.C. ANT. TRIMMER FOR 535-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
7F
7E
7D
7C
7B
7A
1
4
5
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
45
46
47
48

MODEL 239

SENTINEL RADIO CORP.

MODEL 241



I.F.-455 KC.

NOTE-1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

2. SOME MODELS USE SEPARATE BATTERIES REQUIRING CABLE SHOWN DOTTED.

3. ALL BATTERY PLUGS SHOWN PINS DOWN.

VOLTAGE TABLE

SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC. GRID
G2	OSC PLATE
DP	DIODE PLATE
SH	SHELL
NC	NO CONNECTION

NOTE:-ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY-FILAMENT VOLTAGES MEASURED ACROSS SOCKET CONTACTS WITH A 1.5 VOLT 'A' SUPPLY.

'A' BATTERY DRAIN-200 MA.
'B' BATTERY DRAIN---8 MA.

'AB' BATTERY PACK

CONTAINS NECESSARY 1-1/2V. DRY 'A' AND 90V. 'B' BATTERIES

will provide approximately 750 to 1,000 hours of service

PART NO.-241

SHOWING 4 PRONG PLUG ON END OF SET BATTERY CABLE INSERTED INTO RECEPTACLE ON TOP OF "AB" BATTERY PACK

AERIAL

ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF CHASSIS.

GROUND

Connect the black lead coming out the rear of chassis to a wire attached to a metal stake driven two to four feet in moist ground, or to a cold water pipe.

MODEL 240
MODEL 241
MODEL 242

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE MODELS 240, 241, 242

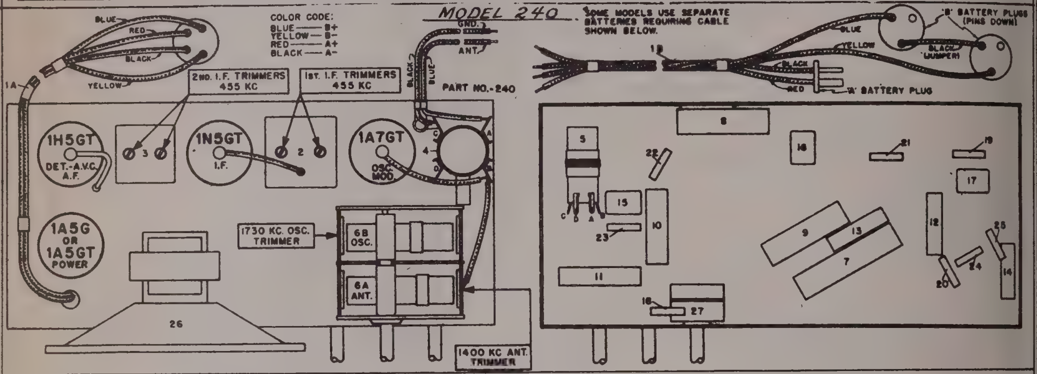
Before starting alignment:

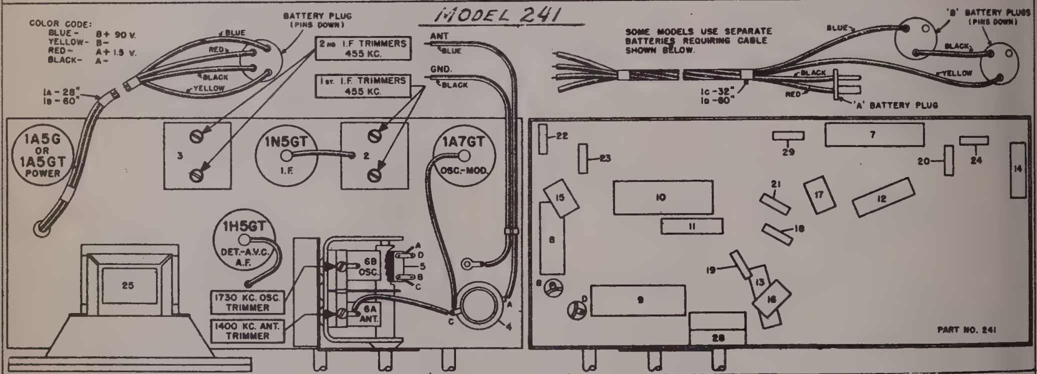
Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point to last line move to correct position.

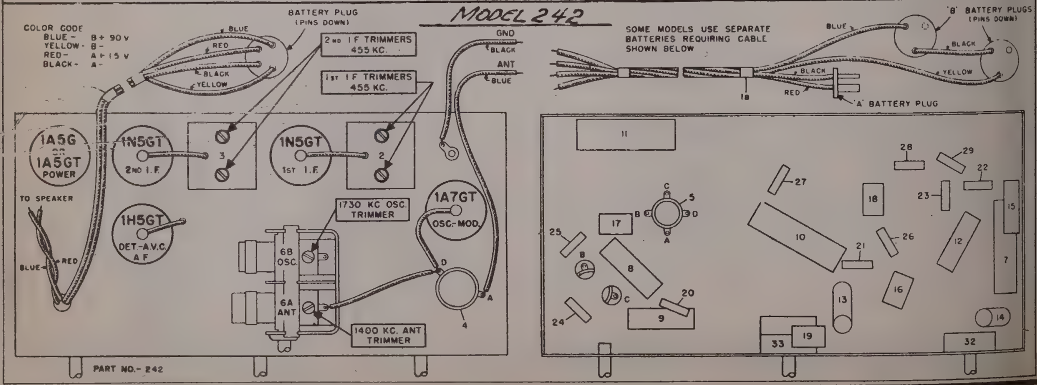
Use an accurately calibrated test oscillator with some type of output measuring device.

Have ground lead of test oscillator attached to chassis.

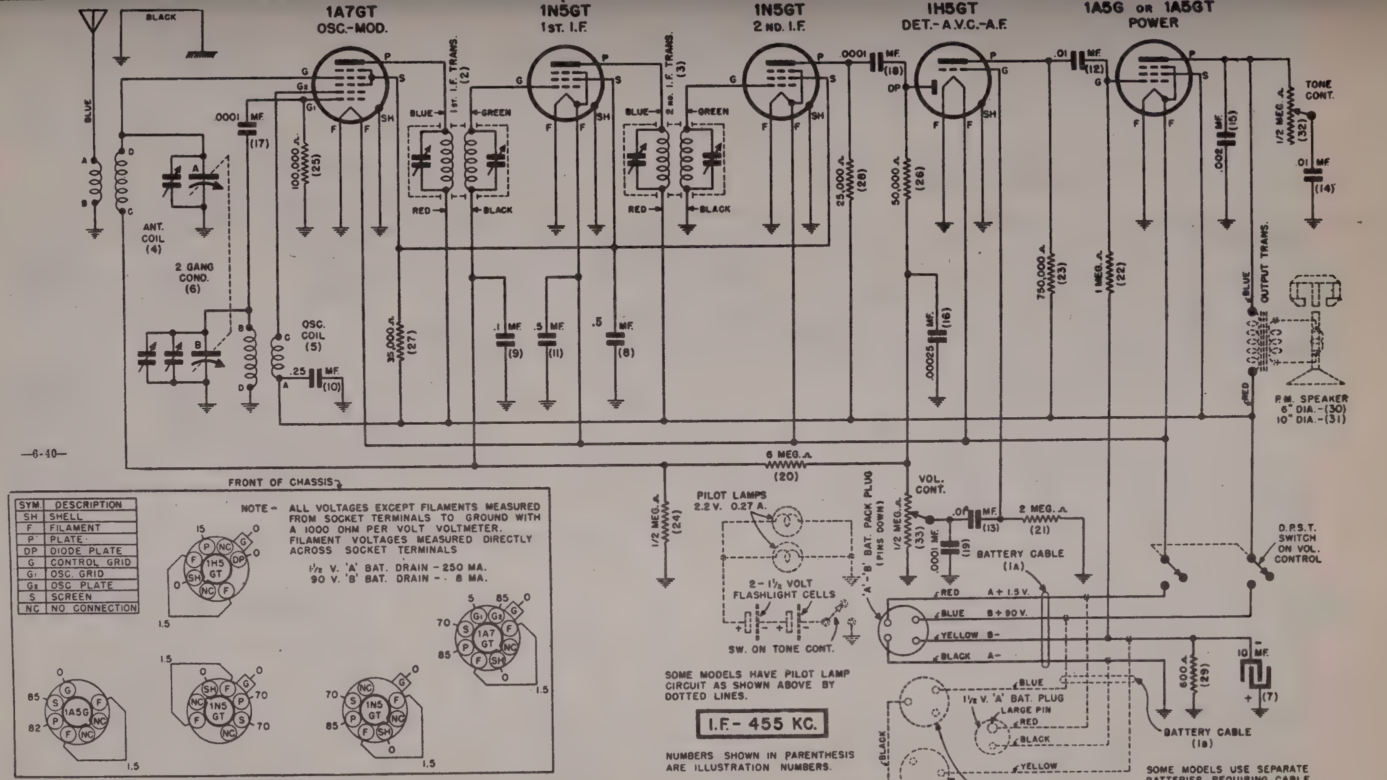
TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7G tube DO NOT REMOVE CAP	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.







SENTINEL RADIO CORP.



SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G₁	OSC. GRID
G₂	OSC PLATE
S	SCREEN
NC	NO CONNECTION

NOTE - ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS

1½ V. 'A' BAT. DRAIN - 250 MA.
90 V. 'B' BAT. DRAIN - 8 MA.

SOME MODELS HAVE PILOT LAMP CIRCUIT AS SHOWN ABOVE BY DOTTED LINES.

I.F.- 455 KC.

NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

SOME MODELS USE SEPARATE BATTERIES REQUIRING CABLE SHOWN DOTTED.

PART NO. 242

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

AERIAL

ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF CHASSIS.

GROUND

Connect the black lead coming out the rear of chassis to a wire attached to a metal stake driven two to four feet in moist ground, or to a cold water pipe.

DIAL LIGHT

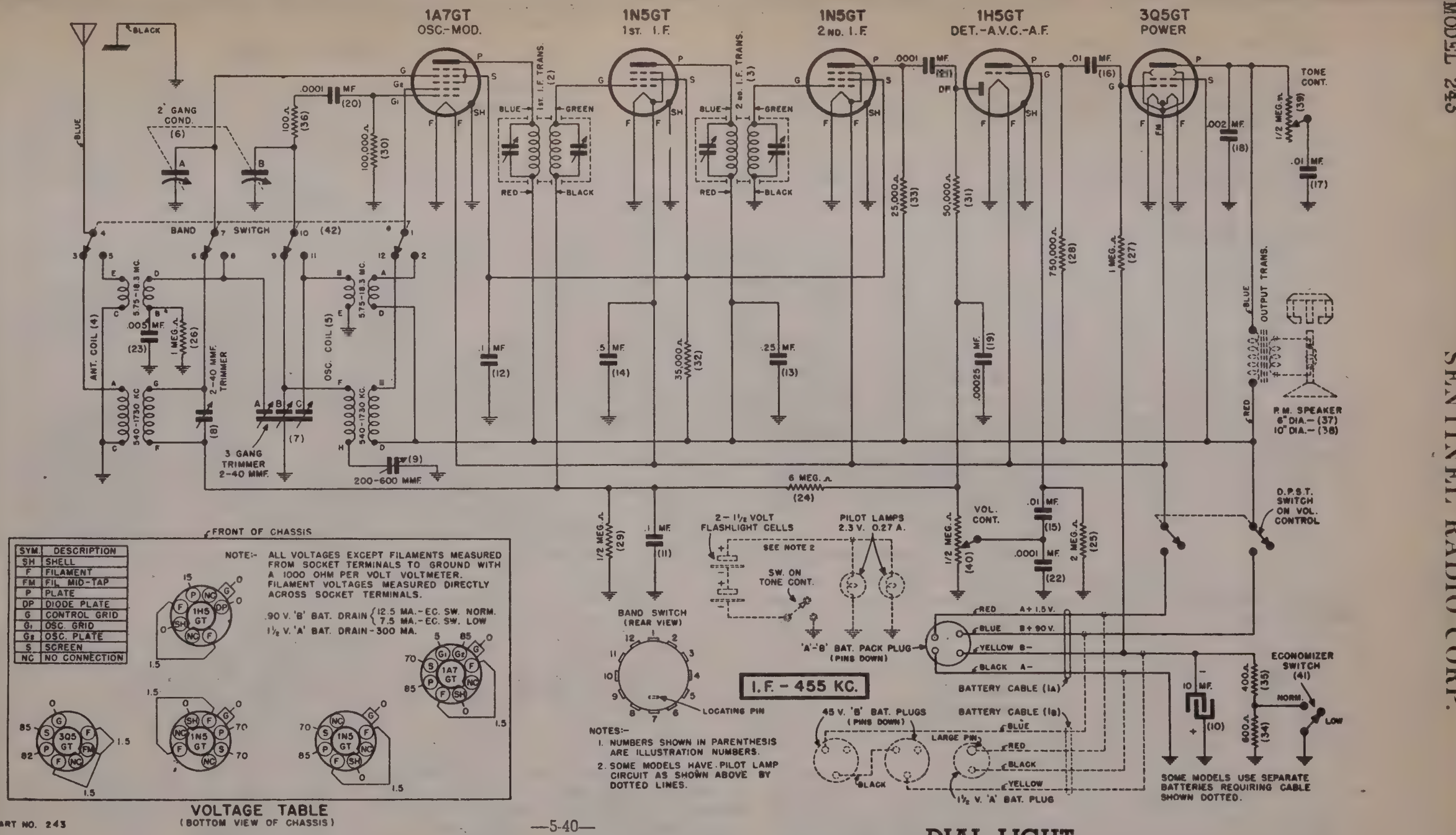
Some of this series of receivers have a pilot light which illuminates the dial when the tone control knob is pushed inward. A two cell 2.3 volt flash light bulb, type 710, is used, operated by TWO 1½ VOLT FLASH LIGHT BATTERIES which MUST BE PLACED IN THE METAL HOLDER THAT WILL BE FOUND INSIDE THE CABINET.

When manual tuning receiver—illuminate the dial by pushing inward on the tone control knob with the left hand and rotate the tuning knob with the right hand. After selected station has been correctly tuned in release knob and dial light will go out.

As the life of the 1½ volt flash light batteries would be shortened if the dial light were to remain lit at all times, the dial light is lit only when the tone control knob is pushed inward.

MODEL 243

SENTINEL RADIO CORP.



SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
FM	FIL. MID-TAP
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G1	OSC. GRID
G2	OSC. PLATE
S	SCREEN
NC	NO CONNECTION

NOTE:- ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

90 V. 'B' BAT. DRAIN { 12.5 MA.-EC. SW. NORM. / 7.5 MA.-EC. SW. LOW

1½ V. 'A' BAT. DRAIN-300 MA.

NOTES:-
1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. SOME MODELS HAVE PILOT LAMP CIRCUIT AS SHOWN ABOVE BY DOTTED LINES.

—5-40—

BATTERY LIFE

The life of the battery depends entirely on the average position of the "BATTERY ECONOMIZER" switch, the number of hours the set is operated daily and the quality and size of the battery.

The special "AB" Battery Pack, designed specifically for use with this radio, will provide approximately 600 to 800 hours of service under normal average operating conditions.

DIAL LIGHT

Some of this series of receivers have a pilot light which illuminates the dial when the tone control knob is pushed inward. A two cell 2.3 volt flash light bulb, type 710, is used, operated by TWO 1½ VOLT FLASHLIGHT BATTERIES which MUST BE PLACED IN THE METAL HOLDER FOUND INSIDE THE CABINET

When tuning receiver—illuminate the dial by pushing inward on the tone control knob with the left hand and rotate the tuning knob with the right hand. After selected station has been correctly tuned in release knob and dial light will go out.

©John F. Rider, Publisher

-1-41-

ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

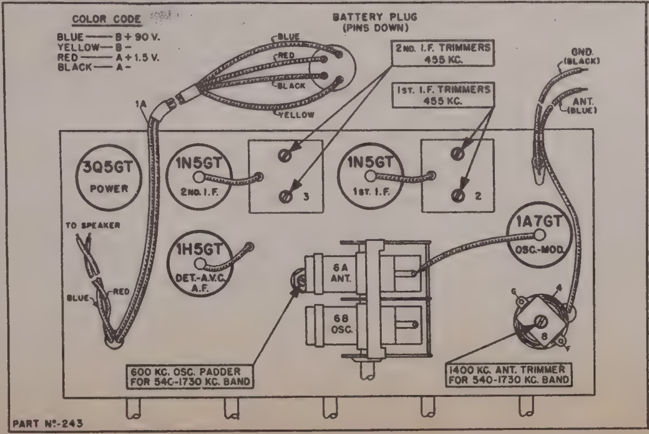
Before starting alignment:

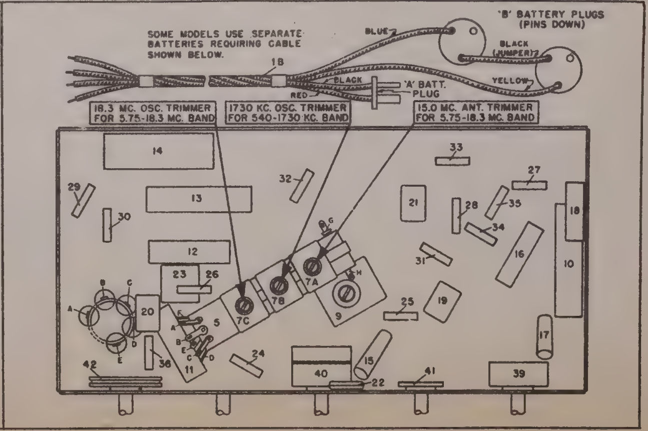
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

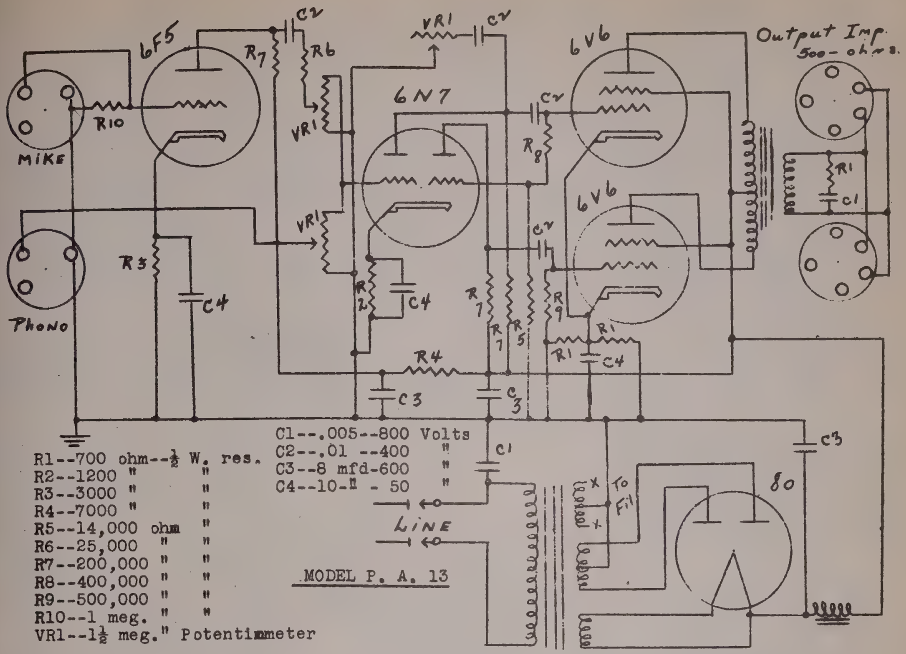
Place band switch for operation on:	Set receiver dial to:		TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
			Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. alignment use any band position.	I.F.	Any point where no interfering signal is received	455 K.C.	.02 MFD. condenser	High side to grid terminal of 1A7G tube DO NOT REMOVE CAP	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1730 to 540 K.C. Band	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 MFD. condenser	High side to Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 MFD. condenser	High side to Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C	None	High side to Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.75 to 18.3 M.C. Band	1	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to Blue Ant. Lead	Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in
	2	Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to Blue Ant. Lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.




'B' BATTERY PLUGS (PINS DOWN)
SOME MODELS USE SEPARATE BATTERIES REQUIRING CABLE SHOWN BELOW.
BLUE
BLACK (JUMPER)
18
BLACK
RED
YELLOW
'A' BATT. PLUG
18.3 MC. OSC. TRIMMER FOR 5.75-18.3 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.75-18.3 MC. BAND
14
33
27
32
29
13
21
28
35
18
30
34
12
G
31
16
10
23
26
7A
H
7B
25
19
A
B
C
20
5
7C
9
17
24
42
D
E
36
11
40
15
39
22
41

SETCHELL CARLSON, INC.

MODEL PA-13
MODEL PA-25

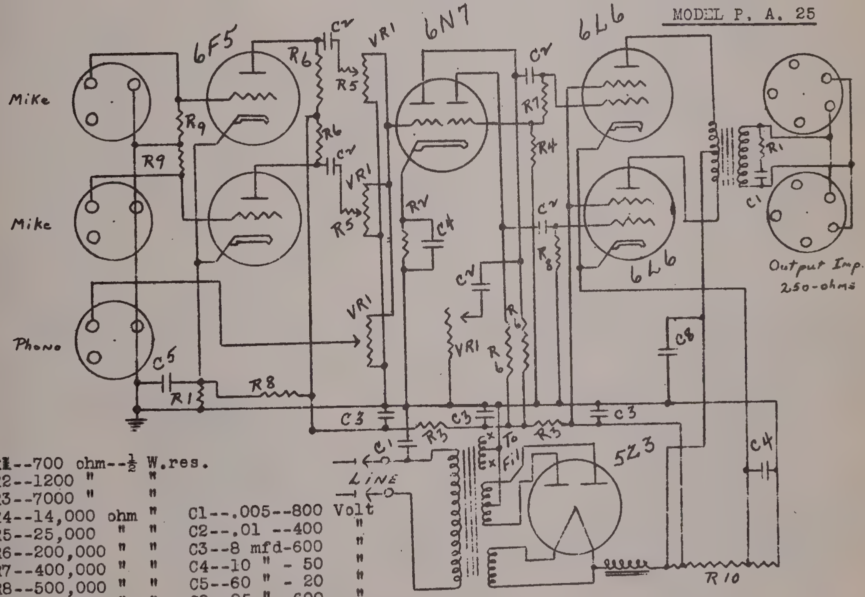


MODEL P. A. 13

R1--700 ohm--½ W. res.
R2--1200 " "
R3--3000 " "
R4--7000 " "
R5--14,000 ohm "
R6--25,000 " "
R7--200,000 " "
R8--400,000 " "
R9--500,000 " "
R10--1 meg. " "
VR1--1½ meg." Potentimmeter

C1--.005--800 Volts
C2--.01 --400 "
C3--8 mfd-600 "
C4--10-" - 50 "

MODEL P. A. 25

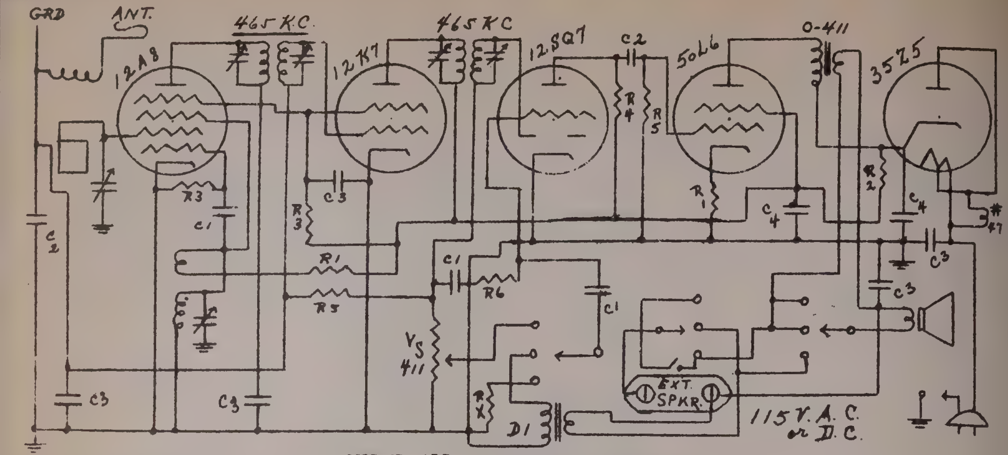


R1--700 ohm--½ W.res.
R2--1200 " "
R3--7000 " "
R4--14,000 ohm "
R5--25,000 " "
R6--200,000 " "
R7--400,000 " "
R8--500,000 " "
R9--1 meg.
R10--6635 Ohm tapped 100 W.
VR1--1½ meg." Potentiometer

C1--.005--800 Volt
C2--.01 --400 "
C3--8 mfd-600 "
C4--10 " - 50 "
C5--60 " - 20 "
C8--25 " -600 "

MODEL 411
RADIO-DOR-PHONE
MODEL 55

SETCHELL CARLSON, INC.



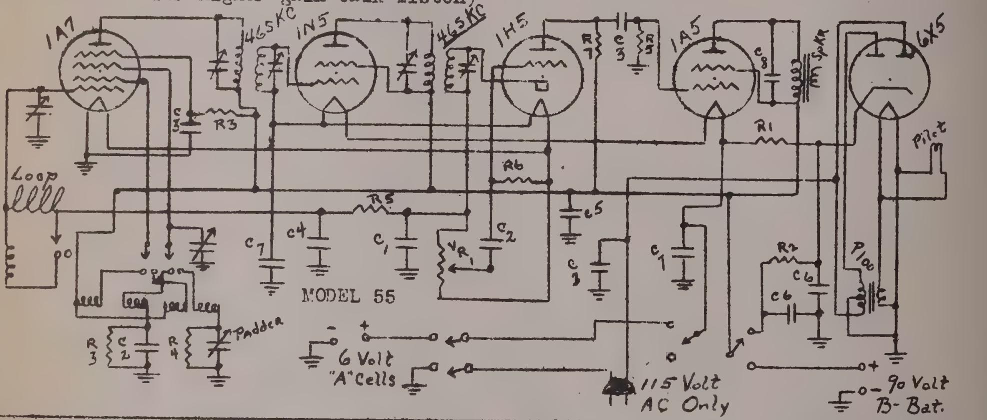
MODEL 411 RADIO-DOR-PHONE

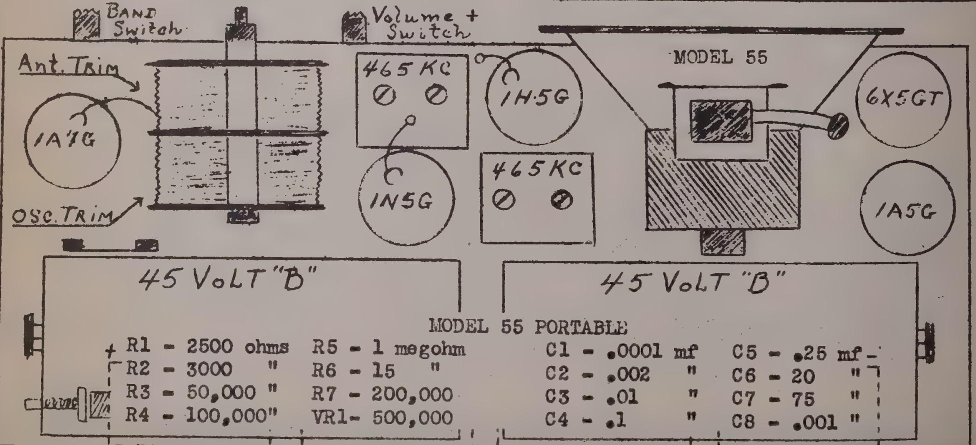
R1 - 200 ohms
R2 - 1200 "
R3 - 50,000 "
R4 - 200,000"

R5 - 500,000 ohms
R6 - 15 megohms
RX - 100,000 ohms
(Raise or omit for higher gain talk-listen)

C1 - .0005 mf
C2 - .01 "
C3 - .05 "
C4 - 50-20 150V.

VS411 - 0.5 meg.Vol.Cont. with switch





MODEL 55 PORTABLE

R1 - 2500 ohms
R2 - 3000 "
R3 - 50,000 "
R4 - 100,000"

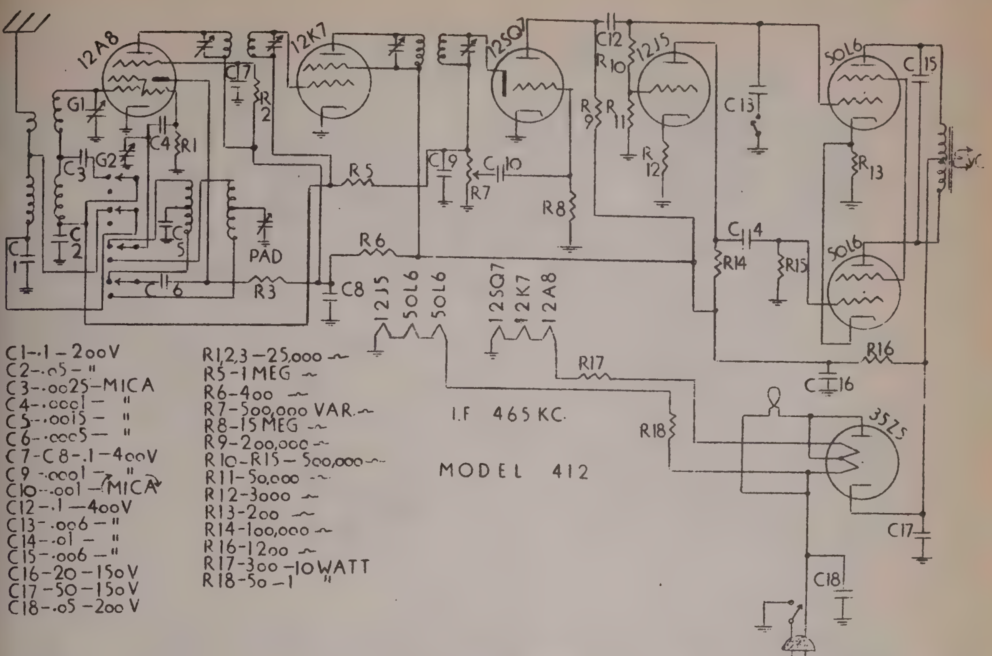
R5 - 1 megohm
R6 - 15 "
R7 - 200,000
VR1- 500,000

C1 - .0001 mf
C2 - .002 "
C3 - .01 "
C4 - .1 "

C5 - .25 mf
C6 - 20 "
C7 - 75 "
C8 - .001 "

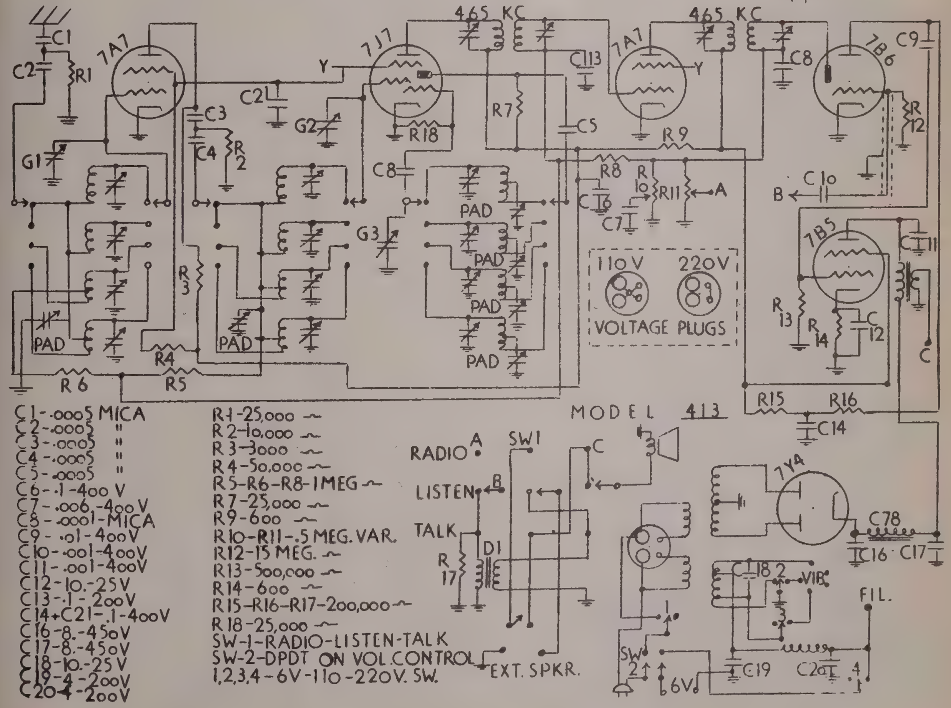
SETCHELL CARLSON, INC.

MODEL 412
MODEL 413



C1-.1-200V
C2-.05-"
C3-.0025-MICA
C4-.0001- "
C5-.0015- "
C6-.0005- "
C7-C8-.1-400V
C9-.0001- "
C10-.001-MICA
C12-.1-400V
C13-.006-"
C14-.01- "
C15-.006-"
C16-20-150V
C17-50-150V
C18-.05-200V

R1,2,3-25,000 ~
R5-1MEG ~
R6-400 ~
R7-500,000 VAR. ~
R8-15 MEG ~
R9-200,000 ~
R10-R15-500,000 ~
R11-50,000 ~
R12-3000 ~
R13-200 ~
R14-100,000 ~
R16-1200 ~
R17-300-10WATT
R18-50-1 "

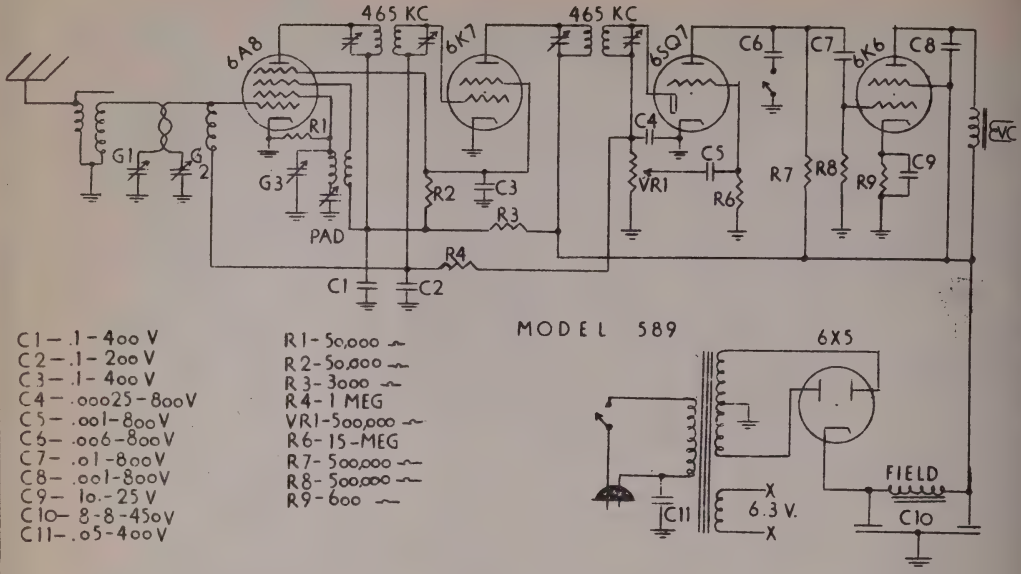


C1-.0005 MICA
C2-.0005 "
C3-.0005 "
C4-.0005 "
C5-.0005 "
C6-.1-400 V
C7-.006-400V
C8-.0001-MICA
C9-.01-400V
C10-.001-400V
C11-.001-400V
C12-10.-25V
C13-.1-200V
C14+C21-.1-400V
C16-8.-450V
C17-8.-450V
C18-10.-25V
C19-4-200V
C20-4-200V

R1-25,000 ~
R2-10,000 ~
R3-3000 ~
R4-50,000 ~
R5-R6-R8-1MEG ~
R7-25,000 ~
R9-600 ~
R10-R11-.5 MEG. VAR.
R12-15 MEG. ~
R13-500,000 ~
R14-600 ~
R15-R16-R17-200,000 ~
R18-25,000 ~
SW-1-RADIO-LISTEN-TALK
SW-2-DPDT ON VOL.CONTROL
1,2,3,4-6V-110-220V. SW.

MODEL 589
MODEL 4160

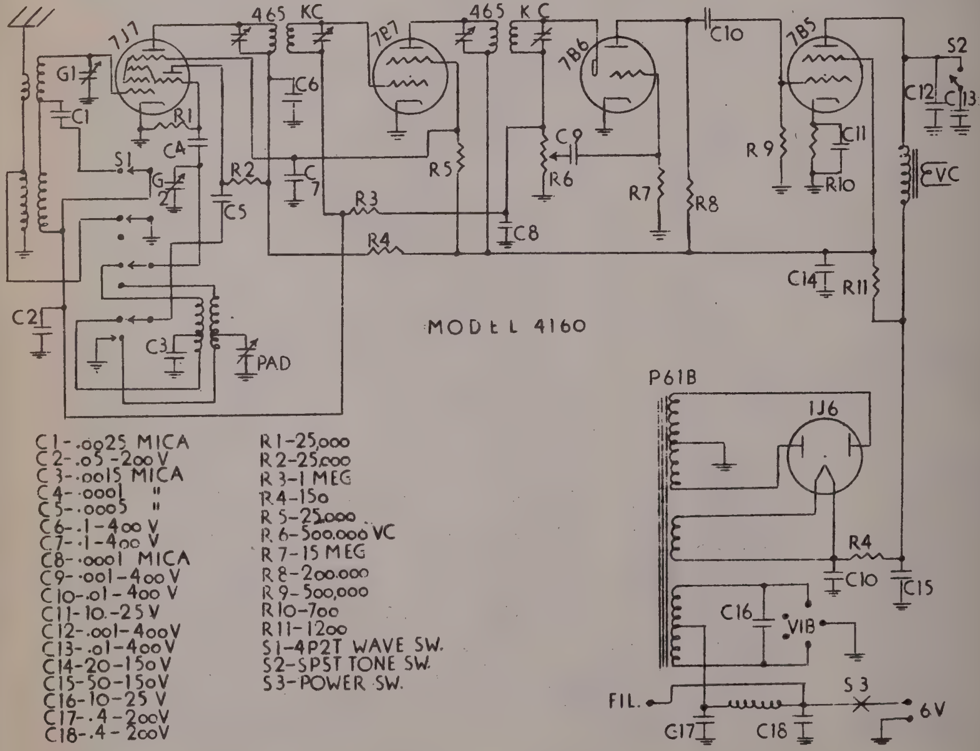
SETCHELL CARLSON, INC.



MODEL 589

C1 – .1 - 400 V
C2 – .1 - 200 V
C3 – .1 - 400 V
C4 – .00025 - 800 V
C5 – .001 - 800 V
C6 – .006 - 800 V
C7 – .01 - 800 V
C8 – .001 - 800 V
C9 – 10. - 25 V
C10 – 8-8 - 450 V
C11 – .05 - 400 V

R1 - 50,000 ~
R2 - 50,000 ~
R3 - 3000 ~
R4 - 1 MEG
VR1 - 500,000 ~
R6 - 15 - MEG
R7 - 500,000 ~
R8 - 500,000 ~
R9 - 600 ~



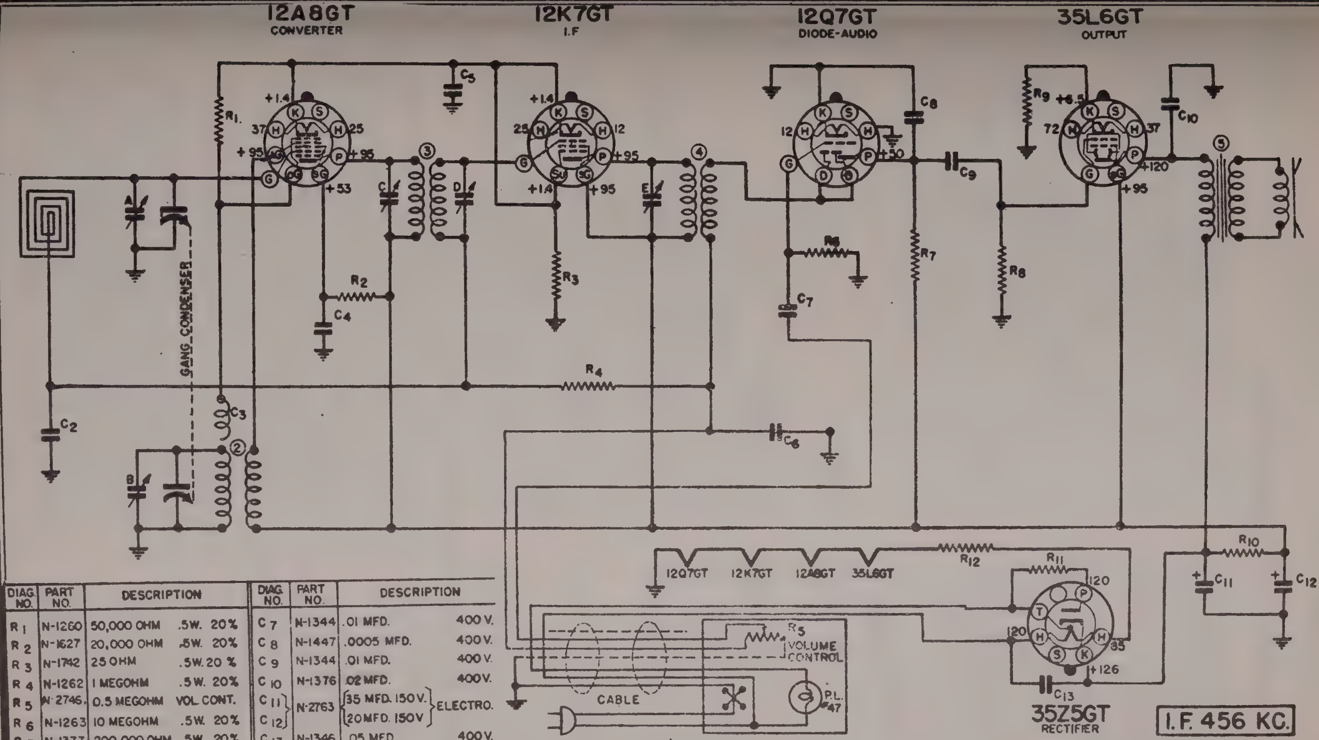
MODEL 4160

C1 - .0025 MICA
C2 - .05 - 200 V
C3 - .0015 MICA
C4 - .0001 "
C5 - .0005 "
C6 - .1 - 400 V
C7 - .1 - 400 V
C8 - .0001 MICA
C9 - .001 - 400 V
C10 - .01 - 400 V
C11 - 10. - 25 V
C12 - .001 - 400 V
C13 - .01 - 400 V
C14 - 20 - 150 V
C15 - 50 - 150 V
C16 - 10 - 25 V
C17 - .4 - 200 V
C18 - .4 - 200 V

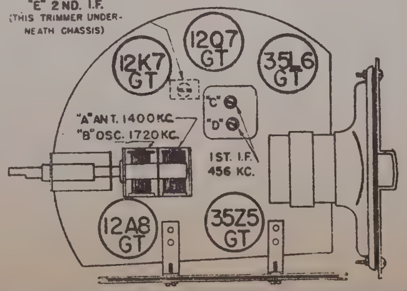
R1 - 25,000
R2 - 25,000
R3 - 1 MEG
R4 - 150
R5 - 25,000
R6 - 500,000 VC
R7 - 15 MEG
R8 - 200,000
R9 - 500,000
R10 - 700
R11 - 1200
S1 - 4P2T WAVE SW.
S2 - SPST TONE SW.
S3 - POWER SW.

SONORA RADIO & TELEV., CORP.

MODEL Globe Navigator
Chassis TSG-R



"E" 2ND. I.F.
(THIS TRIMMER UNDERNEATH CHASSIS)



5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRN. J.B. APP'D B M S
DATE. 12-20-39

DIAG. NO.	PART NO.	DESCRIPTION		
R 1	N-1260	50,000 OHM	.5W.	20%
R 2	N-1627	20,000 OHM	.5W.	20%
R 3	N-1742	25 OHM	.5W.	20%
R 4	N-1262	1 MEGOHM	.5W.	20%
R 5	N-2746	0.5 MEGOHM	VOL CONT.	
R 6	N-1263	10 MEGOHM	.5W.	20%
R 7	N-1377	200,000 OHM	.5W.	20%
R 8	N-1264	500,000 OHM	.5W.	20%
R 9	N-1616	250 OHM	.5W.	10%
R 10	N-1617	2500 OHM	.5W.	20%
R 11	N-1614	50 OHM	.5W.	20%
R 12	N-1618	80 OHM	2W.	10%
C 2	N-1345	.05 MFD.	200V	
C 3		CAPACITY INCLUDED IN OSCILLATOR COIL		
C 4	N-1345	.05 MFD.	200V.	
C 5	N-2725	.15 MFD.	200V	10%
C 6	N-1374	100 MMFD		

DIAG. NO.	PART NO.	DESCRIPTION	
C 7	N-1344	.01 MFD.	400 V.
C 8	N-1447	.0005 MFD.	400 V.
C 9	N-1344	.01 MFD.	400 V.
C 10	N-1376	.02 MFD.	400 V.
C 11	N-2763	35 MFD. 150 V.	ELECTRO.
C 12		20 MFD. 150 V	ELECTRO.
C 13	N-1346	.05 MFD.	400 V.
1	N-2256	ANTENNA COIL LOOP	
2	N-1452	OSCILLATOR COIL	
3	N-2767	1ST. I.F. TRANSFORMER	
4	N-1596	2ND. I.F. TRANSFORMER	
5	N-2771	5" P.M. SPEAKER & TRANS	
E	N-1597	2ND. I.F. TRIMMING COND.	
	N-2750	GANG CONDENSER	

TSG-R

CHASSIS LD, LDU

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1720, 6000, 15000 and 18300 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast and Short Wave bands in the order given, should be aligned.

I.F. ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the black lead of the electrolytic condenser. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1720 KC. Align the BC oscillator trimmer for maximum output. Set the generator at 1400 KC and tune-in signal with the dial. Adjust antenna trimmer for maximum output. Next set the generator at 600 KC and tune in the signal with the dial. Adjust the BC pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 1400 KC as the pad adjustment may have caused misalignment.

SHORT WAVE BAND ALIGNMENT. With the band switch turned to the S. W. position, connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output with the dial at 18300 KC (extreme end). Set the generator at 15000 KC and tune-in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18300 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

MODEL GLOBE NAVIGATOR
Chassis TSG-R

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove chassis from the GLOBE and set it up on the bench. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench.

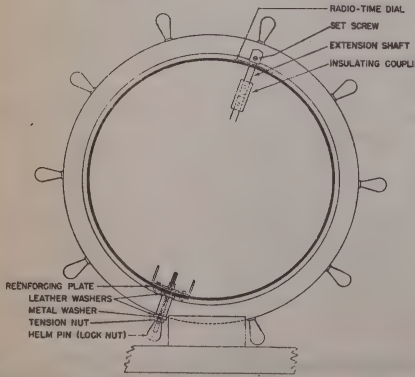
Make a loop consisting of 10 to 20 turns of wire approximately 3 to 4 inches in diameter and connect across the generator terminals. Place this loop parallel to the loop antenna and about six inches away from it.

Set the dial and generator at 1720 KC (gang at minimum capacity). Adjust the oscillator trimmer for maximum output. Set the generator at 1400 KC and tune in the signal. Adjust the antenna trimmer for maximum output. Check the sensitivity at 600 KC to determine if the gang or the coils have been damaged.

REMOVAL OF CHASSIS FOR SERVICING

To remove chassis for servicing and tube replacement, the following proceedure should be used:

(1) Slit the Equator band around the GLOBE with a sharp knife or razor blade. (The GLOBE consists of two halves joined at the horizontal center line or Equator.)



(2) Remove the helm pin, nut, washers and screw at the lower axial pivot on the meridian, the ring which encircles the GLOBE (South Pole.)

(3) Remove the set screw of the upper axial pivot on the meridian (North Pole.)

(4) Remove GLOBE from meridian ring mounting and separate upper half of GLOBE.

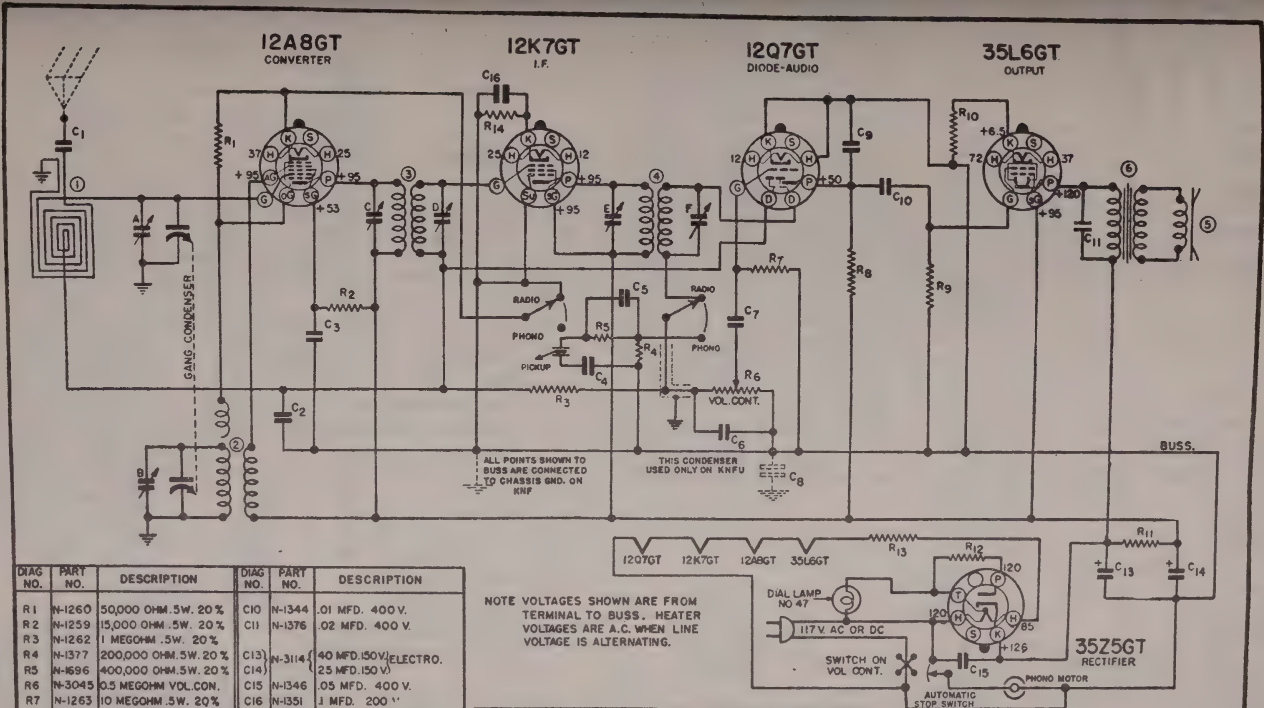
The lower half of the GLOBE can be detached from the chassis assembly by removing two screws at the bottom.

The chassis and GLOBE should be assembled by reversing the proceedure outlined above with the exception of the lower axial pivot fastening.

At this point the GLOBE tension should be adjusted. The hexagon nut serves this purpose and should be adjusted to a point whereby the GLOBE tension is sufficient to maintain an even balance of the GLOBE in any position and still permit the GLOBE to be rotated smoothly. When the adjustment is correct, screw on the helm pin tightly against the adjusting nut. This serves as a lock nut.

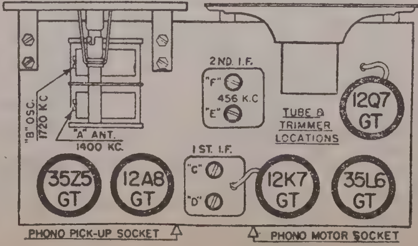
Two spare Equator bands are furnished attached to the inner side of the GLOBE. After the GLOBE is completely assembled, the Equator band tape should be cemented around the GLOBE where the upper and lower halves are joined.

SONORA RADIO & TELEV., CORP. Chassis KNF, KNFU



DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%	C10	N-1344	.01 MFD. 400 V.
R2	N-1259	15,000 OHM .5W. 20%	C11	N-1376	.02 MFD. 400 V.
R3	N-1262	1 MEGOHM .5W. 20%			
R4	N-1377	200,000 OHM .5W. 20%	C13 C14	N-3114	40 MFD. 150 V. 25 MFD. 150 V. ELECTRO.
R5	N-1696	400,000 OHM .5W. 20%			
R6	N-3045	0.5 MEGOHM VOL. CON.	C15	N-1346	.05 MFD. 400 V.
R7	N-1263	10 MEGOHM .5W. 20%	C16	N-1351	.1 MFD. 200 "
R8	N-1377	200,000 OHM .5W. 20%			
R9	N-1264	500,000 OHM .5W. 20%	1	N-3041	LOOP ANTENNA COIL
R10	N-1616	250 OHM .5W. 10%	2	N-1452	OSCILLATOR COIL
R11	N-1257	2,000 OHM .5W. 20%	3	N-3043	1ST. I.F. TRANSFORMER
R12	N-1742	25 OHM .5W. 20%	4	N-3044	2ND. I.F. TRANSFORMER
R13	N-1618	80 OHM 2W. 10%	5	N-2624	5" P.M. SPEAKER
R14	N-2487	200 OHM .5W 20%	6	N-3568	OUTPUT TRANSFORMER
C1	N-1344	.01 MFD. 400 V.			
C2	N-1345	.05 MFD. 200 V.		N-3046	2 GANG CONDENSER
C3	N-1345	.05 MFD. 200 V.			
C4	N-2642	.09 MFD. 200 V.		N-3550	RADIO-PHONO SWITCH
C5	N-1447	.0005 MFD. 400 V			
C6	N-1374	.0001 MFD. MICA		N-3551	CRYSTAL PICK-UP
C7	N-1344	.01 MFD. 400 V.		N-3143	PHONO MOTOR & TURNTABLE
C8	N-3080	.22 MFD. 200 V.		N-3549	AUTOMATIC STOP
C9	N-1447	.0005 MFD. 400 V.			

NOTE VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.



I.F. 456 KC.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

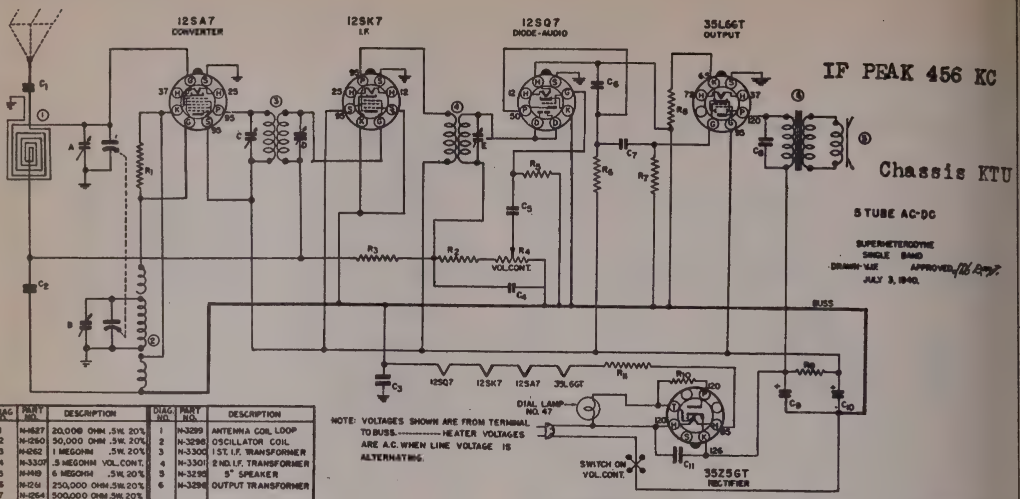
5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND
PHONO COMBINATION

DRWN V.C. APP'D D.W.J.

KNF---KNFU

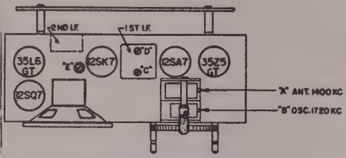
Chassis KTU
Chassis KF, KFU

SONORA RADIO & TELEV., CORP.



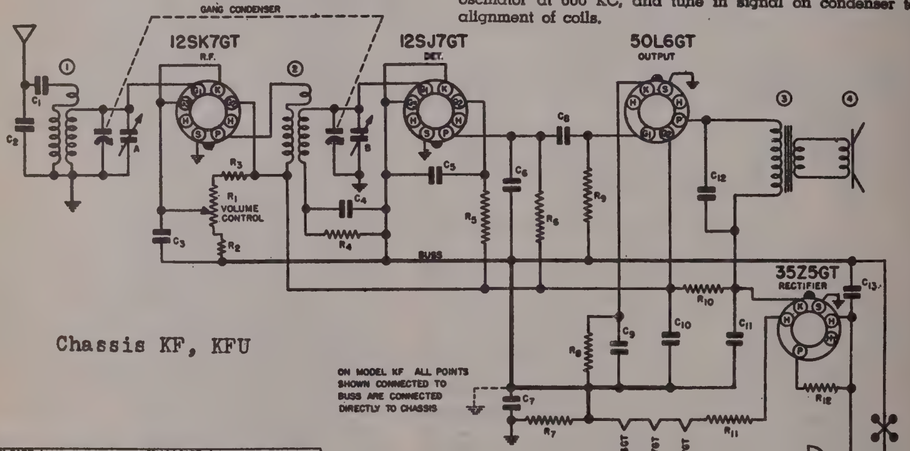
NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS.------------HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1627	20,000 OHM .5W. 20%	1	N-3299	ANTENNA COIL LOOP
R2	N-1260	50,000 OHM .5W. 20%	2	N-3298	OSCILLATOR COIL
R3	N-1262	1 MEGOHM .5W. 20%	3	N-3300	1ST. I.F. TRANSFORMER
R4	N-3307	.5 MEGOHM VOL. CONT.	4	N-3301	2 ND. I.F. TRANSFORMER
R5	N-1419	6 MEGOHM .5W. 20%	5	N-3295	5" SPEAKER
R6	N-1261	250,000 OHM .5W. 20%	6	N-3296	OUTPUT TRANSFORMER
R7	N-1264	500,000 OHM .5W. 20%			
R8	N-1616	250 OHM .5W. 10%			
R9	N-3341	1,000 OHM .5W. 20%			
R10	N-1742	25 OHM .5W. 20%			
R11	N-1618	80 OHM .5W. 10%		N-3297	2 GANG CONDENSER
C1	N-1344	.01 MFD. 400V.			
C2	N-1345	.05 MFD. 200V.			
C3	N-3080	.22 MFD. 200V.			
C4	N-1374	100 MMFD.			
C5	N-2712	.004 MFD. 400V.			
C6	N-1447	.0005 MFD. 400V.			
C7	N-1344	.01 MFD. 400V.			
C8	N-1376	.02 MFD. 400V.			
C9	N-3302	35 MFD. 150V. ELECT.			
C10		30 MFD. 150V.			
C11	N-1346	.05 MFD. 400V.			



I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

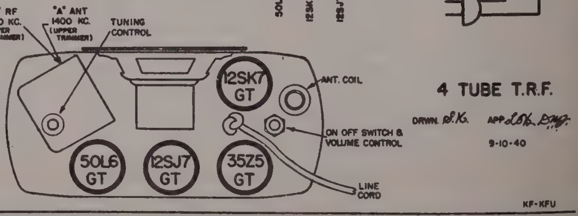
BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 K.C. and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



Chassis KF, KFU

ON MODEL KF ALL POINTS SHOWN CONNECTED TO BUSS ARE CONNECTED DIRECTLY TO CHASSIS

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD. 400. V.	R1	N-3728	25,000 OHM VOL. CONT.
C2	——	20. MMFD. BUILT IN	R2		110 OHM 20% .5 W.
C3	N-1345	.05 MFD. 200. V.			IN VOLUME CONTROL
C4	N-1345	.05 MFD. 200. V	R3	N-1684	75,000 OHM 20% .5 W.
C5	N-1344	.01 MFD. 400. V.	R4	N-1418	3.5 MEG. 20% .5 W.
C6	N-1374	100. MMFD MICA	R5	N-1835	6. MEG. 20% .5 W.
C7	N-2642	.09 MFD. 200V. 20% USED ON MODEL KFU ONLY	R6	N-1262	1. MEG. 20% .5W.
			R7	N-1378	2. MEG. 20% .5W. USED ON MODEL KFU ONLY
C8	N-1344	.01 MFD. 400. V.			
C9	N-3734	20 MFD. 25V. ELECTROLYTIC	R8	N-1787	250. OHM 10% .5 W.
C10		15 MFD. 150 V.	R9	N-1264	.5 MEG. 20% .5 W.
C11		40 MFD. 150 V.	R10	N-1417	3000. OHM 20% .5 W.
C12	N-1344	.01 MFD. 400. V	R11	N-1618	80. OHM 10% 2. W.
C13	N-1346	.05 MFD. 400 V.	R12	N-1742	25. OHM 20% .5 W
			1	N-3722	ANTENNA COIL
	N-3731	GANG CONDENSER	2	N-3733	R.F. COIL
			3	N-3729	OUTPUT TRANS.
			4	N-3730	SPEAKER


"B" RF 1400 KC. (LOWER TRIMMER)
"A" ANT 1400 KC. (UPPER TRIMMER)
TUNING CONTROL
12SK7 GT
ANT. COIL
ON OFF SWITCH & VOLUME CONTROL
50L6 GT
12SJ7 GT
35Z5 GT
LINE CORD

4 TUBE T.R.F.

DRWN. S.K. APP. L.O.K. D.M.G.

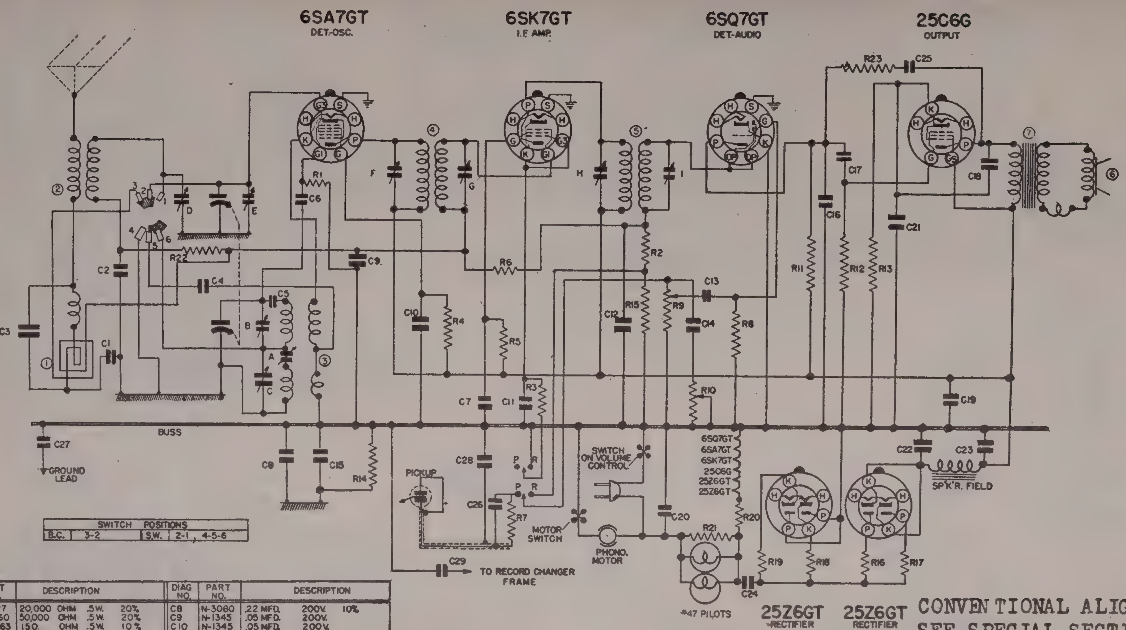
9-10-40

KF-KFU

©John F. Rider, Publisher

SONORA RADIO & TELEV., CORP.

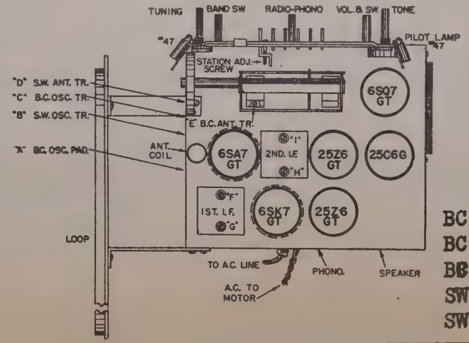
Chassis KXF, KXFU



SWITCH POSITIONS			
B.C.	3-2	S.W.	2-1, 4-5-6

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

I.F. 456 KC.



6 TUBE A.C.
SUPERHETERODYNE
TWO-BAND
PHONO RECORD-CHANGER
DRAWN W.E. APP'D. [illegible]
AUG. 14, 1940.

KXF- KXFU

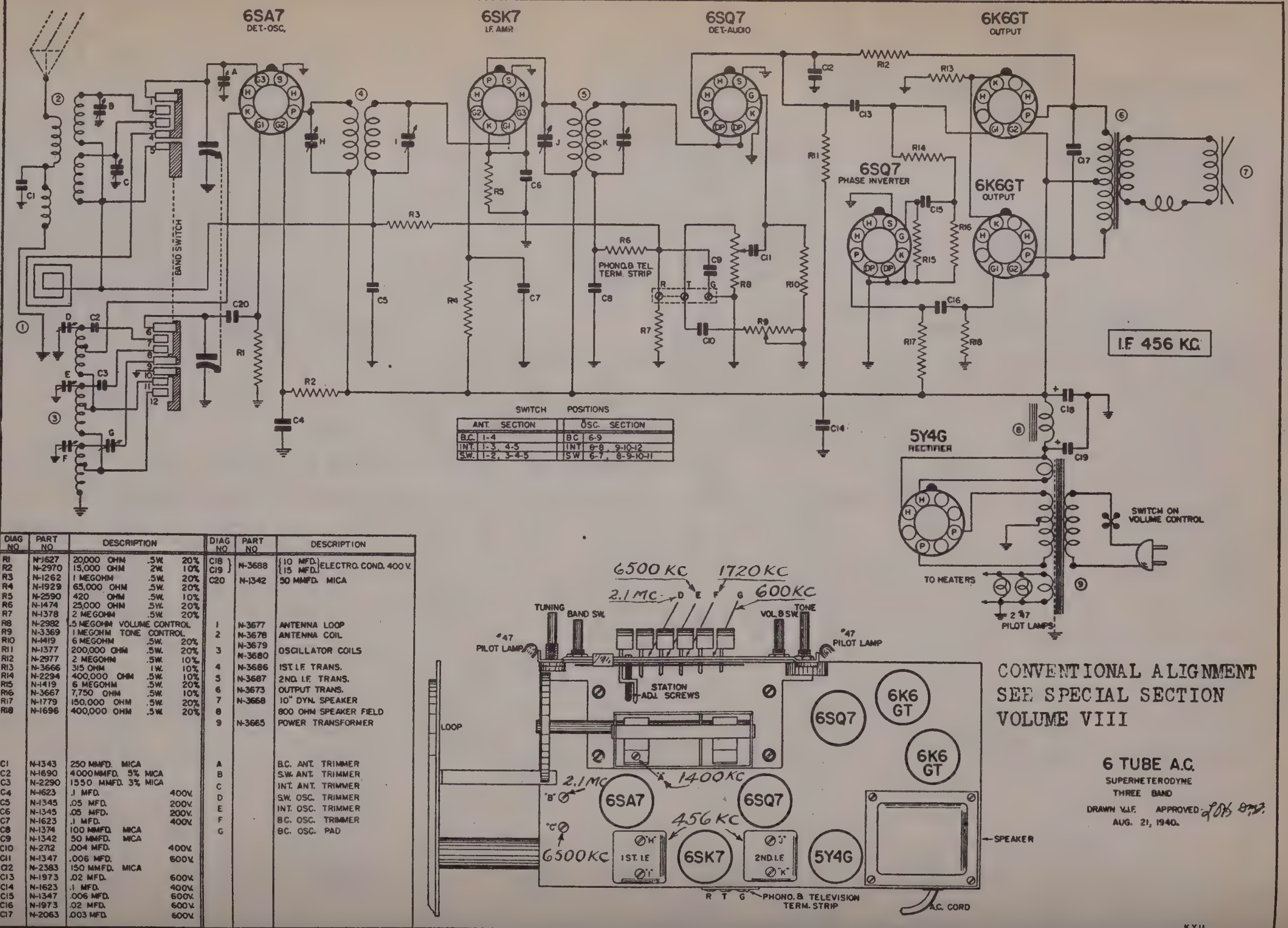
DIAG NO.	PART NO.	DESCRIPTION
R1	N-1627	20,000 OHM .5W. 20%
R2	N-1260	50,000 OHM .5W. 20%
R3	N-3663	150. OHM .5W. 10%
R4	N-1683	7,500 OHM .5W. 20%
R5	N-1474	25,000 OHM .5W. 20%
R6	N-1262	1 MEGOHM .5W. 20%
R7	N-1264	.5 MEGOHM .5W. 20%
R8	N-1419	6 MEGOHM .5W. 20%
R9	N-2982	.5 MEGOHM VOL. CONTROL.
R10	N-3369	1 MEGOHM TONE CONTROL
R11	N-1261	250,000 OHM .5W. 20%
R12	N-1264	.5 MEGOHM .5W. 20%
R13	N-2453	235 OHM 1W. 10%
R14	N-1377	200,000 .5W. 20%
R15	N-1682	3 MEGOHM .5W. 20%
R16	N-2450	75 OHM 1W. 20%
R17	N-2450	75 OHM 1W. 20%
R18	N-2450	75 OHM 1W. 20%
R19	N-2450	75 OHM 1W. 20%
R20	N-3648	162 OHM 6W.
R21		17 OHM 4W.
R22	N-1262	1 MEGOHM .5W. 20%
R23	N-3450	1.5 MEGOHM .5W. 20%
C1	N-1344	.01 MFD. 400V.
C2	N-1344	.01 MFD. 400V.
C3	N-1343	250 MMFD.
C4	N-1344	.01 MFD. 400V.
C5	N-1344	.01 MFD. 400V.
C6	N-1690	.004 MFD. 5%
C7	N-1345	.05 MFD. 200V.

DIAG NO.	PART NO.	DESCRIPTION
C8	N-3080	.22 MFD. 200V. 10%
C9	N-1345	.05 MFD. 200V.
C10	N-1345	.05 MFD. 200V.
C11	N-1351	.1 MFD. 200V.
C12	N-1374	100 MMFD.
C13	N-1344	.01 MFD. 400V.
C14	N-3455	.004 MFD. 600V.
C15	N-1344	.01 MFD. 400V.
C16	N-1343	250 MMFD.
C17	N-1376	.02 MFD. 400V.
C18	N-1478	.01 MFD. 600V.
C19	N-1351	.1 MFD. 200V.
C20	N-1346	.05 MFD. 400V.
C21	N-2437	20 MFD. 25V.
C22		30 MFD. 250V.
C23		30 MFD. 150V.
C24	N-2436	30 MFD. 150V.
C25	N-1834	.002 MFD. 800V.
C26	N-1374	100 MMFD.
C27	N-1346	.05 MFD. 400V.
C28	N-1345	.05 MFD 200V
C29	N-1345	.05 MFD 200V
1	N-3368	ANTENNA LOOP
2	N-2987	ANTENNA COIL
3	N-3722	OSCILLATOR COIL
4	N-3664	IST. I.F. TRANS.
5	N-3657	2ND. I.F. TRANS.
6	N-3645	10" DYN. SPEAKER
7	N-3646	OUTPUT TRANS.

BC Osc Trim.	1720 KC	(200 mmf dummy)
BC Ant "	1400 KC	"
BC Padder	600 KC	"
SW Osc Trim	18.3 MC	(400 ohm dummy)
SW Ant ".	15.0 MC	"

Chassis KY, KYU

SONORA RADIO & TELEV., CORP.



SWITCH POSITIONS

ANT. SECTION		OSC. SECTION	
B.C.	1-4	BC	6-9
INT.	1-3, 4-5	INT	6-8, 9-10-12
S.W.	1-2, 3-4-5	SW	6-7, 8-9-10-11

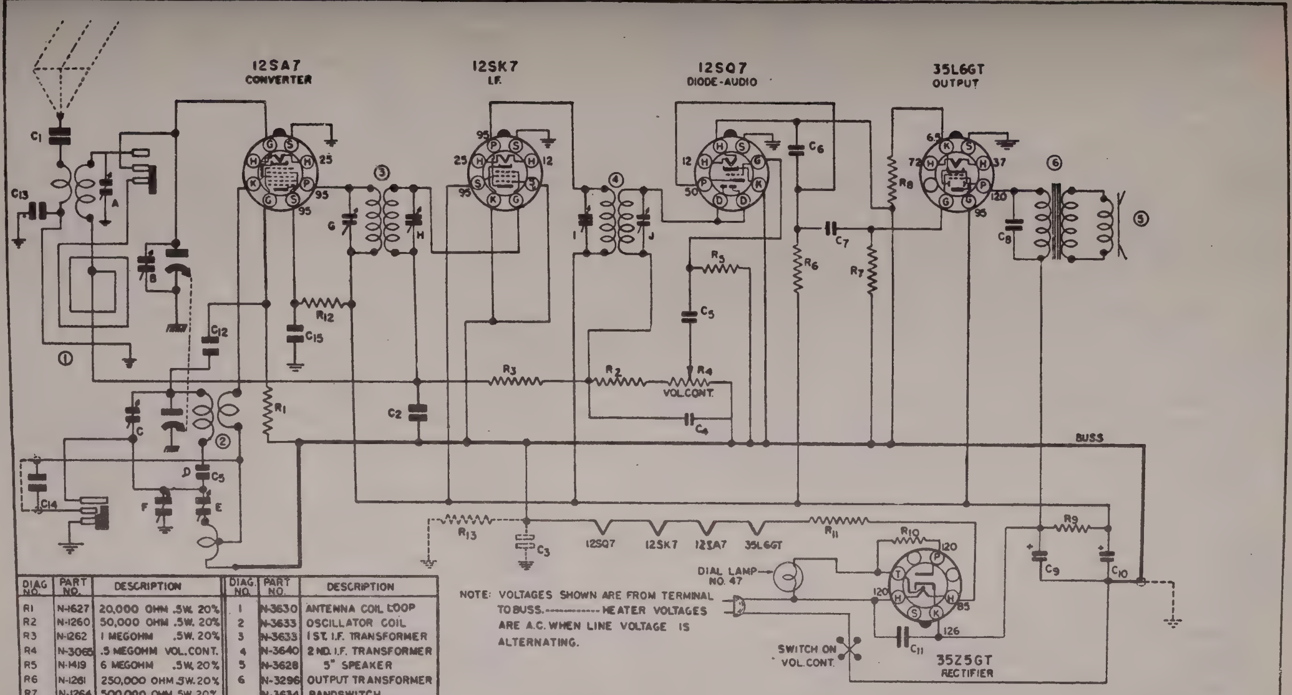
DIAG NO	PART NO	DESCRIPTION			DIAG NO	PART NO	DESCRIPTION
R1	N-1627	20,000 OHM	.5W.	20%	C18 C19	N-3688	10 MFD. 15 MFD. ELECTRO. COND. 400 V.
R2	N-2970	15,000 OHM	2W.	10%			
R3	N-1262	1 MEGOHM	.5W.	20%	C20	N-1342	50 MMFD. MICA
R4	N-1929	65,000 OHM	.5W.	20%			
R5	N-2590	420 OHM	.5W.	10%			
R6	N-1474	25,000 OHM	.5W.	20%			
R7	N-1378	2 MEGOHM	.5W.	20%			
R8	N-2982	.5 MEGOHM VOLUME CONTROL			1	N-3677	ANTENNA LOOP
R9	N-3369	1 MEGOHM TONE CONTROL			2	N-3678	ANTENNA COIL
R10	N-1419	6 MEGOHM	.5W.	20%	3	N-3679 N-3680	OSCILLATOR COILS
R11	N-1377	200,000 OHM	.5W.	20%			
R12	N-2977	2 MEGOHM	.5W.	10%			
R13	N-3666	315 OHM	1W.	10%	4	N-3686	1ST. I.F. TRANS.
R14	N-2294	400,000 OHM	.5W.	10%	5	N-3687	2ND. I.F. TRANS.
R15	N-1419	6 MEGOHM	.5W.	20%	6	N-3673	OUTPUT TRANS.
R16	N-3667	7,750 OHM	.5W.	10%	7	N-3668	10" DYN. SPEAKER
R17	N-1779	150,000 OHM	.5W.	20%	8		800 OHM SPEAKER FIELD
R18	N-1696	400,000 OHM	.5W.	20%	9	N-3665	POWER TRANSFORMER
C1	N-1343	250 MMFD. MICA			A		B.C. ANT. TRIMMER
C2	N-1690	4000 MMFD. 5% MICA			B		S.W. ANT. TRIMMER
C3	N-2290	1550 MMFD. 3% MICA			C		INT. ANT. TRIMMER
C4	N-1623	.1 MFD.		400V.	D		S.W. OSC. TRIMMER
C5	N-1345	.05 MFD.		200V.	E		INT. OSC. TRIMMER
C6	N-1345	.05 MFD.		200V.	F		B.C. OSC. TRIMMER
C7	N-1623	.1 MFD.		400V.	G		B.C. OSC. PAD
C8	N-1374	100 MMFD. MICA					
C9	N-1342	50 MMFD. MICA					
C10	N-2712	.004 MFD.		400V.			
C11	N-1347	.006 MFD.		600V.			
C12	N-2383	150 MMFD. MICA					
C13	N-1973	.02 MFD.		600V.			
C14	N-1623	.1 MFD.		400V.			
C15	N-1347	.006 MFD.		600V.			
C16	N-1973	.02 MFD.		600V.			
C17	N-2063	.003 MFD.		600V.			

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

6 TUBE A.C.
SUPERHETERODYNE
THREE BAND
DRAWN V.I.F. APPROVED
AUG. 21, 1940.

SONORA RADIO & TELEV., CORP.

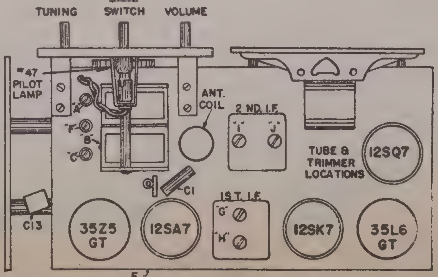
Chassis ID, LDU



NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS.----------HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

DIAG NO.	PART NO.	DESCRIPTION
R1	N-1627	20,000 OHM .5W. 20%
R2	N-1260	50,000 OHM .5W. 20%
R3	N-1262	1 MEGOHM .5W. 20%
R4	N-3065	.5 MEGOHM VOL. CONT.
R5	N-1419	6 MEGOHM .5W. 20%
R6	N-1261	250,000 OHM .5W. 20%
R7	N-1264	500,000 OHM .5W. 20%
R8	N-1616	250 OHM .5W. 10%
R9	N-3341	1,000 OHM .5W. 20%
R10	N-1742	25 OHM .5W. 20%
R11	N-1618	80 OHM .5W. 10%
R12	N-1258	10,000 OHM .5W. 20%
R13*	N-1261	250,000 OHM .5W. 20%
C1	N-1344	.01 MFD. 400V.
C2	N-1345	.05 MFD. 200V.
C3*	N-3080	22 MFD. 200V.
C4	N-1374	100 MMFD.
C5	N-2712	.004 MFD. 400V.
C6	N-1447	.0005 MFD. 400V.
C7	N-1344	.01 MFD. 400V.
C8	N-1376	.02 MFD. 400V.
C9	N-3658	40 MFD. 150V. ELECT
C10		40 MFD. 150V. ELECT
C11	N-1346	.05 MFD. 400V.
C12	N-1342	50 MMFD.
C13	N-1343	250 MMFD.

DIAG. NO.	PART NO.	DESCRIPTION
1	N-3630	ANTENNA COIL LOOP
2	N-3633	OSCILLATOR COIL
3	N-3633	1 ST. I.F. TRANSFORMER
4	N-3640	2 ND. I.F. TRANSFORMER
5	N-3628	5" SPEAKER
6	N-3296	OUTPUT TRANSFORMER
	N-3634	BANDSWITCH
	N-3629	2 GANG CONDENSER
A		S.W. ANT. TR.
B		B.C. ANT. TR.
C		S.W. OSC. TR.
D		S.W. PAD
E		B.C. PAD
F		B.C. OSC. TR.
	*	R13 C3 AND C14 USED ONLY ON LDU.
		BUSS IS GROUNDED AND C14 SHORTED ON LD ONLY.
C14*	N-1344	.01 MFD. 400 V.
C15	N-1345	.05 MFD. 400 V.



I.F. 456KC.

5 TUBE AC-DC

SUPERHETERODYNE
TWO BAND

DRAWN: VJF APPROVED

FOR ALIGNMENT
SEE INDEX

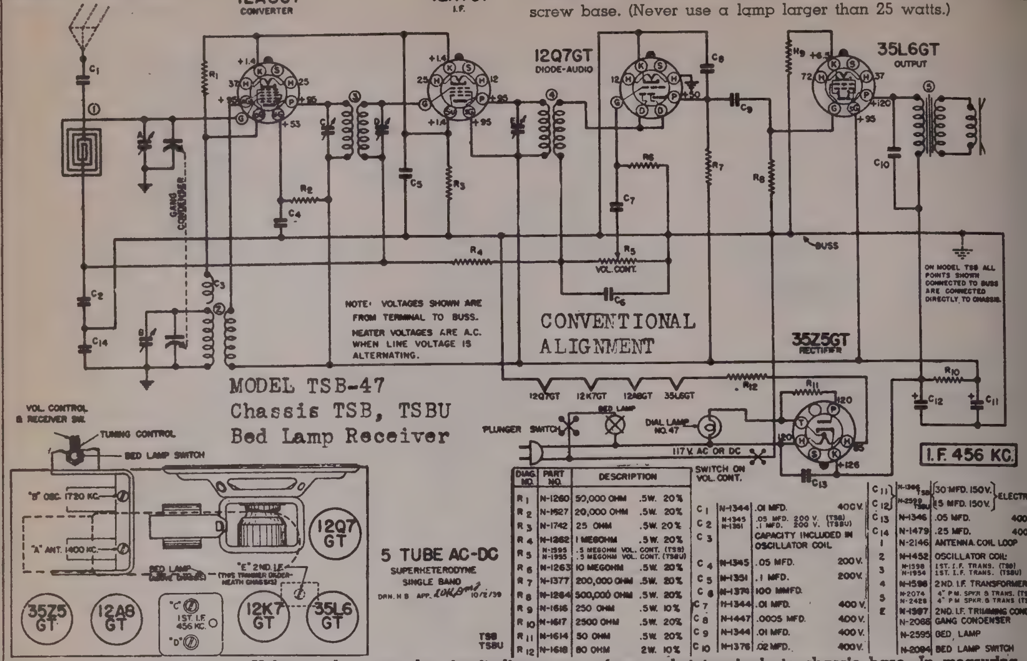
LD-LDU

©John F. Rider, Publisher

MODEL TSB-47,
Chassis TSB, TSBU
MODEL TSU-105

SONORA RADIO & TELEV., CORP.

LAMP USED. Show case lamp 120 volt, 25 watts with medium screw base. (Never use a lamp larger than 25 watts.)



MODEL TSB-47
Chassis TSB, TSBU
Bed Lamp Receiver

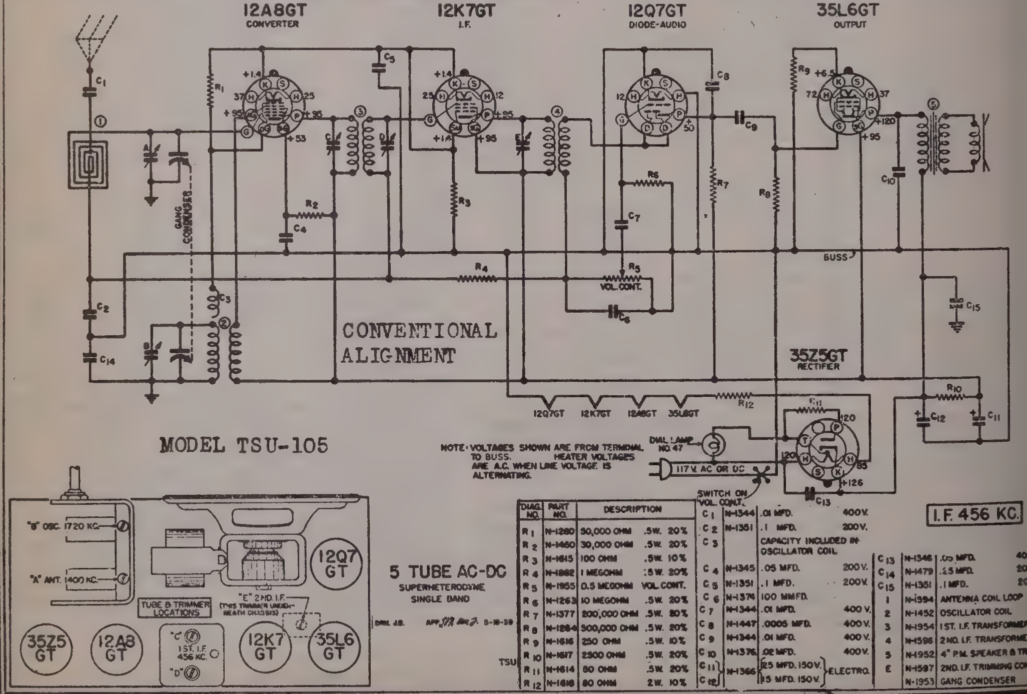
5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

I.F. 456 KC.

DIAG. NO.	PART NO.	DESCRIPTION
R 1	N-1260	50,000 OHM .5W. 20%
R 2	N-1527	20,000 OHM .5W. 20%
R 3	N-1742	25 OHM .5W. 20%
R 4	N-1262	1 MEGOHM .5W. 20%
R 5	N-1595 N-1955	.5 MEGOHM VOL. CONT. (TSB) .5 MEGOHM VOL. CONT. (TSBU)
R 6	N-1263	10 MEGOHM .5W. 20%
R 7	N-1377	200,000 OHM .5W. 20%
R 8	N-1264	500,000 OHM .5W. 20%
R 9	N-1616	250 OHM .5W. 10%
R 10	N-1617	2500 OHM .5W. 20%
R 11	N-1614	50 OHM .5W. 20%
R 12	N-1618	80 OHM 2W. 10%
C 1	N-1344	.01 MFD. 400V.
C 2	N-1345 N-1351	.05 MFD. 200 V. (TSB) .1 MFD. 200 V. (TSBU)
C 3		CAPACITY INCLUDED IN OSCILLATOR COIL
C 4	N-1345	.05 MFD. 200V.
C 5	N-1351	.1 MFD. 200V.
C 6	N-1374	100 MMFD.
C 7	N-1344	.01 MFD. 400 V.
C 8	N-1447	.0005 MFD. 400 V.
C 9	N-1344	.01 MFD. 400 V.
C 10	N-1376	.02 MFD. 400V.
C 11 C 12	N-1366 TSB N-2599 TSBU	30 MFD. 150V. 15 MFD. 150V. ELECTRO.
C 13	N-1346	.05 MFD. 400V.
C 14	N-1479	.25 MFD. 400 V.
1	N-2146	ANTENNA COIL LOOP
2	N-1452	OSCILLATOR COIL
3	N-1598 N-1954	1ST. I.F. TRANS. (TSB) 1ST. I.F. TRANS. (TSBU)
4	N-1596	2ND. I.F. TRANSFORMER
5	N-2074 N-2428	4" P.M. SPKR. & TRANS. (TSB) 4" P.M. SPKR. & TRANS. (TSBU)
E	N-1597	2ND. I.F. TRIMMING COND.
	N-2088	GANG CONDENSER
	N-2595	BED LAMP
	N-2094	BED LAMP SWITCH

VOLTAGE NOTES
FOR BOTH SCHEMATICS

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



MODEL TSU-105

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

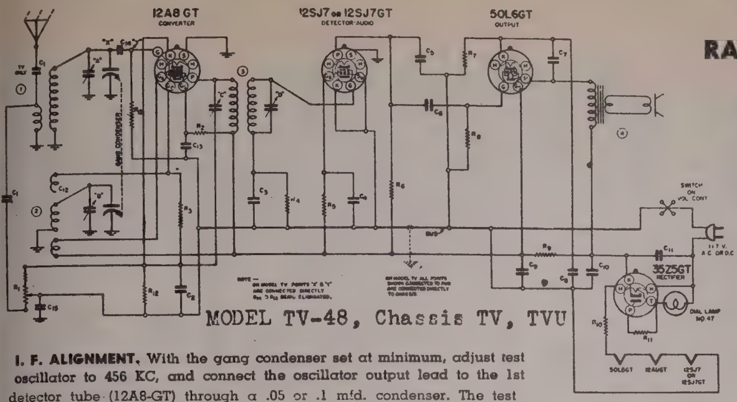
I.F. 456 KC.

DIAG. NO.	PART NO.	DESCRIPTION
R 1	N-1260	50,000 OHM .5W. 20%
R 2	N-1460	30,000 OHM .5W. 20%
R 3	N-1615	100 OHM .5W. 10%
R 4	N-1262	1 MEGOHM .5W. 20%
R 5	N-1955	0.5 MEGOHM VOL. CONT.
R 6	N-1263	10 MEGOHM .5W. 20%
R 7	N-1377	200,000 OHM .5W. 20%
R 8	N-1264	500,000 OHM .5W. 20%
R 9	N-1616	250 OHM .5W. 10%
R 10	N-1617	2500 OHM .5W. 20%
R 11	N-1614	50 OHM .5W. 20%
R 12	N-1618	80 OHM 2W. 10%
C 1	N-1344	.01 MFD. 400V.
C 2	N-1351	.1 MFD. 200V.
C 3		CAPACITY INCLUDED IN OSCILLATOR COIL
C 4	N-1345	.05 MFD. 200V.
C 5	N-1351	.1 MFD. 200V.
C 6	N-1374	100 MMFD.
C 7	N-1344	.01 MFD. 400 V.
C 8	N-1447	.0005 MFD. 400 V.
C 9	N-1344	.01 MFD. 400 V.
C 10	N-1376	.02 MFD. 400V.
C 11 C 12	N-1366	25 MFD. 150V. 15 MFD. 150V. ELECTRO.
C 13	N-1346	.05 MFD. 400V.
C 14	N-1479	.25 MFD. 200V.
C 15	N-1351	.1 MFD. 200V.
1	N-1394	ANTENNA COIL LOOP
2	N-1452	OSCILLATOR COIL
3	N-1954	1ST. I.F. TRANSFORMER
4	N-1596	2ND. I.F. TRANSFORMER
5	N-1952	4" P.M. SPEAKER & TRANS.
E	N-1597	2ND. I.F. TRIMMING COND.
	N-1953	GANG CONDENSER

SONORA RADIO & TELEV., CORP.

MODEL TV-48
Chassis TV, TVU
MODELS KVU-85, KVU-97

RANGE 535 to 1720 Kilocycles


12A8GT
CONVERTER
12SJ7 or 12SJ7GT
DETECTOR-AUDIO
50L6GT
OUTPUT
35Z5GT
RECTIFIER
SWITCH ON VOL. CONT
117 V. A.C. OR D.C.
DIAL LAMP NO 47
NOTE — ON MODEL TV POINTS "X" & "Y" ARE CONNECTED DIRECTLY C16 & R16 BEING ELIMINATED.
ON MODEL TV ALL POINTS SHOWN CONNECTED TO BUSS ARE CONNECTED DIRECTLY TO CHASSIS.
50L6GT
12A8GT
12SJ7 OR 12SJ7GT

MODEL TV-48, Chassis TV, TVU

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-2173 [illegible]	50,000 OHM VOL. CONT (TV) 50,000 OHM VOL. CONT (TVU)	C5	N-1374	100 MMFD
R2	N-1527	20,000 OHM .5W 20%	C6	N-1344	.01 MFD 400V
R3	N-1260	50,000 OHMS .5W 20%	C7	N-1344	.01 MFD 400V
R4	N-2189	4 MEGOHMS .5W 20%	C8		20 MFD 25V ECLYTIC
R5	N-1019	6 MEGOHMS .5W 20%	C9	N-2176	15 MFD 150V ECLYTIC
R6	N-1262	1 MEGOHMS .5W 20%	C10		30 MFD 150V ECLYTIC
R7	N-2106	225 OHMS .5W 10%	C11	N-1348	.05 MFD 400V.
R8	N-1263	5 MEGOHM .5W. 20%	C12		CAPACITY BETWEEN COILS
R9	N-1417	3000 OHMS .5W. 20%	C13	N-1345	.05 MFD. 200V
R10	N-1618	80 OHMS 2W 10%	C14	N-1447	.0005 MFD 400V TVU ONLY
R11	N-1458	25 OHMS .5W 20%	C15	N-1351	.1 MFD 200V TVU ONLY
R12	N-1258	10,000 OHMS .5W 20%	①	N-2170	ANT COIL
R13	N-1378	2 MEGOHM (TVU ONLY) .5W 20%	2	N-4152	OSCILLATOR COIL
			3	[illegible] [illegible]	IF TRANSFORMER (TV) IF TRANSFORMER (TVU)
			4	[illegible] [illegible]	3 1/2" SPK. & TRANS (TV) 3 1/2" SPKR & TRANS (TVU)
C1	N-1344 N-1447	.01 MFD 400V (TV) .0005 MFD 400V (TVU)		N-2169	GANG CONDENSER
C2	N-2175	.010 MFD 200V			
C3	N-1345	.05 MFD 200V			
C4	N-1344	.01 MFD 400V			

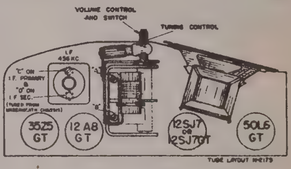
4 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND

I.F. 456 KC.

DRWN. J.B. APP'D. [illegible]
TV & TVU

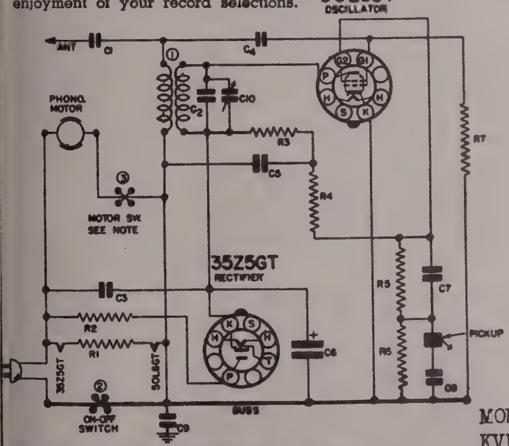
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust test oscillator to 456 KC, and connect the oscillator output lead to the 1st detector tube (12A8-GT) through a .05 or .1 mfd. condenser. The test oscillator ground lead should be connected to the chassis base. Proceed by adjusting the two I.F. trimmers for maximum signal, or swing on output meter, if available. The two trimmers for the transformer I.F. will be found below the coil next to the base.

BROADCAST ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next — set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



TUBE & TRIMMER LAYOUT

RADIO RECEIVER CONTROLS — Volume will be controlled by the volume control on the radio receiver as for radio reception. Other radio controls will affect record reproduction. Adjustment of the radio set's fidelity and tone controls may add considerably to the enjoyment of your record selections.



MODELS
KVU-85
KVU-97

2 TUBE
PHONOGRAPH OSCILLATOR
DRAWN-W.F. APP'D. [illegible]
AUG. 15 1940.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-3488	220 OHM .5W. 10%	C7	N-1630	500 MMFD.
R2	N-1683	7,500 OHM .5W.	C8	N-2642	.09 MFD. 400V.
R3	N-1682	3 MEGOHM .5W.	C9	N-3080	.22 MFD. 200V.
R4	N-1262	1 MEGOHM .5W.	C10	N-3480	OSC. TRIMMER
R5	N-1604	75,000 .5W.			
R6	N-2974	5 MEGOHM .5W. 10%	1	N-3479	OSC. COILS
R7	N-1460	30,000 OHM .5W.	2	N-3814	UNIT ON-OFF SW.
			3	N-2094 OR N-3549	PUSH SW. ON KVU-85 AUTO. STOP SW. ON KVU-97
C1	N-1897	25 MMFD.			
C2	N-3481	140 MMFD. CERAMIC 5%			
C3	N-1623	.1 MFD. 400V.			
C4	N-1374	100 MMFD.			
C5	N-1351	.1 MFD. 200V.			
C6	N-1675	20 MFD. 200V.			

KVU-85 KVU-97

ANTENNA — The single lead attached to the record player is the transmitting antenna. If the record player is located within a distance of ten feet from the receiving set no additional antenna will be required. An antenna not longer than ten feet may be added to operate over greater distances.

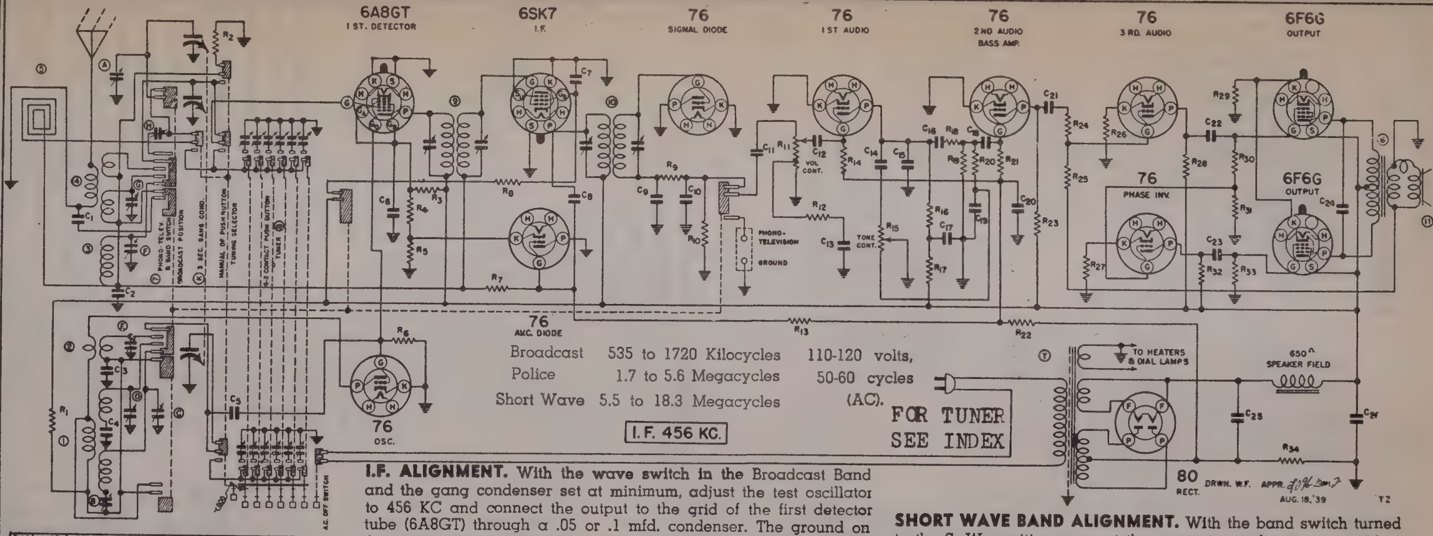
OPERATION — Turn on the power switch allowing about one minute for the tubes to warm up, place the selected record upon the turntable and start the motor. Lift pickup and lower the needle point gently to the outside record groove.

Next go to your radio and tune to approximately 600 K.C. at which setting the phonograph signal will be received.

FREQUENCY ADJUSTMENT — If a local station is operating at a frequency of approximately 600 KC, interference will be encountered in the form of a continuous squeal or howl. To avoid this interference tune the radio receiver to a point at which no local station can be heard. With the unit in operation insert a screw driver in the hole located underneath the unit on the metal chassis and adjust the screw. If the radio receiver has been set at a point below 600 KC, (for example 550 KC) turn to the right until the phonograph signal is heard. If the receiver has been set above 600 KC turn the adjusting screw to the left.

Chassis TZ

SONORA RADIO & TELEV., CORP.



Broadcast 535 to 1720 Kilocycles
Police 1.7 to 5.6 Megacycles
Short Wave 5.5 to 18.3 Megacycles

110-120 volts,
50-60 cycles
(AC).

I. F. 456 KC.

FOR TUNER
SEE INDEX

I.F. ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

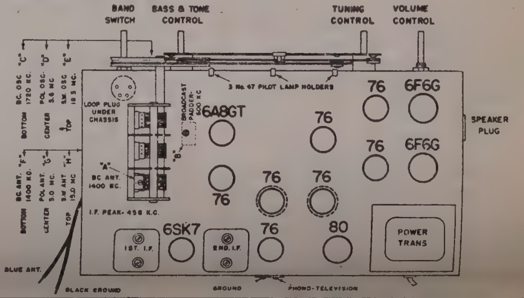
BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1720 KC. Align the BC oscillator trimmer for maximum output. Set the generator at 1400 KC and tune-in signal with the dial. Adjust both antenna trimmers for maximum output. Next set the generator at 600 KC and tune in the signal with the dial. Adjust the BC pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 1400 KC as the pad adjustment may have caused misalignment. In making the BC alignment the loop should be located in the same position with respect to the chassis as it occupies in the cabinet. No metal should be near the loop.

POLICE BAND ALIGNMENT. With the band switch turned to the Pol. position, connect the generator to the antenna with a 400 ohm dummy. Adjust the Pol. oscillator to give a maximum output with the dial at 5600 KC (extreme end). Set the generator at 5000 KC and tune-in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 5600 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 2000 KC to determine if the coils and pad are not defective.

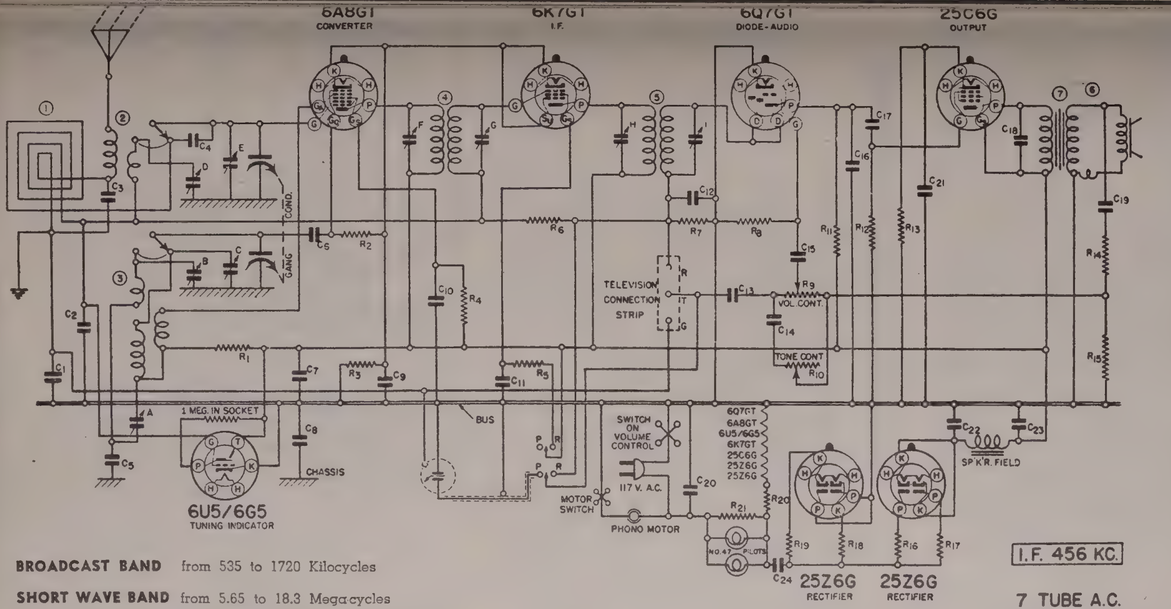
SHORT WAVE BAND ALIGNMENT. With the band switch turned to the S. W. position, connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output with the dial at 18,300 KC (extreme end). Set the generator at 15000 KC and tune-in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M.C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18,300 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and pad are not defective.

DIAG NO.	PART NO.		DIAG NO.	PART NO.	
R_1	N-2568	50,000 OHM 1. W. 20%	R_{24}	N-2572	300,000 OHM .5W. 10%
R_2	N-1419	6 MEGOHM .5W. 20%	R_{25}	N-2570	200,000 OHM .5W. 10%
R_3	N-2573	25,000 OHM 1.3W. 20%	R_{26}	N-1695	5000 OHM .5W. 20%
R_4	N-1353	50,000 OHM .5W. 20%	R_{27}	N-1695	5000 OHM .5W. 20%
R_5	N-2567	7,500 OHM .5W. 10%	R_{28}	N-1778	100,000 OHM .5W. 20%
R_6	N-1260	50,000 OHM .5W. 20%	R_{29}	N-2566	240 OHM 2. W. 10%
R_7	N-1262	1 MEGOHM .5W. 20%	R_{30}	N-2571	250,000 OHM .5W. 10%
R_8	N-2569	75,000 OHM 1. W. 20%	R_{31}	N-1353	50,000 OHM .5W. 10%
R_9	N-1260	50,000 OHM .5W. 20%	R_{32}	N-1778	100,000 OHM .5W. 20%
R_{10}	N-1264	.5 MEGOHM .5W. 20%	R_{33}	N-1261	250,000 OHM .5W. 20%
R_{11}	N-2482	1. MEGOHM VOL. CONT.	R_{34}	N-2565	40 OHM .5W. 10%
R_{12}	N-2574	70,000 OHM .5W. 20%			
R_{13}	N-1262	1 MEGOHM .5W. 20%			
R_{14}	N-1262	1 MEGOHM .5W. 20%	C_1	N-1447	500 MMFD. 400V. 20%
R_{15}	N-2483	.5 MEGOHM TONE CONT.	C_2	N-2594	.05 MFD. 200V. 20%
R_{16}	N-1779	150,000 OHM .5W. 20%	C_3	N-1690	4000 MMFD. 5%
R_{17}	N-1778	100,000 OHM .5W. 20%	C_4	N-2290	1550 MMFD. 3%
R_{18}	N-1261	250,000 OHM .5W. 20%	C_5	N-1342	50 MMFD. 20%
R_{19}	N-2570	200,000 OHM .5W. 10%	C_6	N-2579	.25 MFD. 400V. 20%
R_{20}	N-1460	30,000 OHM .5W. 20%	C_7	N-1623	.1 MFD. 400V. 20%
R_{21}	N-1262	1 MEGOHM .5W. 20%	C_8	N-1342	50 MMFD. 20%
R_{22}	N-1261	250,000 .5W. 20%	C_9	N-1342	50 MMFD. 20%
R_{23}	N-1261	250,000 .5W. 20%	C_{10}	N-1342	50 MMFD. 20%

DIAG NO	PART NO		DIAG NO	PART NO.	
C_{11}	N-1344	.01 MFD. 400V. 20%	4	N-2534	INT. & S.W. ANT. COIL
C_{12}	N-1344	.01 MFD. 400V. 20%	5	N-2003	LOOP ANT.
C_{13}	N-1347	.006 MFD. 600V. 20%	6	N-2513	OUTPUT TRANS.
C_{14}	N-1344	.01 MFD. 400V. 20%	7	N-2486	BAND SWITCH
C_{15}	N-1374	100 MMFD. 20%	8	N-2465	PUSH BUTTON TUNER & SWITCH
C_{16}	N-1376	.02 MFD. 400V. 20%	9	N-2531	1ST I. F. TRANSFORMER
C_{17}	N-1623	.1 MFD. 400V. 20%	10	N-2532	2ND. I. F. TRANSFORMER
C_{18}	N-1344	.01 MFD. 400V. 20%	11	N-2512	12" DYN SP. 650^ FIELD
C_{19}	N-1376	.02 MFD. 400V. 20%			
C_{20}	N-1478	.25 MFD. 200V. 20%			
C_{21}	N-1376	.02 MFD. 400V. 20%	T	N-2514	POWER TRANSFORMER
C_{22}	N-1376	.02 MFD. 400V. 20%	K	N-2484	GANG CONDENSER
C_{23}	N-1376	.02 MFD 400V 20%			
C_{24}	N-2578	.006 MFD. 1000V. 20%	A	N-2315	BC. ANT. TRIM. COND. #1
C_{25}	N-2459	15 MFD 450WV. 20%	B	N-2205	BC. PADDING COND.
C_{26}	N-2460	15 MFD. 450WV. 20%	C	N-2158	BC. OSC. TRIM. COND.
			D		POL. OSC. TRIM. COND.
			E		S.W. OSC. TRIM. COND.
			F	N-2158	BC ANT. TRIM. COND. #2
			G		POL ANT. TRIM COND.
1	N-2535	BC & INT OSC. COIL	H		S.W. ANT. TRIM. COND.
2	N-2536	SW OSC. COIL			
3	N-2533	BC. ANT COIL			



MODEL TXF-67
Chassis TXF



I.F. 456 KC.

7 TUBE A.C.
SUPERHETERODYNE
TWO BAND
PHONO RECORD-CHANGER
DRN. H.B. APP. Bm
SEPT. 25, 1939

DIAG NO.	PART NO.	DESCRIPTION
R_1	N-1627	20,000 OHM .5W. 20%
R_2	N-1260	50,000 OHM .5W 20%
R_3	N-1787	250 OHM .5W. 10%
R_4	N-1460	30 000 OHM .5W. 20%
R_5	N-2456	40,000 OHM .5W. 20%
R_6	N-1262	1 MEGOHM .5W. 20%
R_7	N-1264	0.5 MEGOHM .5W. 20%
R_8	N-1419	6 MEGOHM .5W. 20%
R_9	N-2411	0.5 MEGOHM VOL. CONT.
R_{10}	N-2435	1 MEGOHM TONE CONT.
R_{11}	N-1261	.25 MEGOHM .5W. 20%
R_{12}	N-1264	0.5 MEGOHM .5W. 20%
R_{13}	N-2453	235 OHM 1 W. 10%
R_{14}	N-2454	5000 OHM .5W. 10%
R_{15}	N-1473	200 OHM .5W. 10%
R_{16}	N-2452	100 OHM 1-3 W. 20%
R_{17}	N-2452	100 OHM 1-3 W. 20%
R_{18}	N-2451	75 OHM 1 W. 20%
R_{19}	N-2451	75 OHM 1 W. 20%
R_{20}	N-2430	42 OHM ARMORED
R_{21}		17 OHM WIRE RES.
C_1	N-1344	.01 MFD. 400 V. 20%
C_2	N-1345	.05 MFD. 200 V. 20%
C_3	N-1897	25 MMFD. 20%
C_4	N-1897	25 MMFD. 20%
C_5	N-1690	4000 MMFD. 5%
C_6	N-1342	50 MMFD. 20%
C_7	N-1351	0.1 MFD. 200 V. 20%
C_8	N-1479	.25 MFD. 200 V. 20%
C_9	N-1479	.25 MFD. 200 V. 20%
C_{10}	N-1345	.05 MFD. 200 V. 20%
C_{11}	N-1345	.05 MFD. 200 V. 20%
C_{12}	N-1374	100 MMFD. 20%
C_{13}	N-1344	.01 MFD. 400 V. 20%
C_{14}	N-2450	.002 MFD. 400 V. 20%
C_{15}	N-1344	.01 MFD. 400 V. 20%
C_{16}	N-1343	250 MMFD. 20%
C_{17}	N-1376	.02 MFD. 400 V. 20%
C_{18}	N-1344	.01 MFD. 400 V. 20%
C_{19}	N-1351	0.1 MMFD. 200 V. 20%
C_{20}	N-1346	.05 MFD. 400 V 20%
C_{21}	N-2437	20 MFD. 25 V. ELECT. COND.
C_{22}		30 MFD. 250 V.
C_{23}		30 MFD. 150 V.
C_{24}	N-2436	30 MFD. 150 V.
1	N-2154	ANTENNA LOOP
2	N-2010	S.W. ANTENNA COIL
3	N-2008	OSC. COIL
4	N-2461	1st. I.F. TRANS.
5	N-2462	2nd. I.F. TRANS.
6	N-2433	12" DYN. SPKR. (CONSOLE)
7	N-2447	OUTPUT TRANS.
A	N-2205	BC PADDING COND
B	N-2158	S.W. OSC. TRIM. COND.
C		BC. OSC TRIM COND.
D		S.W. ANT TRIM COND.
	N-2218	GANG COND. & TUNER
	N-2164	BAND SWITCH

BROADCAST BAND from 535 to 1720 Kilocycles

SHORT WAVE BAND from 5.65 to 18.3 Megacycles

ALIGNMENT PROCEDURE

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast and Short Wave bands in the order given, should be aligned.

I.F. ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis buss. Align all four I.F. trimmers to peak or maximum reading on the output meter.

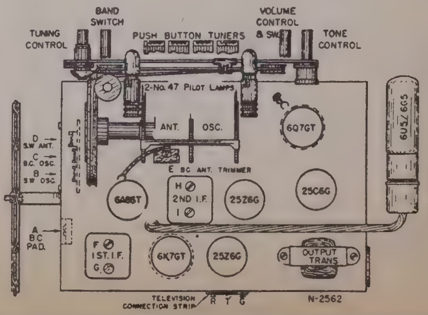
BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and the ground of the set (Black wire) to the generator ground. Set the dial and generator at 1720 KC. Align the BC oscillator trimmer for maximum output. Set the generator at 1400 KC and tune-in signal with the dial. Adjust antenna trimmer for maximum output. Next set the generator at 600 KC and tune in the signal with the dial. Adjust the BC pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 1400 KC as the pad adjustment may have caused misalignment.

SHORT WAVE BAND ALIGNMENT. With the band switch turned to the S. W. position, connect the generator to the antenna with a 400 ohm dummy and the ground of the set (Black wire) to the generator ground. Adjust the S. W. oscillator to give a maximum output with the dial at 18300 KC (extreme end). Set the generator at 15000 KC and tune-in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18300 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

TELEVISION CONNECTOR

This receiver is fully designed to provide sound reception when connected to a television receiver. To make this connection attach the two leads from your television receiver to terminals "T" and "G". The black lead or the outside shield (in case a shielded lead is used) should be connected to terminal "G", and the other lead to terminal "T". For complete directions consult the instruction sheet of your television receiver.

TXF



MODEL TXF-67
Chassis TXF
Chassis TZ

SONORA RADIO & TELEV., CORP.

AUTOMATIC TUNING

Chassis TZ

SETTING-UP PROCEDURE. To set up a list of stations on the automatic tuner proceed as follows:

(1) Make a list of the stations you listen to most frequently.

(2) Determine their frequencies from a station list or by adding a zero to their position on the dial, thus: 56 is 560 KC.

(3) Arrange them in order, starting with the lowest frequency first; then the next highest and so on until not more than six of your favorite stations have been selected.

(4) Select the proper button for each station, starting at the top of your list (the lowest frequency station) and determine if it is within the required range of button No. 7 as shown on the button diagram below. If it is in this range assign button No. 7 to this station. Take the second station on your list and determine if it can be assigned to the button to the left of the one already assigned. If it can be applied, assign the station to this button. If not, go to the next button to the left which has the proper range to accommodate the station. Proper assigning of stations to buttons will make it possible to set up the buttons to all principal stations in every locality.

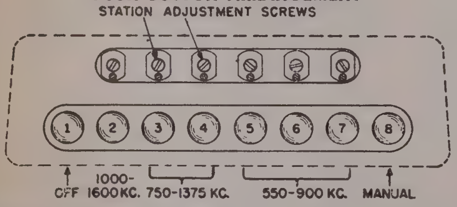
(5) Turn the band switch to the broadcast position and depress button No. 8 (manual button at extreme right); then tune in with the manual tuning control, the station on the top of your list (the lowest frequency station).

(6) Remove the push button escutcheon by unscrewing the screw at each end. Depress the button assigned to this station and with a screw driver carefully turn the large screw head above the depressed button until the desired station is tuned in. Turning to the right lowers the frequency and turning to the left raises the frequency. Never try to turn the screw past the ends of its travel as you will damage the tuner. The screw has approximately three complete turns. The small screw head located below the large screw should not be disturbed as it is set at the factory.

(7) When the station is picked up adjust the screw carefully for maximum volume and least noise. Push the manual button and the same station will be heard if you have tuned in the correct station.

(8) After all six stations have been set up replace the escutcheon. Select a gummed tab with the proper call letters and insert in each slot above the button.

PUSH BUTTON ARRANGEMENT



AUTOMATIC TUNER ALIGNMENT: With the band switch turned to the broadcast position connect the generator to the antenna lead through a 200 MMF dummy. Depress button No. 2, set the generator to 1200 KC and tune in the signal by adjusting the large head screw located above the button. After the signal is carefully turned in adjust the small screw located below the large screw head for maximum output. This procedure should be repeated on the remaining buttons using the frequencies as listed below:

Button	2	3	4	5	6	7
Freq. (KC):	1200	950	950	650	650	650

In any specific locality where the customer has already set up his stations, the tuner alignment may be made at the actual frequency being used on each button.

OPERATION. With the set turned on to a moderate level of volume the automatic tuner is operated by merely pressing the button set to the desired station. The volume and tone are then adjusted to suit individual requirements.

To tune in stations with the manual control depress the manual button, select the band desired with the band switch and tune in your stations with the manual control.

When using the automatic tuning the wave band selector switch must be turned to the broadcast position.

TELEVISION AND PHONOGRAPH CONNECTOR. This receiver is fully designed to provide sound reception when connected to a television receiver. To make this connection attach the two leads from your television receiver to terminals "T" and "G". The black lead or the outside shield (in case a shielded lead is used) should be connected to terminal "G", and the other lead to terminal "T". For complete directions consult the instruction sheet of your television receiver.

To use this attachment with a phonograph, connect the two terminals from the phonograph pick-up to terminals "T" and "G". If one of the pick-up leads is a shield connect it to the terminal "G". If both leads are unshielded, try reversing the terminals if the hum is excessive. If hum is still present reverse the power plug in the wall socket. Consult the instruction sheets on your phonograph for additional information.

With the connections made as described above simply turn the band change switch to the extreme left position and your television sound channel or phonograph pickup is connected in.

AUTOMATIC TUNING

MODEL TXF-67, Chassis TXF

ADJUSTMENT. All adjustments are simply made from the top of the cabinet using an ordinary screw driver.

To make adjustments remove all four buttons which pull off readily. The center buttons should be removed first since by depressing the adjacent buttons with thumb and finger a firm grip may be secured on either center button. The side buttons can then be easily removed.

Loosen the screw of the desired button and with the manual tuning knob tune to any desired station. Hold the manual tuning knob in position and depress the button shaft as far as possible. With the button fully depressed tighten up the screw firmly.

Be sure the push button knob is held down in position while being tightened.

After the stations are adjusted it is advisable to check each button to assure sufficient tightening.

To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

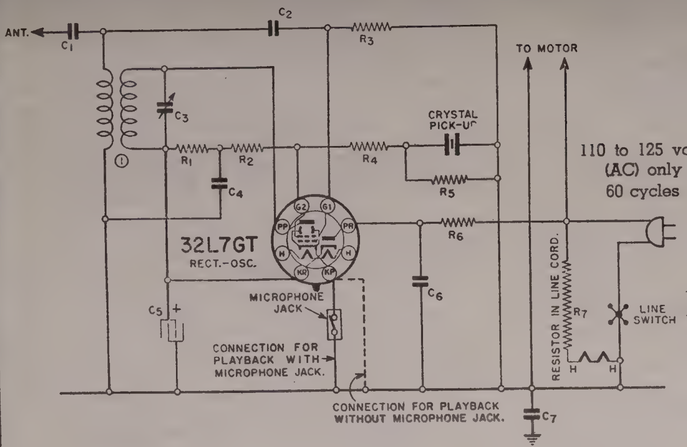
With each button definitely set and securely tightened to the selected stations, the tuner is ready for operation.

OPERATION. With the set turned on to a moderate level of volume, the automatic tuner is operated by merely pressing a button set to the desired station.

Station selection may be made automatically or manually at will since the manual tuning control operates free and independent of the automatic unit.

The station call letter tabs furnished should be inserted into the slot of the push-buttons using designations corresponding to the station selected for each button. After inserting call letter tabs the buttons may be replaced.

WIRELESS RECORD PLAYER



DRWN. FLC APP. 3-24-39
W-19, W-17, W-24

DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1681	10 MMFD. 20 %
C2	N-1374	100 MMFD. "
C3	N-1323	PADDER COND.
C4	N-1351	.10 MFD. 200 V.
C5	N-1675	20 MFD. "
C6	N-1351	.10 MFD. "
C7	N-1351	.10 MFD. "

DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1682	3 MEGOHM .5W 20 %
R2	N-1262	1.0 MEGOHM " "
R3	N-1460	30,000 OHM " "
R4	N-1684	75,000 OHM " "
R5	N-1264	.5 MEGOHM " "
R6	N-1683	7,500 OHM " "
R7	N-1677	RESISTOR IN LINE CORD 285 OHM 25W. .3 AMP.
①	N-1671	OSC. COIL

1. **OFF-ON SWITCH** — This is the only knob on the device. Turn to the right to switch on the power.

2. **PICKUP** — The pickup is the new crystal type. To insert a needle, raise the pickup arm to a vertical position, loosen the needle holder screw on the front, insert a needle to its full depth, tighten up the needle holder screw and lower pickup arm to its non-playing position outside the record and slip into the pickup rest holder. When commencing to play, remove pickup from holder, lift and place gently the point of needle in outside starting groove of record.

3. **MOTOR SWITCH** — On models in wooden cabinets which have the automatic stop, the motor switch is incorporated in the automatic stop. To start motor move the lever at the right side of the turntable. The automatic stop can be adjusted so that the pickup arm will strike it at the conclusion of a record and thus turn off the motor.

   On models in metal cabinets the motor switch is located in the front panel on the right side.

4. **ANTENNA** — The single lead attached to the record player is the transmitting antenna. If the record player is located within a distance of ten feet from the receiving set no additional antenna will be required. An antenna not longer than ten feet may be added to operate over greater distances.

5. **OPERATION** — Turn on the power switch allowing about two minutes for the tube to warm up, place the selected record upon the turntable and start the motor. Lift pickup and lower the needle point gently to the outside record groove.

   Next go to your radio and tune to approximately 600 K.C. at which setting the phonograph signal will be received.

6. **FREQUENCY ADJUSTMENT** — If a local station is operating at a frequency of approximately 600 KC, interference will be encountered in the form of a continuous squeal or howl. To avoid this interference tune the radio receiver to a point at which no local station can be heard. Pry out the button located between the turntable and the ON-OFF switch. With the unit in operation insert a screw driver in the hole and adjust the screw. If the radio receiver has been set at a point below 600 KC, (for example 550 KC) turn to the right until the phonograph signal is heard. If the receiver has been set above 600 KC turn the adjusting screw to the left.

7. **RADIO RECEIVER CONTROLS** — Volume will be controlled by the volume control on the radio receiver as for radio reception. Other radio controls will affect record reproduction. Adjustment of the radio set's fidelity and tone controls may add considerably to the enjoyment of your record selections.

8. **HUM** — If hum is present it may be necessary to reverse the power plug in the wall socket.

NEEDLES

High quality needles are important to your enjoyment of recorded music. Use good full-tone steel needles. If long playing needles are used, do not change the position of the needle in the pickup after it has once been played, as this will injure the record grooves.

Note: The needle point wears down gradually in use and wears down in conformity with the shape of the record groove. Changing the position of the needle in the pickup after it has been played will provide a new fit to the groove and will damage the record groove by changing the shape of the groove. The life of the record depends upon maintaining the original record groove. To summarize this important message, never reinsert a used needle in the pickup, since this will do permanent injury to the record and shorten your record life materially.

MICROPHONE ATTACHMENT

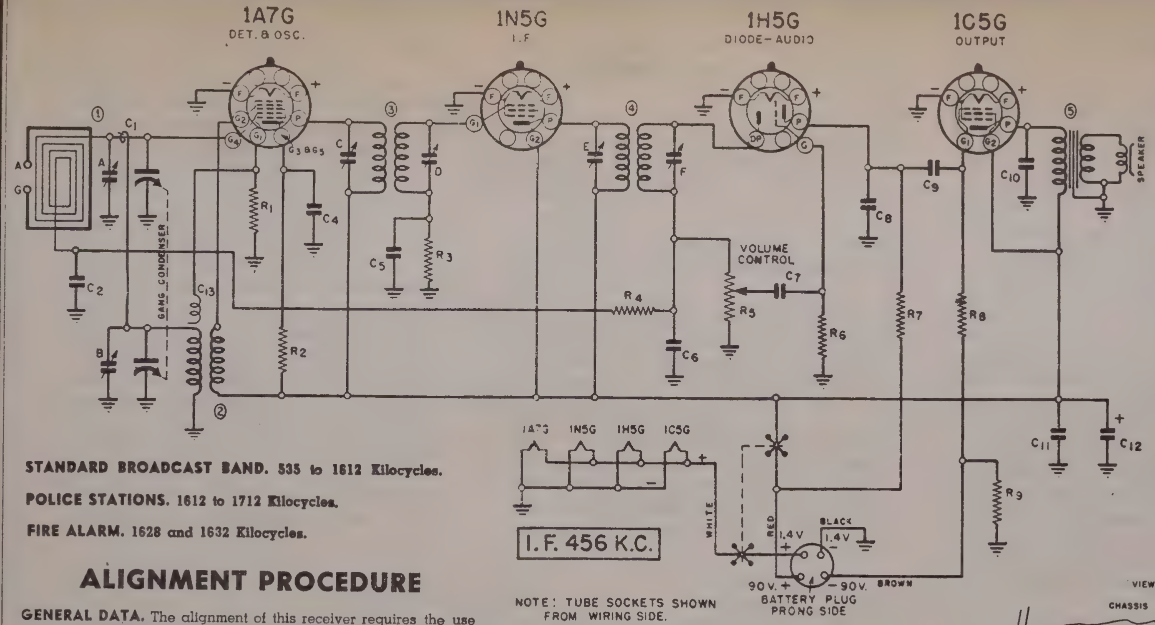
On models in wooden cabinets a jack is provided in the rear of the cabinet for using a microphone. Use only a low impedance (200 ohms or less) carbon button microphone. Most low-priced microphones are of this type. To attach microphone simply insert the phone tips in the jack.

Warning!! One of the terminals is directly connected to one terminal of the line cord. In using a microphone make certain all parts are fully insulated.

SERVICE

As the phonograph motor is the only moving part it is the only part of your record player that will require any attention.

A little oil applied to the motor, idler and turntable bearings about once every three months will suffice.



DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1377	.2 MEGOHM 20% .5W.
R2	N-1353	50,000 OHM 10% "
R3	N-1378	2 MEGOHM 20% "
R4	N-1262	1 MEGOHM " "
R5	N-1504	.5 MEG. VOLUME CONT.
R6	N-1378	2 MEGOHM 20% .5W
R7	N-1262	1 MEGOHM " "
R8	N- "	" " "
R9	N-1379	550 OHM 10% "
C1	——	GIMMIC
C2	N-1345	.05 MFD 200 V
C4	N-1345	.05 MFD. 200 V.
C5	N-1376	.02 MFD. 400 V.
C6	N-1343	250 MMFD. 20%
C7	N-1344	.01 MFD. 400 V.
C8	N-1374	100 MMFD. 20%
C9	N-1344	.01 MFD 400 V.
C10	N-1347	.006 MFD. 600 V.
C11	N-1351	.10 MFD. 200 V.
C12	N-1367	6 MFD. ELECTROLYTIC
C13	-	CAPACITY INCLUDED IN OSCILLATOR COIL.
1	N-1508	LOOP ANTENNA
2	N-1532	OSCILLATOR COIL
3	N-1391	1ST I.F. TRANS.
4	N-1509	2ND I.F. TRANS.
5	N-1507	5" P.M. SPKR. & TRANS.
	N-1499	GANG CONDENSER
	N-1510	BATTERY CABLE

STANDARD BROADCAST BAND. 535 to 1612 Kilocycles.

POLICE STATIONS. 1612 to 1712 Kilocycles.

FIRE ALARM. 1628 and 1632 Kilocycles.

ALIGNMENT PROCEDURE

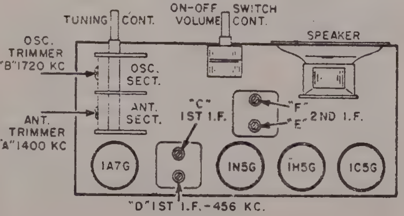
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna terminal to the generator through a 200 MMF dummy and the ground terminal to the generator ground. Set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output. Check the sensitivity at 600 to determine if the gang or the coils have been damaged.

TUBE LAYOUT & TRIMMER LOCATION

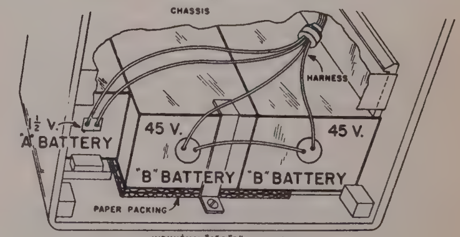


PORTABLE
4 TUBE - 1½ VOLT

SUPERHETERODYNE
SINGLE BAND

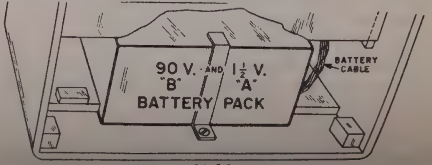
DRWN. F.L.C. APP. Gmg 1-24-39

VIEW FROM REAR



INDIVIDUAL "A" & "B" BATTERIES

VIEW FROM REAR

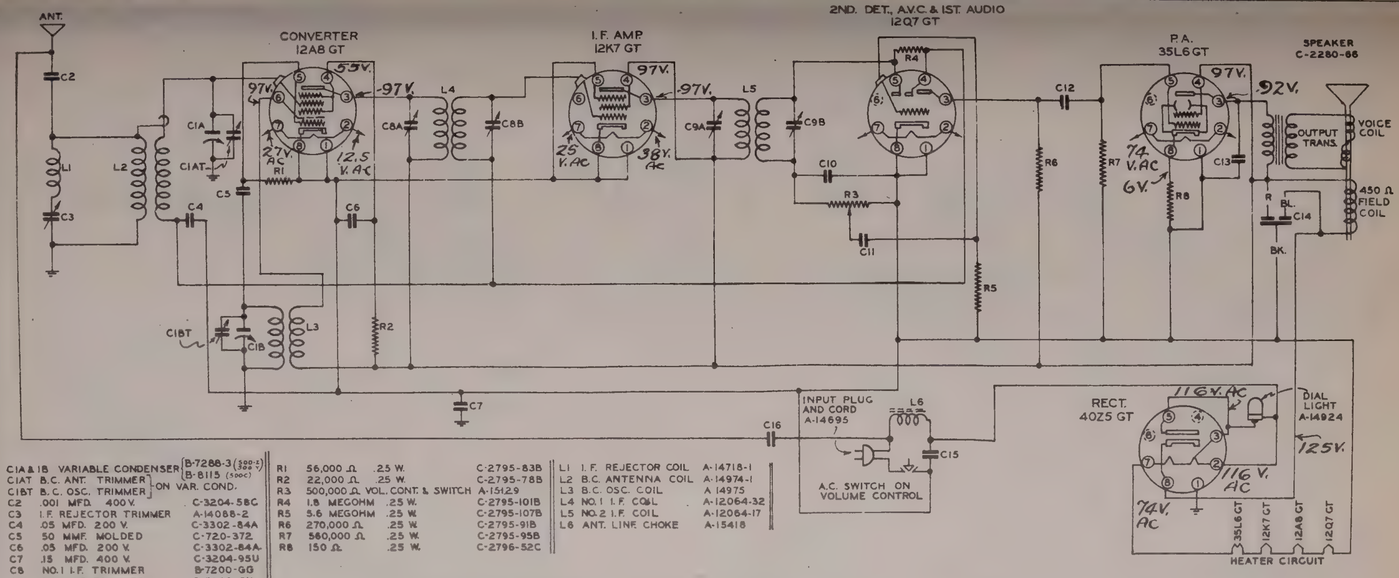


SINGLE UNIT "A" & "B" BATTERY

XL

SPARKS WITHINGTON CO.

MODELS 500CB, 500CG,
500CR, 500Y, 500Z



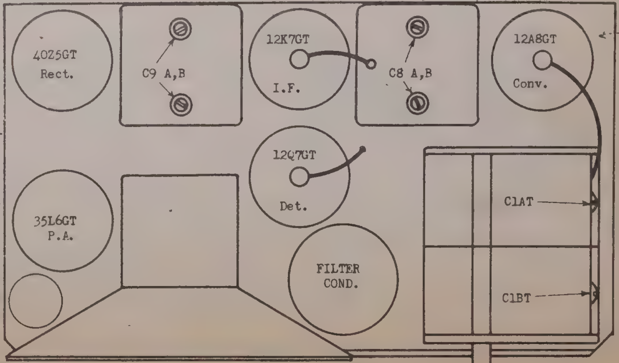
C1A & 1B	VARIABLE CONDENSER	B-7288-3 (500-Z, 500-Y) B-8115 (500C)
C1AT	B.C. ANT. TRIMMER	ON VAR. COND.
C1BT	B.C. OSC. TRIMMER	ON VAR. COND.
C2	.001 MFD. 400 V.	C-3204-58C
C3	I.F. REJECTOR TRIMMER	A-14088-2
C4	.05 MFD. 200 V.	C-3302-84A
C5	50 MMF. MOLDED	C-720-372
C6	.05 MFD. 200 V.	C-3302-84A
C7	.15 MFD. 400 V.	C-3204-95U
C8	NO. 1 I.F. TRIMMER	B-7200-GG
C9	NO. 2 I.F. TRIMMER	B-7200-GN
C10	500 MMF. MOLDED	C-720-316
C11	.01 MFD. 200 V.	C-3302-20A
C12	.01 MFD. 200 V.	C-3302-20C
C13	.03 MFD. 400 V.	C-3304-80A
C14	25-25 MFD. ELECT.	A-15124-1
C15	.01 MFD. 400 V.	C-3304-20A
C16	250 MMF. MOLDED	C-720-324

R1	56,000 Ω	.25 W.	C-2795-83B
R2	22,000 Ω	.25 W.	C-2795-78B
R3	500,000 Ω	VOL. CONT. & SWITCH	A-15129
R4	1.8 MEGOHM	.25 W.	C-2795-101B
R5	5.6 MEGOHM	.25 W.	C-2795-107B
R6	270,000 Ω	.25 W.	C-2795-91B
R7	560,000 Ω	.25 W.	C-2795-95B
R8	150 Ω	.25 W.	C-2796-52C

L1	I. F. REJECTOR COIL	A-14718-1
L2	B.C. ANTENNA COIL	A-14974-1
L3	B.C. OSC. COIL	A 14975
L4	NO. 1 I. F. COIL	A-12064-32
L5	NO. 2 I. F. COIL	A-12064-17
L6	ANT. LINE CHOKE	A-15418

SPARTON SUPERHETERODYNE MODEL 500-C, 500-Y, 500-Z
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS



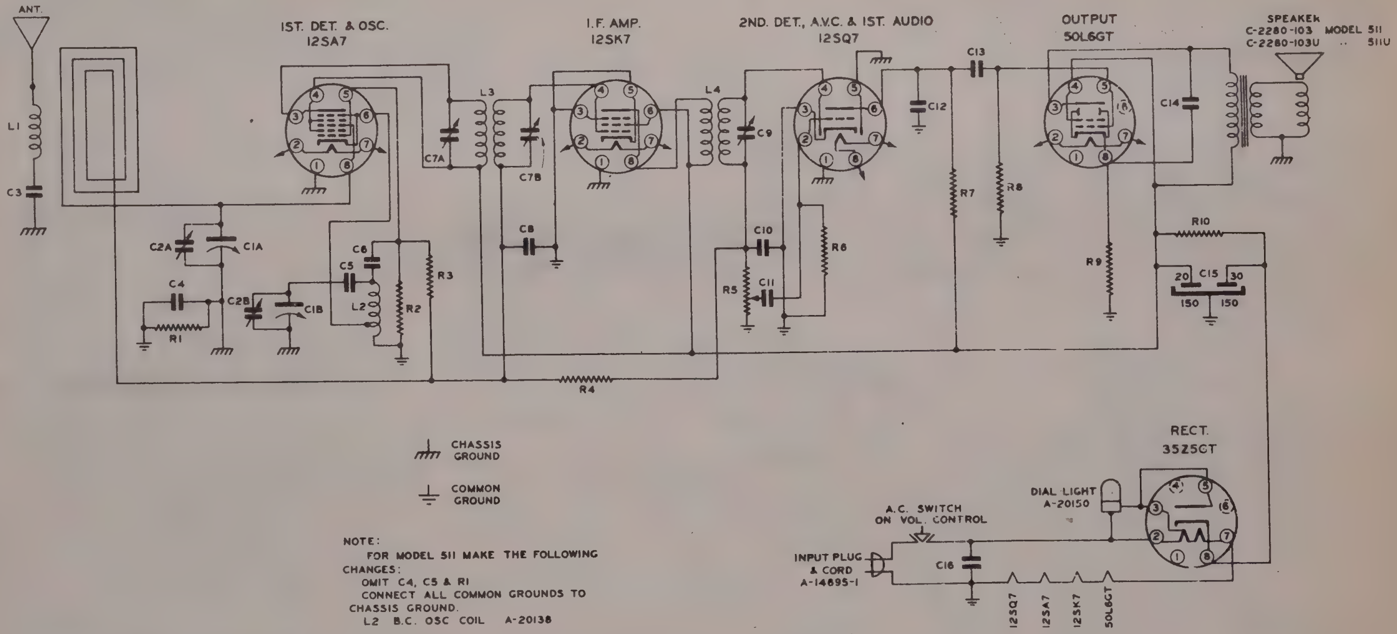
December 28, 1939

ALIGNMENT CHART

ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
Set pointer 3/16 inch from right-hand end of guide plate opening with condenser plates fully meshed.							
I.F.	12A8GT Grid Cap	200 mmf.	456KC	BC	Open	C9 A&B C8 A&B	2nd. I.F. 1st. I.F.
Rejector	Ant.	200 mmf.	456KC	BC	Closed	C3	Adjust to minimum
Broadcast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C1BT OSC. C1AT	Peak at max. Peak at max.
(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
(Check operations 1 to 5 inclusive)							

SCHEMATIC DIACRAM
SPARTON SUPERHETERODYNE MODEL 511U & 511 (SEE NOTE)
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



NOTE:
FOR MODEL 511 MAKE THE FOLLOWING CHANGES:
OMIT C4, C5 & R1
CONNECT ALL COMMON GROUNDS TO CHASSIS GROUND.
L2 B.C. OSC COIL A-20138

C1A&B	VARIABLE CONDENSER	A-20158
C2A&B	TRIMMERS ON VARIABLE	
C3	.001 MFD. 600V.	C 3206-58C
C4	.2 MFD. 200V.	C-3202-98C
C5	.02 MFD. 200V.	C-3202-78C
C6	50 MMF. MICA	C-720-315
C7A&B	NO.1 I.F. TRIMMERS	
C8	.05 MFD. 200V.	C-3202-84C

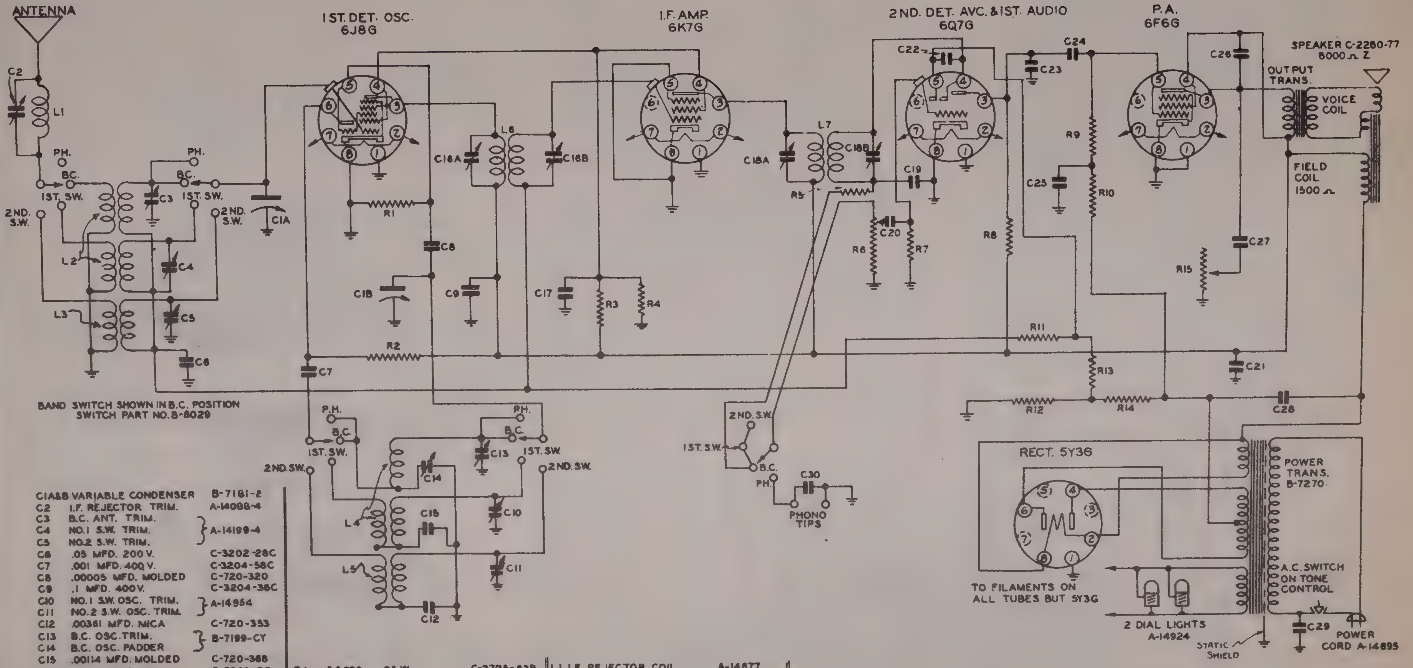
C9	NO.2 I.F. TRIMMER	
C10	250 MMF. MICA	C-720-324
C11	.01 MFD. 400V.	C-3204-76C
C12	500 MMF. MICA	C-720-316
C13	.002 MFD. 600V.	C-3206-60C
C14	.01 MFD. 400V.	C-3204-76C
C15	20-30 MFD ELECT.	A-20135
C16	.05 MFD. 400V.	C-3204-84C

R1	150,000 Ω	.5W.	C-2796-26C
R2	20,000 Ω	.5W.	C-2796-190C
R3	15 MEGOHM	.5W.	A-20136
R4	2 MEGOHM	.5W.	C-2796-238C
R5	500,000 Ω	V.C. & SW.	A-20137
R6	5 MEGOHM	.5W.	C-2796-248C
R7	250,000 Ω	.5W.	C-2796-216C
R8	500,000 Ω	.5W.	C-2796-94C
R9	150 Ω	.5W.	C-2796-52C
R10	1000 Ω	1W.	C-2797-13B

L1	LOOP ANTENNA	A-20159
L2	B.C. OSC. COIL	A-20138-U
L3	NO.1 I.F. COIL	A-20139
L4	NO.2 I.F. COIL	A-20140

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 541 SX
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS



C1A&B	VARIABLE CONDENSER	B-7181-2
C2	I.F. REJECTOR TRIM.	A-14088-4
C3	B.C. ANT. TRIM.	A-14199-4
C4	NO. 1 S.W. TRIM.	
C5	NO. 2 S.W. TRIM.	
C6	.05 MFD. 200 V.	C-3202-28C
C7	.001 MFD. 400 V.	C-3204-58C
C8	.00005 MFD. MOLDED	C-720-320
C9	.1 MFD. 400 V.	C-3204-38C
C10	NO. 1 S.W. OSC. TRIM.	A-14954
C11	NO. 2 S.W. OSC. TRIM.	
C12	.00361 MFD. MICA	C-720-353
C13	B.C. OSC. TRIM.	B-7199-CY
C14	B.C. OSC. PADDER	
C15	.00114 MFD. MOLDED	C-720-368
C16A&B	NO1 I.F. TRIM.	B-7200-GG
C17	.1 MFD. 400 V.	C-3204-38C
C18A&B	NO. 2 I.F. TRIM.	B-7200-GN.
C19	.00025 MFD. MOLDED	C-720-319
C20	.05 MFD. 200 V.	C-3202-28C
C21	30 MFD. 300 V. ELECT.	A-14072-A
C22	.0001 MFD. MOLDED	C-720-318
C23	.00025 MFD. MOLDED	C-720-319
C24	.05 MFD. 400 V.	C-3204-84C
C25	.1 MFD. 200 V.	C-3202-38C
C26	.006 MFD. 600 V.	C-3206-68C
C27	.03 MFD. 600 V.	C-3206-80C
C28	16 MFD. 450 V. ELECT.	A-14073-A
C29	.006 MFD. 600 V.	C-3206-12C
C30	.003 MFD. 200 V.	C-3202-82C

R-1	56000 Ω .25 W.	C-2795-83B
R2	22000 Ω .5 W.	C-2796-78C
R3	24000 Ω 2 W.	C-2798-192A
R4	27000 Ω 1 W.	C-2797-79B
R5	27000 Ω .25 W.	C-2795-79B
R6	5 MEG. VOL. CONTROL	A-15130
R7	5.6 MEG. .25 W.	C-2795-107B
R8	270000 Ω .25 W.	C-2795-91B
R9	270000 Ω .25 W.	C-2795-91B
R10	270000 Ω .25 W.	C-2795-91B
R11	1 MEGOHM .25 W.	C-2795-98B
R12	82 Ω .25 W.	C-2795-133B
R13	1 MEGOHM .25 W.	C-2795-98B
R14	220 Ω 1 W.	C-2797-143B
R15	1 MEG. TONE CONTROL	A-15131

L1	I.F. REJECTOR COIL	A-14677
L2	B.C. & 1ST. S.W. ANT. COIL	A-14209-6
L3	2ND. S.W. ANT. COIL	A-14879-1
L4	B.C. & 1ST. S.W. OSC. COIL	A-14213-6
L5	2ND. S.W. OSC. COIL	A-14880-1
L6	NO. 1 I.F. COIL	A-12064-29
L7	NO. 2 I.F. COIL	A-12064-30

Power Transformer (All voltage) 25 Cycle		B-6775-25-4
Power Transformer (All voltage) 50 Cycle		B-7270
Power Transformer 50 Cycle	115 volts	B-8129

January 2, 1940

541-SX

VOLTAGE CHART

Line Voltage: 112 volts
Power Transformer Tap: 95-115

Position of Volume Control: Full with Ant. Disconnected
Position of Band Selector Switch: Broadcast (medium-wave)

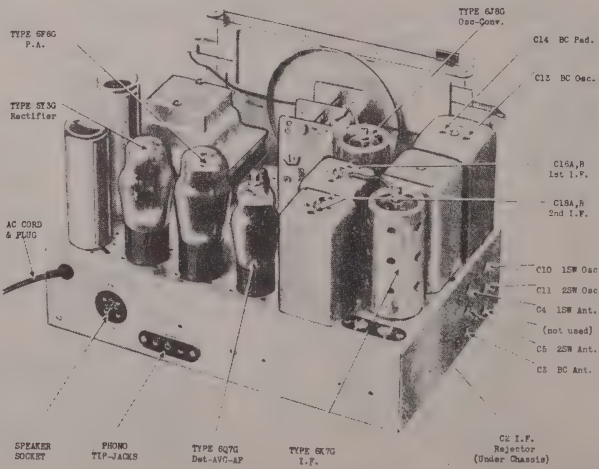
Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6J8G	Osc.-Conv.	0	0	250	95	-4 a	140	6.3*	0	-.3 a
6K7G	I-F Amp.	0	6.3*	250	95	0	-	0	0	-.3 a
6Q7G	Det. AVC AF	0	0	44 b	-1.5	-1.5	-.3 a	6.3*	0	-.2 a
6F6G	Power Amp.	0	0	230	250	-.4 a	-.6 a	6.3*	0	-
5Y3G	Rectifier	0	330	-	340*	-	340*	-	330	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts. a: 0-5 volt scale. b: 0-100 volt scale.

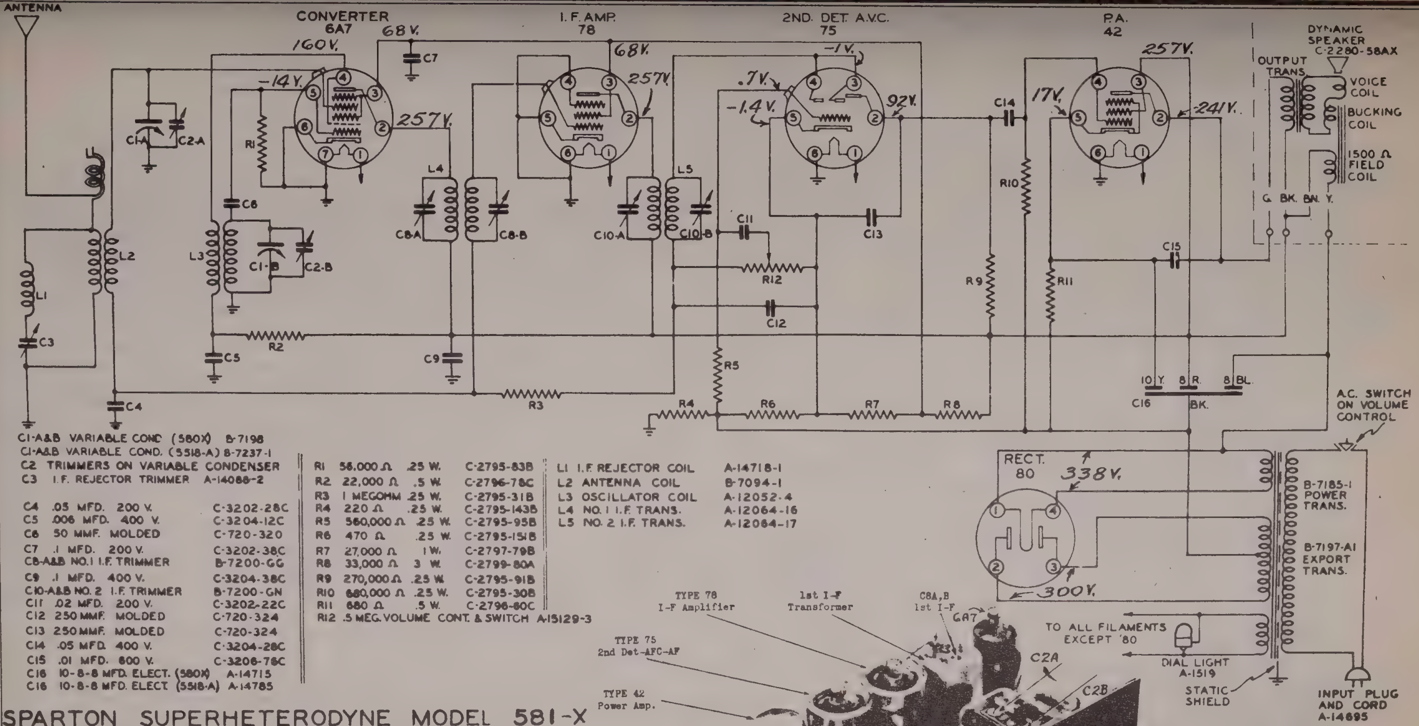
ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last mark at end of scale with tuning condenser closed)							
2	I.F.	6J8G Grid	.1 mf.	456 KC	BC	Open	C18 A,B C16 A,B	2nd I.F. 1st I.F.
3	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C2	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1400 KC	BC	1400 KC	C13 Osc. C3 Ant.	
5				600 KC	BC	600 KC	C14 Pad	Rock dial for peak adj.
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC, 1400 KC)							
8	1st SW Band	Ant.	*	7. MC	1 SW	7. MC	C10 Osc. C4 Ant.	
9	(Check calibration and sensitivity at 2.5 MC, 4. MC and 7. MC)							
10	2nd SW Band	Ant.	*	22. MC	2 SW	22. MC	C11 Osc. C5 Ant.	Rock dial for peak adj.
11	(Check calibration and sensitivity at 8. MC, 15. MC and 22. MC)							

* Use 200 mmf. condenser and 100 ohm non-inductive resistor in series.



CHASSIS ILLUSTRATION



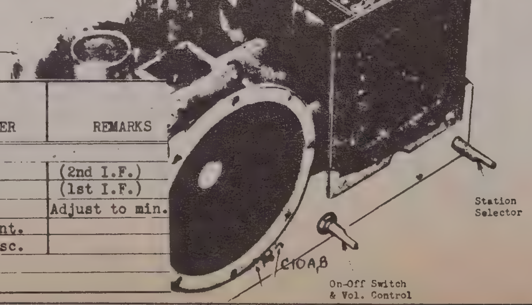
C1-A&B VARIABLE CONC (580X) B-7198
C1-A&B VARIABLE COND. (5518-A) B-7237-1
C2 TRIMMERS ON VARIABLE CONDENSER
C3 I.F. REJECTOR TRIMMER A-14088-2

C4	.05 MFD. 200 V.	C-3202-28C
C5	.006 MFD. 400 V.	C-3204-12C
C6	50 MMF. MOLDED	C-720-320
C7	.1 MFD. 200 V.	C-3202-38C
C8-A&B	NO.1 I.F. TRIMMER	B-7200-GG
C9	.1 MFD. 400 V.	C-3204-38C
C10-A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C11	.02 MFD. 200 V.	C-3202-22C
C12	250 MMF. MOLDED	C-720-324
C13	250 MMF. MOLDED	C-720-324
C14	.05 MFD. 400 V.	C-3204-28C
C15	.01 MFD. 600 V.	C-3206-76C
C16	10-8-8 MFD. ELECT. (580X)	A-14715
C16	10-8-8 MFD. ELECT (5518-A)	A-14785

R1	56,000 Ω	.25 W.	C-2795-83B
R2	22,000 Ω	.5 W.	C-2796-78C
R3	1 MEGOHM	.25 W.	C-2795-31B
R4	220 Ω	.25 W.	C-2795-143B
R5	560,000 Ω	.25 W.	C-2795-95B
R6	470 Ω	.25 W.	C-2795-151B
R7	27,000 Ω	1 W.	C-2797-79B
R8	33,000 Ω	3 W.	C-2799-80A
R9	270,000 Ω	.25 W.	C-2795-91B
R10	680,000 Ω	.25 W.	C-2795-30B
R11	680 Ω	.5 W.	C-2796-80C

R12 .5 MEG. VOLUME CONT. & SWITCH A-15129-3

L1	I.F. REJECTOR COIL	A-14718-1
L2	ANTENNA COIL	B-7094-1
L3	OSCILLATOR COIL	A-12052-4
L4	NO. 1 I.F. TRANS.	A-12064-16
L5	NO. 2 I.F. TRANS.	A-12064-17



SPARTON SUPERHETERODYNE MODEL 581-X
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEW OF ALL SOCKET CONNECTIONS

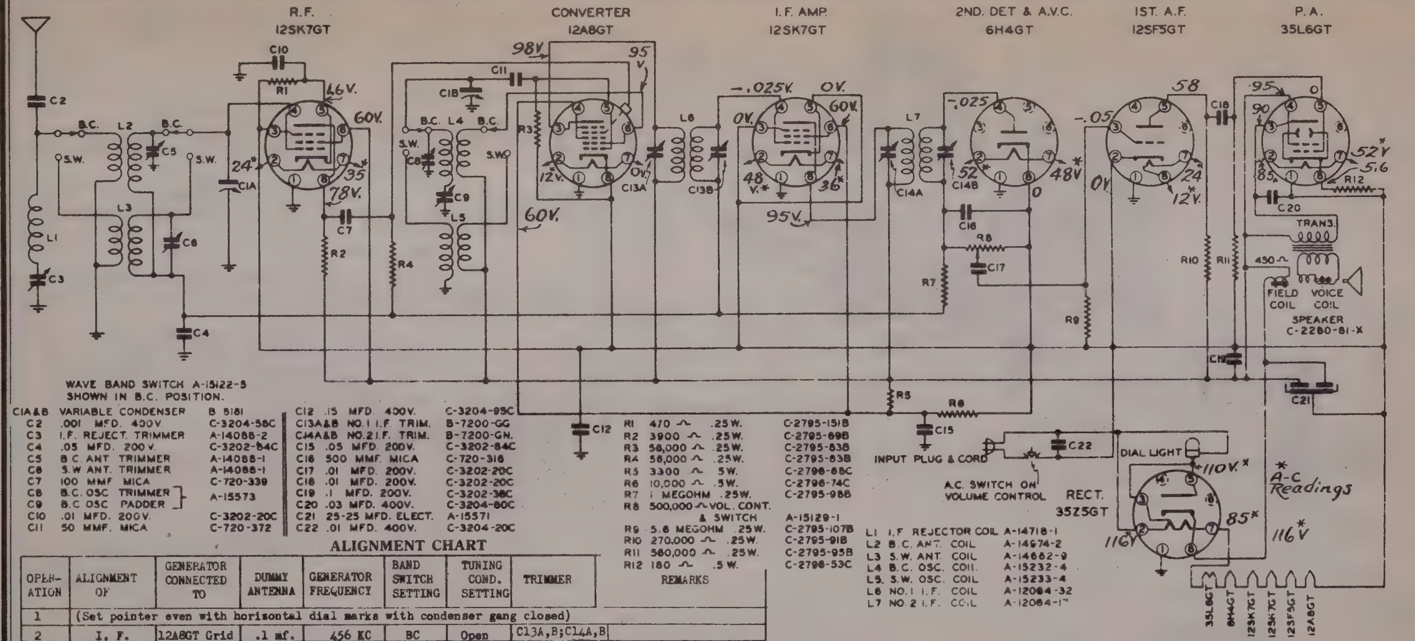
July 18, 1940

ALIGNMENT

ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
(Set dial pointer to end of scale with condenser gang closed)						
I.F.	6A7 Grid	.1 mf.	456	Closed	C10 A,B	(2nd I.F.)
					C8 A,B	(1st I.F.)
Rejector	Ant.	150 mmf.	456	Closed	C3	Adjust to min.
Broadcast Band	Ant.	150 mmf.	1500	1500	C2 A Ant.	
					C2 B Osc.	
(Check for dial reading and sensitivity at 600 kc., 1000 kc.)						
(Check operations 1 to 5 inclusive)						

MODEL 711X

SPARKS WITHINGTON CO.



WAVE BAND SWITCH A-15122-5
SHOWN IN B.C. POSITION.

C1A&B	VARIABLE CONDENSER	B 5181
C2	.001 MFD. 400V.	C-3204-56C
C3	I.F. REJECT. TRIMMER	A-14088-2
C4	.05 MFD. 200V.	C-3202-84C
C5	B.C. ANT TRIMMER	A-14088-1
C6	S.W ANT. TRIMMER	A-14088-1
C7	100 MMF MICA	C-720-339
C8	B.C. OSC TRIMMER	A-15573
C9	B.C OSC PADDER	
C10	.01 MFD. 200V.	C-3202-20C
C11	50 MMF. MICA	C-720-372

C12	.15 MFD. 400V.	C-3204-95C
C13A&B	NO.1 I.F. TRIM.	B-7200-GG
C14A&B	NO.2 I.F. TRIM.	B-7200-GN.
C15	.05 MFD. 200V.	C-3202-84C
C16	500 MMF. MICA	C-720-316
C17	.01 MFD. 200V.	C-3202-20C
C18	.01 MFD. 200V.	C-3202-20C
C19	.1 MFD. 200V.	C-3202-38C
C20	.03 MFD. 400V.	C-3204-80C
C21	25-25 MFD. ELECT.	A-15571
C22	.01 MFD. 400V.	C-3204-20C

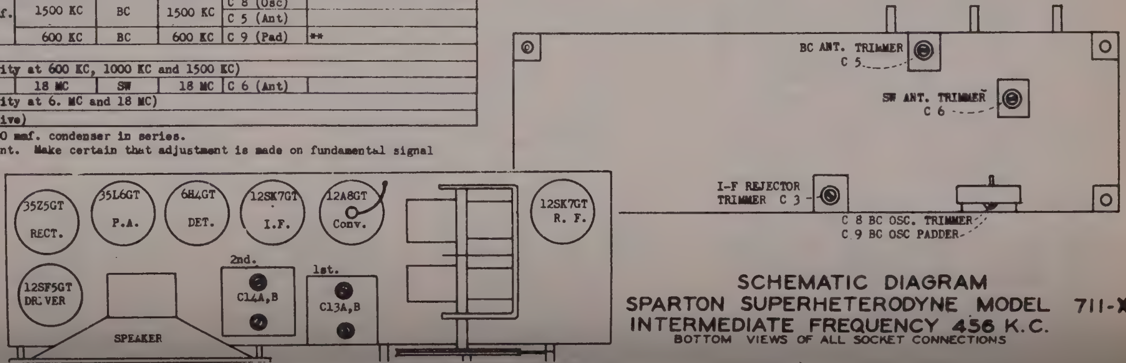
R1	470 Ω	.25 W.	C-2795-151B
R2	3900 Ω	.25 W.	C-2795-69B
R3	56,000 Ω	.25 W.	C-2795-83B
R4	56,000 Ω	.25 W.	C-2795-83B
R5	3300 Ω	5 W.	C-2796-68C
R6	10,000 Ω	.5 W.	C-2796-74C
R7	1 MEGOHM	.25 W.	C-2795-98B
R8	500,000 Ω VOL. CONT. & SWITCH		A-15129-1
R9	5.6 MEGOHM	.25 W.	C-2795-107B
R10	270,000 Ω	.25 W.	C-2795-91B
R11	560,000 Ω	.25 W.	C-2795-95B
R12	180 Ω	.5 W.	C-2796-53C

L1	I.F REJECTOR COIL	A-14718-1
L2	B.C. ANT. COIL	A-14974-2
L3	S.W. ANT. COIL	A-14682-9
L4	B.C. OSC. COIL	A-15232-4
L5	S.W. OSC. COIL	A-15233-4
L6	NO.1 I.F. COIL	A-12084-32
L7	NO.2 I.F. COIL	A-12084-17

ALIGNMENT CHART

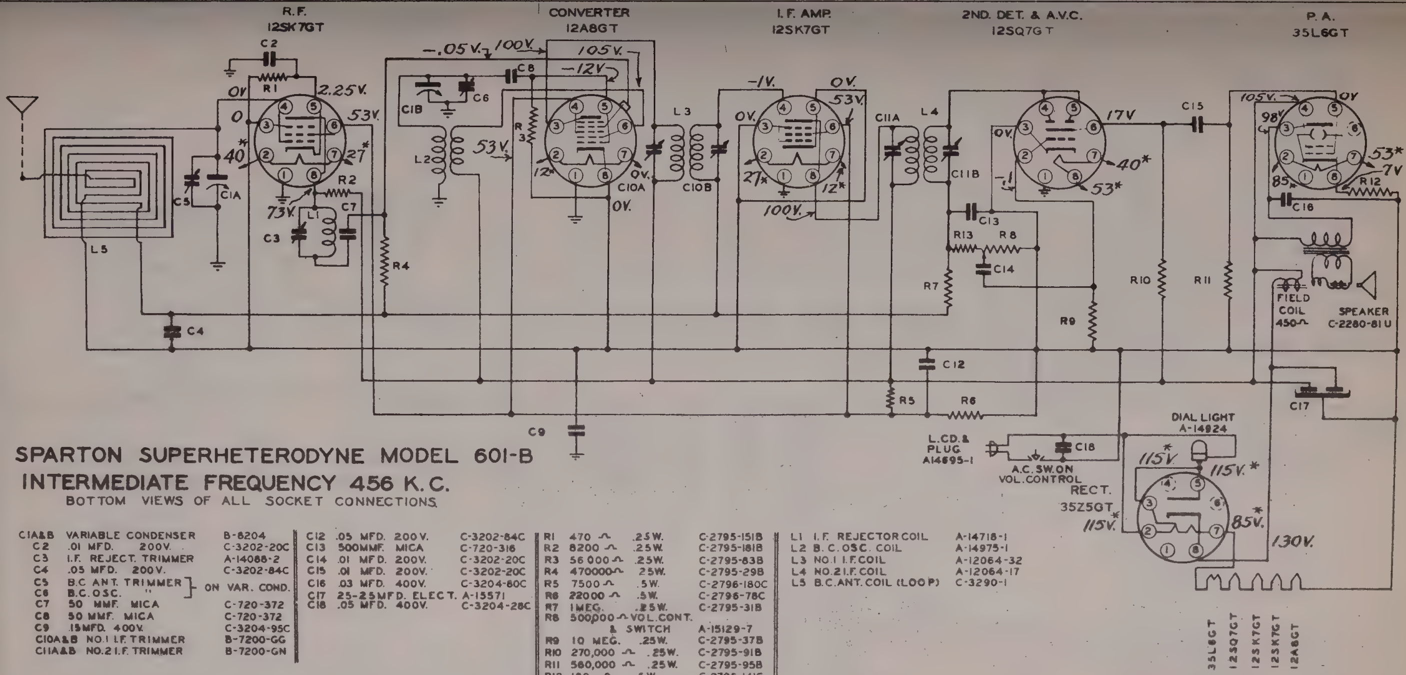
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer even with horizontal dial marks with condenser gang closed)							
2	I. F.	12A8GT Grid	.1 mf.	456 KC	BC	Open	C13A,B;C14A,B	
3	Rejector	Ant.	200mmf.	456 KC	BC	Closed	C 3	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C 8 (Osc) C 5 (Ant)	
5				600 KC	BC	600 KC	C 9 (Pad)	**
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	SW Band	Ant.	*	18 MC	SW	18 MC	C 6 (Ant)	
9	(Check calibration and sensitivity at 6. MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.



SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 711-X
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



SPARTON SUPERHETERODYNE MODEL 601-B

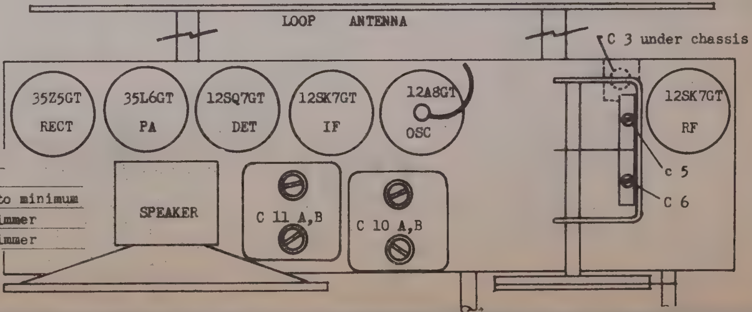
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-8204
C2	.01 MFD. 200V.	C-3202-20C
C3	I.F. REJECT. TRIMMER	A-14088-2
C4	.05 MFD. 200V.	C-3202-84C
C5	B.C ANT. TRIMMER	ON VAR. COND.
C6	B.C. OSC. "	ON VAR. COND.
C7	50 MMF. MICA	C-720-372
C8	50 MMF. MICA	C-720-372
C9	.15MFD. 400V.	C-3204-95C
C10A&B	NO.1 I.F. TRIMMER	B-7200-GG
C11A&B	NO.2 I.F. TRIMMER	B-7200-GN
C12	.05 MFD. 200V.	C-3202-84C
C13	500MMF. MICA	C-720-316
C14	.01 MFD. 200V.	C-3202-20C
C15	.01 MFD. 200V.	C-3202-20C
C16	.03 MFD. 400V.	C-3204-80C
C17	25-25MFD. ELECT.	A-15571
C18	.05 MFD. 400V.	C-3204-28C

R1	470 Ω	.25W.	C-2795-151B
R2	8200 Ω	.25W.	C-2795-181B
R3	56 000 Ω	.25W.	C-2795-83B
R4	470000 Ω	.25W.	C-2795-29B
R5	7500 Ω	.5W.	C-2796-180C
R6	22000 Ω	.5W.	C-2796-78C
R7	1MEG.	.25W.	C-2795-31B
R8	500,000 Ω VOL. CONT. & SWITCH		A-15129-7
R9	10 MEG.	.25W.	C-2795-37B
R10	270,000 Ω	.25W.	C-2795-91B
R11	560,000 Ω	.25W.	C-2795-95B
R12	180 Ω	.5W.	C-2796-141C
R13	27,000 Ω	.25W.	C-2795-79B

L1	I.F. REJECTOR COIL	A-14718-1
L2	B.C. OSC. COIL	A-14975-1
L3	NO.1 I.F. COIL	A-12064-32
L4	NO.2 I.F. COIL	A-12064-17
L5	B.C. ANT. COIL (LOOP)	C-3290-1



ALIGNMENT CHART

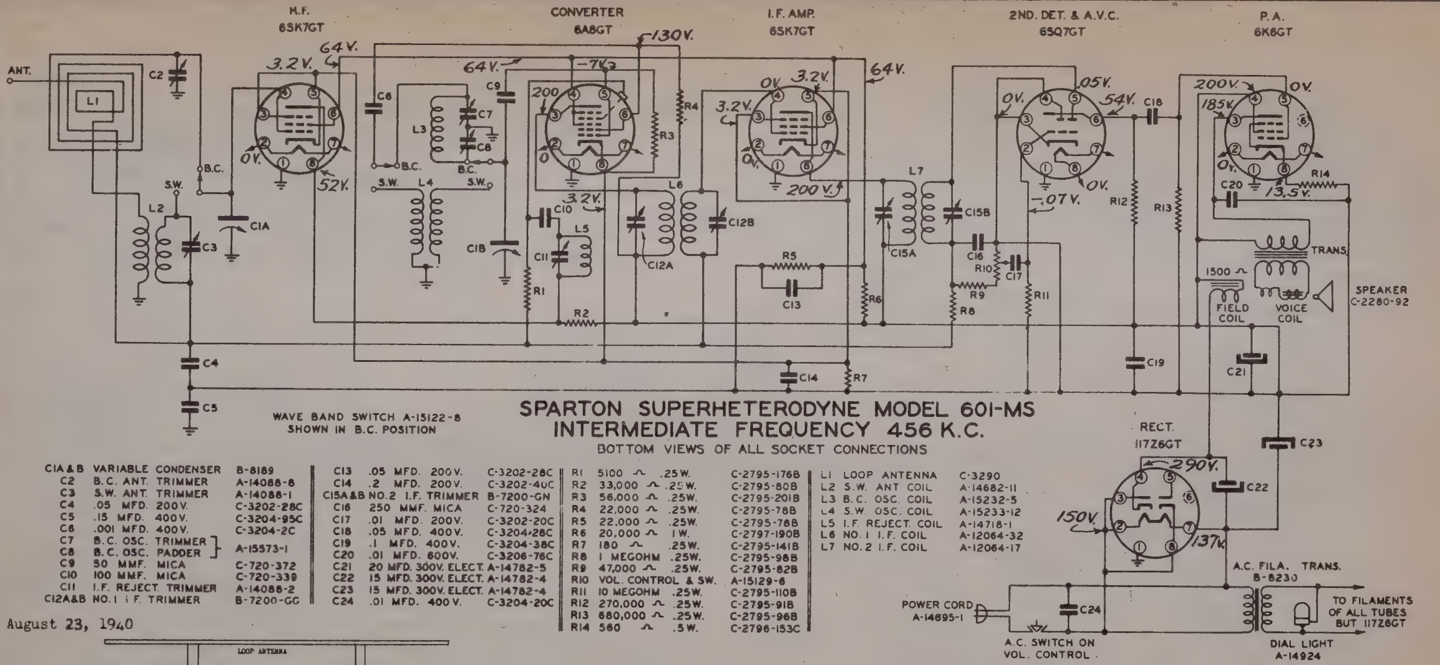
ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	
(Set pointer even with last calibration mark when condenser gang is closed.)						
I.F.	12A8GT Grid Cap	.1 mf.	456 KC	Open	C11 A & B C10 A & B	2nd I-F 1st I-F
Rejector	*	200 mmf.	456 KC	Closed	C3	Adjust to minimum
Broadcast Band	*	200 mmf.	1500 KC	1500 KC	C6 C5	Osc. Trimmer Ant. Trimmer
(Check calibration and sensitivity at 1500 KC, 1000 KC and 600 KC.)						
(Check operations 1 to 6 inclusive.)						

*Connect dummy antenna to blue wire of loop winding.

August 23, 1940

MODEL 601MS

SPARKS WITHINGTON CO.



WAVE BAND SWITCH A-15122-8
SHOWN IN B.C. POSITION

SPARTON SUPERHETERODYNE MODEL 601-MS
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

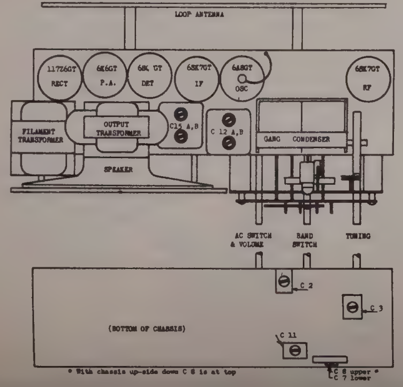
C1A&B	VARIABLE CONDENSER	B-8189
C2	B.C. ANT. TRIMMER	A-14088-8
C3	S.W. ANT. TRIMMER	A-14088-1
C4	.05 MFD. 200V.	C-3202-28C
C5	.15 MFD. 400V.	C-3204-95C
C6	.001 MFD. 400V.	C-3204-2C
C7	B.C. OSC. TRIMMER	A-15573-1
C8	B.C. OSC. PADDER	
C9	50 MMF. MICA	C-720-372
C10	100 MMF. MICA	C-720-339
C11	I.F. REJECT. TRIMMER	A-14088-2
C12A&B	NO.1 I.F. TRIMMER	B-7200-GG

C13	.05 MFD. 200V.	C-3202-28C
C14	.2 MFD. 200V.	C-3202-40C
C15A&B	NO.2 I.F. TRIMMER	B-7200-GN
C16	250 MMF. MICA	C-720-324
C17	.01 MFD. 200V.	C-3202-20C
C18	.05 MFD. 400V.	C-3204-28C
C19	.1 MFD. 400V.	C-3204-38C
C20	.01 MFD. 600V.	C-3206-76C
C21	20 MFD. 300V. ELECT.	A-14782-5
C22	15 MFD. 300V. ELECT.	A-14782-4
C23	15 MFD. 300V. ELECT.	A-14782-4
C24	.01 MFD. 400V.	C-3204-20C

R1	5100 Ω	.25W.	C-2795-176B
R2	33,000 Ω	.25W.	C-2795-80B
R3	56,000 Ω	.25W.	C-2795-201B
R4	22,000 Ω	.25W.	C-2795-78B
R5	22,000 Ω	.25W.	C-2795-78B
R6	20,000 Ω	1W.	C-2797-190B
R7	180 Ω	.25W.	C-2795-141B
R8	1 MEGOHM	.25W.	C-2795-98B
R9	47,000 Ω	.25W.	C-2795-82B
R10	VOL. CONTROL & SW.		A-15129-6
R11	10 MEGOHM	.25W.	C-2795-110B
R12	270,000 Ω	.25W.	C-2795-91B
R13	680,000 Ω	.25W.	C-2795-96B
R14	560 Ω	.5W.	C-2796-153C

L1	LOOP ANTENNA	C-3290
L2	S.W. ANT COIL	A-14682-11
L3	B.C. OSC. COIL	A-15232-5
L4	S.W. OSC. COIL	A-15233-12
L5	I.F. REJECT. COIL	A-14718-1
L6	NO. 1 I.F. COIL	A-12064-32
L7	NO. 2 I.F. COIL	A-12064-17

August 23, 1940



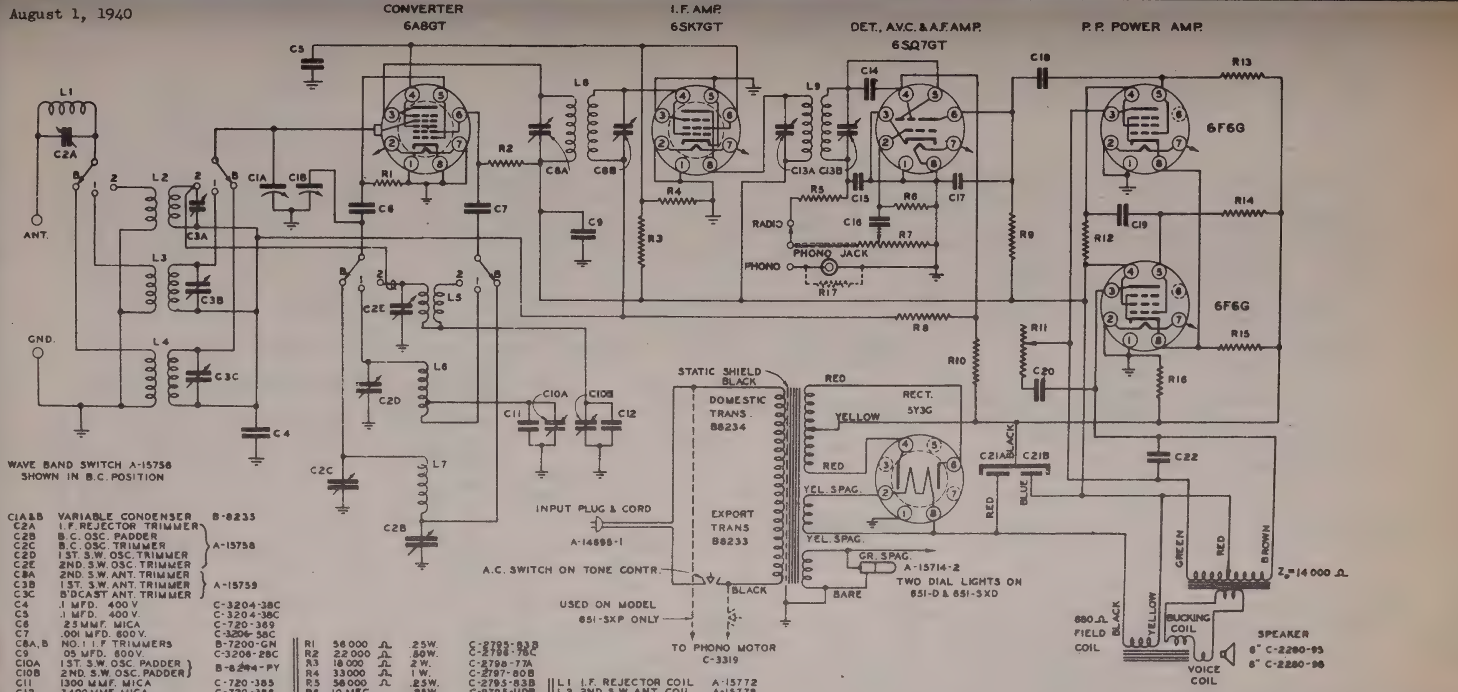
* With chassis up-side down C 8 is at top

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer even with last calibration mark when condenser gang is fully closed.)							
2	I. F.	6A8GT Grid Cap	.1 mf.	456 KC	BC	Open	C15 A & B	2nd I-F
							C12 A & B	1st I-F
3	Rejector	*	200 mmf.	456 KC	BC	Closed	C11	Adjust to minimum
4	Broad-cast band	*	200 mmf.	1500 KC	BC	1500 KC	C7	Osc. Trimmer
							C2	Ant. Trimmer
5				600 KC	BC	600 KC	C8	Osc. Pad.
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 1500 KC, 1000 KC and 600 KC.)							
8	SW Band	*	**	18. MC	SW	18. MC	C3	Ant. Trimmer
9	(Check calibration and sensitivity at 18. MC, 9. MC and 6 MC)							
10	(Check operation 1 to 9 inclusive.)							

Notes: *Connect dummy antenna to blue wire of loop winding.
**200 mmf. and 100 ohms in series.

August 1, 1940



WAVE BAND SWITCH A-15756
SHOWN IN B.C. POSITION

C1A&B	VARIABLE CONDENSER	B-8235
C2A	I.F. REJECTOR TRIMMER	A-15758
C2B	B.C. OSC. PADDER	
C2C	B.C. OSC. TRIMMER	
C2D	1ST. S.W. OSC. TRIMMER	
C2E	2ND. S.W. OSC. TRIMMER	
C8A	2ND. S.W. ANT. TRIMMER	A-15759
C3B	1ST. S.W. ANT. TRIMMER	
C3C	B'DCAST ANT. TRIMMER	
C4	.1 MFD. 400 V	C-3204-38C
C5	.1 MFD. 400 V.	C-3204-38C
C6	25 MMF. MICA	C-720-369
C7	.001 MFD. 600 V.	C-3206-58C
C8A, B	NO. 1 I.F TRIMMERS	B-7200-GN
C9	.05 MFD. 600V.	C-3206-28C
C10A	1ST. S.W. OSC. PADDER	B-8244-PY
C10B	2ND. S.W. OSC. PADDER	
C11	1300 MMF. MICA	C-720-385
C12	3400 MMF. MICA	C-720-388
C13A,B	NO. 2 I.F. TRIMMERS	B-7200-GN
C14	100 MMF. MICA	C-720-339
C15	250 MMF. MICA	C-720-319
C16	.01 MFD. 400V	C-3204-132C
C17	100 MMF. MICA	C-720-339
C18	.03 MFD. 600 V.	C-3206-136C
C19	.03 MFD. 600 V	C-3206-136C
C20	.03 MFD. 800V.	C-3208-136C
C21A	15 MFD 450V. ELECT.	A-15755
C21B	30 MFD. 300V. ELECT.	
C22	.003 MFD. 800 V	C-3208-118C

R1	56 000 Ω	.25W.	C-2795-83B	
R2	22 000 Ω	.50W.	C-2796-76C	
R3	18 000 Ω	2 W.	C-2796-77A	
R4	33000 Ω	1 W.	C-2797-80B	
R5	56000 Ω	.25W.	C-2795-83B	
R6	10 MEG.	.25W.	C-2795-110B	
R7	.5 MEG. VOL. CONTROL		A-15130-4	
R8	1 MEG.	.25W.	C-2795-98B	
R9	270 000 Ω	.25W.	C-2795-91B	
R10	1 MEG.	.25W.	C-2795-98B	
R11	1 MEG. T.C. & SWITCH		A-15131-1	
R12	2700 Ω	.25W.	C-2795-169B	
R13	470000 Ω	.25W.	C-2795-223B	
R14	470000 Ω	.25W.	C-2795-223B	
R15	330 Ω	1 W.	C-2797-147B	
R18	680 Ω	1 W.	C-2797-155B	ON 25 ~ RECEIVERS ONLY
R16	100 Ω	.25W	C-2795-135B	
R17	10 000 Ω	.25W.	C-2795-74B	ON MODEL 651-SXP ONLY

L1	I.F. REJECTOR COIL	A-15772
L2	2ND S.W. ANT. COIL	A-15778
L3	1ST S.W. ANT. COIL	A-15774
L4	B.C. ANT. COIL	A-14664-1
L5	2ND S.W. OSC. COIL	A-15233-14
L6	1ST S.W. OSC. COIL	A-15773
L7	B.C. OSC. COIL	A-15771
L8	NO. 1 I.F. COIL	A-12064-39
L9	NO. 2 I.F. COIL	A-12064-17

MODELS 651, 651-D, 651-SX, 651-SXD, 651-SXP

INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

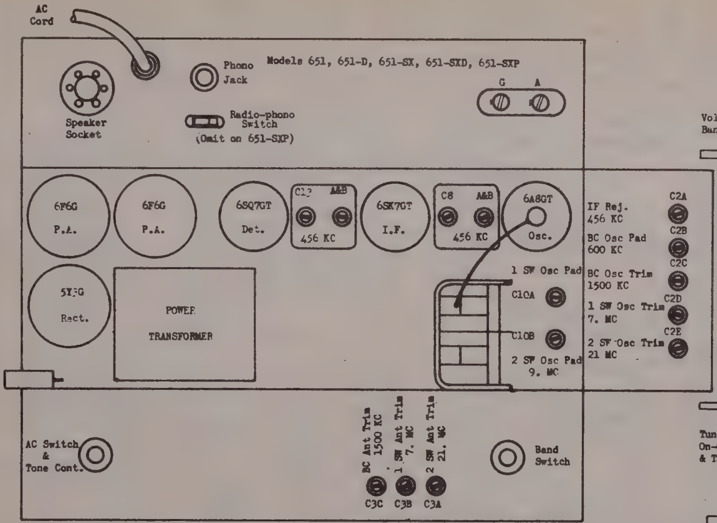
TUBE	FUNCTION Line Voltage: 117 volts	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid cap
6A8GT	Osc. - Converter	0	6.2*	230	82	-3	150	0	0	-.
6SK7GT	I-F Amplifier	0	0	0	-.2	0	80	6.2*	230	-
6SQ7GT	Det - AVC - 1st Audio	0	-.3	0	-.2	**	35	6.2*	0	-
6F6G	Power Amplifier	0	0	225	220	0	-3	6.2*	15	-
6F6G	Power Amplifier	0	0	225	235	0	-3	6.2*	15	-
5Y3G	Rectifier	0	320*	0	300*	0	300*	0	320*	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements.

*AC
** Cannot be measured with 1000 ohms/volt voltmeter.

MODELS 651, 651D,
651-SX, 651-SXD, 651-SXP
MODEL 831-X

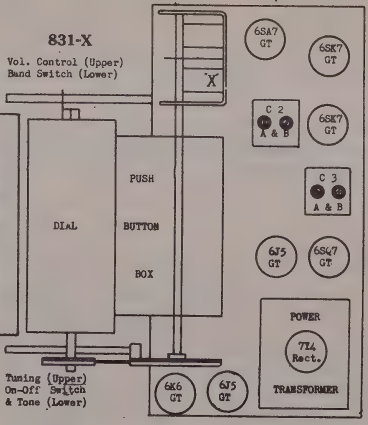
SPARKS WITHINGTON CO.



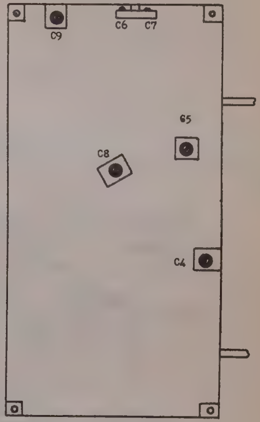
ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer even with last calibration at low frequency end of dial with gang closed.)							
2	I.F.	6A8GT Grid	.1 mf.	456 KC	BC	Open	C13 A&B	**
							C8 A&B	**
3	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C2A	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C2C Osc.	**
							C3C Ant.	**
5				600 KC		600 KC	C2B Pad.	***
6	(Repeat operation 4)							
7	1st Short-Wave Band	Ant.	*	7 MC	1 SW	7 MC	C2D Osc.	**
							C3B Ant.	**
8				2.5 MC		2.5 MC	C10A Pad.	***
9	(Repeat operation 7)							
10	2nd Short-Wave Band	Ant.	*	21 MC	2 SW	21. MC	C2E Osc.	**
							C3A Ant.	**
11				9. MC		9. MC	C10B Pad.	***
12	(Repeat operation 10)							
13	(Check operations 1 to 12 inclusive)							

Notes: * 100 ohm non-inductive resistor and 200 mmf. condenser in series.
** Peak accurately.
*** Rock dial while making this adjustment. Adjust to fundamental signal and not to image. Peak accurately.



TOP VIEW OF CHASSIS

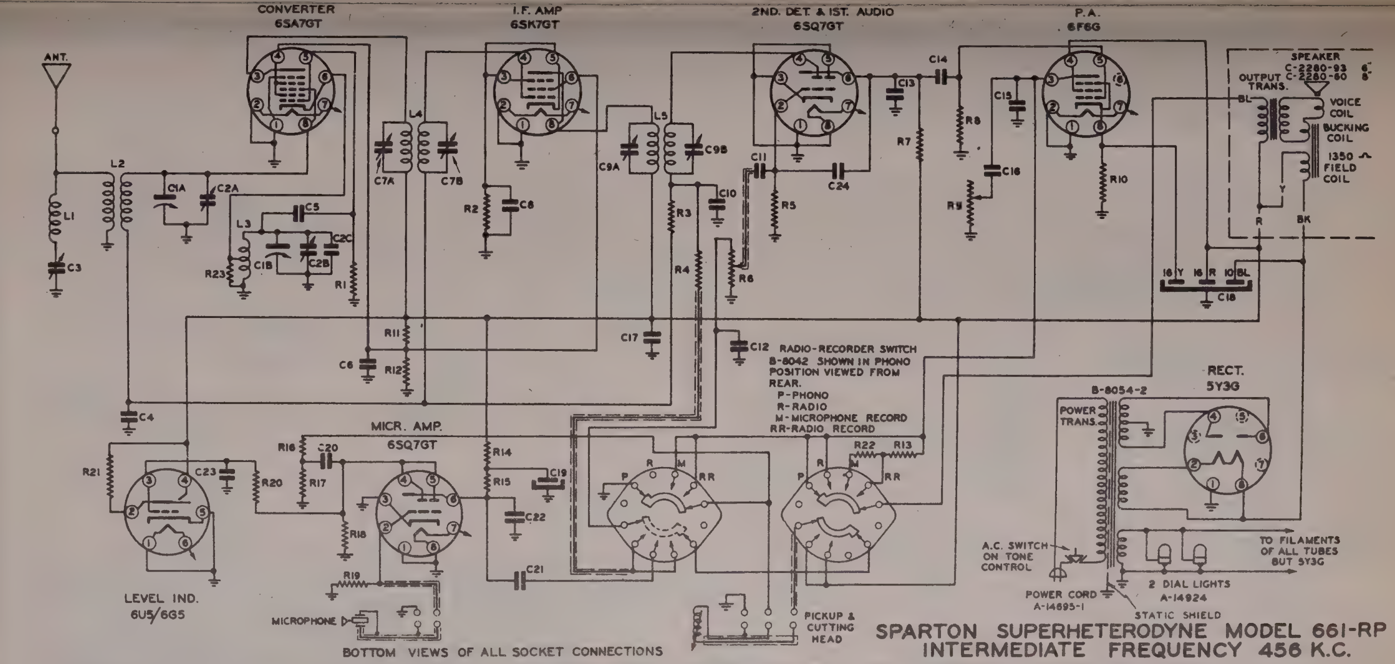


BOTTOM VIEW OF CHASSIS

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that last mark on BC scale is directly toward front of set when condenser plates are fully meshed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C3 A&B	2nd I-F
							C2 A&B	1st I-F
3	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C4	Adjust to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C6 Osc.	
							C5 Ant.	
5				600 KC	BC	600 KC	C7 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	Ant.	*	18 MC	SW	18 MC	C9 Osc.	Rock dial while adjusting for maximum output
							C8 Ant.	
9	(Check calibration and sensitivity at 6 MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

Notes: *Connect to point "X" on Variable Condenser. See drawing below.
**100 ohm and 200 mmf. in series



SPARTON SUPERHETERODYNE MODEL 661-RP
INTERMEDIATE FREQUENCY 456 K.C.

C1A&B	VARIABLE CONDENSER	B-8225
C2A,B,C	TRIMMERS ON VAR. COND.	
C3	I.F. REJECT. TRIMMER	A-14088-2
C4	.05 MFD. 200 MFD	C-3202-28C
C5	50 MMF. MICA	C-720-372
C6	.05 MFD. 400 V.	C-3204-28C
C7A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C8	.05 MFD. 200 V.	C-3202-28C
C9A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C10	100 MMF. MICA	C-720-339
C11	.02 MFD. 200 V.	C-3202-22C
C12	250 MMF. MICA	C-720-324
C13	100 MMF. MICA	C-720-339
C14	.02 MFD. 400 V.	C-3204-22C
C15	.003 MFD. 600 V.	C-3206-62C
C16	.03 MFD. 600 V.	C-3206-80C
C17	.05 MFD. 400 V.	C-3204-28C
C18	16-16-10 MFD. ELECT.	A-14780-2
C19	8 MFD. 250 V.	A-14782-1
C20	.01 MFD. 400 V.	C-3204-76C
C21	.02 MFD. 400 V.	C-3204-22C
C22	.01 MFD. 400 V.	C-3204-76C
C23	.01 MFD. 400 V.	C-3204-76C
C24	12 MMF. MICA	C-720-356

R1	27,000 Ω	.25W.	C-2795-79B
R2	330 Ω	.25W.	C-2795-56B
R3	1 MEGOHM	.25W.	C-2795-98B
R4	27,000 Ω	.25W.	C-2795-79B
R5	5.6 MEGOHM	.25W.	C-2795-107B
R6	500,000 Ω VOL. CONT.		A-15130-5
R7	220,000 Ω	.25W.	C-2795-90B
R8	560,000 Ω	.25W.	C-2795-95B
R9	TONE CONTROL & SW.		A-15128
R10	470 Ω	1 W.	C-2797-58B
R11	15,000 Ω	2 W.	C-2798-76A
R12	68,000 Ω	.25W.	C-2795-84B
R13	22,000 Ω	1 W.	C-2797-78B
R14	220,000 Ω	.25W.	C-2795-90B
R15	100,000 Ω	.25W.	C-2795-86B
R16	1.5 MEGOHM	.25W.	C-2795-100B
R17	1.2 MEGOHM	.25W.	C-2795-99B
R18	10 MEGOHM	.25W.	C-2795-110B
R19	5.6 MEGOHM	.25W.	C-2795-107B
R20	1 MEGOHM	.25W.	C-2795-98B
R21	220,000	.25W.	C-2795-90B
R22	56,000 Ω	.25W.	C-2795-83B
R23	330 Ω	.25W.	C-2795-56B

L1	I.F. REJECT. COIL	A-14718-1
L2	B.C. ANT. COIL	A-14974-4
L3	B.C. OSC. COIL	A-15232-6
L4	NO. 1 I.F. COIL	A-12064-41
L5	NO. 2 I.F. COIL	A-12064-17

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to last calibration mark at low end of dial with condenser gang fully closed)							
2	I. F.	Ant.	.1 mf.	456 kc	*	open	C8 A & B C7 A & B	2nd. I.F. 1st. I.F.
3	Rejector	Ant.	200 mmf.	456 kc	*	closed	C3	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 kc	*	1500 kc	C2B	oscillator
5				1500 kc	*	1500 kc	C2A	antenna
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 kc, 900 kc, and 1500 kc.)							

(Check operations 1 to 7 inclusive)

* "RECEIVE RADIO"

Sparton Superheterodyne Model
661-RP

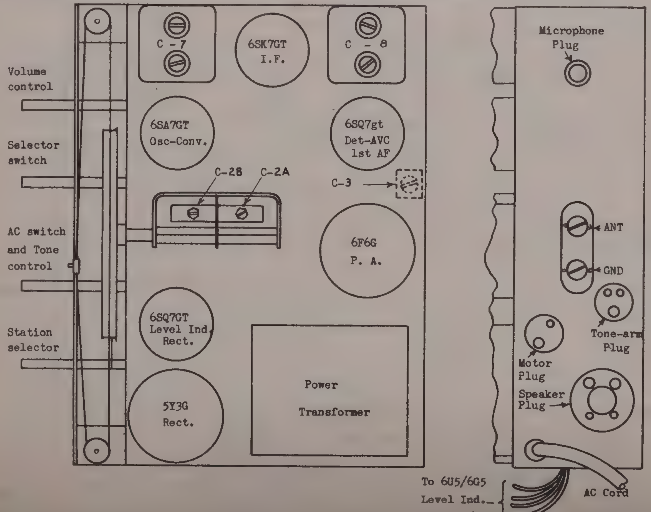
VOLTAGE CHART

Line voltage: 117 volts		Position of Volume Control; Full with Ant. disconnected Position of Band Switch: Broadcast							
Tube	Function	Voltage of socket prongs to Gnd. (See prong no's. on diagram)							
		No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8
6SA7GT	Oscillator-Converter	0	0	220	77	-7.2	0	6.1*	0
6SK7GT	I-f Amplifier	0	0	2.7	0	2.7	77	6.1*	220
6SQ7GT	Det-AVC-1st Audio	0	**	0	0	0	58	6.1*	0
6F6G	Power Amplifier	0	0	200	220	0	57	6.1*	15.
6SQ7GT	Microphone Amplifier	0	**	0	**	**	45	6.1*	0
6U5/6G5	Record. Level Indicator	6.1*	19	0	220	0	0	-	-
5Y3G	Rectifier	0	320*	-	280*	-	280*	-	320*

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless otherwise designated, voltages in table are + DC voltages.

* AC volts
** Cannot be measured with 1000 ohms/volt voltmeter.

Check cutting head voltage with cutting head connected using signal generator (1000 KC 30% modulated) connected to "Ant" and "Gnd". With Selector switch in "Record Radio" position, advance gain until Level Indicator (6U5/6G5 tube) closes without over-lapping. AC voltage as measured from 6F6G plate to ground (AC meter in series with .1 mf. 400 volt condenser) should be approximately 52 volts.



HOW TO ADJUST THE CUTTING HEAD

The Model 661-RP features a combination "cutting" and "play back" head on the tone arm. The adjustment is controlled by the position of a knurled screw on the side of the arm, and the correct position of the screw is very important, otherwise record discs may not be correctly cut (or played back).

Loosening the screw will allow it to be moved up or down - up for cutting records and down for playing records. The slot in which the screw travels is designed so that the screw may be tightened in several intermediate positions, as well as in the extreme up or extreme down positions. These intermediate positions actually compensate for exceptionally hard or soft discs and new or used needles.

In general, three (3) positions of the screw will take care of all grades of record hardness and sharpness of the cutting needle.

(1) With the screw midway between maximum up (cut position) and maximum down (play position) for "soft" records and new cutting needles.

(2) With the screw approximately two-thirds of the way toward "cut position" for average hardness (Presto) records and slightly used needles.

(3) With the screw up as far as possible for extremely hard records and dull needles.

NOTE: It is never good practice to use dull needles.

The screw must always be all the way "down" at "play position" when records are played.

IMPORTANT:

Don't forget to insert a cutting needle in the tonearm head when a recording is to be made, and don't forget to remove the cutting needle and insert a play-back needle before playing any type of record.

The cutting needle must be inserted correctly with the needle screw tightened firmly against the flat spot on the shank of the needle.

Play-back needles should not be used too many times or they will ruin the cut in the record and cause fuzzy distorted reproduction.

HOW TO ADJUST THE VOLUME FOR BEST RESULTS

In order to make good records there must be just the right amount of volume whether it is a radio program that is being recorded, or whether the microphone is being used.

To make it easy to tell when the volume is "just right", SPARTON Record Makers are equipped with a Level Indicator Tube which acts something like a Viso-Glo or Magic Eye Tuning Tube for radios. The circuits in the Record Makers are so arranged that the "eye" just closes without overlapping when the proper amount of volume is obtained. The volume control is used in the regular way to increase or decrease volume and the "eye" tells when the level is just right.

When a recording is being made do not attempt to turn the volume control up so that normal room volume is heard through the loud speaker.

SPARTON Engineers designed the Record Makers so that only a part of the music or speech comes through the speaker while a recording is being made, and this enables the user to know exactly what is "going on the record". This applies whether the selector switch is in the "Record Radio" position or in the "Record Microphone" position.

When recordings are being made the circuits are correctly matched for the cutting arm rather than the loud speaker. As a result, the tone volume is correct for the recording but the program will not sound natural through the loud speaker.

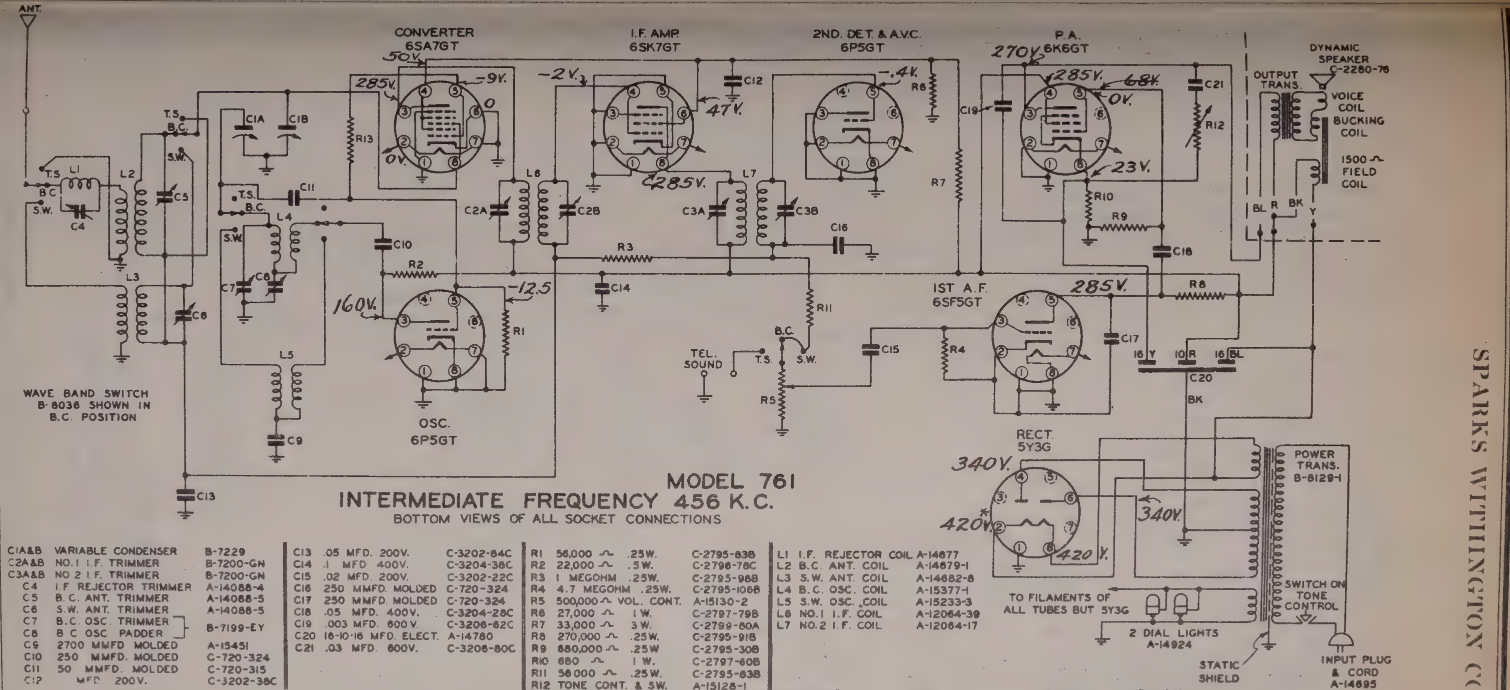
An important thing to remember is that the volume control should never be turned so high up that the "eye" over-laps on music or speech as this will cause "over-cutting" and spoil an otherwise good recording.

Model 761

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer at last calibrated mark with condenser gang closed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C3 A&B C2 A&B	
3	I-F Rej.	Ant.	200 mf.	456 KC	BC	Closed	C4	Adjust to minimum
4	Broad-cast Band	Ant.	200 mf.	1500 KC	BC	1500 KC	C7 (Osc.) C5 (Ant.)	
5				600 KC	BC	600 KC	C8 (Pad.)	***
6	(Repeat operation 4).							
7	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
8	SW Band	Ant.	**	18 MC	SW	18 MC	C6 (Ant.)	***
9	(Check calibration and sensitivity at 6. MC and 18. MC)							
10	(Check operations 1 to 9 inclusive.)							

*Connect to point marked "X" in drawing below.
**100 ohms and 200 mmf. in series.
***Rock dial while adjusting for maximum output. Be sure to adjust on fundamental signal and not on image.



MODEL 761

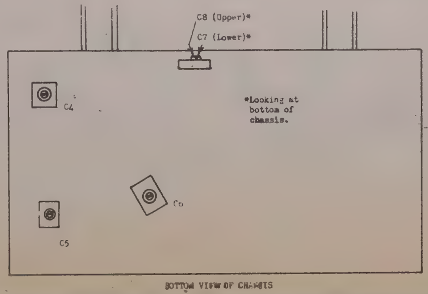
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-7229
C2A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C3A&B	NO 2 I.F. TRIMMER	B-7200-GN
C4	I.F REJECTOR TRIMMER	A-14088-4
C5	B.C. ANT. TRIMMER	A-14088-5
C6	S.W. ANT. TRIMMER	A-14088-5
C7	B.C. OSC. TRIMMER	B-7199-EY
C8	B C OSC PADDER	
C9	2700 MMFD MOLDED	A-15451
C10	250 MMFD. MOLDED	C-720-324
C11	50 MMFD. MOLDED	C-720-315
C12	MFD 200V.	C-3202-38C
C13	.05 MFD. 200V.	C-3202-84C
C14	.1 MFD 400V.	C-3204-38C
C15	.02 MFD. 200V.	C-3202-22C
C16	250 MMFD. MOLDED	C-720-324
C17	250 MMFD. MOLDED	C-720-324
C18	.05 MFD. 400V.	C-3204-28C
C19	.003 MFD. 600 V.	C-3206-62C
C20	16-10-16 MFD. ELECT.	A-14780
C21	.03 MFD. 600V.	C-3206-80C

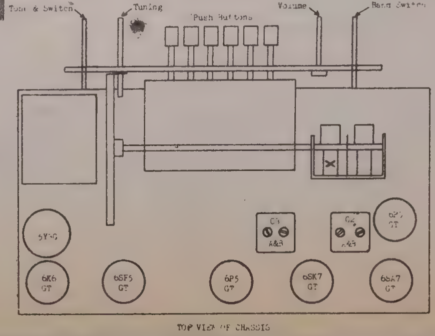
R1	56,000 Ω	.25W.	C-2795-83B
R2	22,000 Ω	.5W.	C-2796-76C
R3	1 MEGOHM	.25W.	C-2795-98B
R4	4.7 MEGOHM	.25W.	C-2795-106B
R5	500,000 Ω VOL. CONT.		A-15130-2
R6	27,000 Ω	1 W.	C-2797-79B
R7	33,000 Ω	3 W.	C-2799-80A
R8	270,000 Ω	.25W.	C-2795-91B
R9	680,000 Ω	.25W	C-2795-30B
R10	680 Ω	1 W.	C-2797-60B
R11	56 000 Ω	.25W.	C-2795-83B
R12	TONE CONT. & SW.		A-15128-1
R13	560 Ω	.25W.	C-2795-59B

L1	I.F. REJECTOR COIL	A-14677
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-8
L4	B.C. OSC. COIL	A-15377-1
L5	S.W. OSC. COIL	A-15233-3
L6	NO. 1 I.F. COIL	A-12064-39
L7	NO. 2 I.F. COIL	A-12064-17



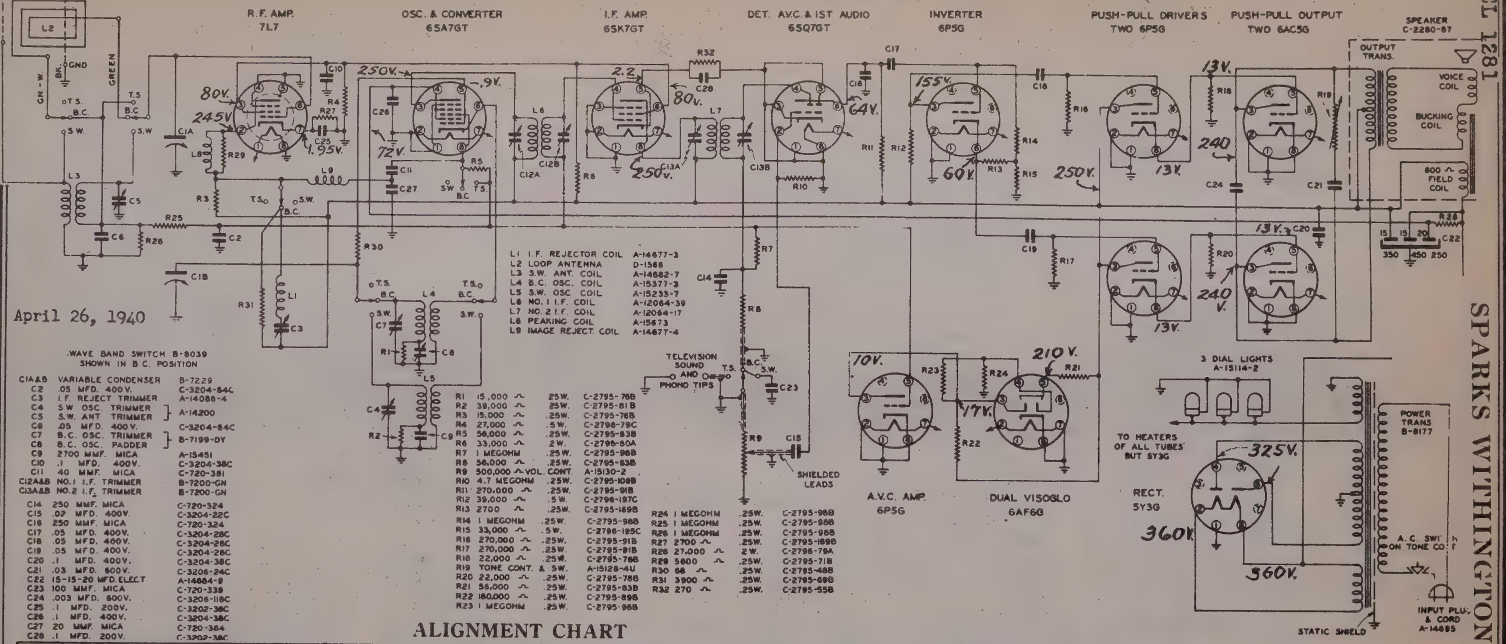
BOTTOM VIEW OF CHASSIS

FOR OTHER DATA, SEE INDEX



TOP VIEW OF CHASSIS

SPARTON SUPERHETERODYNE MODEL 1281
INTERMEDIATE FREQUENCY 456K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



April 26, 1940

WAVE BAND SWITCH B-8039
SHOWN IN B C. POSITION

C1A&B	VARIABLE CONDENSER	B-7229
C2	.05 MFD. 400V.	C-3204-84C
C3	I.F. REJECT TRIMMER	A-14088-4
C4	S.W. OSC. TRIMMER	A-14200
C5	S.W. ANT TRIMMER	
C6	.05 MFD. 400V.	C-3204-84C
C7	B.C. OSC. TRIMMER	B-7199-DY
C8	B.C. OSC. PADDER	
C9	2700 MMF. MICA	A-15451
C10	.1 MFD. 400V.	C-3204-38C
C11	40 MMF. MICA	C-720-381
C12A&B	NO.1 I.F. TRIMMER	B-7200-GN
C13A&B	NO.2 I.F. TRIMMER	B-7200-GN
C14	250 MMF. MICA	C-720-324
C15	.02 MFD. 400V.	C-3204-22C
C16	250 MMF. MICA	C-720-324
C17	.05 MFD. 400V.	C-3204-28C
C18	.05 MFD. 400V.	C-3204-28C
C19	.05 MFD. 400V.	C-3204-28C
C20	.1 MFD. 400V.	C-3204-38C
C21	.03 MFD. 600V.	C-3206-24C
C22	15-15-20 MFD. ELECT	A-14684-9
C23	100 MMF. MICA	C-720-339
C24	.003 MFD. 600V.	C-3206-118C
C25	.1 MFD. 200V.	C-3202-38C
C26	.1 MFD. 400V.	C-3204-38C
C27	20 MMF. MICA	C-720-384
C28	.1 MFD. 200V.	C-3202-38C

L1	I.F. REJECTOR COIL	A-14677-3
L2	LOOP ANTENNA	D-1566
L3	S.W. ANT. COIL	A-14682-7
L4	B.C. OSC. COIL	A-15377-3
L5	S.W. OSC COIL	A-15233-7
L6	NO. 1 I.F. COIL	A-12064-39
L7	NO. 2 I.F. COIL	A-12064-17
L8	PEAKING COIL	A-15673
L9	IMAGE REJECT. COIL	A-14677-4

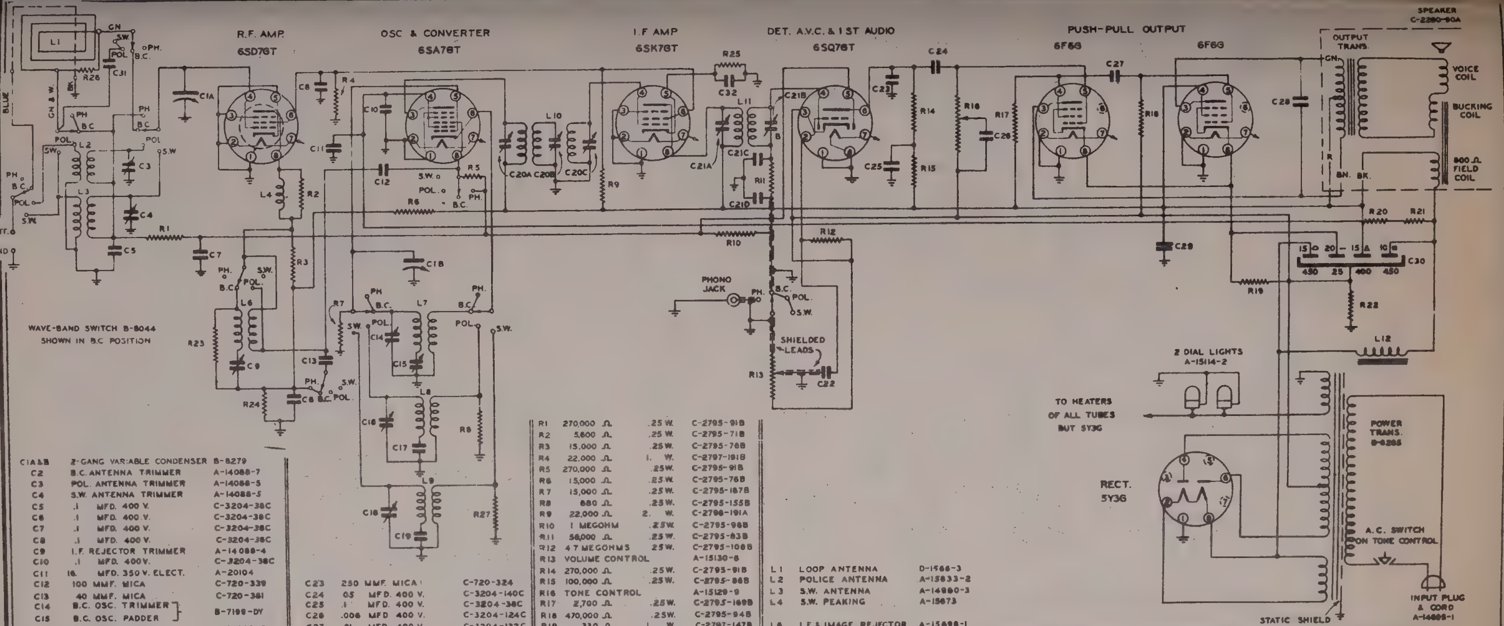
R1	15,000 Ω	.25W.	C-2795-76B
R2	39,000 Ω	.25W.	C-2795-81B
R3	15,000 Ω	.25W.	C-2795-76B
R4	27,000 Ω	.5W.	C-2798-79C
R5	56,000 Ω	.25W.	C-2795-83B
R6	33,000 Ω	2W.	C-2798-80A
R7	1 MEGOHM	.25W.	C-2795-98B
R8	56,000 Ω	.25W.	C-2795-83B
R9	500,000 Ω	VOL. CONT.	A-15130-2
R10	4.7 MEGOHM	.25W.	C-2795-106B
R11	270,000 Ω	.25W.	C-2795-91B
R12	39,000 Ω	.5W.	C-2798-197C
R13	2700 Ω	.25W.	C-2795-169B
R14	1 MEGOHM	.25W.	C-2795-98B
R15	33,000 Ω	.5W.	C-2798-195C
R16	270,000 Ω	.25W.	C-2795-91B
R17	270,000 Ω	.25W.	C-2795-91B
R18	22,000 Ω	.25W.	C-2795-78B
R19	TONE CONT. & SW.		A-15128-4U
R20	22,000 Ω	.25W.	C-2795-78B
R21	56,000 Ω	.25W.	C-2795-83B
R22	180,000 Ω	.25W.	C-2795-89B
R23	1 MEGOHM	.25W.	C-2795-98B
R24	1 MEGOHM	.25W.	C-2795-98B
R25	1 MEGOHM	.25W.	C-2795-98B
R26	1 MEGOHM	.25W.	C-2795-98B
R27	2700 Ω	.25W.	C-2795-169B
R28	27,000 Ω	2W.	C-2798-79A
R29	5600 Ω	.25W.	C-2795-71B
R30	68 Ω	.25W.	C-2795-48B
R31	3900 Ω	.25W.	C-2795-69B
R32	270 Ω	.25W.	C-2795-55B

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left hand stop line of alignment scale with condenser fully meshed. See special note below.)							
2	I.F.	*	.1 mf	456	BC	1600 KC	C13 A&B	2nd I.F.
							C12 A&B	1st I.F.
3	Rejector	**	200 mmf	456	BC	600 KC	C3	Adjust to minimum
4	Broadcast Band	**	200 mmf	1500 KC	BC	1500 KC	C7 (Osc.)	***
5				600 KC	BC	600 KC	C8 (Pad.)	***
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 750 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	**	****	18 MC	SW	18 MC	C4 (Osc.)	***
							C5 (Ant.)	***
9	(Check calibration and sensitivity at 6.0 MC, 9.0 MC and 18.0 MC)							
10	(Check operations 1 to 9 inclusive.)							

Special Note: For accurate alignment, the special scale found on page 12-22 should be used.

Notes: *Pin No. 8 of 6SA7GT Osc-Converter tube.
**Connect dummy antenna to "Antenna" of loop winding.
***Rock dial while adjusting for maximum output.
****100 ohms resistor and 200 mmf. condenser in series.



C1A&B	2-GANG VARIABLE CONDENSER	B-8279
C2	B.C. ANTENNA TRIMMER	A-14088-7
C3	POL. ANTENNA TRIMMER	A-14088-5
C4	S.W. ANTENNA TRIMMER	A-14088-5
C5	.1 MFD. 400 V.	C-3204-38C
C6	.1 MFD. 400 V.	C-3204-38C
C7	.1 MFD. 400 V.	C-3204-38C
C8	.1 MFD. 400 V.	C-3204-38C
C9	I.F. REJECTOR TRIMMER	A-14088-4
C10	.1 MFD. 400V.	C-3204-38C
C11	16. MFD. 350 V. ELECT.	A-20104
C12	100 MMF. MICA	C-720-339
C13	40 MMF. MICA	C-720-381
C14	B.C. OSC. TRIMMER	B-7198-DY
C15	B.C. OSC. PADDER	
C16	POL. OSC. TRIMMER	A-14088-5
C17	POL. OSC. PADDER	A-15451-3
C18	S.W. OSC. TRIMMER	A-14088-5
C19	S.W. OSC PADDER	A-15451-4
C20A.B&C	NO.1 I.F. TRIMMER	A-14792
C21A.B.C.D	NO.2 I.F. TRIMMER	A-20014
C22	.02 MFD. 400 V.	C-3204-22C

C23	250 MMF. MICA	C-720-324
C24	.05 MFD. 400 V.	C-3204-140C
C25	.1 MFD. 400 V.	C-3204-38C
C26	.006 MFD 400 V.	C-3204-124C
C27	.01 MFD. 400 V.	C-3204-132C
C28	.003 MFD. 600 V.	C-3206-118C
C29	.1 MFD 400 V	C-3204-38C
C30A	15. MFD. 400 V.	ELECT. A-20110
C30B	10. MFD. 450 V.	
C30C	20. MFD 25 V.	
C30D	15. MFD. 450 V.	
C31	250 MMF. MICA	C-720-324
C32	.1 MFD. 200 V.	C-3202-38C

R1	270,000 Ω	.25 W.	C-2795-91B
R2	5,600 Ω	.25 W.	C-2795-71B
R3	15,000 Ω	.25 W.	C-2795-76B
R4	22,000 Ω	1. W.	C-2797-191B
R5	270,000 Ω	.25 W.	C-2795-91B
R6	15,000 Ω	.25 W.	C-2795-76B
R7	15,000 Ω	.25 W.	C-2795-187B
R8	680 Ω	.25 W.	C-2795-155B
R9	22,000 Ω	2. W.	C-2798-191A
R10	1 MEGOHM	.25 W.	C-2795-98B
R11	56,000 Ω	.25 W.	C-2795-83B
R12	4.7 MEGOHMS	.25 W.	C-2795-108B
R13	VOLUME CONTROL		A-15130-8
R14	270,000 Ω	.25 W.	C-2795-91B
R15	100,000 Ω	.25 W.	C-2795-86B
R16	TONE CONTROL		A-15129-9
R17	2,700 Ω	.25 W.	C-2795-169B
R18	470,000 Ω	.25 W.	C-2795-94B
R19	330 Ω	1. W.	C-2797-147B
R20	12,000 Ω	1. W.	C-2797-185B
R21	8,200 Ω	1. W.	C-2797-73B
R22	100 Ω	.25 W	C-2795-135B
R23	5,600 Ω	.25 W.	C-2795-71B
R24	33,000 Ω	1. W.	C-2797-80B
R25	820 Ω	.25 W.	C-2795-154B
R26	5,600 Ω	.25 W.	C-2795-71B
R27	680 Ω	.25 W.	C-2795-187B

L1	LOOP ANTENNA	D-1566-3
L2	POLICE ANTENNA	A-15833-2
L3	S.W. ANTENNA	A-14880-3
L4	S.W. PEAKING	A-15673
L6	I.F. & IMAGE REJECTOR	A-15698-1
L7	B.C. OSC.	A-15377-4
L8	POL. OSC.	A-15835-1
L9	S.W. OSC.	A-14967-5
L10	NO. 1 I.F.	A-14794-3
L11	NO. 2 I.F.	A-12064-42
L12	FILTER CHOKE	A-15386

SPARTON SUPERHETERODYNE MODEL 782PA
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

(Original) Effective January 15, 1941

Line Voltage: 117 Volts AC

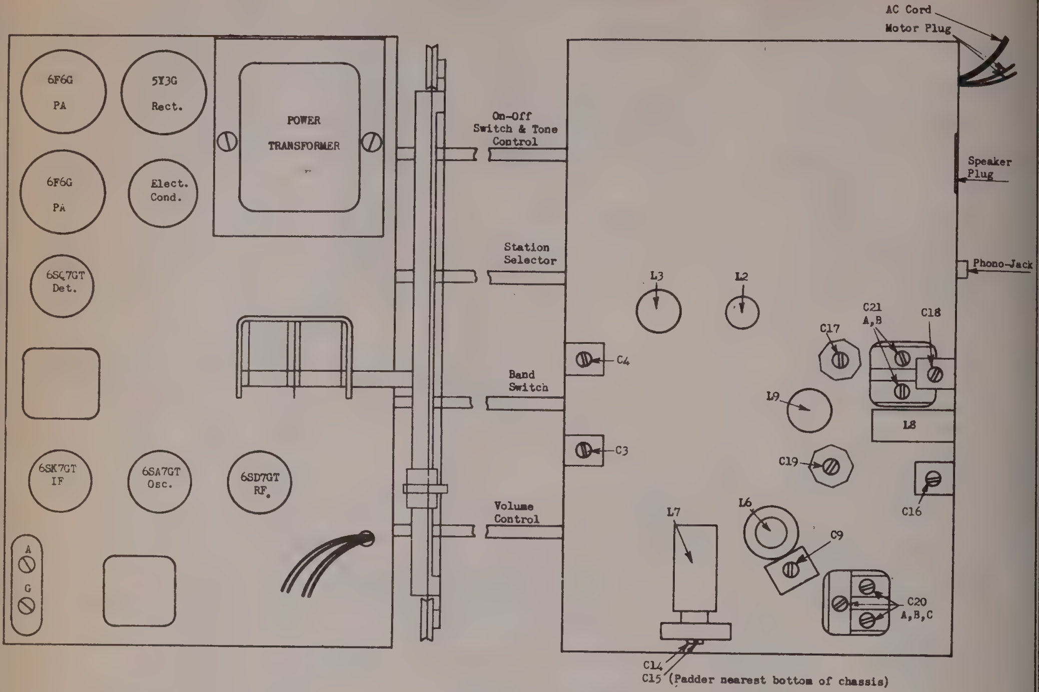
Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

*AC volts.
**Cannot be measured with Model 665 Analyzer.

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SD7GT	R-F Amplifier	0	0	0	**	0	90	6*	125
6SA7GT	Oscillator & Converter	0	0	230	90	**	0	6*	**
6SK7GT	I.F. Amplifier	0	0	0	**	4	90	6*	**
6SQ7GT	Det AVC & 1st Audio	0	**	**	**	**	30	6*	0
6F6G	Power Amplifier	0	0	230	230	**	—	6*	14
6F6G	Power Amplifier	0	0	230	230	**	80	6*	14
5Y3G	Rectifier	0	325	200	325*	0	325*	--	325

Sparton Superheterodyne Model

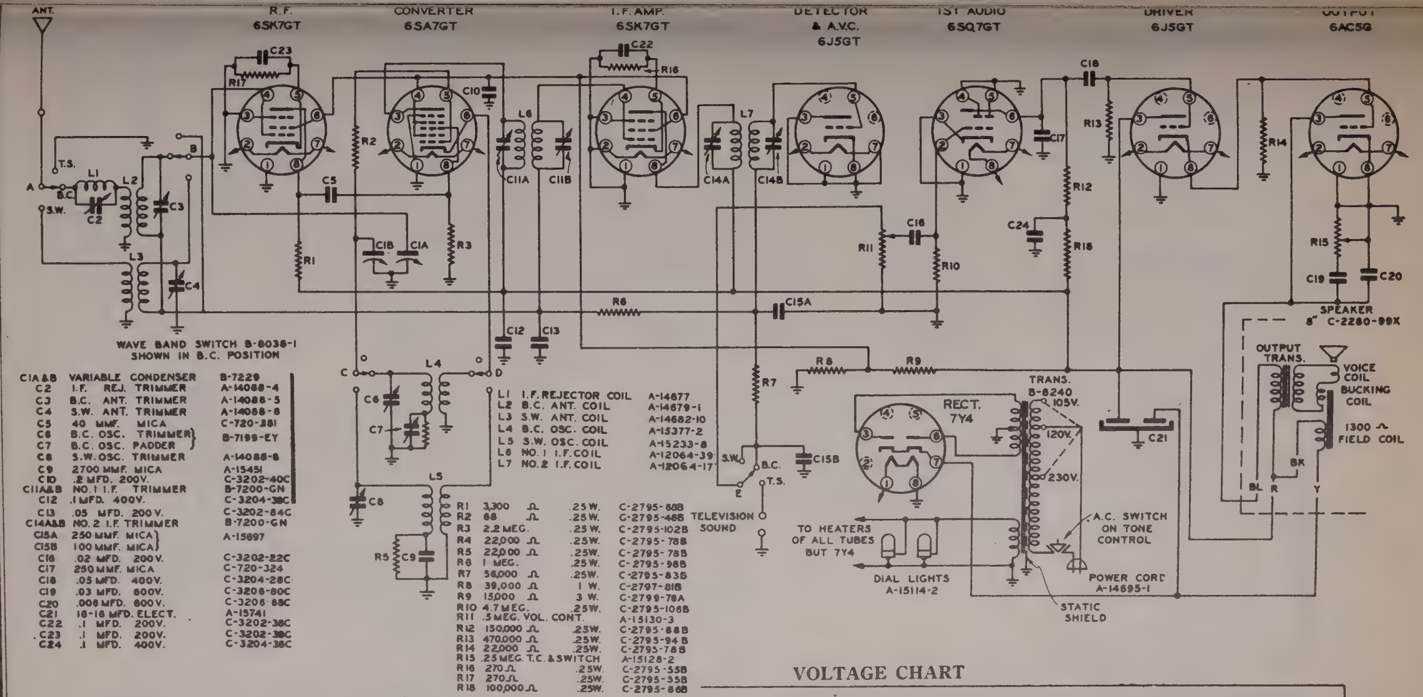
782-PA



ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left hand stop line of alignment scale with condenser plates fully meshed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C20 B **	***
3							C20 A&C C20 B	Peak accurately
4							C21 A&B	Peak accurately
5	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C9	Adjust to minimum
6	Broad cast Band	Ant.	200 mmf.	1600 KC	BC	1600 KC	C14 (Osc.)	Peak accurately
7				600 KC		600 KC	C15 (Pad.)	Peak accurately
8	(Repeat operation 6)							
9	(Check calibration and sensitivity at 600 KC, 1000 KC and 1600 KC)							
10	Police Band	Ant.	****	5. MC	Pol.	5. MC	C16 (Osc.) C3 (Ant.)	Peak accurately *****
11	(Repeat operation 10)							
12	(Check calibration and sensitivity at 2 MC, 3.5 MC and 5 MC)							
13	Short-Wave Band	Ant.	*****	18 MC	SW	18 MC	C18 (Osc.) C4 (Ant.)	Peak accurately *****
14	(Repeat operation 14)							
15	(Check calibration and sensitivity at 6 MC, 12 MC and 18 MC)							
16	(Check operations 1 to 15 inclusive.)							

Notes: *Connect to terminal No. 8 of type 6SA7GT Osc - Conv. tube.
**Bronze color trimmer screw.
***Turn trimmer screw all the way down.
****100 ohms, 200 mmf. in series.
*****Rock dial while adjusting for maximum output.



C1A&B	VARIABLE CONDENSER	B-7229
C2	I.F. REJ. TRIMMER	A-14088-4
C3	B.C. ANT. TRIMMER	A-14088-5
C4	S.W. ANT. TRIMMER	A-14088-8
C5	40 MMF. MICA	C-720-381
C6	B.C. OSC. TRIMMER	B-7199-EY
C7	B.C. OSC. PADDER	
C8	S.W. OSC. TRIMMER	A-14088-6
C9	2700 MMF. MICA	A-15451
C10	.2 MFD. 200V.	C-3202-40C
C11A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C12	.1 MFD. 400V.	C-3204-38C
C13	.05 MFD. 200 V.	C-3202-84C
C14A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C15A	250 MMF. MICA	A-15697
C15B	100 MMF. MICA	
C16	.02 MFD. 200 V.	C-3202-22C
C17	250 MMF. MICA	C-720-324
C18	.05 MFD. 400V.	C-3204-28C
C19	.03 MFD. 600V.	C-3208-80C
C20	.006 MFD. 600 V.	C-3206-68C
C21	16-16 MFD. ELECT.	A-15741
C22	.1 MFD. 200V.	C-3202-38C
C23	.1 MFD. 200V.	C-3202-38C
C24	.1 MFD. 400V.	C-3204-38C

L1	I.F. REJECTOR COIL	A-14677
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-10
L4	B.C. OSC. COIL	A-15377-2
L5	S.W. OSC. COIL	A-15233-8
L6	NO. 1 I.F. COIL	A-12064-39
L7	NO. 2 I.F. COIL	A-12064-17

R1	3,300 Ω	.25 W.	C-2795-68B
R2	68 Ω	.25 W.	C-2795-48B
R3	2.2 MEG.	.25 W.	C-2795-102B
R4	22,000 Ω	.25W.	C-2795-78B
R5	22,000 Ω	.25W.	C-2795-78B
R6	1 MEG.	.25 W.	C-2795-98B
R7	56,000 Ω	.25W.	C-2795-83B
R8	39,000 Ω	1 W.	C-2797-81B
R9	15,000 Ω	3 W.	C-2799-76A
R10	4.7 MEG.	.25W.	C-2795-106B
R11	.5 MEG. VOL. CONT.		A-15130-3
R12	150,000 Ω	.25W.	C-2795-88B
R13	470,000 Ω	.25W.	C-2795-94B
R14	22,000 Ω	.25W.	C-2795-78B
R15	.25 MEG. T.C. & SWITCH		A-15128-2
R16	270 Ω	.25W.	C-2795-55B
R17	270 Ω	.25W.	C-2795-55B
R18	100,000 Ω	.25W.	C-2795-86B

MODEL 831-X

INTERMEDIATE FREQUENCY 456 K.C

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

FOR OTHER DATA, SEE INDEX

VOLTAGE CHART

Line voltage: 117 volts

Position of Volume control: Full with Antenna disconnected

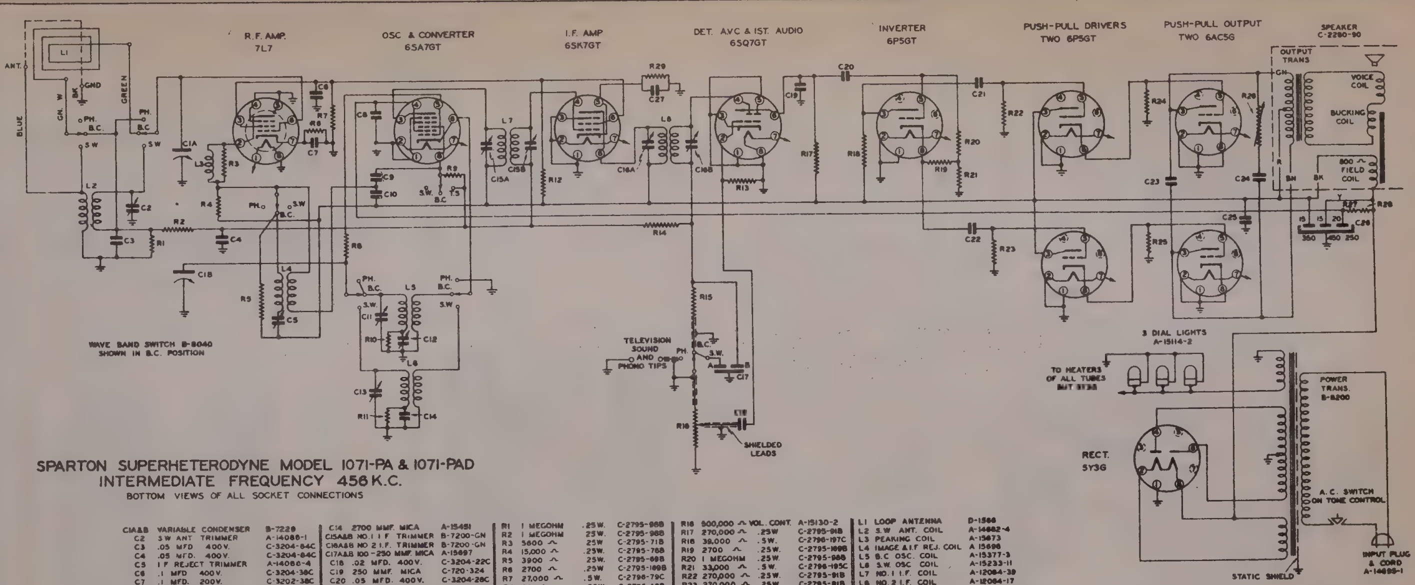
Position of Band Switch: Broadcast

Tube	Function	Voltage of socket prongs to Gnd. (Prong no's. on Schematic)							
		No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8
6SK7GT	R-f Amplifier	0	0	0	**	1.6	76	6.2*	237
6SA7GT	Oscillator-Converter	0	0	245	76	0	**	6.2*	0
6SK7GT	I-f Amplifier	0	0	0	**	1.6	76	6.2*	245
6J5GT	Detector-AVC	0	0	0	0	**	155	6.2*	0
6SQ7GT	1st Audio Amplifier	0	**	0	0	0	60	6.2*	0
6J5GT	Audio Driver	0	0	255	77	0	0	6.2*	11
6AC5G	Power Amplifier	0	0	240	0	11	0	6.2*	0
7Y4	Rectifier ***	0	0	300*	0	0	300*	0	0

* AC volts
** Cannot be measured with 1000 ohms/volt voltmeter.
*** Tube removed from socket to enable test prods to reach socket prongs.

August 1, 1940

MODELS 1071-PA, 1071-PAD


R.F. AMP. 7L7
OSC & CONVERTER 6SA7GT
I.F. AMP 6SK7GT
DET. AVC & IST. AUDIO 6SQ7GT
INVERTER 6P5GT
PUSH-PULL DRIVERS TWO 6P5GT
PUSH-PULL OUTPUT TWO 6AC5G
SPEAKER C-2280-90
OUTPUT TRANS
VOICE COIL
BUCKING COIL
800 Ω FIELD COIL
ANT.
BLUE
GREEN
GND
WAVE BAND SWITCH B-8040 SHOWN IN B.C. POSITION
TELEVISION SOUND AND PHONO TIPS
SHIELDED LEADS
3 DIAL LIGHTS A-15114-2
TO HEATERS OF ALL TUBES BUT 5Y3G
RECT. 5Y3G
POWER TRANS. B-8200
A.C. SWITCH ON TONE CONTROL
INPUT PLUG & CORD A-14899-1
STATIC SHIELD

SPARTON SUPERHETERODYNE MODEL 1071-PA & 1071-PAD
INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-7229
C2	S.W. ANT. TRIMMER	A-14088-1
C3	.05 MFD 400V.	C-3204-84C
C4	.05 MFD. 400V.	C-3204-84C
C5	I.F. REJECT TRIMMER	A-14088-4
C6	.1 MFD 400V.	C-3204-38C
C7	.1 MFD. 200V.	C-3202-38C
C8	.1 MFD. 400V.	C-3204-38C
C9	40 MMF. MICA	C-720-381
C10	40 MMF. MICA	C-720-381
C11	B.C. OSC. TRIMMER	B-7199-DY
C12	B.C. OSC. PADDER	
C13	S.W. OSC. TRIMMER	A-14088-5

C14	2700 MMF. MICA	A-15451
C15A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C16A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C17A&B	100-250 MMF. MICA	A-15697
C18	.02 MFD. 400V.	C-3204-22C
C19	250 MMF. MICA	C-720-324
C20	.05 MFD. 400V.	C-3204-28C
C21	.05 MFD. 400V.	C-3204-28C
C22	.05 MFD. 400V.	C-3204-28C
C23	.001 MFD. 600V.	C-3206-58C
C24	.03 MFD. 600V.	C-3206-24C
C25	.1 MFD. 400V	C-3204-38C
C26	15-15-20 MFD. ELECT.	A-15696
C27	.1 MFD 200V.	C-3202-38C

R1	1 MEGOHM	.25W.	C-2795-98B
R2	1 MEGOHM	.25W.	C-2795-98B
R3	5600 Ω	.25W	C-2795-71B
R4	15,000 Ω	.25W.	C-2795-76B
R5	3900 Ω	.25W.	C-2795-69B
R6	2700 Ω	.25W	C-2795-109B
R7	27,000 Ω	.5W.	C-2796-79C
R8	68 Ω	.25W.	C-2795-48B
R9	56,000 Ω	.25W.	C-2795-83B
R10	15,000 Ω	.25W.	C-2795-76B
R11	22,000 Ω	.25W.	C-2795-76B
R12	33,000 Ω	2W.	C-2798-80A
R13	4.7 MEGOHM	.25W.	C-2795-106B
R14	1 MEGOHM	.25W.	C-2795-98B
R15	56,000 Ω	.25W	C-2795-83B

R16	500,000 Ω VOL. CONT.		A-15130-2
R17	270,000 Ω	.25W	C-2795-91B
R18	39,000 Ω	.5W.	C-2796-197C
R19	2700 Ω	.25W.	C-2795-109B
R20	1 MEGOHM	.25W.	C-2795-98B
R21	33,000 Ω	.5W.	C-2796-195C
R22	270,000 Ω	.25W.	C-2795-91B
R23	270,000 Ω	.25W.	C-2795-91B
R24	22,000 Ω	.25W.	C-2795-78B
R25	22,000 Ω	.25W.	C-2795-78B
R26	TONE CONT. & SW.		A-15128-4
R27	12,000 Ω	1W.	C-2797-75B
R28	12,000 Ω	1W.	C-2797-75B
R29	270 Ω	.25W.	C-2795-55B

L1	LOOP ANTENNA	D-1566
L2	S.W. ANT. COIL	A-14882-4
L3	PEAKING COIL	A-15873
L4	IMAGE & I.F. REJ. COIL	A-15698
L5	B.C. OSC. COIL	A-15377-3
L6	S.W. OSC. COIL	A-15233-11
L7	NO. 1 I.F. COIL	A-12084-39
L8	NO. 2 I.F. COIL	A-12084-17

VOLTAGE CHART

Line Voltage: 117 Volts

Position of Volume Control: Full with set tuned to quiet channel.
Position of Band Switch: Broadcast

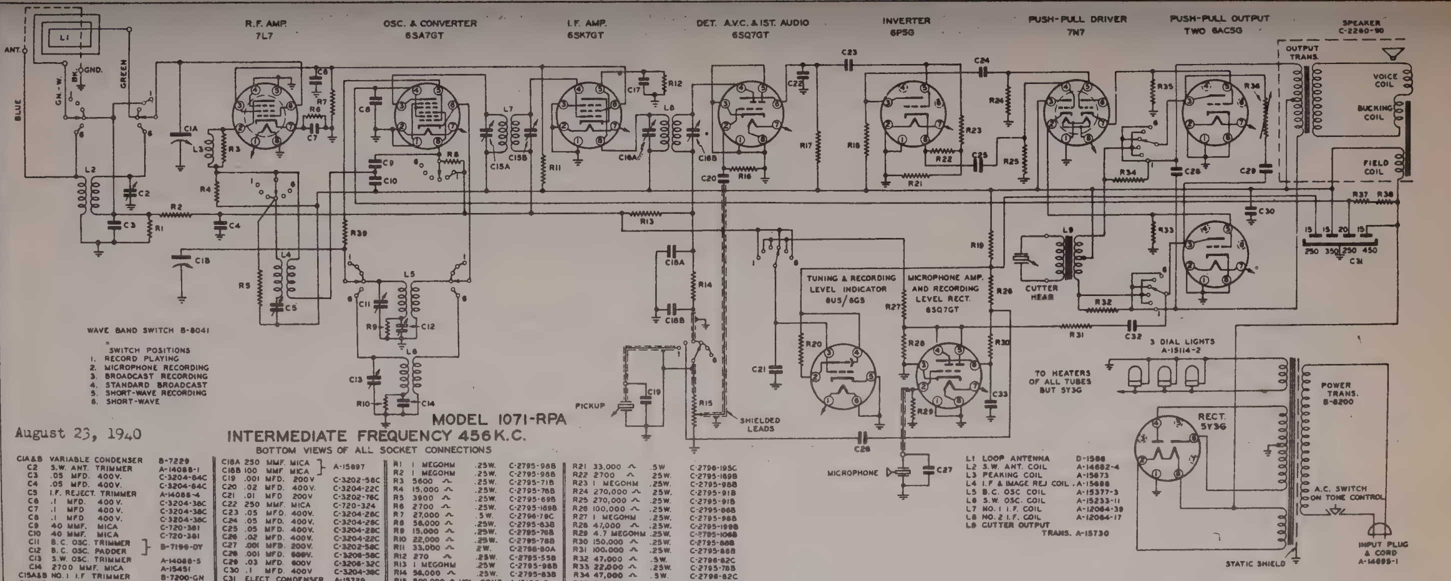
TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7L7	R-F Amplifier	—	185	58	—	—	**	1.25b	6*
6SA7GT	Osc-Converter	—	—	190	78	-1.25b	0	6*	0
6SK7GT	I-F Amplifier	—	—	—	**	1.25b	58	6*	190
6SQ7GT	Det - AVC - 1st AF	—	0	—	0	—	17	6*	—
6P5GT	Inverter	—	—	145	245	**	43	6*	43
6P5GT	Driver	—	—	245	—	**	—	6*	12.5a
6P5GT	Driver	—	—	245	—	**	—	6*	12.5a
6AC5G	Power Amplifier	—	—	230	—	12.5a	—	6*	—
6AC5G	Power Amplifier	—	—	230	80	12.5a	—	6*	—
5Y3G	Rectifier	—	325	230	325*	0	325*	200	360

*-AC volts.

A-25 volt DC scale.
B-2.5 volt DC scale

FOR OTHER DATA, SEE INDEX

SPARKS WITHINGTON CO.



August 23, 1940

MODEL 1071-RPA
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-7229
C2	S.W. ANT. TRIMMER	A-14088-1
C3	.05 MFD. 400V.	C-3204-84C
C4	.05 MFD. 400V.	C-3204-84C
C5	I.F. REJECT. TRIMMER	A-14088-4
C6	.1 MFD. 400 V.	C-3204-38C
C7	.1 MFD 400 V.	C-3204-38C
C8	.1 MFD 400 V.	C-3204-38C
C9	40 MMF. MICA	C-720-381
C10	40 MMF. MICA	C-720-381
C11	B.C. OSC. TRIMMER	B-7198-DY
C12	B.C. OSC. PADDER	
C13	S.W. OSC. TRIMMER	A-14088-5
C14	2700 MMF. MICA	A-15451
C15A&B	NO. 1 I.F TRIMMER	B-7200-GN
C16A&B	NO 2 I.F TRIMMER	B-7200-GN
C17	.1 MFD. 400V.	C-3204-38C

C18A	250 MMF. MICA	A-15897
C18B	100 MMF MICA	
C19	.001 MFD. 200V	C-3202-58C
C20	.02 MFD. 400V.	C-3204-22C
C21	.01 MFD 200V	C-3202-76C
C22	250 MMF. MICA	C-720-324
C23	.05 MFD. 400V.	C-3204-28C
C24	.05 MFD. 400V.	C-3204-28C
C25	.05 MFD. 400V.	C-3204-28C
C26	.02 MFD. 400V.	C-3204-22C
C27	.001 MFD. 200V.	C-3202-58C
C28	.001 MFD. 600V.	C-3206-58C
C29	.03 MFD. 600V	C-3206-32C
C30	.1 MFD. 400V	C-3204-38C
C31	ELECT CONDENSER	A-15729
C32	.02 MFD. 400V.	C-3204-22C
C33	.006 MFD. 400V.	C-3204-68C

R1	1 MEGOHM	.25W.	C-2795-98B
R2	1 MEGOHM	.25W.	C-2795-98B
R3	5600 Ω	.25W.	C-2795-71B
R4	15,000 Ω	.25W.	C-2795-76B
R5	3900 Ω	.25W.	C-2795-69B
R6	2700 Ω	.25W.	C-2795-169B
R7	27,000 Ω	.5W.	C-2796-79C
R8	56,000 Ω	.25W.	C-2795-83B
R9	15,000 Ω	.25W.	C-2795-76B
R10	22,000 Ω	.25W.	C-2795-78B
R11	33,000 Ω	2W.	C-2798-80A
R12	270 Ω	.25W.	C-2795-55B
R13	1 MEGOHM	.25W	C-2795-98B
R14	56,000 Ω	.25W.	C-2795-83B
R15	500,000 Ω VOL. CONT.		A-15130-2
R16	4.7 MEGOHM	.25W.	C-2795-106B
R17	270,000 Ω	.25W.	C-2795-91B
R18	39,000 Ω	.5W.	C-2796-197C
R19	75,000 Ω	.5W.	C-2796-204B
R20	220,000 Ω	.25W.	C-2795-90B

R21	33,000 Ω	.5W	C-2796-195C
R22	2700 Ω	.25W.	C-2795-169B
R23	1 MEGOHM	.25W.	C-2795-98B
R24	270,000 Ω	.25W.	C-2795-91B
R25	270,000 Ω	.25W.	C-2795-91B
R26	100,000 Ω	.25W.	C-2795-86B
R27	1 MEGOHM	.25W.	C-2795-98B
R28	47,000 Ω	.25W.	C-2795-199B
R29	4.7 MEGOHM	.25W.	C-2795-106B
R30	150,000 Ω	.25W.	C-2795-88B
R31	100,000 Ω	.25W.	C-2795-86B
R32	47,000 Ω	.5W.	C-2796-82C
R33	22,000 Ω	.25W.	C-2795-78B
R34	47,000 Ω	.5W.	C-2796-82C
R35	22,000 Ω	.25W.	C-2795-78B
R36	TONE CONTROL & SW.		A-15128-4
R37	12,000 Ω	1W.	C-2797-75B
R38	12,000 Ω	1W.	C-2797-75B
R39	68 Ω	.25W.	C-2795-48B

L1	LOOP ANTENNA	D-1986
L2	S.W. ANT. COIL	A-14682-4
L3	PEAKING COIL	A-15673
L4	I.F & IMAGE REJ COIL	A-15698
L5	B.C. OSC COIL	A-15377-3
L6	S.W. OSC. COIL	A-15233-11
L7	NO. 1 I.F. COIL	A-12084-39
L8	NO. 2 I.F. COIL	A-12084-17
L9	CUTTER OUTPUT TRANS.	A-15730

VOLTAGE CHART

Line Voltage: 117 volts		Position of Vol. Control: Full, with Set Tuned to Quiet Channel Position of Band Switch: Standard Broadcast							
Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7L7	R-F Amplifier	0	270	72	0	0	0	9.3	6.2*
6SA7GT	Osc. - Converter	0	0	280	90	-4.3	0	6.2*	0
6SK7GT	I-F Amplifier	0	0	0	-.2	2.2	75	6.2*	280
6SQ7GT	Det - AVC - 1st Audio	0	-.2	0	-.2	0	44	6.2*	0
6P5G	Phase Inverter	0	0	175 a	280	**	48	6.2*	69
7N7	Push-pull Driver	0	11	275	0	0	275	11	6.2*
6AC5G	Power Amplifier	0	0	270	0	11	0	6.2*	0
6AC5G	Power Amplifier	0	0	270	90	11	0	6.2*	0
6SQ7GT	Mike Amp. & Indicator	0	0	0	0	0	23 b	6.2*	0
6U5/6G5	Viso-Glo & Indicator Tube Removed	6.2*	8 c	0	185	0	0	-	-
5Y3G	Rectifier	0	370*	74	330*	0	330*	210	370*

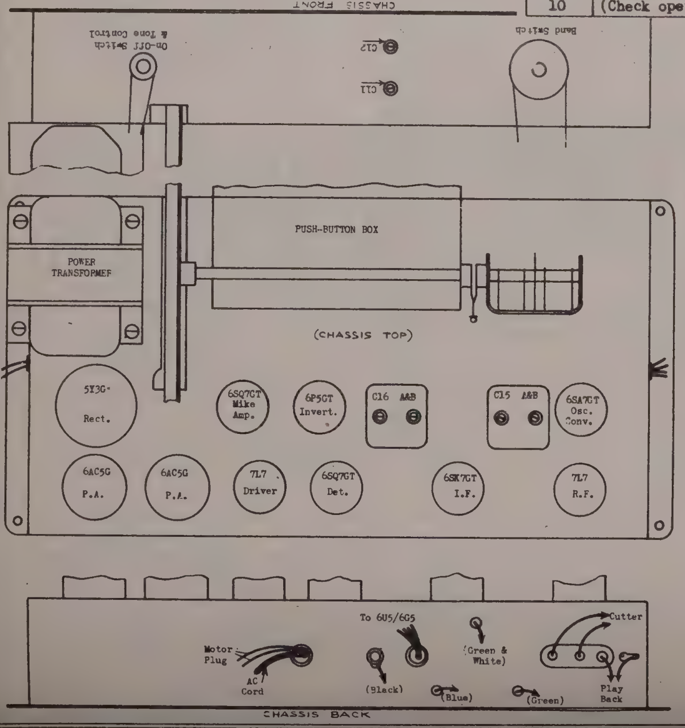
*A.C. volts.
**Cannot measure with M665 analyzer.
a. Use 250 V. scale.
b. Use 50 V. scale.
c. Use 10 V. scale.

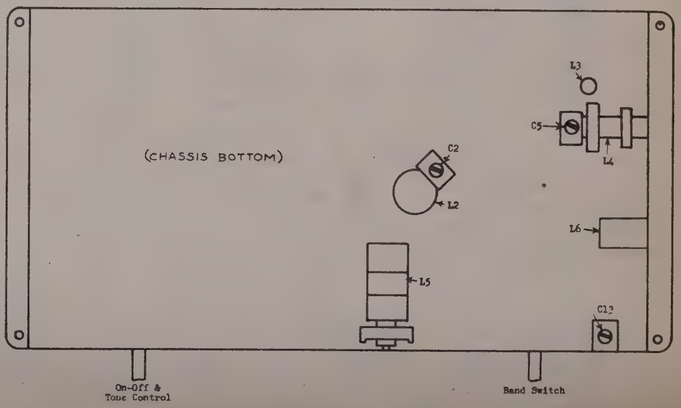
FOR OTHER DATA, SEE INDEX

Sparton Superheterodyne Models
1071-PA 1071-PAD
1071-RPA

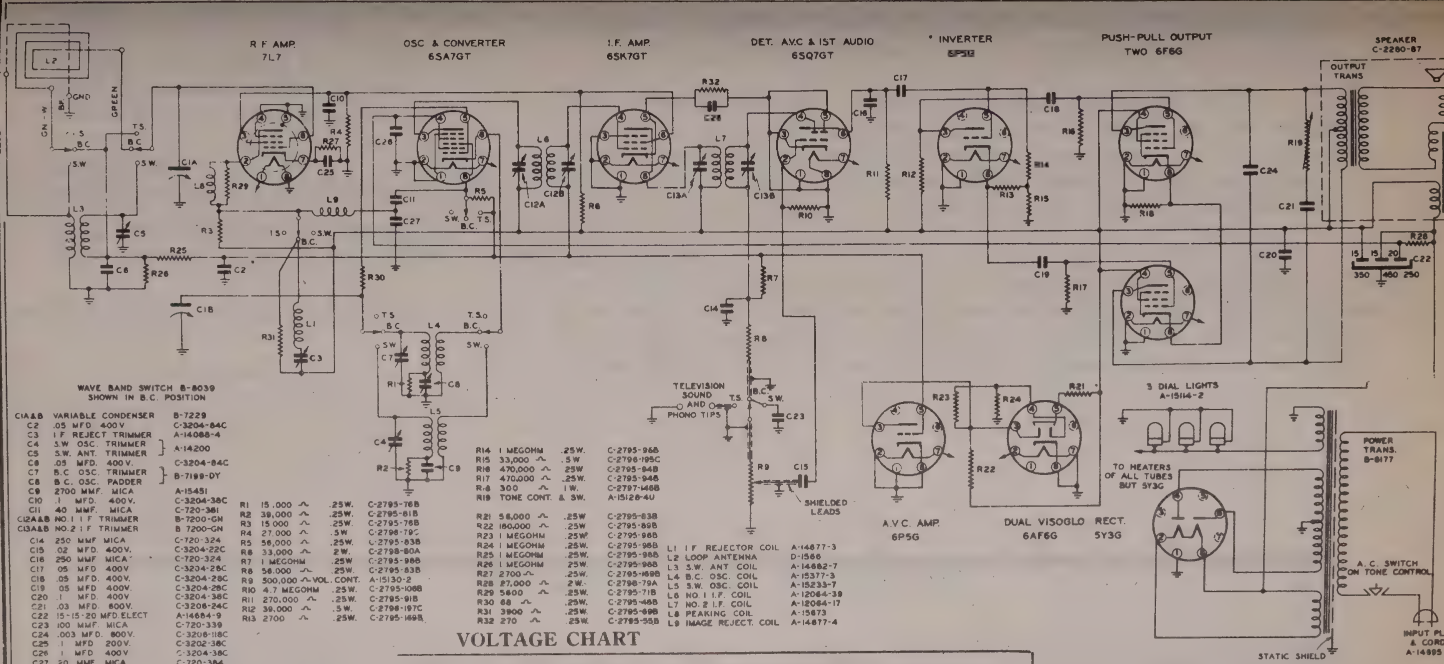
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left-hand stop line of alignment scale with condenser plates fully meshed. See special note below.)							
2	I.F.	*	.1 mf.	456 KC	BC	1600 KC	C16 A&B C15 A&B	2nd I.F. 1st I.F.
3	Rejector	**	200 mmf.	456 KC	BC	600 KC	C5	Adjust to minimum
4	Broadcast Band	**	200 mmf.	1500 KC	BC	1500 KC	C11 (osc.)	***
5				600 KC	BC	600 KC	C12 (pad.)	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 750 KC, 1000 KC and 1500 KC)							
8	Short-wave Band	**	****	18 MC	SW	18 MC	C13 (osc.) C2 (ant.)	***
9	(Check calibration and sensitivity at 6. MC, 9. MC and 18 MC)							
10	(Check operations 1 to 9 inclusive.)							

NOTES: *Pin No. 8 of 6SA7GT Oscillator-Converter tube
**Connect dummy antenna to "Antenna" of loop winding
***Rock dial while adjusting for maximum output.
****100 ohms and 200 mmf. in series.





SPARKS-WITHINGTON CO.



C1A&B	VARIABLE CONDENSER	B-7229
C2	.05 MFD 400V	C-3204-84C
C3	I F REJECT TRIMMER	A-14088-4
C4	S.W OSC. TRIMMER	A-14200
C5	S.W. ANT. TRIMMER	
C6	.05 MFD. 400V.	C-3204-84C
C7	B.C OSC. TRIMMER	B-7199-DY
C8	B C. OSC. PADDER	
C9	2700 MMF. MICA	A-15451
C10	.1 MFD. 400V.	C-3204-38C
C11	40 MMF. MICA	C-720-381
C12A&B	NO.1 I F TRIMMER	B-7200-GN
C13A&B	NO.2 I F TRIMMER	B 7200-GN
C14	250 MMF MICA	C-720-324
C15	.02 MFD. 400V.	C-3204-22C
C16	250 MMF MICA	C-720-324
C17	.05 MFD 400V	C-3204-28C
C18	.05 MFD. 400V.	C-3204-28C
C19	.05 MFD 400V.	C-3204-28C
C20	.1 MFD. 400V	C-3204-38C
C21	.03 MFD. 600V.	C-3206-24C
C22	15-15-20 MFD.ELECT	A-14684-9
C23	100 MMF. MICA	C-720-339
C24	.003 MFD. 600V.	C-3206-118C
C25	.1 MFD 200V.	C-3202-38C
C26	.1 MFD 400V	C-3204-38C
C27	20 MMF MICA	C-720-384
C28	.1 MFD, 200V	C-3202-38C

R1	15,000 Ω	.25W.	C-2795-76B
R2	39,000 Ω	.25W.	C-2795-81B
R3	15 000 Ω	.25W.	C-2795-76B
R4	27,000 Ω	.5W	C-2796-79C
R5	56,000 Ω	.25W.	C-2795-83B
R6	33,000 Ω	2W.	C-2798-80A
R7	1 MEGOHM	.25W	C-2795-98B
R8	56,000 Ω	.25W.	C-2795-83B
R9	500,000 Ω VOL. CONT.		A-15130-2
R10	4.7 MEGOHM	.25W.	C-2795-106B
R11	270,000 Ω	.25W.	C-2795-91B
R12	39,000 Ω	.5W.	C-2796-197C
R13	2700 Ω	.25W.	C-2795-169B
R14	1 MEGOHM	.25W.	C-2795-96B
R15	33,000 Ω	.5W	C-2796-195C
R16	470,000 Ω	.25W	C-2795-94B
R17	470,000 Ω	.25W.	C-2795-94B
R18	300 Ω	1W.	C-2797-146B
R19	TONE CONT. & SW.		A-15128-4U
R21	56,000 Ω	.25W	C-2795-83B
R22	180,000 Ω	.25W	C-2795-89B
R23	1 MEGOHM	.25W	C-2795-98B
R24	1 MEGOHM	.25W.	C-2795-98B
R25	1 MEGOHM	.25W.	C-2795-98B
R26	1 MEGOHM	.25W.	C-2795-98B
R27	2700 Ω	.25W.	C-2795-169B
R28	27,000 Ω	2W.	C-2798-79A
R29	5600 Ω	.25W.	C-2795-71B
R30	68 Ω	.25W.	C-2795-48B
R31	3900 Ω	.25W.	C-2795-69B
R32	270 Ω	.25W.	C-2795-55B

L1	I F REJECTOR COIL	A-14677-3
L2	LOOP ANTENNA	D-1566
L3	S.W. ANT COIL	A-14682-7
L4	B.C. OSC. COIL	A-15377-3
L5	S.W. OSC. COIL	A-15233-7
L6	NO. 1 I.F. COIL	A-12064-39
L7	NO. 2 I.F. COIL	A-12064-17
L8	PEAKING COIL	A-15673
L9	IMAGE REJECT. COIL	A-14677-4

VOLTAGE CHART

Line Voltage: 117 volts AC

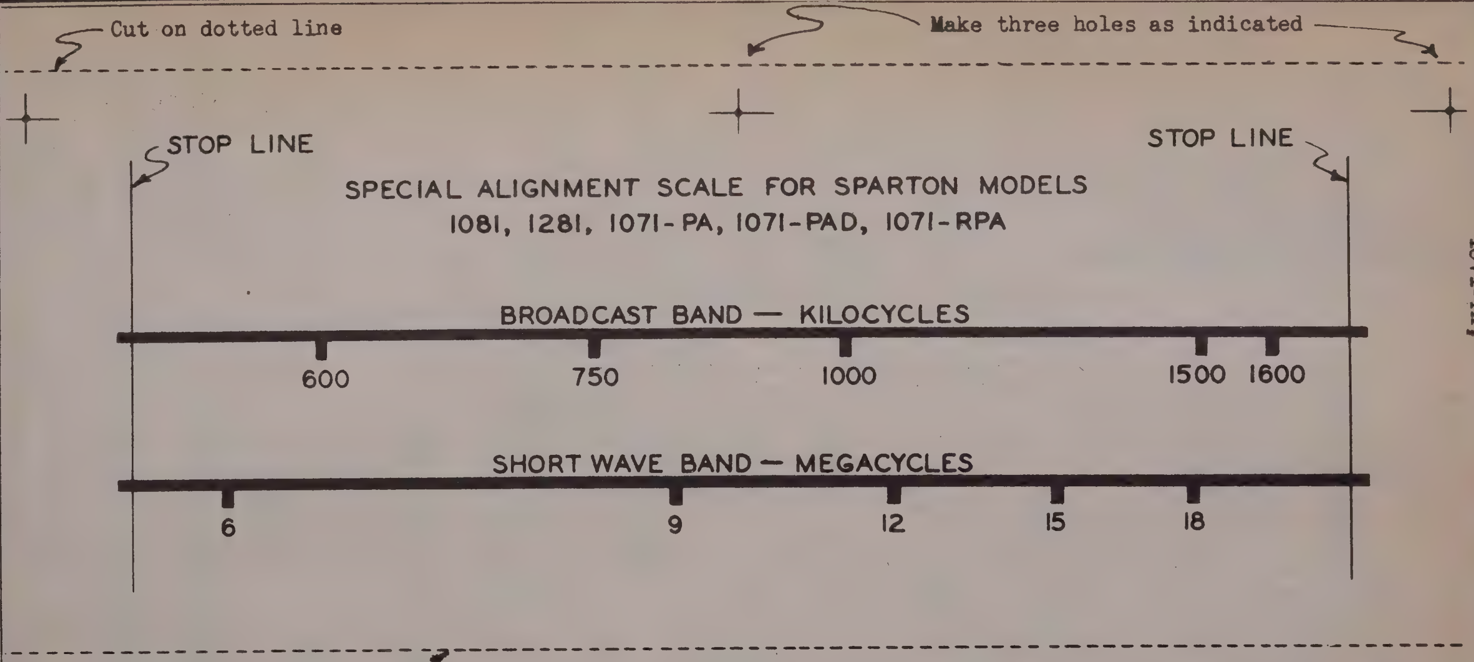
Position of Volume Control: Full with set tuned to quiet channel.
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7L7	R-F Amplifier	6.*	250	90	--	--	0	2a	--
6SA7GT	Osc-Converter	--	--	250	74	-.1b	0	6.*	***
6SK7GT	I-F Amplifier	--	--	--	-.1b	0	78	6.*	250
6SQ7GT	Det - AVC - 1st A-F	--	-.1b	--	0	--	60	6.*	--
6P5G	Inverter	--	--	155	45	0	250	6.*	62.
6F6G	Power Amplifier	--	--	245	250	0	0	6.*	0
6F6G	Power Amplifier	--	--	245	250	0	130	6.*	0
6P5G	AVC Amplifier	--	--	18.5	--	1.1b	--	6.*	--
6AF6G	Dual Viso-Glo	--	6.*	25	**	150	--	--	--
5Y3G	Rectifier	--	370*	0	320*	--	320*	260*	370*

*-AC volts.
**-Cannot be measured with 1000 ohms per volt voltmeter.

A-2.5 volt DC scale.
B-1. volt DC scale.

SPARTON SUPERHETERODYNE MODEL 1081
INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS


Cut on dotted line
Make three holes as indicated
STOP LINE
STOP LINE
SPECIAL ALIGNMENT SCALE FOR SPARTON MODELS
1081, 1281, 1071-PA, 1071-PAD, 1071-RPA
BROADCAST BAND — KILOCYCLES
600
750
1000
1500
1600
SHORT WAVE BAND — MEGACYCLES
6
9
12
15
18
Cut on dotted line

TO USE SCALE PROCEED AS FOLLOWS:

1. MAKE ACCURATE TRACING OF SCALE WITH CARBON PAPER ON CARDBOARD.
2. CUT OR PUNCH OUT THE HOLES AS INDICATED.
3. PLACE THE SCALE IN POSITION OVER THE CHASSIS DIAL PLATE SO THE SCALE HOLES AND PLATE HOLES COINCIDE. USE PINS OR SCREWS TO HOLD SCALE IN PLACE.

These SPARTON Models are designed with the dial scale as a part of the cabinet escutcheon for the dial. Since the actual dial scale is not a part of the chassis, accurate calibration and setting of the pointer become difficult unless a duplicate or auxiliary scale is used.

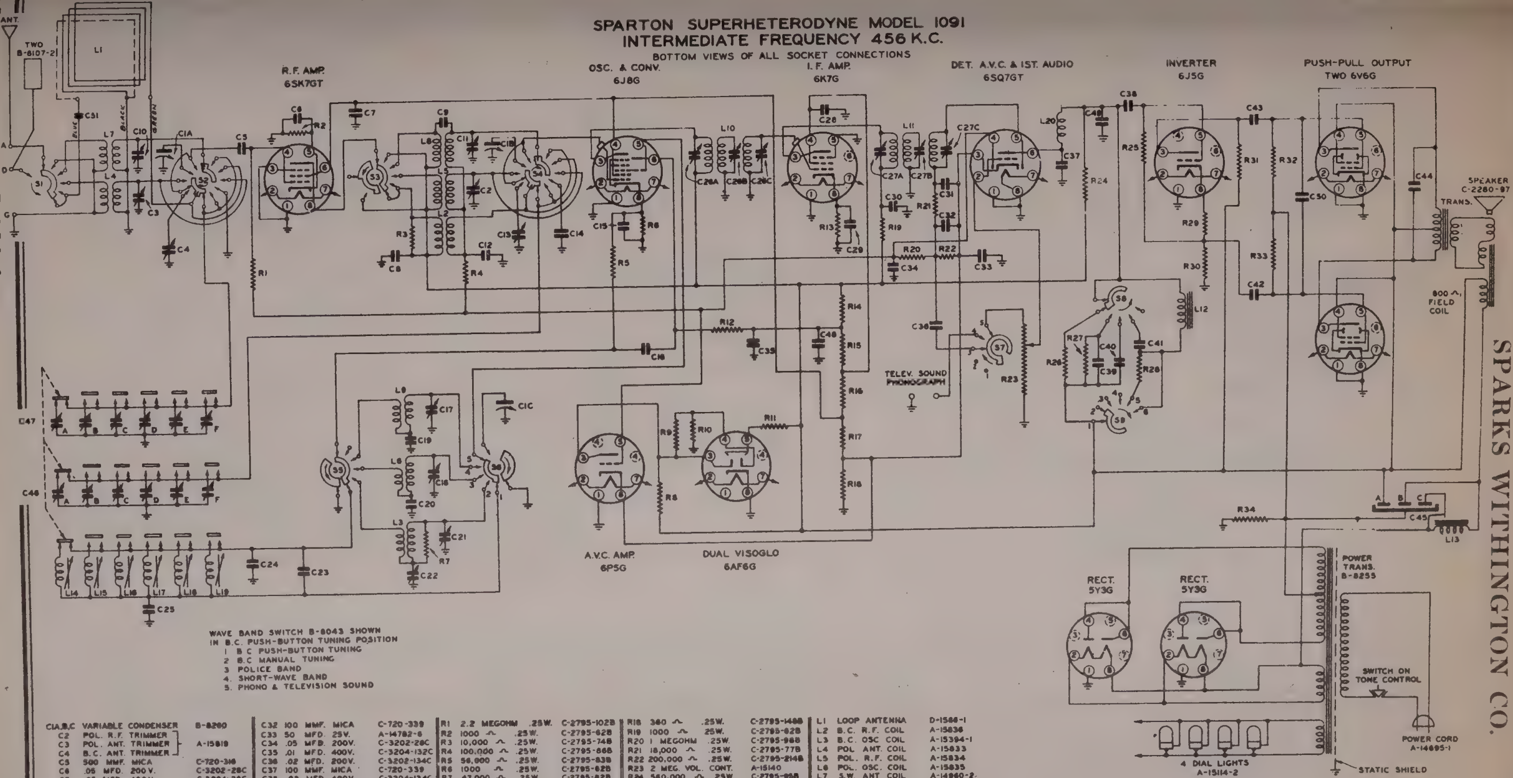
ALIGNMENT NOTES:

A. "Stop Lines" on scale indicate actual stopping points of pointer travel with complete 180 degress rotation of variable tuning condenser. Therefore, the "STOP LINES" on the scale are reference points and allow correct positioning of the various parts associated with the dial indicating mechanism.

B. Pointer must always be at LEFT HAND Stop Line with condenser closed. Then if pointer is not at RIGHT HAND Stop Line with condenser fully open, make necessary adjustments

SPARTON SUPERHETERODYNE MODEL 1091
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



WAVE BAND SWITCH B-8043 SHOWN
IN B.C. PUSH-BUTTON TUNING POSITION
1. B.C. PUSH-BUTTON TUNING
2. B.C. MANUAL TUNING
3. POLICE BAND
4. SHORT-WAVE BAND
5. PHONO & TELEVISION SOUND

C1A,B,C	VARIABLE CONDENSER	B-8260
C2	POL. R.F. TRIMMER	A-15819
C3	POL. ANT. TRIMMER	
C4	B.C. ANT. TRIMMER	
C5	500 MMF. MICA	C-720-316
C6	.05 MFD. 200 V.	C-3202-28C
C7	.05 MFD. 400 V.	C-3204-28C
C8	.05 MFD 400 V.	C-3204-28C
C9	5 MMF. MICA	C-720-381
C10	S.W. ANT TRIMMER	A-15820
C11	S.W. R.F. TRIMMER	
C12	.05 MFD. 200V.	C-3202-84C
C13	B.C. R.F. TRIMMER	A-15821
C14	.05 MFD. 200 V.	C-3202-28C
C15	.05 MFD 200 V.	C-3202-28C
C16	50 MMF MICA	C-720-320
C17	S.W. OSC TRIMMER	A-15820
C18	POL. OSC TRIMMER	
C19	3180 MMF MICA	A-15451-2
C20	1120 MMF MICA	A-15451-1
C21	B.C. OSC. TRIMMER	B-7199-BY
C22	B.C. OSC. PADDER	
C23	20 MMF. COMPENSATOR	A-14922-1
C24	370 MMF MICA	B-8265-1
C25	370 MMF MICA	B-8265-1
C26ABC	NO. 1 I.F. TRIMMER	A-14792
C27ABC	NO. 2 I.F. TRIMMER	A-14792
C28	.05 MFD. 400V.	C-3204-28C
C29	.05 MFD. 200V.	C-3202-28C
C30	.05 MFD 400V.	C-3204-28C
C31	100 MMF MICA	C-720-339

C32	100 MMF. MICA	C-720-339
C33	50 MFD. 25V.	A-14782-6
C34	.05 MFD. 200V.	C-3202-28C
C35	.01 MFD. 400V.	C-3204-132C
C36	.02 MFD. 200V.	C-3202-134C
C37	100 MMF. MICA	C-720-339
C38	.02 MFD. 400V.	C-3204-134C
C39	.002 MFD. 400V.	C-3204-116C
C40	.004 MFD. 400V.	C-3204-120C
C41	.006 MFD. 400V.	C-3204-124C
C42	.1 MFD. 400V.	A-15851-1
C43	.1 MFD. 400V.	A-15851-1
C44	.003 MFD. 600V.	C-3206-118C
C45 A	15 MFD. 450V.	ELECT A-14864-7
C45 B	10 MFD. 450V.	
C45 C	15 MFD. 450V.	
C46 A	578-160 MMF	A-15825-1
C46 B	578-160 MMF.	
C46 C	441-100 MMF	
C46 D	441-100 MMF.	
C46 E	222-40 MMF.	
C46 F	65-12 MMF.	
C47 A	578-160 MMF.	A-15825-2
C47 B	578-160 MMF.	
C47 C	441-100 MMF	
C47 D	441-100 MMF.	
C47 E	222-40 MMF.	
C47 F	65-12 MMF.	
C48	4 MFD 400V.	A-14782-8
C49	50 MMF. MICA	C-720-320
C50	100 MMF MICA	C-720-339
C51	200 MMF. MICA	C-720-330

R1	2.2 MEGOHM	.25W.	C-2795-102B
R2	1000 ^	.25W.	C-2795-62B
R3	10,000 ^	.25W.	C-2795-74B
R4	100,000 ^	.25W.	C-2795-86B
R5	56,000 ^	.25W.	C-2795-83B
R6	1000 ^	.25W.	C-2795-62B
R7	47,000 ^	.25W.	C-2795-82B
R8	180,000 ^	.25W.	C-2795-89B
R9	1 MEGOHM	.25W.	C-2795-98B
R10	1 MEGOHM	.25W.	C-2795-98B
R11	56,000 ^	.25W.	C-2795-83B
R12	22,000 ^	.5W.	C-2796-78C
R13	620 ^	.25W.	C-2795-154B
R14	12,000 ^	3W.	C-2799-185A
R15	6800 ^	1W.	C-2797-179B
R16	6800 ^	1W.	C-2797-179B
R17	16,000 ^	2W.	C-2798-188A

R18	360 ^	.25W.	C-2795-148B
R19	1000 ^	.25W.	C-2795-62B
R20	1 MEGOHM	.25W.	C-2795-98B
R21	18,000 ^	.25W.	C-2795-77B
R22	200,000 ^	.25W.	C-2795-214B
R23	2 MEG. VOL. CONT.		A-15140
R24	560,000 ^	.25W.	C-2795-95B
R25	470,000 ^	.25W.	C-2795-94B
R26	560,000 ^	.25W.	C-2795-95B
R27	680,000 ^	.25W.	C-2795-96B
R28	13,000 ^	.25W.	C-2795-186B
R29	2700 ^	.25W.	C-2795-189B
R30	22,000 ^	.25W.	C-2795-191B
R31	22,000 ^	.25W.	C-2795-191B
R32	47,000 ^	.25W.	C-2795-82B
R33	47,000 ^	.25W.	C-2795-82B
R34	180 ^	3W.	C-2799-141A

L1	LOOP ANTENNA	D-1566-1
L2	B.C. R.F. COIL	A-15836
L3	B.C. OSC COIL	A-15394-1
L4	POL ANT. COIL	A-15833
L5	POL. R.F. COIL	A-15834
L6	POL. OSC. COIL	A-15835
L7	S.W. ANT COIL	A-14960-2
L8	S.W. R.F. COIL	A-15837
L9	S.W. OSC. COIL	A-14967-3
L10	NO. 1 I.F. COIL	A-14794-1
L11	NO. 2 I.F. COIL	A-14794-2
L12	TONE CONT. CHOKE	B-8266
L13	FILTER CHOKE	A-15386
L14	P.B. B.C. OSC. COIL	B-8263
L15		
L16		
L17		
L18		
L19		
L20	R.F. CHOKE	A-14718-2

S1	ANT. PRI. SECTION	WAVE BAND SWITCH B-8043
S2	ANT. SEC. SECTION	
S3	DET. PRI SECTION	
S4	DET. SEC SECTION	
S5	OSC. PRI SECTION	
S6	OSC SEC. SECTION	
S7	RADIO-PHONO SEC.	
S8	TONE CONTROL	
S9	" "	

TONE CONTROL A-15823 SHOWN IN,
HIGH FIDELITY POSITION.
1. OFF
2. ON – HIGH FIDELITY
3. BARITONE
4. BASS
5. TREBLE
6. SPEECH

December 2, 1940

Sparton Superheterodyne Model 1091

VOLTAGE CHART

Line Voltage: 117 Volts	Position of Volume Control: Full with Antenna Disconnected Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6SK7GT	R.F. Amplifier	0	0	0	0	4.2	60	6.2*	300	-
6J8G	Osc. & Converter	0	0	300	60	**	80	6.2*	4.2	0
6K7G	I-F Amplifier	0	0	300	100	0	-	6.2*	4.2	0
6SQ7GT	Det. & AVC 1st Audio	0	0	**	**	**	130	6.2*	0	-
6J5G	Phase Inverter	0	0	225	300	**	80	6.2*	60	-
6V6G	Power Amplifier	0	0	300	300	**	0	6.2*	0	-
6V6G	Power Amplifier	0	0	300	300	**	0	6.2*	0	-
6P5G	AVC Amplifier	0	0	**	-	**	50	6.2*	0	-
6AF6G	Dual Visoglo	0	0	0	300	0	22	6.2*	0	-
5Y3G	Rectifier	0	400	-	375	375	375	0	400	-
5Y3G	Rectifier	0	400	-	375	-	375	-	400	-

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*AC volts.
**Cannot be measured with Weston Analyzer #665.

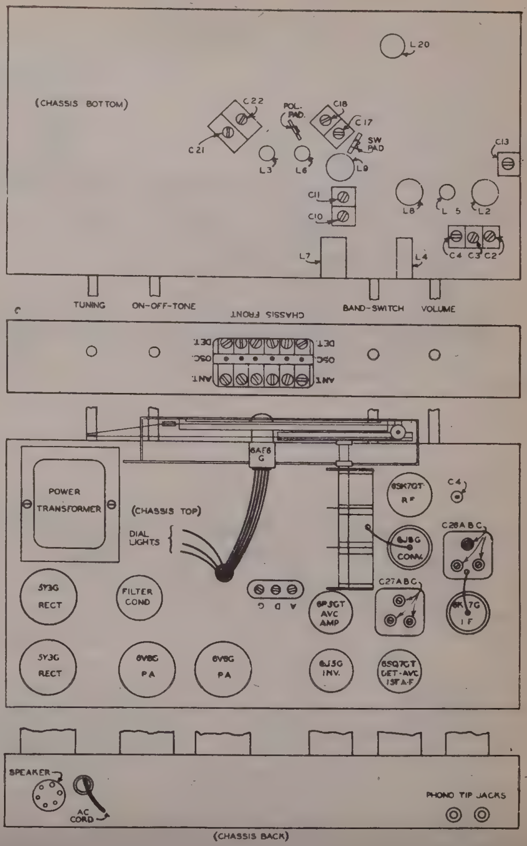
ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left hand stop line of alignment scale with condenser gang fully meshed.)							
2	I.F.	Grid Cap of 6J8G Osc. Conv.	.1 mf.	456 KC	BC	Open	C27 B *	**
3							C27 A C27 C	Peak accurately
4							C27 B *	Peak accurately
5							C26 B *	**
6							C26 A C26 C	Peak accurately
7							C26 B *	Peak accurately
8	CAUTION: Do not readjust trimmers 27A&C and 26A&C after red spot trimmers 27B and 26B have been peaked.							
9	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C21 (Osc.) C13 (RF) C4 (ANT)	Peak accurately Peak accurately Peak accurately
10				600 KC	BC	600 KC	C22 (Pad.)	Rock ***
11	(Repeat operation 9)							
12	(Check calibration and sensitivity at 1500 KC, 1000 KC and 600 KC)							
13	Police Band	Ant.	100 ohms 200 mmf. series	5 MC	Police	5 MC	C18 (Osc.) C2 (RF) C3 (ANT)	Peak accurately Peak accurately Peak accurately
14	(Check calibration and sensitivity at 5 MC, 3 MC and 1.6 MC)							
15	Short Wave Band	Ant.	100 ohms 200 mmf. series	18 MC	S.W.	18 MC	C17 (Osc.) C11 (RF) C10 (ANT)	Peak accurately Rock *** Peak accurately
16	(Check calibration and sensitivity at 18 MC, 12 MC and 6 MC)							
17	(Check operations 1 to 14 inclusive)							

NOTES: *Bronze color trimmer screw
**Turn trimmer screw all the way down
***Rock dial while adjusting for maximum output.

Sparton Superheterodyne Model 1091

CHASSIS DIAGRAM

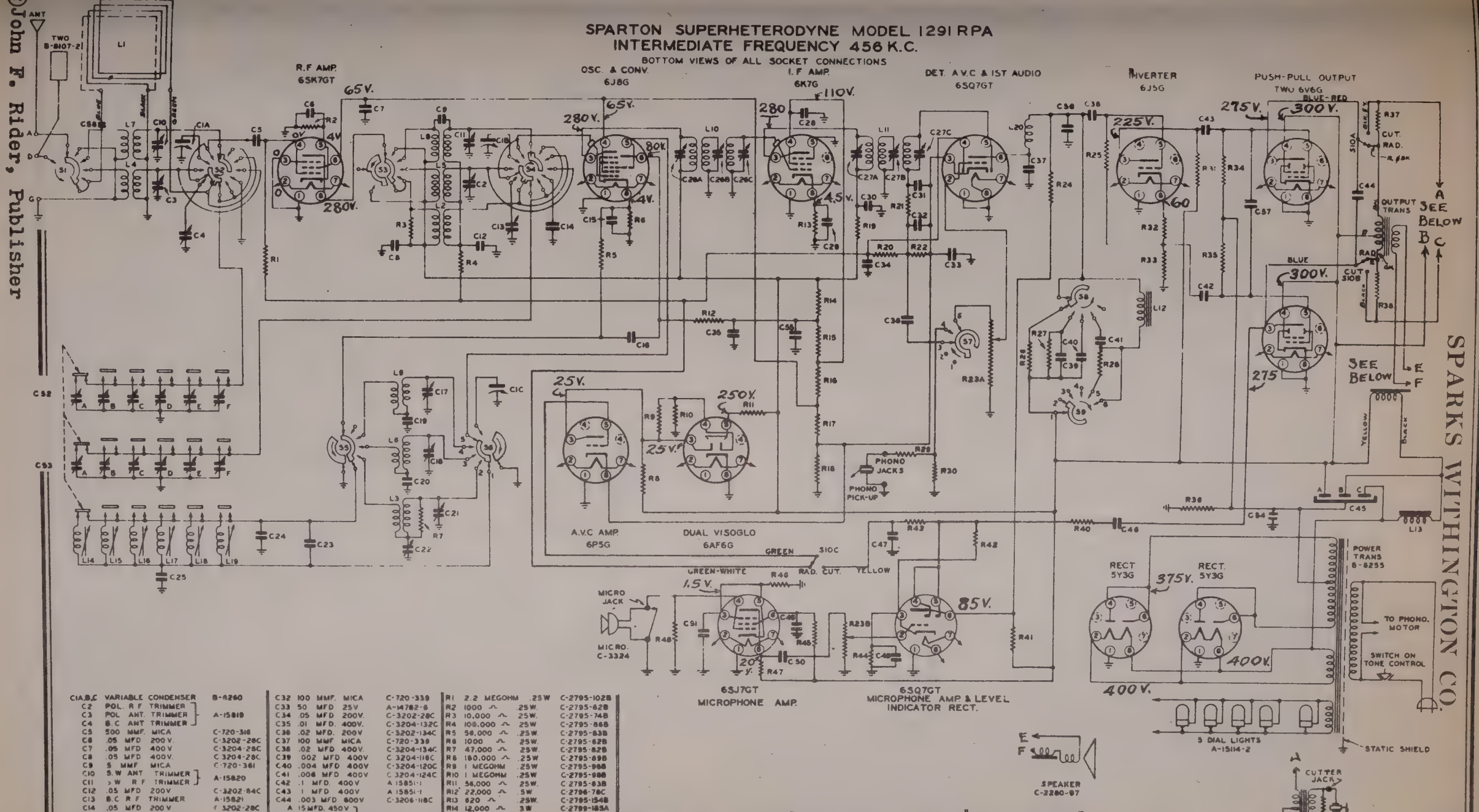


SPARKS WITHINGTON CO.

MODEL 1291-RPA

SPARTON SUPERHETERODYNE MODEL 1291 RPA
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1A,B,C	VARIABLE CONDENSER	B-8260
C2	POL. R F TRIMMER	A-15819
C3	POL ANT. TRIMMER	
C4	B.C ANT TRIMMER	
C5	500 MMF. MICA	C-720-316
C6	.05 MFD 200 V.	C-3202-28C
C7	.05 MFD 400 V	C-3204-28C
C8	.05 MFD 400V.	C 3204-28C
C9	5 MMF MICA	C-720-361
C10	S.W ANT TRIMMER	A-15820
C11	S.W R F TRIMMER	
C12	.05 MFD 200V	C-3202-84C
C13	B.C R F TRIMMER	A-15821
C14	.05 MFD 200 V	C 3202-28C
C15	05 MFD 200V	C 3202-28C
C16	50 MMF MICA	C-720-320
C17	S W OSC TRIMMER	A 15820
C18	POL OSC TRIMMER	
C19	3180 MMF MICA	A 15451 2
C20	1120 MMF MICA	A-15451 1
C21	B C OSC TRIMMER	B-7199-BY
C22	B C OSC PADDER	
C23	20 MMF COMPENSATOR	A-14922-1
C24	370 MMF MICA	B-8265 1
C25	370 MMF MICA	B 8265 1
C26ABC	NO. 1 I.F TRIMMER	A-14792
C27ABC	NO 2 I.F TRIMMER	A-14792
C28	05 MFD 400V	C 3204 28C
C29	.05 MFD 200V	C 3204-28C
C30	.05 MFD 400V	C 3204-28C
C31	100 MMF MICA	C 720-339

C32	100 MMF. MICA	C-720-339
C33	50 MFD 25V	A-14782-6
C34	.05 MFD 200V.	C-3202-28C
C35	.01 MFD. 400V.	C-3204-132C
C36	.02 MFD. 200V	C-3202-134C
C37	100 MMF MICA	C-720-339
C38	.02 MFD 400V.	C-3204-134C
C39	.002 MFD 400V	C 3204-116C
C40	.004 MFD 400V	C-3204-120C
C41	.006 MFD 400V	C 3204-124C
C42	.1 MFD. 400V	A 15851-1
C43	1 MFD 400V	A 15851-1
C44	.003 MFD 600V	C-3206-118C
A	15 MFD. 450V ELECT	A-14684-7
C45 B	10 MFD 450V	
C	15 MFD 450V.	
C46	02 MFD. 400 V	C-3204-134C
C47	01 MFD. 200 V.	C-3202-132C
C48	3 MFD 25 V.	A-14782-7
C49	05 MFD. 400 V.	C-3204-28C
C50	.02 MFD. 400 V.	C-3204-134C
C51	3 MFD. 25 V.	A-14782-7
C52	P.B. TRIMMERS (A-F)	A-15825-1
C53	P.B. TRIMMERS (A-F)	A-15825-2
C54	10 MFD 25V	A-14782-2
C55	4 MFD 400V.	A-14782-8
C56	50 MMF. MICA	C-720-320
C57	100 MMF MICA	C-720-339
C58	200 MMF. MICA	C-720-350

R1	2.2 MEGOHM	.25W	C-2795-102B
R2	1000 Ω	.25W.	C-2795-62B
R3	10,000 Ω	25W.	C-2795-74B
R4	100,000 Ω	25W	C-2795-86B
R5	56,000 Ω	.25W.	C-2795-83B
R6	1000 Ω	25W.	C-2795-62B
R7	47,000 Ω	25W.	C-2795-82B
R8	180,000 Ω	.25W	C-2795-89B
R9	1 MEGOHM	.25W	C-2795-98B
R10	1 MEGOHM	.25W	C-2795-98B
R11	56,000 Ω	25W.	C-2795-83B
R12	22,000 Ω	.5W	C-2796-78C
R13	620 Ω	.25W.	C-2795-154B
R14	12,000 Ω	3W	C-2799-185A
R15	6800 Ω	1W.	C-2797-179B
R16	6800 Ω	1W.	C-2797-179B
R17	18,000 Ω	2W	C-2798-188A
R18	180 Ω	25W	C-2795-141B
R19	1000 Ω	.25W.	C-2795-62B
R20	1 MEG.	.25W.	C-2795-98B
R21	18000 Ω	25W	C-2795-77B
R22	200000	25W.	C-2795-214B
R23A	2 MEG. VOL. CONT.		A-15141
R23B	1 MEG.		
R24	390000 Ω	.25W.	C-2795-93B
R25	470000 Ω	.25W.	C-2795-94B
R26	560000 Ω	.25W.	C-2795-95B
R27	680000 Ω	25W	C-2795-96B
R28	13000 Ω	.25W	C-2795-186B
R29	560000 Ω	.25W.	C-2795-95B
R30	180000 Ω	.25W.	C-2795-89B

R31	22000 Ω	.25W.	C-2795-191B
R32	2700 Ω	.25W.	C-2795-169B
R33	22000 Ω	25W	C-2795-191B
R34	47000 Ω	25W	C-2795-82B
R35	47000 Ω	25W.	C-2795-82B
R36	180 Ω	3.W.	C-2799-141A
R37	47000 Ω	5W	C-2796-82C
R38	47000 Ω	.5W.	C-2796-82C
R39	8000 Ω	7.W.	A-14263-2
R40	100000 Ω	25W	C-2795-86B
R41	180000 Ω	25W	C-2795-89B
R42	27000 Ω	.25W.	C-2795-79B
R43	1 MEG.	25W.	C-2795-98B
R44	2000 Ω	.25W	C-2795-166B
R45	1 MEG	25W.	C-2795-98B
R46	2000 Ω	.25W	C-2795-166B
R47	270000 Ω	.25W	C-2795-91B
R48	1 MEG.	.25W.	C-2795-98B

L1	LOOP ANT. COIL	D-1506-1
L2	B.C. R F. COIL	A-15836
L3	B C. OSC COIL	A-15394-1
L4	POL ANT COIL	A-15833
L5	POL R F COIL	A-15834
L6	POL OSC COIL	A-15835
L7	S.W. ANT COIL	A-14960-2
L8	S.W. R.F. COIL	A-15837
L9	S.W. OSC. COIL	A-14967-3
L10	NO.1 I F COIL	A-14794-1
L11	NO 2 I F COIL	A-14794-2
L12	TONE CONT. CHOKE	B-8266
L13	FILTER CHOKE	A-15366
L14	P.B.B.C.OSC.COILS	B-8263
L15		
L16		
L17		
L18		
L19		
L20	R.F. CHOKE	A-14718-2

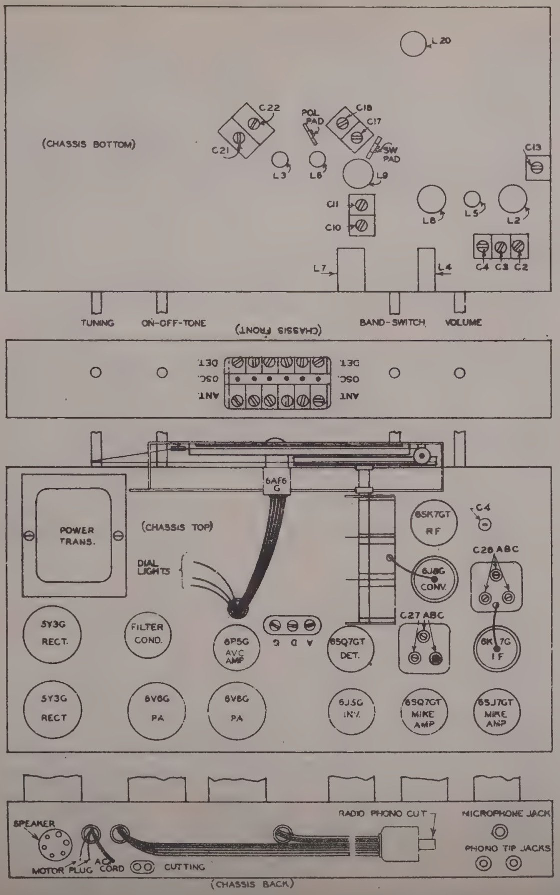
S1	ANT. PRI SECTION
S2	ANT. SEC. SECTION
S3	DET PRI SECTION
S4	DET SEC SECTION
S5	OSC. PRI SECTION
S6	OSC. SEC. SECTION
S7	RADIO - PHONO SEC.
S8	TONE CONTROL
S9	" "

WAVE BAND SWITCH B-8043
SHOWN IN B C PB. TUNING POS.
1. B.C PUSH BUTTON TUNING.
2. B.C MANUAL
3. POLICE BAND
4. SHORT WAVE BAND
5 PHONO - TELEV SOUND

S10A-C RAD CUT SW A 15898
TONE CONTROL A-15823
SHOWN IN HIGH FIDELITY
1. OFF
2 ON - HIGH FIDELITY
3. BARITONE
4. BASS
5. TREBLE
6. SPEECH

Dec. 2, 1940

Sparton Superheterodyne Model 1291-RPA



CHASSIS DIAGRAM

Sparton Superheterodyne Model 1291-RPA

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left hand line of alignment scale with condenser gang fully meshed)							
2	I.F.	Grid Cap of 6J8G Osc. Conv.	.1 mf.	456 KC	BC	Open	C27 B *	**
3							C27 A C27 C	Peak accurately
4							C27 B *	Peak accurately
5							C26 B *	**
6							C26 A C26 C	Peak accurately Peak accurately
7							C26 B *	Peak accurately
8	CAUTION: Do not readjust trimmers 27A&C and 26A&C after red spot trimmers 27B and 26B have been peaked.							
9	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C21 (Osc.) C13 (RF) C4 (ANT)	Peak accurately Peak accurately Peak accurately
10				600 KC	BC	600 KC	C22 (Pad)	Rock ***
11	(Repeat operation 7)							
12	(Check calibration and sensitivity at 1500 KC, 1000 KC and 600 KC)							
13	Police Band	Ant.	100 ohms 200 mmf. series	5 MC	Police	5 MC	C18 (Osc.) C2 (RF) C3 (ANT)	Peak accurately Peak accurately Peak accurately
14	(Check calibration and sensitivity at 5 MC, 3 MC and 1.6 MC)							
15	Short Wave Band	Ant.	100 ohms 200 mmf. series	18 MC	S.W.	18 MC	C17 (Osc.) C11 (RF) C10 (ANT)	Peak accurately Rock *** Peak accurately
16	(Check calibration and sensitivity at 18 MC, 12 MC and 6 MC)							
17	(Check operations 1 to 14 inculsive.)							

NOTES: *Bronze color trimmer screw
**Turn trimmer screw all the way down.
***Rock dial while adjusting for maximum output.

Model 1081

ALIGNMENT CHART

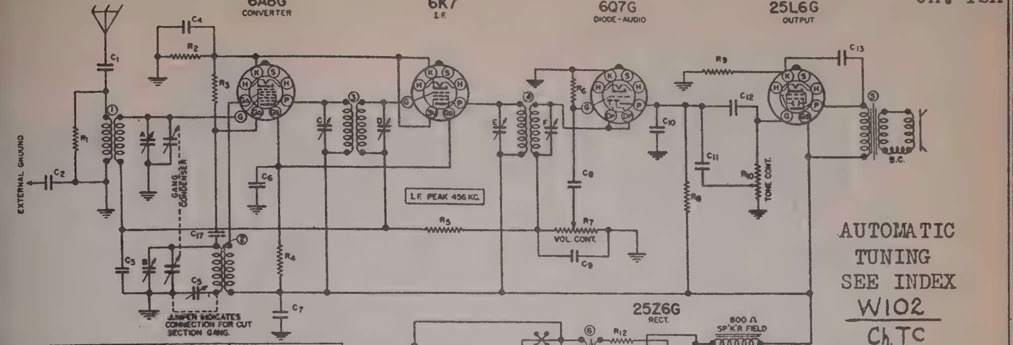
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is over left hand stop line of alignment scale with condenser fully meshed. See special note below.)							
2	I.F.	*	.1 mf	456	BC	1600 KC	C13 A & B C12 A & B	2nd I.F. 1st I.F.
3	Rejector	**	200 mmf.	456	BC	600 KC	C3	Adjust to minimum
4	Broadcast Band	**	200 mmf.	1500 KC	BC	1500 KC	C7 (Osc.)	***
5				600 KC	BC	600 KC	C8 (Pad.)	***
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 750 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	**	****	18 MC	SW	18 MC	C4 (Osc.) C5 (ANT.)	*** ***
9	(Check calibration and sensitivity at 6.0 MC, 9.0 MC and 18.0 MC)							
10	(Check operations 1 to 9 inclusive.)							

NOTES: *Pin No. 8 of 6SA7GT Osc-Converter tube.
**Connect dummy antenna to "Antenna" of loop winding.
***Rock dial while adjusting for maximum output.
****100 ohm resistor and 200 mmf. condenser in series.

Special Note: For accurate alignment, the special scale reproduced in this bulletin must be used. The scale and full directions for using it will be found on page

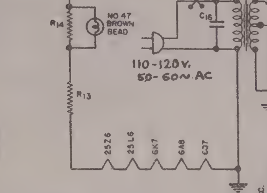
SPIEGEL, INC.

MODEL W102, Ch. TC
MODELS A2002, Z7006
Ch. TSA



AUTOMATIC
TUNING
SEE INDEX
W102
Ch.TC

IF PEAK 456 KC

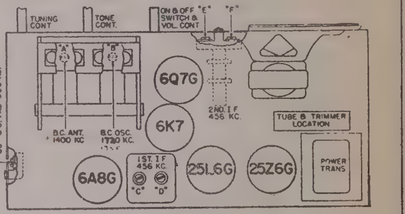


DIAG NO	PART NO.	DESCRIPTION
C_1	N-1344	.01 MFD. 400V.
C_2	N-1344	.01 MFD. 400V.
C_3	N-1345	.05 MFD. 200V.
C_4	N-1351	.1 MFD. 200V.
C_5	N-1323	300-600 MMFD. PADDER
C_6	N-1345	.05 MFD. 200V.
C_7	N-1345	.05 MFD. 200V.
C_8	N-1347	.006 MFD. 600V.
C_9	N-1343	250 MMFD.
C_{10}	N-1343	250 MMFD.
C_{11}	N-1347	.006 MFD. 600V.
C_{12}	N-1344	.01 MFD. 400V.
C_{13}	N-1344	.01 MFD. 400V.
C_{14}	N-1312	15 MFD 150V.
C_{15}		20 MFD. 200V.
C_{16}	N-1346	.05 MFD. 400V.
C_{17}		CAPACITY INCLUDED IN OSCILLATOR COIL.
R_1	N-1352	15,000 OHMS .5 W.
R_2	N-1360	150 OHMS .5 W.
R_3	N-1353	50,000 OHMS .5 W.
R_4	N-1352	15,000 OHMS .5 W.
R_5	N-1355	1 MEGOHM .5 W.
R_6	N-1356	15 MEGOHMS .5 W.
R_7	N-1320	1 MEGOHM VOLUME CONT.
R_8	N-1354	300,000 OHMS .5W.
R_9	N-1350	150 OHMS .5 W. ±10%
R_{10}	N-1321	.5 MEGOHM TONE CONT.

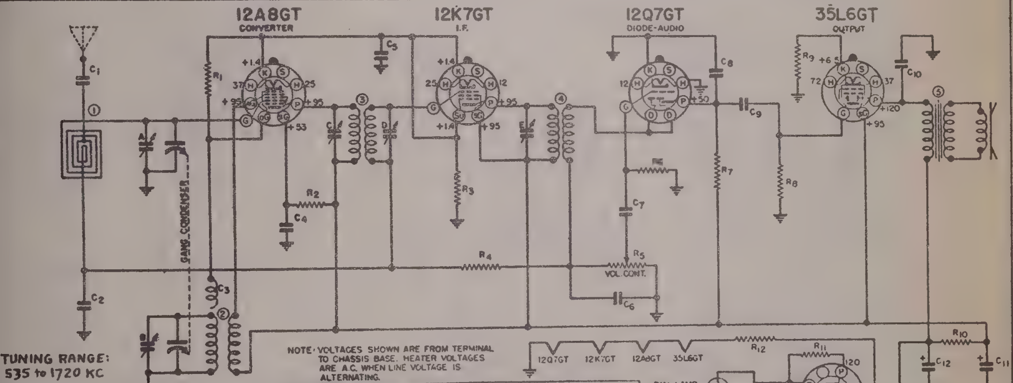
DIAG. NO.	PART NO.	DESCRIPTION
R_{11}	N-1349	100 OHMS .5 W.
R_{12}	N-1349	100 OHMS .5 W.
R_{13}	N-1322	150 OHMS } ARMORED
R_{14}		30 OHMS } WIRE RES.
1	N-1316	ANTENNA COIL
2	N-1317	OSCILLATOR COIL
3	N-1318	1ST. I.F TRANSFORMER
4	N-1319	2ND I.F. TRANSFORMER
5	N-1314	SPEAKER & TRANSFORMER
6	N-1315	POWER TRANSFORMER
	N-1273	GANG CONDENSER
SET WITH CUT SECTION GANG		
	N-1337	OSCILLATOR COIL
	N 1338	GANG CONDENSER
C_5	N 1323	PADDER, ELIMINATED

RANGE: 535-1720 KC

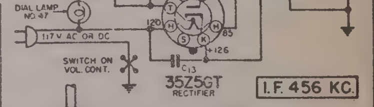
5 TUBE A.C.
SUPERHETERODYNE
SINGLE BAND
CHASSIS-TC



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO CHASSIS BASE. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.



I.F. 456 KC.

TUNING RANGE:
535 to 1720 KC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

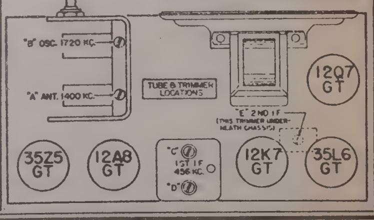
A2002, Z7006
Ch. TSA

TSA:

DO NOT
USE
EXTERNAL
GROUND

DIAG NO	PART NO.	DESCRIPTION
R_1	N-1260	50,000 OHM .5W. 20%
R_2	N-1460	30,000 OHM .5W 20%
R_3	N-1615	100 OHM 5W. 10%
R_4	N-1262	1 MEGOHM 5 W. 20%
R_5	N-1595	0.5 MEGOHM VOL. CONT.
R_6	N-1263	10 MEGOHM .5W. 20%
R_7	N-1377	200,000 OHM .5W. 20%
R_8	N-1264	500,000 OHM .5W. 20%
R_9	N-1616	250 OHM .5W. 10%
R_{10}	N-1617	2500 OHM .5W. 20%
R_{11}	N-1614	50 OHM .5W. 20%
R_{12}	N-1618	80 OHM 2W. 10%
C_1	N-1344	.01 MFD. 400V.
C_2	N-1345	.05 MFD. 200V.
C_3		CAPACITY INCLUDED IN OSCILLATOR COIL
C_4	N-1345	.05 MFD. 200V.
C_5	N-1351	.1 MFD. 200V.
C_6	N-1374	100 MMFD.

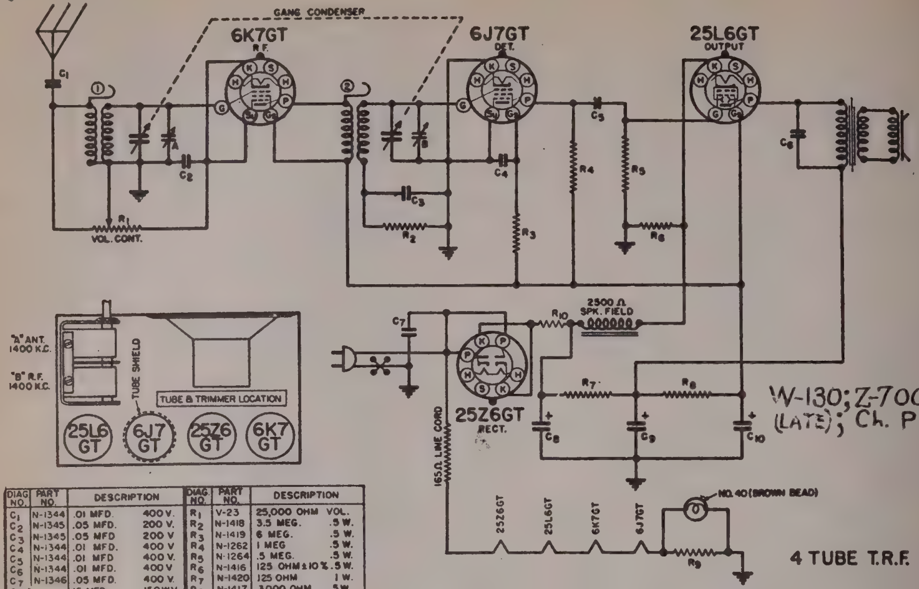
DIAG NO	PART NO.	DESCRIPTION
C_7	N-1344	.01 MFD. 400 V.
C_8	N-1447	.0005 MFD. 400 V.
C_9	N-1344	.01 MFD. 400 V.
C_{10}	N-1376	.02 MFD. 400 V.
C_{11}	N-1366	25 MFD. 150 V. } ELECTRO.
C_{12}		15 MFD. 150 V }
C_{13}	N-1346	.05 MFD. 400 V.
1	N-1594	ANTENNA COIL LOOP
2	N-1452	OSCILLATOR COIL
3	N-1598	1ST. I.F TRANSFORMER
4	N-1596	2ND. I.F. TRANSFORMER
5	N-1585	4" P.M. SPEAKER & TRANS.
E	N-1597	2ND. I.F. TRIMMING COND.
	N-1431	GANG CONDENSER



©John F. Rider, Publisher

MODELS W-130, Z-7008-9
(Late), Ch. P
MODEL Z-7008-9
(Late), Ch. TP

SPIEGEL, INC.

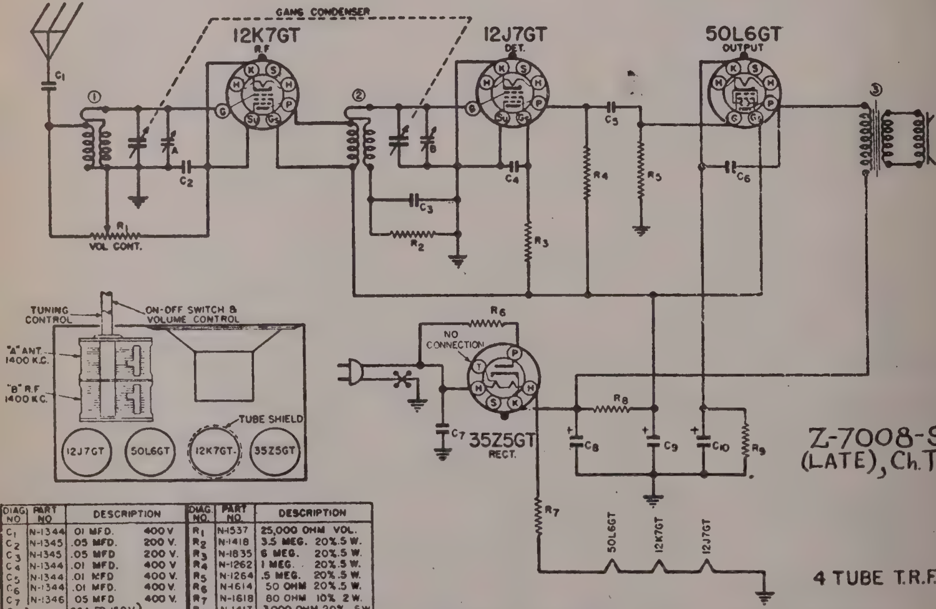


W-130; Z-7008-9
(LATE); Ch. P

4 TUBE T.R.F.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C_1	N-1344	.01 MFD. 400 V.	R_1	V-23	25,000 OHM VOL.
C_2	N-1345	.05 MFD. 200 V.	R_2	N-1418	3.5 MEG. .5 W.
C_3	N-1345	.05 MFD 200 V	R_3	N-1419	6 MEG. .5 W.
C_4	N-1344	.01 MFD. 400 V	R_4	N-1262	1 MEG .5 W.
C_5	N-1344	.01 MFD 400 V.	R_5	N-1264	.5 MEG. .5 W.
C_6	N-1344	.01 MFD. 400 V	R_6	N-1416	125 OHM ±10% .5 W.
C_7	N-1346	.05 MFD. 400 V.	R_7	N-1420	125 OHM 1 W.
C_8	C-233	16 MFD 150 WV	R_8	N-1417	3,000 OHM .5 W.
C_9		8 MFD 150 W.V.	R_9	N-1415	30 OHM 1.0 W.
C_{10}		6 MFD 150 W.V.	R_{10}	N-1251	25 OHM 1 W.
	S-300	SPEAKER	1	L-110	ANTENNA COIL
	G-25	GANG CONDENSER	2	L-111	R.F. COIL

OPERATES ON 110-120 V., 50-60~ AC or DC
DO NOT CONNECT TO EXTERNAL GROUND.



Z-7008-9
(LATE), Ch. TP

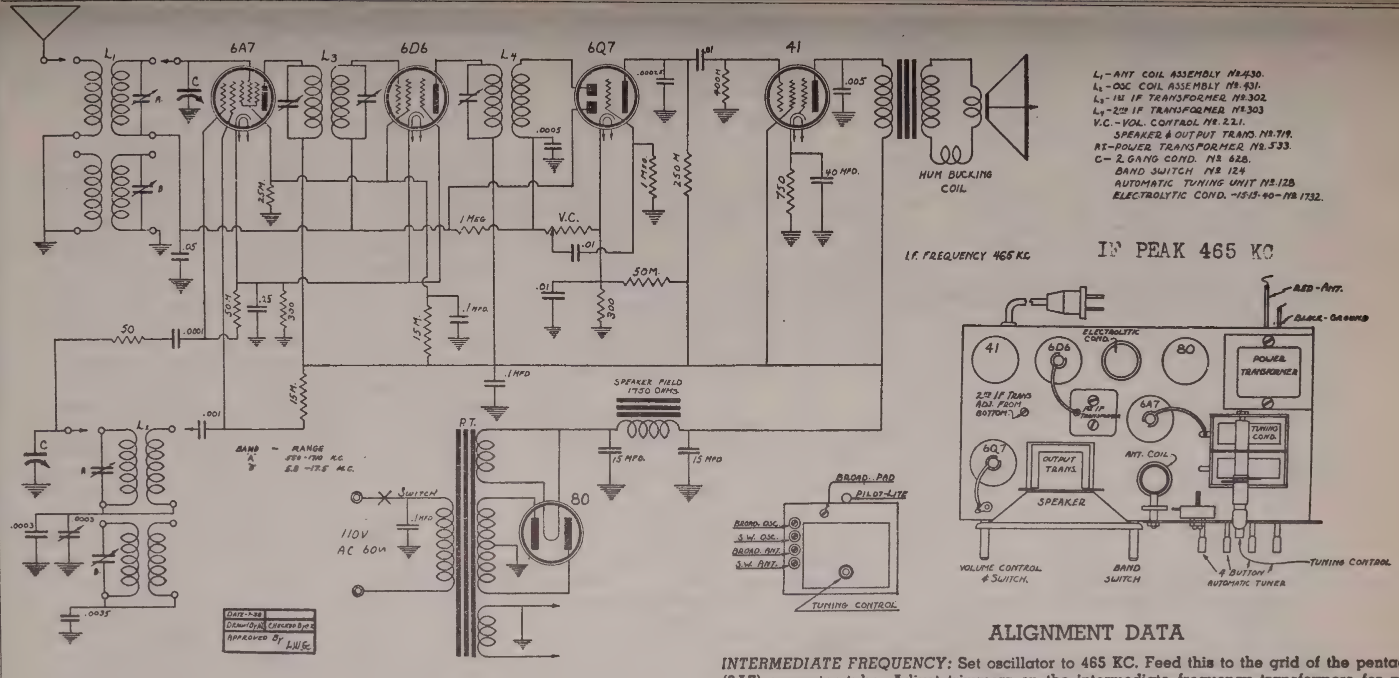
4 TUBE T.R.F.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C_1	N-1344	.01 MFD. 400 V	R_1	N-1537	25,000 OHM VOL.
C_2	N-1345	.05 MFD. 200 V.	R_2	N-1418	3.5 MEG. 20% .5 W.
C_3	N-1345	.05 MFD 200 V.	R_3	N-1835	6 MEG. 20% .5 W.
C_4	N-1344	.01 MFD. 400 V	R_4	N-1262	1 MEG. 20% .5 W.
C_5	N-1344	.01 MFD 400 V.	R_5	N-1264	.5 MEG. 20% .5 W.
C_6	N-1344	.01 MFD. 400 V.	R_6	N-1614	50 OHM 20% .5 W.
C_7	N-1346	.05 MFD 400 V.	R_7	N-1618	80 OHM 10% 2 W.
C_8	N-1850	25 MFD 150 V ELECT	R_8	N-1417	3,000 OHM 20% .5 W
C_9		10 MFD 150 V ELECT	R_9	N-1718	250 OHM 10% .5 W.
C_{10}		20 MFD 25 V ELECT	1	N-1790	ANTENNA COIL
	N-1401 N-1847	GANG CONDENSER	2	N-1791	R F COIL
			3	N-2047	SPEAKER & TRANS

OPERATES ON 110-120V, 50-60~ AC or DC
DO NOT CONNECT TO EXTERNAL GROUND

SPIEGEL, INC.

MODELS W-132, V-1032
Chassis 601



ALIGNMENT DATA

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

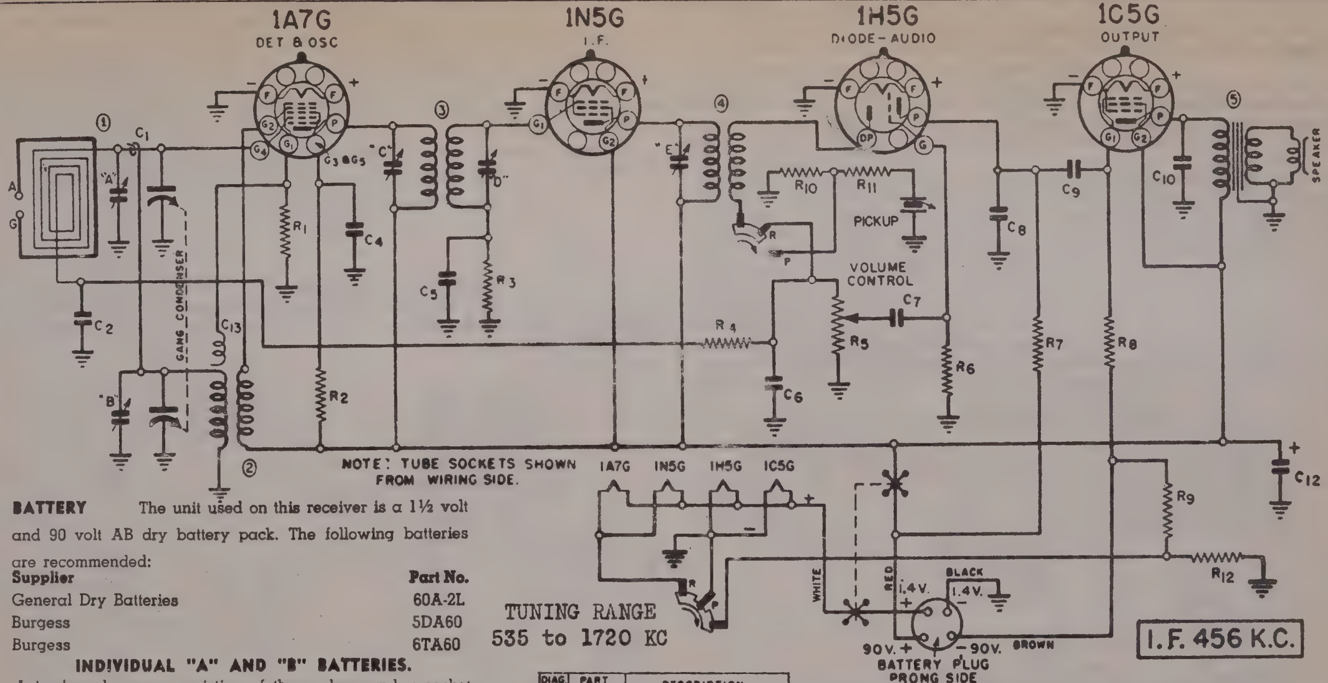
This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C.

STATION SELECTOR

The four button automatic tuner on this receiver can be adjusted to any station desired by the listener regardless of the frequency of the station. To adjust: Tune in the station desired with the manual control. Loosen the first automatic tuning button by turning the button counter-clockwise. Press it in all the way while holding the manual control knob tuned to the desired station. Rotate button clockwise to lock it. The remaining three buttons are adjusted in the same way. The adjustments can be changed at any time desired.

MODELS W-134, Z7124
Chassis TF

SPIEGEL, INC.



BATTERY The unit used on this receiver is a 1½ volt and 90 volt AB dry battery pack. The following batteries are recommended:

Supplier	Part No.
General Dry Batteries	60A-2L
Burgess	5DA60
Burgess	6TA60

INDIVIDUAL "A" AND "B" BATTERIES.

A hook-up harness consisting of three plugs and a socket is required. This hook-up harness is not furnished with the receiver and should be purchased when obtaining separate A and B batteries.

SUPPLIER	1½ Volt A Battery (2½" x 2½" x 4")	45 Volt B Battery (2½" x 4⅛" x 5")
Eveready	No. 742	No. 762
Burgess	No. 4FAPI	No. B 30 PI
Ray-O-Vac	No. P94A	No. P 5303
General Dry Battery	No. 4H1	No. V-30-B

Use one "A" battery and two "B" batteries with the hook-up harness. Clamp down the batteries with support strap.

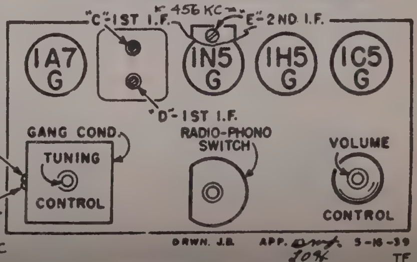
DIAG. NO.	PART NO.	DESCRIPTION
1	N-1804	LOOP ANTENNA
2	N-1452	OSCILLATOR COIL
3	N-1391	1ST I.F. TRANS.
4	N-1548	2ND I.F. TRANS.
5	N-1507	5" P.M. SPKR. & TRANS.
	N-1737	GANG CONDENSER
	N-1552	BATTERY CABLE
"E"	N-1453	TRIMMER COND.-2ND I.F.
	N-1883	RADIO-PHONO SWITCH

DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1377	.2 MEGOHM 20% .5W.
R2	N-1353	50,000 OHM 10% "
R3	N-1378	2 MEGOHM 20% "
R4	N-1262	1 MEGOHM " "
R5	N-1738	.5 MEG. VOLUME CONT.
R6	N-1378	2 MEGOHM 20% .5W
R7	N-1262	1 MEGOHM " "
R8	N- "	" " "
R9	N-1661	650 OHM 10% "
R10	N-1929	65,000 OHM 20% "
R11	N-1779	150,000 OHM 20% "
R12	N-1844	300 OHM 10% "
C1	——	GIMMIC
C2	N-1345	.05 MFD 200 V
C4	N-1345	.05 MFD. 200 V.
C5	N-1376	.02 MFD. 400 V.
C6	N-1343	250 MMFD. 20%
C7	N-1344	.01 MFD. 400 V.
C8	N-1374	100 MMFD. 20%
C9	N-1344	.01 MFD 400 V.
C10	N-1347	.006 MFD. 600 V.
C12	N-1367	6 MFD. ELECTROLYTIC
C13	-	CAPACITY INCLUDED IN OSCILLATOR COIL.

CONNECT TO GENERATOR 2-TURN LOOP APPROX. 1 FOOT IN DIAM. PLACE THIS PARALLEL TO RECEIVER LOOP, ABOUT 6 INCHES AWAY FROM IT.

CONVENTIONAL ALIGNMENT: SEE SPECIAL SECTION OF VOLUME VIII.

TUBE LAYOUT & TRIMMER LOCATION

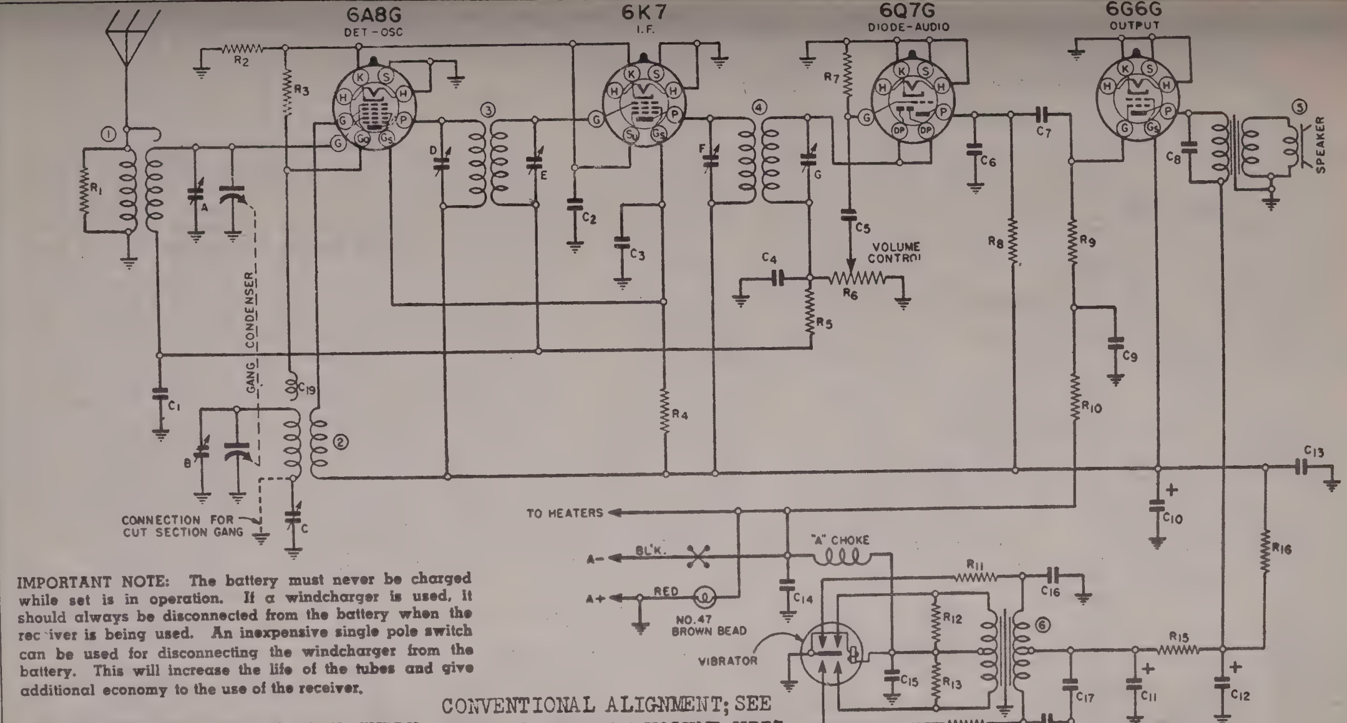


DRWN. J.B. APP. 10% 5-16-39
TF

FOR PHONO.DATA
SEE INDEX

SPIEGEL, INC.

MODEL W216
Chassis TM



IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

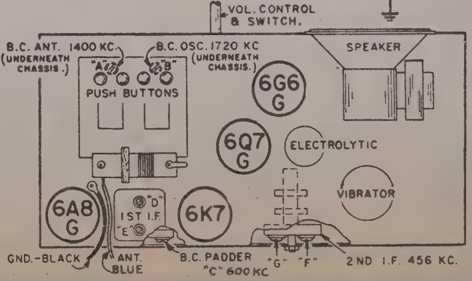
CONVENTIONAL ALIGNMENT; SEE SPECIAL SECTION VOLUME VIII

FOR AUTOMATIC TUNING SEE INDEX

DIAG. NO.	PART NO.	DESCRIPTION	
R1	N-1259	15,000 OHM	.5 W.
R2	N-1473	200 OHM	"
R3	N-1260	50,000 OHM	"
R4	N-1474	25,000 OHM	"
R5	N-1378	2.0 MEGOHM	"
R6	N-1320	1.0 MEG. VOL. CONT.	
R7	N-1263	10.0 MEGOHM	.5 W.
R8	N-1261	250,000 OHM	"
R9	N-1264	.5 MEG.	"
R10	N-1260	50,000 OHM	"
R11	N-1256	500 OHM	"
R12	N-1506	75 OHM	1. W.
R13	N-1506	75 OHM	1. W.
R14	N-1256	500 OHM	.5 W.
R15	N-1482	250 OHM	"
R16	N-1256	500 OHM	"

C1	N-1345	.05 MFD.	200 V.
C2	N-1479	.25 MFD.	"
C3	N-1351	.10 MFD.	"
C4	N-1374	100 MMFD.	—
C5	N-1347	.006 MFD.	600 V.
C6	N-1343	250 MMFD.	—
C7	N-1344	.01 MFD.	400 V.
C8	N-1347	.006 MFD	600 V.
C9	N-1345	.05 MFD.	200 V.
C10	N-1468	20 MFD.	150 V.
C11		10 MFD.	250 V.
C12		20 MFD.	150 V.
C13	N-1351	.10 MFD.	200 V
C14	N-1471	.5 MFD.	50 V.
C15	N-1471	.5 MFD.	50 V.
C16	N-1480	.01 MFD. (OIL)	1000 V.
C17	N-1478	.01 MFD.	600 V.
C18	N-1480	.01 MFD. (OIL)	1000 V.
C19	—	CAPACITY INCLUDED IN OSCILLATOR COIL.	

DIAG. NO.	PART NO.	DESCRIPTION
①	N 1461	ANTENNA COIL
②	N 1317	OSCILLATOR COIL
③	N 1318	1 ST I.F. TRANS.
④	N 1319	2 ND I.F. TRANS.
⑤	N 1472	5" P.M. SPEAKER
⑥	N 1476	POWER TRANS.
"C"	N 1323	PADDER COND.
	N 1475	VIBRATOR (SYNCHRO.)
	N 1477	"A" CHOKE
	N 1273	2 GANG COND.-TUNER
	N 1485	BATTERY CABLE
SET WITH CUT SECT GANG		
	N 1337	OSCILLATOR COIL
	N 1338	GANG CONDENSER
"C"	—	PADDER ELIMINATED



I.F. 456 KC.

NOTE: TUBE SOCKETS SHOWN FROM WIRING SIDE.

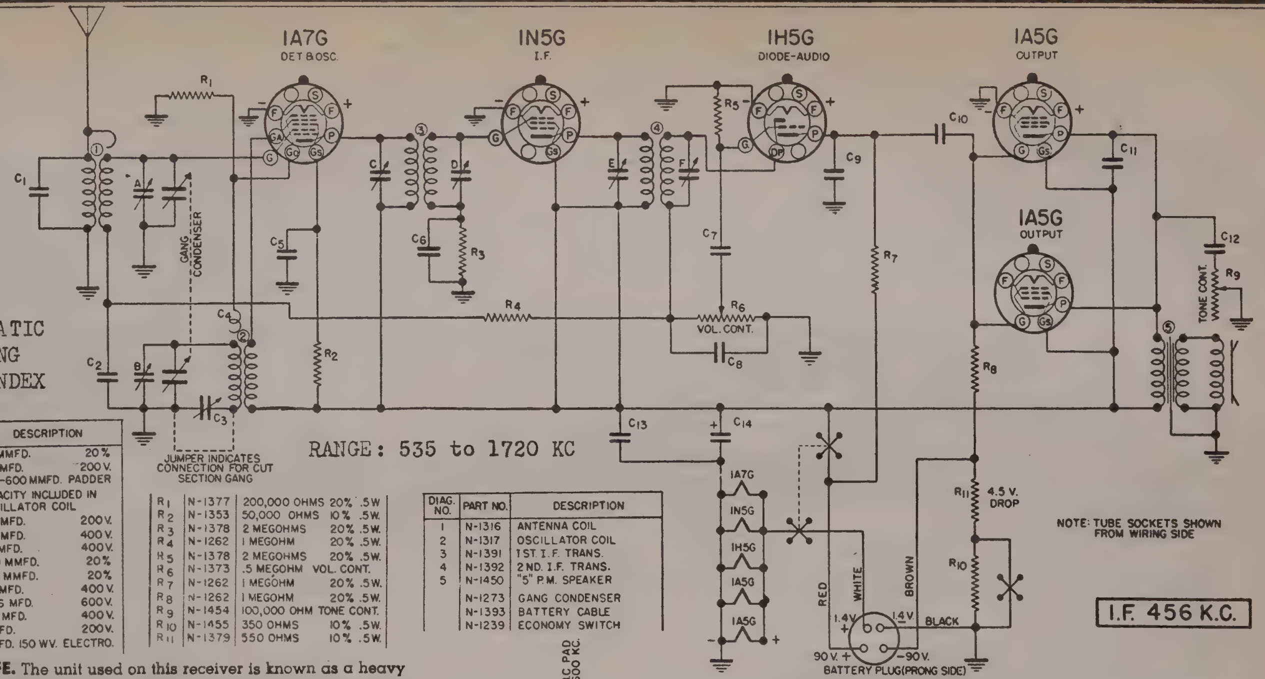
4 TUBE 6 VOLT
SUPERHETERODYNE
SINGLE BAND

DRWN. F.L.C. APP. 1-19-39

TM

MODELS W-300, W-312
Chassis SL

SPIEGEL, INC.



AUTOMATIC
TUNING
SEE INDEX

RANGE: 535 to 1720 KC

I.F. 456 K.C.

DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1342	50 MMFD. 20%
C2	N-1345	.05 MFD. 200 V.
C3	N-1323	300-600 MMFD. PADDER
C4		CAPACITY INCLUDED IN OSCILLATOR COIL
C5	N-1345	.05 MFD. 200 V.
C6	N-1376	.02 MFD. 400 V.
C7	N-1344	.01 MFD. 400 V.
C8	N-1343	250 MMFD. 20%
C9	N-1374	100 MMFD. 20%
C10	N-1344	.01 MFD. 400 V.
C11	N-1347	.006 MFD. 600 V.
C12	N-1376	.02 MFD. 400 V.
C13	N-1351	.1 MFD. 200 V.
C14	N-1367	6 MFD. 150 WV. ELECTRO.

R1	N-1377	200,000 OHMS 20% .5W
R2	N-1353	50,000 OHMS 10% .5W.
R3	N-1378	2 MEGOHMS 20% .5W.
R4	N-1262	1 MEGOHM 20% .5W.
R5	N-1378	2 MEGOHMS 20% .5W.
R6	N-1373	.5 MEGOHM VOL. CONT.
R7	N-1262	1 MEGOHM 20% .5W.
R8	N-1262	1 MEGOHM 20% .5W.
R9	N-1454	100,000 OHM TONE CONT.
R10	N-1455	350 OHMS 10% .5W.
R11	N-1379	550 OHMS 10% .5W.

DIAG. NO.	PART NO.	DESCRIPTION
1	N-1316	ANTENNA COIL
2	N-1317	OSCILLATOR COIL
3	N-1391	1ST. I.F. TRANS.
4	N-1392	2ND. I.F. TRANS.
5	N-1450	"5" P.M. SPEAKER
	N-1273	GANG CONDENSER
	N-1393	BATTERY CABLE
	N-1239	ECONOMY SWITCH

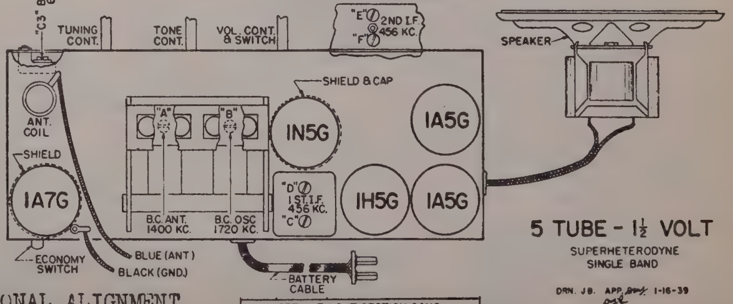
BATTERY LIFE. The unit used on this receiver is known as a heavy duty 1½ volt and 90 volt AB dry battery pack, approximately sixteen inches long, four and a half inches wide and six and a half inches high with a socket type connector. A battery of this type has a probable life of six to seven months with three hours daily use and a longer or shorter life as the daily usage is decreased or increased when the set is operated in the "power position"

REAR SWITCH. (**Two Position Economy Switch.**) The switch is provided to obtain the maximum of battery life without sacrificing the performance of the set.

The switch should be operated in the "Economy" (left hand) position until the performance of the radio receiver drops sufficiently to indicate the end of the batteries' **normal** life.

When the battery is new the set gives sufficient power output and sensitivity in the economy position and the life of the battery is materially increased.

When the battery becomes old the "Power" position (right hand) makes it possible to use the battery to the complete end of the batteries' useful life and still retain good reception.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

SET WITH CUT SECTION GANG		
C3	N-1323	PADDER, ELIMINATED
	N-1338	GANG CONDENSER
2	N-1337	OSCILLATOR COIL

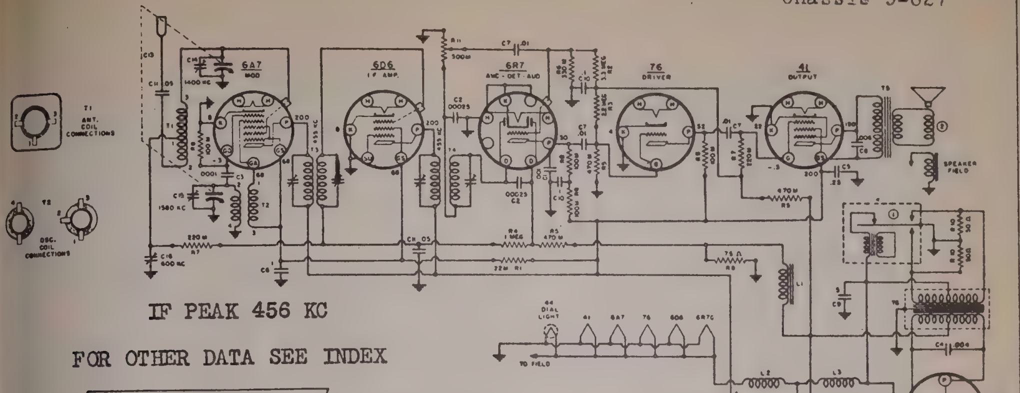
5 TUBE - 1½ VOLT
SUPERHETERODYNE
SINGLE BAND

DRN. J.B. APP. 1-16-39

SL

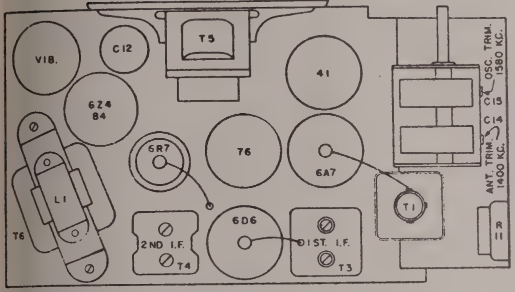
SPIEGEL, INC.

MODELS W400, V1148
Chassis 9-627



IF PEAK 456 KC

FOR OTHER DATA SEE INDEX



LOCATION OF PARTS ON TOP OF CHASSIS

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES TAKEN WITH A 6V. INPUT.

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
ALIGNMENT IS TO MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS

CODE	PART NO	DESCRIPTION 9 62
T 1	10 223	ANTENNA TRANSFORMER
T 2	10-224	OSCILLATOR "
T 3	10-221	1 ST I F. "
T 4	10-222	2 ND I F "
T 5		OUTPUT TRANS (ON SPKR.)
T 6	80-169	POWER TRANSFORMER } 84-7
L 1	33 219	FILTER CHOKE } 84-7
L 2	33-210	FILAMENT CHOKE
L 3	33 211	VIBRATOR CHOKE
1	34-102	VIBRATOR
2	78-240	5" SPEAKER

CODE	PART NO	DESCRIPTION
R 1	60 2-4	22 M OHM 1 W CARBON RES
R 2	60-209	3 3 MEGOHM 1/2 W. " "
R 3	60-208	2 2 " " " "
R 4	60-167	1 " " " "
R 5	60-206	470 M OHM " " "
R 6	60-210	330 M " " " "
R 7	60-207	220 M " " " "
R 8	60-172	100 M " " " "
R 9	60-211	75 " " " "
R 10	60-212	50 " " " "
R 11	24-119	VOLUME CONTROL 500M OHMS

CODE	PART NO	DESCRIPTION
C 1	15-111	.001 MFD. MICA CONDENSER
C 2	1504	.00025 " " "
C 3	1501	.0001 " " "
C 4	16-129	.004 MFD 1600 V BUFFER COND
C 5	16-117	.25 " 400 V TUB. CONDENSER
C 6	16 116	.1 " " " "
C 7	16-119	.01 " " " "
C 8	16-120	006 " " " "
C 9	16-112	5 " 200 V OVAL "
C 10	16-115	.1 " " TUB. "
C 11	1622	05 " " " "
C 12	18 240	20 X 5 MFD ELECTROLYTIC 300 V
C 13	19-127	2 GANG VARIABLE COND ALSO C14 & C15
C 16	20 117	300-600 MFD PADDING CONDENSER
C 17	99-1	SPARK PLATE

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections	Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt	1.85 Volts
Generator Ground Lead Connection	Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output	See Chart Below
Connection of Generator Output Lead	See Chart Below
Generator Modulation	30%, 400 Cycles
Position of Volume Control	Fully On

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmer Adjustment (In Order Shown)	Trimmer Function
Closed	455 Kc.	.1 mfd.	6A7 Grid	T3 T4	I. F.
Fully Open	1580 K. C.	.0002 mfd.	Antenna Conn.	C15	Osc. Trimmer
1400 K.C.	1400 K.C.	.0002 mfd.	Antenna Conn.	C14	Ant. Trimmer
600 K. C.	600 K. C.	.0002 mfd.	Antenna Conn.	C16	Antenna Padder

The variable condenser should be at 600 k.c. for antenna adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy. A nal adjustment of antenna padder condenser C16 is always made after the receiver is installed in the car, in order to atch the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver rom interfering with accurate alignment.

HE AMMETER LEAD

The ammeter cable (See "H" in Fig. 1) has a spring clip at one end and a fuse receptacle at the other. Compress the pring clip and slide it over the ammeter stud on the back of the car's ammeter. When the clip is released it will spring ut and grip the stud securely. (See fig 1.) (The cable clip may be connected to either stud of the ammeter. If connected to ne stud, the current taken by the radio will register on the ammeter. If connected to the other stud, it will not register.) In few cars such as the first models of the Ford V-8 the ammeter does not have terminals. In such cases the spring clip should e fastened to any available terminal behind the dash which is connected to the ungrounded side of the battery at all times. ome terminals will be so connected only when the ignition or light switches are turned "On." Insert the fibre sleeve and use (See "J" and "K" in Fig. 1) in the other end of the ammeter cable. The black wire coming from the radio receiver has plug at its end which should be inserted into the fuse receptacle after the fuse sleeve and fuse have been inserted.

HE GENERATOR CONDENSER

The Generator Condenser should be mounted to the generator frame by means of any one of the generator assembly olts. Scrape all dirt and paint away so that a clean metal to metal contact is made. The flexible lead from the Generator Condenser should be connected to the output terminal of the generator.

MODEL T-2307, Ch. 101505-599
MODEL V-1140, Ch. 101.505

SPIEGEL, INC.

MODELS W400, V1148, Ch. 9-627
MODELS 579, 1140, 1141, Ch. 559
MODELS 2307, 2308, Ch. 101.505

ANTENNA

Insert the single prong of the antenna cable (See "G" in Fig. 1) into its receptacle located on the bottom of the receiver case and near the front left hand corner. Note that the other end of this cable has a white covered wire protruding from its end and a bright metal pigtail. The white covered inner-wire and the bright metal pigtail are to be connected to the car's antenna in the following manner:

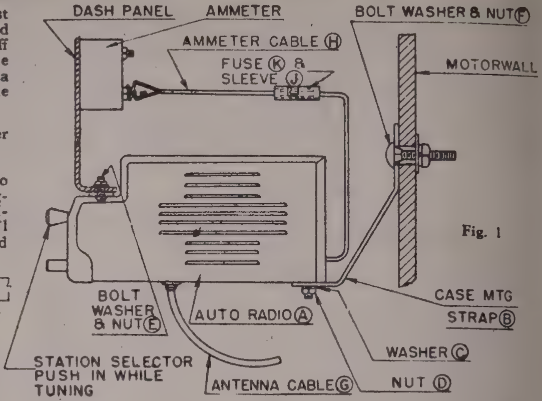


Fig. 1

If an antenna was located coming from the corner post of the car, it will probably have an inner wire covered with the metal braid. (If it has a plug at its end, cut off the plug). Scrape clean and solder the white wire of the receiver's antenna lead to the inner wire of the car antenna lead. Be certain these inner wires do not at any time touch the outer shield. (See Fig. 5.)

After the connection is cleaned and connected, cover the joint carefully with tape. (See Fig. 6.)

Connect the pigtail of the receiver's antenna wire to the pigtail braid of the car's antenna lead-in. Wrap pigtails and solder together using rosin core solder. IMPORTANT—Make certain when bolting soldered pigtail ends to car that the section is scraped clean and a good chassis ground. (See Fig. 7.)

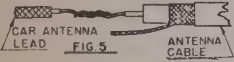


FIG. 5

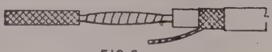


FIG. 6

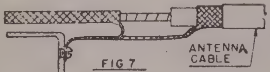


FIG 7

If the lead-in from the car antenna is not shielded, it is advisable to do so to overcome motor noise. Slip a shielded loom over the entire length of the car antenna lead-in. In some cases where a roof antenna is used, the lead-in is brought down through a corner post of the car frame at the end of the windshield (See Figure 2). If the radio antenna cable is long enough to be inserted several inches into the corner post, connect antenna lead-in and the radio antenna cable as shown in Figures 5, 6 and 7, and after taping, insert the splice and all the unshielded portion of the lead-in up into the corner post. If this cannot be done, this type of lead-in should be covered with a shielded loom several inches into the corner post. Connect the lead-in and shielding as illustrated in Figures 5, 6 and 7. The other end of the shielding at the car antenna should be grounded. To eliminate crackling and noisy reception due to antenna lead-in pick-up, the shielded antenna lead-in should be either insulated from chassis (or car body) or grounded at interval points, leading from the radio antenna cable to the car antenna. Be sure to use car chassis or grounded section of body only for grounding.

THE DISTRIBUTOR SUPPRESSOR

To install the distributor suppressor, cut the CENTER lead from the distributor cap in two, as close as possible to the distributor cap. Screw the Distributor Suppressor to one end of the cut cable and then to the other end leading to the distributor cap.

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

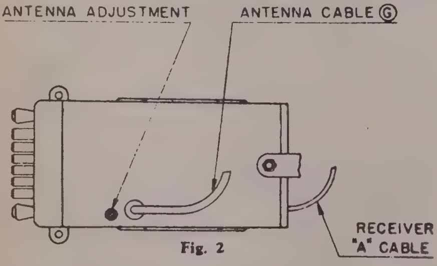


Fig. 2

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

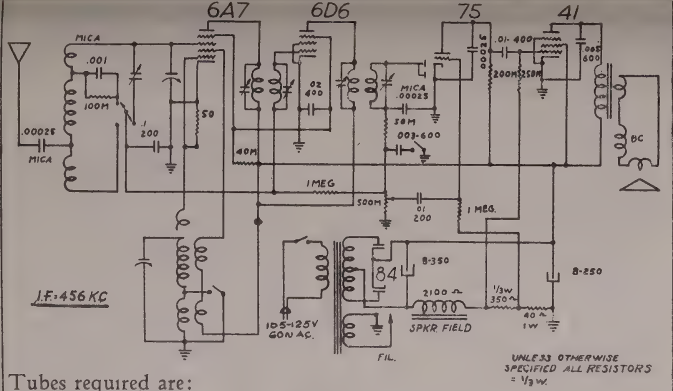
Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your auto radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

IMPORTANT: ANTENNA ADJUSTMENT

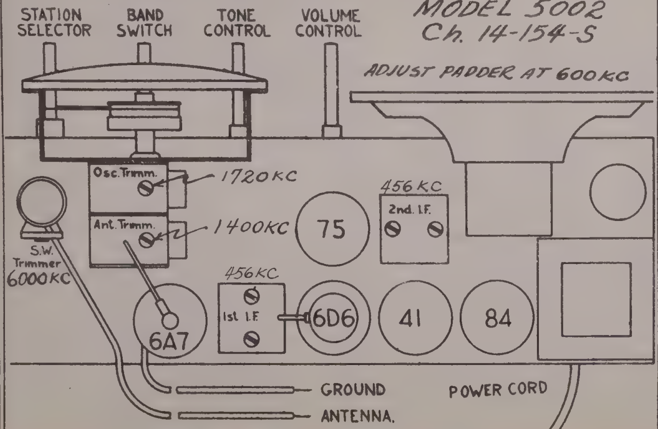
The antenna adjustment control is located close to the antenna cable receptacle as shown in Figure 2. To make the adjustment first, remove plug button from bottom of case by inserting a screwdriver between case and plug button, then tune in a weak station with full volume at or very close to 600 kilocycles (60) on the dial. Second, insert a small screwdriver into the antenna adjustment screw shown in Figure 2 and turn the screwdriver either to the left or right until the volume of the station is at its maximum point. While adjusting the antenna adjustment screw it is advisable to vary the station selector knob a degree or two to obtain the best adjustment. Now insert plug button into case. The receiver is now balanced and no further radio electrical adjustments are necessary.



Tubes required are:

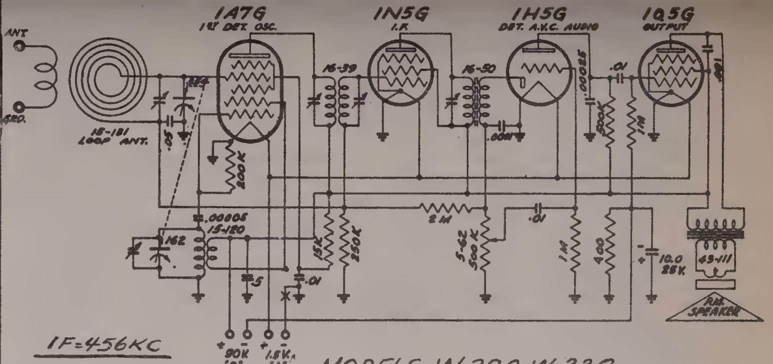
1—6A7 Oscillator-Translator	1— 41 Output
1—6D6 I. F. Amplifier	1— 84 Rectifier
1— 75 Detector-A.V.C., Audio Amplifier	

MODEL 5002
Ch. 14-154-S



CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOLUME VIII

Tubes must be in proper position and connected as shown.



MODELS W-320, W-330
Ch 553

I. F. ALIGNMENT

From a good signal generator connect the proper leads, one to the radio chassis and the other thru a .1 mfd condenser to the grid cap of the 1A7G tube, with the tube's grid lead still in place. Set the receiver dial to 1720 K. C. and the signal generator to 456 K. C. With the receiver's volume control full on, adjust the signal generator's output until the signal is heard in the speaker and the output meter reads approximately .3 volts. Adjust the I. F. trimmers for maximum output, decreasing the generator output as the receiver output increases, so the meter always reads approximately .3 volt.

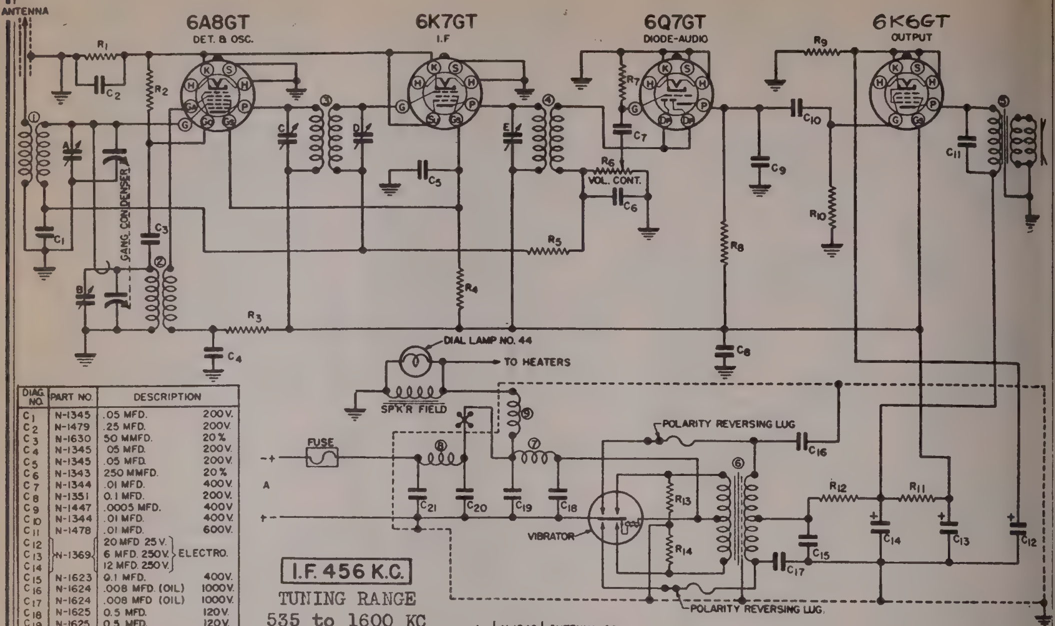
R. F. ALIGNMENT

When aligning the antenna and oscillator circuits the loop antenna should be placed in its approximate position in relation to the radio chassis and speaker as it is placed in the cabinet. No leads are connected from the signal generator, but the generator leads are connected to a three or four turn loop about three inches in diameter, of ordinary insulated hookup wire. This loop is placed about four inches from the loop antenna and parallel to it.

The radio dial and generator are set to 1720 K. C. and the oscillator trimmer set for maximum output, still using a .3 volt meter reading. The dial and generator are then set to 1400 K. C. so the signal comes thru, and the trimmer on the loop antenna is adjusted for maximum output. Check for alignment at 600 K. C.

MODEL W408
Ch. AU-10

SPIEGEL, INC.



DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1345	.05 MFD. 200V.
C2	N-1479	.25 MFD. 200V.
C3	N-1630	50 MMFD. 20%
C4	N-1345	.05 MFD. 200V.
C5	N-1345	.05 MFD. 200V.
C6	N-1343	250 MMFD. 20%
C7	N-1344	.01 MFD. 400V.
C8	N-1351	0.1 MFD. 200V.
C9	N-1447	.0005 MFD. 400V
C10	N-1344	.01 MFD. 400V.
C11	N-1478	.01 MFD. 600V.
C12 C13 C14	N-1369	20 MFD 25 V. 6 MFD. 250V. 12 MFD. 250 V. ELECTRO.
C15	N-1623	0.1 MFD. 400V.
C16	N-1624	.008 MFD. (OIL) 1000V.
C17	N-1624	.008 MFD (OIL) 1000V.
C18	N-1625	0.5 MFD. 120V.
C19	N-1625	0.5 MFD. 120V.
C20	N-1343	250 MMFD. 20%
C21	N-1343	250 MMFD. 20%
R1	N-1473	200 OHM .5W. 10%
R2	N-1260	50,000 OHM .5 W. 20%
R3	N-1627	20,000 OHM .5 W 20%
R4	N-1627	20,000 OHM .5 W 20%
R5	N-1262	1 MEGOHM .5 W 20%
R6	N-1238	0.5 MEGOHM VOL. CONT.
R7	N-1419	6 MEGOHM .5 W. 20%

I.F. 456 K.C.

TUNING RANGE
535 to 1600 KC

R8	N-1261	250,000 OHM	.5 W.	20%
R9	N-1628	750 OHM	.5 W.	10%
R10	N-1264	0.5 MEGOHM	.5 W.	20%
R11	N-1256	500 OHM	.5 W.	20%
R12	N-1482	250 OHM	.5 W.	20%
R13	N-1629	100 OHM	1 W.	20%
R14	N 1629	100 OHM	1 W.	20%

1	N-1249	ANTENNA COIL
2	N-1250	OSCILLATOR COIL
3	N-1248	1 ST. I.F. TRANS.
4	N-1596	2 ND. I.F. TRANS.
5	N-1235	4" SPEAKER & TRANS.
6	N-1540	VIBRATOR TRANS.
7	N-1477	HASH CHOKE
8	N-1632	MOTOR NOISE CHOKE
9	N-1631	HEATER CHOKE

N-1236	VIBRATOR (SYNCHRONOUS)
N-1237	GANG CONDENSER
N-1241	TUNING DIAL
N-1539	BATTERY LEADS
N-1239	TOGGLE SWITCH

4 TUBE-6 VOLT
SUPERHETERODYNE
SINGLE BAND
AUTO SET

DRN. J.B. APP. B.M.J. 2-23-39
AU

MOTOR NOISE ELIMINATION

1. Ground the antenna lead-in shield at one or more points to the cowl or any other metal surface in contact with the lead-in.

2. Move the battery lead around to a point of least noise pick-up and fasten in place with tying cord or tape.

3. Bond together the throttle rod, choke rod and any metal tubing with a piece of copper braid and ground to the fire wall. This should be done on the engine side.

4. Bond steering post to firewall.

5. Bond hood, side panel and other protective covering for engine if it is not making a positive contact to the body.

In extreme cases, a distributor resistor and generator condenser will reduce noise interference to a minimum. These parts are available at your dealer.

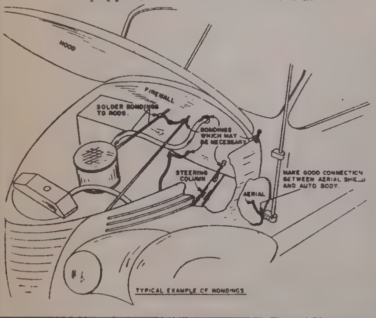
From the standpoint of motor noise, the whip type antenna recommended has been found to be the most satisfactory. It is advisable to use this type antenna even if the car is equipped with a built-in antenna.

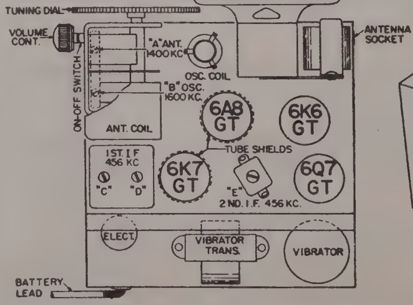
I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three trimmers to peak or maximum reading on the output meter.

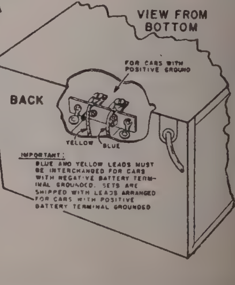
ANT. AND OSC. ALIGNMENT. Connect the antenna to the generator through a 65 MMF dummy* and set the dial and generator at 1600 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output.

Next set the test oscillator at 600 KC and tune in the signal with the dial to check the sensitivity at this point.

*If the antenna is aligned using a whip antenna shielded lead use a 30 MMF dummy antenna.

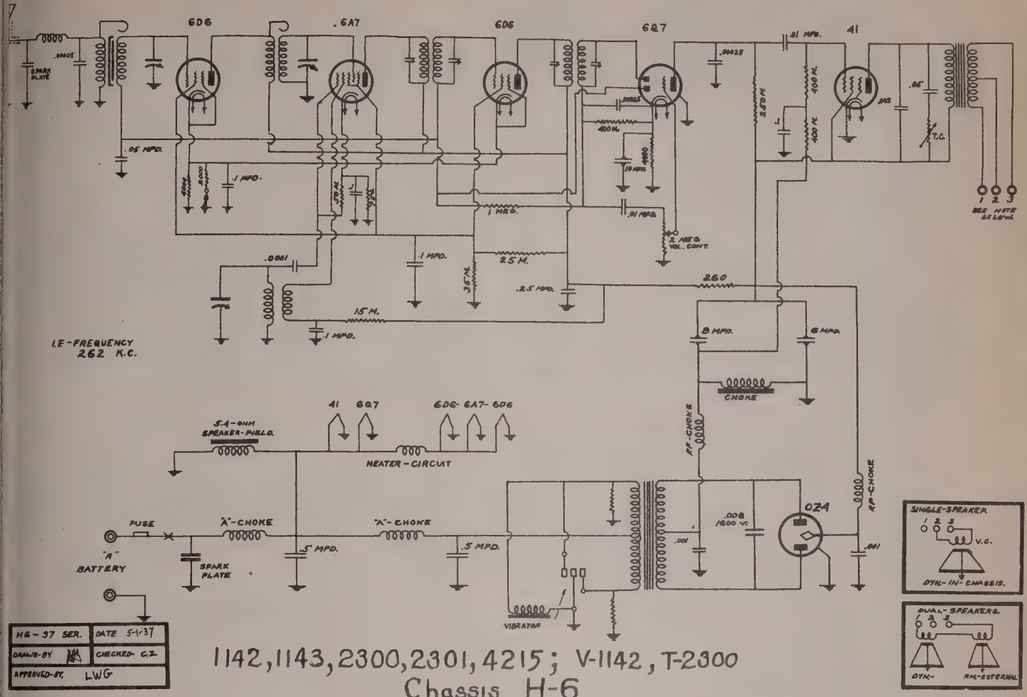

HOOD
FIREWALL
SOLDER BONDINGS TO RODS.
BONDINGS WHICH MAY BE NECESSARY
STEERING COLUMN
MAKE GOOD CONNECTION BETWEEN AERIAL SHIELD AND AUTO BODY.
AERIAL
TYPICAL EXAMPLE OF BONDINGS





IMPORTANT:
BLUE AND YELLOW LEADS MUST BE INTERCHANGED FOR CARS WITH NEGATIVE BATTERY TERMINAL GROUNDED. SETS ARE SHIPPED WITH LEADS ARRANGED FOR CARS WITH POSITIVE BATTERY TERMINAL GROUNDED

SPIEGEL, INC. MODELS 1142, 1143, 2300, 2301, 4215; V-1142, T-2300, Ch. H-6
MODEL A2026, Ch. 10-70
MODEL Z-7002, Ch. 0-51



H6-37 SER.	DATE 5-1-37
DRAWN-BY	CHECKED- C.Z.
APPROVED-BY, LWG	

1142,1143,2300,2301,4215; V-1142, T-2300
Chassis H-6

ADJUSTING PUSH BUTTONS FOR MODELS A2026 Ch. 10-70; Z-7002 Ch. 0-51

Cut the call letters of your four selected stations from the list supplied with your receiver and slip them into the top of the Push-Buttons, with the clear celluloid on top of the call letters to protect them. Arrange the call letters in the buttons from left to right, having the lowest frequency station (that is, the station closest to 600 K.C. at the left and work progressively towards the right, so that the highest frequency station is toward the right.

Follow the procedure outline below, in order to adjust the push-buttons properly:

1. By means of the tuning knob, tune in with the right hand as accurately as possible the desired station having the lowest frequency.

2. Continuing to hold the tuning control knob in its exact position with the right hand, loosen with the left hand the push-button to be set up for that station, (the one farthest toward the left) by unscrewing the push-button about one turn to the left (counter-clockwise).

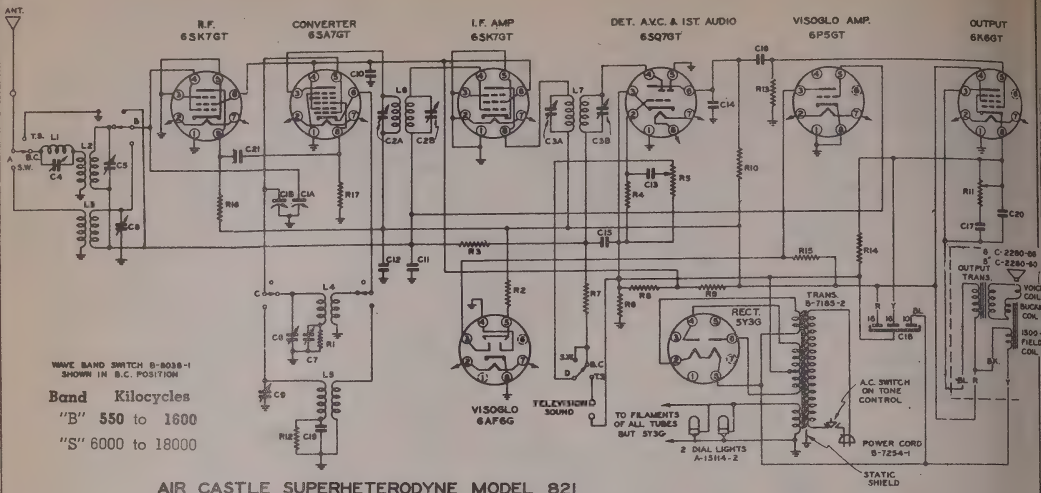
3. Push the push-button in all the way, and then tighten it gently toward the right (clockwise). Release push-button slowly and when in normal position grip button and tighten firmly.

The push-button tuning system is now correctly set up for your first selected station of lowest frequency.

Follow through with this same procedure, setting up the other three stations in the order of their frequency, that is, the second station set up will be second lowest in frequency, etc.

MODEL A-2000, Ch. 821

SPIEGEL, INC.



Band	Kilocycles
"B"	550 to 1600
"S"	6000 to 18000

AIR CASTLE SUPERHETERODYNE MODEL 821
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-7229
C2A&B	NO. 1 I. F. TRIMMER	B-7200-GN
C3A&B	NO. 2 I. F. TRIMMER	B-7200-GN
C4	I.F. REJ. TRIMMER	A-14088-4
C5	B.C. ANT. TRIMMER	A-14088-5
C6	B. C. OSC. TRIMMER	B-7199-BY
C7	B. C. OSC. PADDER	
C8	S. W. ANT. TRIMMER	A-14088-8
C9	S. W. OSC. TRIMMER	A-14088-8
C10	.1 MFD. 200 V.	C-3202-38C
C11	.05 MFD. 200 V.	C-3202-84C

C12	.1 MFD. 400V.	C-3204-38C
C13	.02 MFD. 200 V.	C-3202-22C
C14	250 MMF. MICA	C-720-324
C15	250 MMF. MICA	C-720-324
C16	.05 MFD. 400 V.	C-3204-28C
C17	.03 MFD. 600 V.	C-3206-80C
C18	16-10-16 MFD. ELECT.	A-14780-1
C19	2700 MMF. MICA	A-15451
C20	.003 MFD. 600 V.	C-3206-62C
C21	40 MMF. MICA	C-720-381

R1	22,000 Ω	.25 W.	C-2795-78B
R2	56,000 Ω	.25 W.	C-2795-83B
R3	1 MEGOHM	.25 W.	C-2795-98B
R4	4.7 MEGOHM	.25 W.	C-2795-106B
R5	.5 MEG. VOL. CONTROL		A-15130-3
R6	150 Ω	.25 W.	C-2795-52B
R7	56,000 Ω	.25 W.	C-2795-83B
R8	39,000 Ω	1 W.	C-2797-81B
R9	15,000 Ω	3 W.	C-2799-76A
R10	270 000 Ω	.25 W.	C-2795-91B

R11	.25 MEG. T.C. & SWITCH		A-15128-2
R12	22,000 Ω	.25 W.	C-2795-78B
R13	680,000 Ω	.25 W.	C-2795-30B
R14	470 Ω	1 W.	C-2797-58B
R15	1 MEGOHM	.25 W.	C-2795-98B
R16	3,300 Ω	.25 W.	C-2795-60B
R17	2.2 MEG.	.25 W.	C-2795-102B

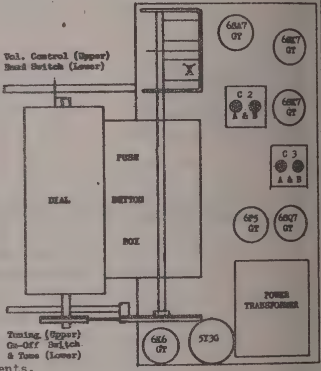
L1	I.F. REJECTOR COIL	A-14677
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-10
L4	B. C. OSC. COIL	A-15377-2
L5	S. W. OSC. COIL	A-15233-8
L6	NO. 1 I. F. COIL	A-12064-39
L7	NO. 2 I. F. COIL	A-12064-17

VOLTAGE CHART

Line Voltage: 110 volts
Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

Tube	Voltage of Socket Prongs to Gnd. See Prong Nos. on Schematic Diagram							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SA7	0	0	218	70	-.05	0	*5.8	-.015
6SK7 Rf	0	0	0	-.1	0	70	*5.8	190
6SK7 IF	0	0	0	-.1	0	70	*5.8	210
6SQ7	0	-1.9	-3	-3	-.2	52	*5.8	0
6P5	0	0	.2	200	-.1	—	*5.8	0
6AF6	0	*5.8	A	—	200	—	0	0
6K6	0	0	190	210	0	—	*5.8	12.5
5Y3	0	270	—	*270	—	*270	—	270

Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts
A - Cannot be measured with 1000 ohms per volt voltmeter.

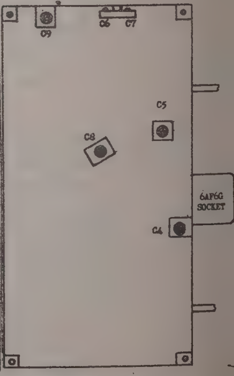


TOP VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that last mark on BC scale is directly toward front of set when condenser plates are fully meshed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C3 A&B	2nd I-F
							C2 A&B	1st I-F
3	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C4	Adjust to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C6 Osc.	
							C5 Ant.	
5				600 KC	BC	600 KC	C7 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	Ant.	*	18 MC	SW	18 MC	C9 Osc:	Rock dial while adjusting for maximum output
							C8 Ant.	
9	(Check calibration and sensitivity at 6 MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

Notes: *Connect to point "X" on Variable Condenser. See drawing below.
**100 ohm and 200 mmf. in series



BOTTOM VIEW OF CHASSIS

SPIEGEL, INC. MODELS 2004, 2005, 2082, 2083, T-2004, T-2054, T-2082, Ch. 175E

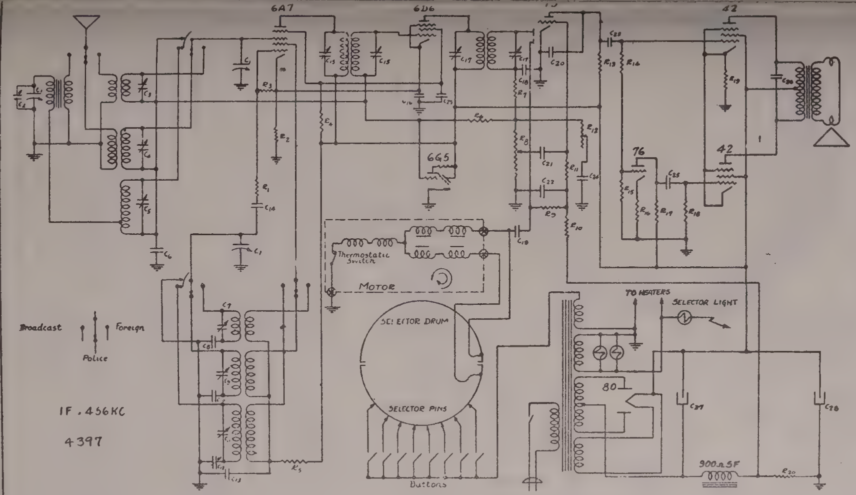
TUBES

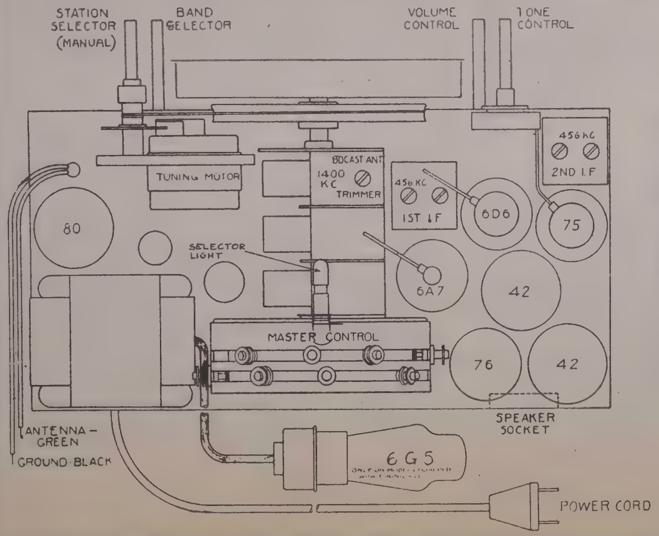
Tubes required are:

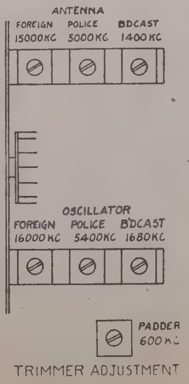
- 1—6A7 Oscillator-translator
- 1—6D6 Intermediate Frequency Amplifier
- 1—75 Detector AVC—First Audio Amplifier
- 1—76 Driver—Phase Inverter
- 2—42 Power Output
- 1—80 Rectifier
- 1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Do not use tubes of types different from those shown above. When replacing tubes or checking connections, refer to the *Tube Layout Chart.*

Symbol	*Part No.*	*Description*
C1	4354	12-375 mmf Variable
C3,11	1611	3-35 mmf trimmer
C4,5,7,9	2597	1-10 mmf trimmer
C6,22	572	1-200v
C8	2793	006 padder
C10	2741	1330 padder
C12	2560	200-400 mmf padder
C13	575	.1-400v
C14	2780	50 mmf mica
C15,17		IF trimmers
C16	2792	.2-200v
C18,20	1286	250 mmf mica
C19	580	.05-200v
C21	565	.01-200v
C23,25	576	.02-400v
C24	581	.005-600v
C26	824	.002-600v
C27	3375	16 mf 450v
C28	3351	8 mf 225 V. reg.
C29	3358	.2-400v
R1,2	2689	100 ohm 1/3w
R3,7,17	631	50M 1/3w
R4	636	40M 1/3w
R5	617	20M 1/3w
R6,9,10,11	624	1 meg. 1/3w
R8	2726	500M VC
R12	2737	2 meg TC
R13	2730	200M 10% 1/3w
R14	2881	400M 10% 1/3w
R15	2880	100M 10% 1/3w
R16	2883	5M 10% 1/3w
R18	2731	500 M 10% 1/3w
R19	3353	250 ohm 2 W.
R20	2882	15 ohm 10% 1/3w
	4387	Power transformer
	3462-1	1st IF transformer
	3464-1	2nd IF transformer
	2724	Band Switch
	2771	Antenna Coil
	2772	Oscillator Coil
	2845	B. C. Antenna Coil
	4392	Contact Ribbon
	4377	Contact Pins
	4394	Motor Assembly
	3346	Speaker 8"
	3710	Speaker 10"







MODELS 2004, 2005, 2082, 2083, T-2004, T-2054, T-2082, Ch. 175E SPIEGEL, INC.

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

Master Selector: This includes the *Selector Drum*, the *Selector Pins*, and the *Selector Light*. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the *Manual Station Selector* drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the escutcheon below the dial. Stations are tuned in automatically when the button under the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list eight of your favorite *local* or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 1600 kc) the *No. 1* station, and number the other stations similarly going from left to right across the dial. For example, assume that you favorite stations operate on frequencies of 1500 kc, 1400 kc, 1300 ks, 1200 kc, 1000 kc, 900 kc, 700 kc, and 600 kc. Then the 1500 kc station would be *No. 1*, the 1400 kc station would be *No. 2*, and so on down the list with the 600 kc station being designated *No. 8*. Reference to the push buttons is not necessary since they are not used until *After* the *Master Selector* has been set up.

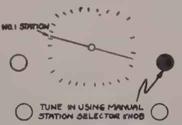
On the back of the receiver will be found the *Selector Drum* and the eight *Contact Pins* which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, *Fig. 1* shows the general layout and relation of the drum and contacts. *Fig. 2* shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. *Fig. 3* shows the arrangement of the *Contact Pins*, each pin being numbered according to the system suggested for numbering the stations, thus *pin No. 1* will be used for *Station No. 1*, *pin No. 2* will be used for *Station No. 2*, and so on down the list.

On the *Selector Drum* are two pairs of *Contact Ribbons*. Note that there is a *Paint Dot* on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This *Paint Dot* is for the purpose of locating the approximate position at which a given *Contact Pin* should be set in order to have the *Drum* stop for a particular station.

It is very important that the following steps be followed exactly as outlined; any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of *Standard Broadcast Stations*, as outlined previously under *"Operation."* Turn the receiver *"On,"* let it run for *at Least Ten Minutes* to allow the tubes to reach their final operating temperature.

2. Using the *Manual Station Selector* (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.



3. Face the rear of the chassis. Attach the lead from the *Selector Light* to the *No. 1 Contact Pin*; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

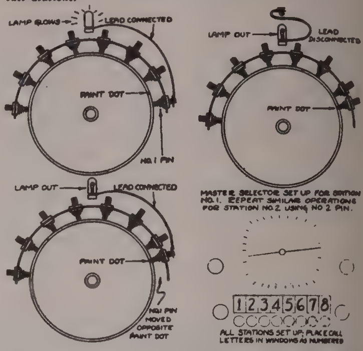
4. Observe the position of the *Paint Dot* on the edge of the *Drum*. Grasp the No. 1 pin firmly and slide it toward the *Paint Dot*, being careful not to break the connection between the *Selector Light* lead and the pin. When the pin is directly opposite the *Paint Dot*, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making this setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. *Be very careful not to move the Selector Drum while the pin is being set.* When the pin is definitely in its proper position, *Disconnect the Selector Light Lead from the Pin.*

5. Repeat the above procedure for the *No. 2* station: tune in the station, connect the *Selector Light* lead to the *No. 2* contact pin, move this pin opposite the *Paint Dot* so that the light goes out, then *Disconnect the Selector Light Lead.*

6. Using similar procedure, set up the other six stations, in each case using the *Contact Pin* bearing the *same number as that assigned to the station being set up.* Always *Disconnect the Selector Light Lead* as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, locate the *Call Letters* of your stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets, and insert them in the proper pockets above the push buttons.

8. The only operations necessary to receive any of the eight stations set up as outlined above are: Turn the power switch on by rotating the lower left knob to the right—*turn the control a few degrees beyond the point at which the switch snaps on* — allow about one minute for the tubes to heat, press the button under the call letters of the desired station *Holding the Button Down Until the Pointer Stops Moving and the Station is Heard*, then adjust the tone and volume. Be sure that the *Band Selector* switch is in the proper position for reception of *Standard Broadcast Stations.*


LAMP GLOWS
LEAD CONNECTED
PAINT DOT
NO. 1 PIN
LAMP OUT
LEAD DISCONNECTED
PAINT DOT
MASTER SELECTOR SET UP FOR STATION NO. 1. REPEAT SIMILAR OPERATIONS FOR STATION NO. 2 USING NO 2 PIN.
LAMP OUT
LEAD CONNECTED
PAINT DOT
NO. 1 PIN MOVED OPPOSITE PAINT DOT
1 2 3 4 5 6 7 8
ALL STATIONS SET UP; PLACE CALL LETTERS IN WINDOWS AS NUMBERED

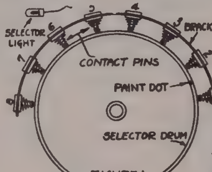


FIGURE 1

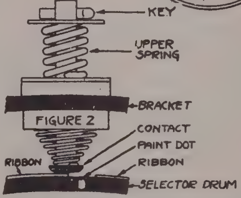


FIGURE 2

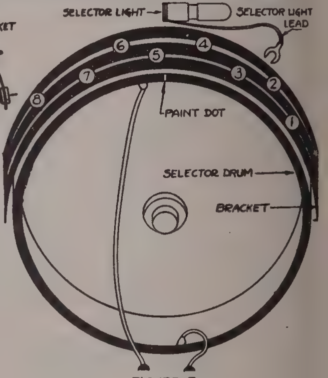


FIGURE 3

ALINEMENT PROCEDURE

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

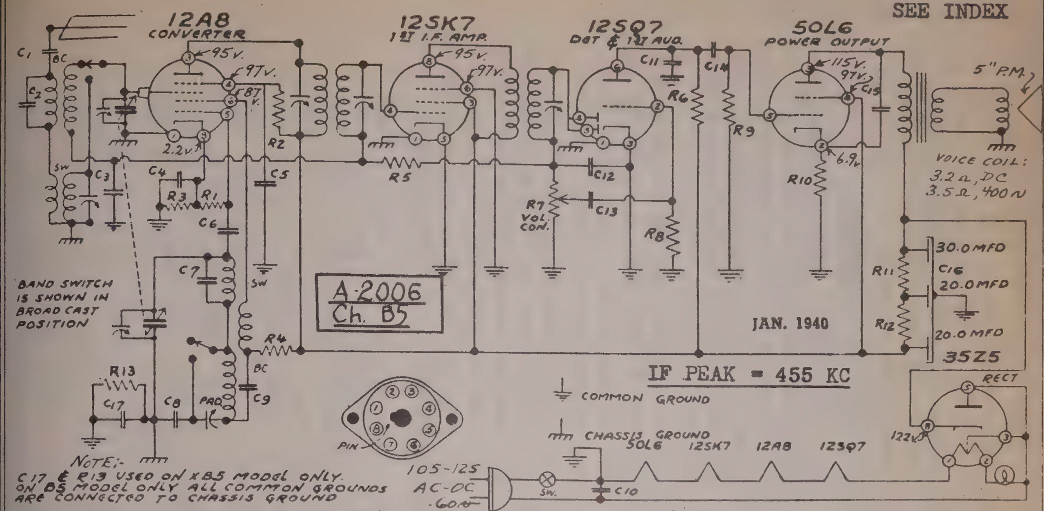
RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5400 kc., then aline the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and aline the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmed down tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

SPIEGEL, INC.

MODEL A-2006, Ch. B5

MODEL A-2132, Ch. F5 **FOR LAYOUT SEE INDEX**

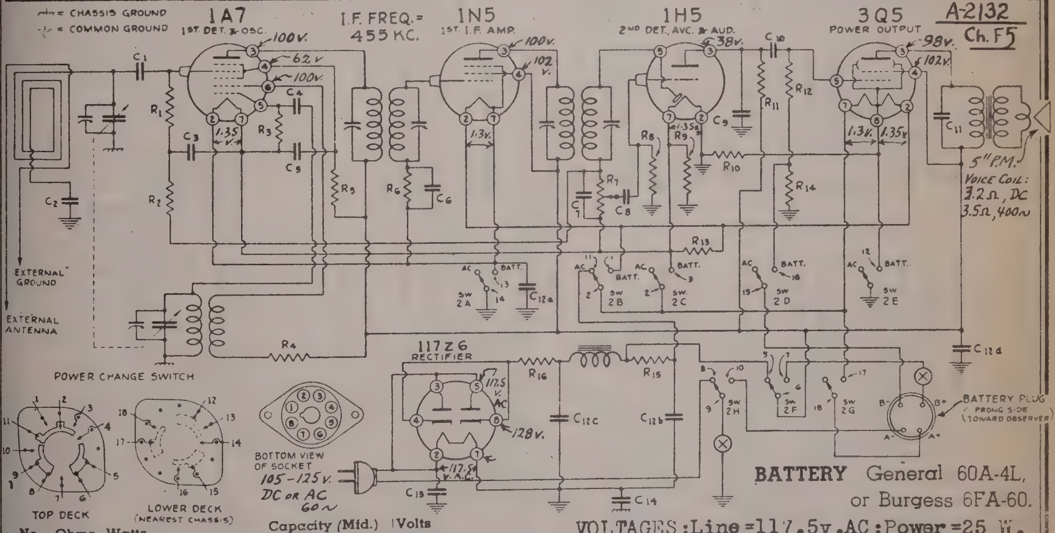


No.	Ohms		No.	Ohms		C8	.003-5 %	Mica
R1	50,000 ¼	Watt	R12	500	½ Watt	C9	.005	600
R2	20,000 ¼	Watt	R13	150,000	¼ Watt	C10	.05	400
R3	440 ¼	Watt				C11	.0005	Mica
R4	3,000 ¼	Watt	No.	Capacity	Volts	C12	.00025	Mica
R5	2,000,000 ¼	Watt	C1	.001	600	C13	.01	400
R6	250,000 ¼	Watt	C2	.00005	Mica	C14	.002	400
R7	500,000	Vol. Cont.	C3	.05	200	C15	.01	400
R8	5,000,000 ¼	Watt	C4	.05	200	C16	30.0	150
R9	500,000 ¼	Watt	C5	.05	200		20.0	150
R10	200 ¼	Watt	C6	.0001	Mica		20 0	150
R11	500 ¼	Watt	C7	.00001	Mica	C17	.25	200

VOLTAGES:Line=117v.AC;Power=30W.Volume Cont'l=Max. Meter=1000 ohms/volt(150 v. scale). Measure with respect to common gnd

ALIGNMENT PROCEDURE(See 7C-PH Automatic):

Trim OSC. at 1730 KC (Broadcast)
Pad OSC. at 600 KC (Broadcast)
Trim ANT. at 1400 KC (Broadcast)
Trim ANT at 15000 KC (Short Wave)



BATTERY General 60A-4L, or Burgess 6FA-60.

No.	Ohms	Watts				Capacity (Mfd.)		Volts			
						C1	.00025	Mica			
R1	1,000,000	½	R9	110	½	C2	.1	200	C10	.01	400
R2	1,000,000	½	R10	750—10%	½	C3	.01	200	C11	.002	400
R3	200,000	½	R11	250,000	½	C4	.0005	Mica	C12a	40.	25
R4	500	½	R12	1,000,000	½	C5	.05	200	C12b	40.	25
R5	30,000	½	R13	400	½	C6	.01	200	C12c	30.	150
R6	5,000,000	½	R14	400—10%	½	C7	.00025	Mica	C12d	30.	150
R7	1,000,000	V.C.	R15	2,100	5	C8	.01	400	C13	.05	400
R8	5,000,000	½	R16	30	½	C9	.00025	Mica	C14	.25	200

VOLTAGES:Line=117.5v.AC;Power=25 W. Vol.Cont'l=Max. Meter=1000 ohms/volt Measure with respect to common gnd.

ALIGNMENT(use common gnd): IF=455KC

*Trim Osc. at 1550 KC, Ant. at 1400KC

*TRIM USING EXTERNAL GND.

APRIL 1940

In Model F5 switch points 4, 15, 16, 17 and 18 are not used. Switch points 4 is also not used on Model XF5. Power change switch 2A thru 2H and the pictorial view shown in the "AC-DC" position.

In late models C2 is not used.

MODELS W-134, Z-7124, Ch. TF
MODEL A-2132, Ch. F5
MODEL A-2006, Ch. B5

SPIEGEL, INC.

PHONOGRAPH OPERATION

W-134 Ch. TF ; Z-7124 Ch. TF

MOTOR. The motor is a strong mechanical type hand wound spring motor. Insert the crank in the hole at the right. When the motor is fully wound the phonograph will play two full ten-inch records before rewinding is required.

TURNTABLE. To start turntable move the brake lever forward. To stop turntable pull lever toward you. Speed may be regulated by the control arm. For correct pitch adjust this speed to 78 revolutions per minute.

WARNING: Do not forget to turn off radio set when through playing records or the battery will run down. Battery life is appreciably shortened by continuous operation over long periods of time.

PICKUP. The pickup is the new crystal type. To insert a needle, raise the pickup arm to a vertical position, loosen the needle holder screw on the front, insert a needle to its full depth, tighten up the needle holder screw and lower pickup arm to its non-playing position outside the record and slip into the pickup rest holder. When commencing to play, remove pickup from holder, lift and place gently the point of the needle on the smooth outer rim of the record and slide into the first groove of the record.

PLAYING RECORDS

(a) Turn on the volume control and "on-off" switch on the receiver.

(b) Turn the "Radio-phono" switch to the phono position.

(c) Place the selected record upon the turntable and move the starting lever forward. This will place the record in motion.

(d) Lift pickup and lower the needle point gently to the smooth outer rim of the record and slide into the first groove of the record.

(e) Adjust volume to proper level by rotation of the volume control knob. After the selection is completed, lift the pickup, swing the arm to the right beyond the edge of the record and lower and affix to the arm rest bracket.

(f) When you have finished playing, lift pickup and place in its rest position and remove record from turntable. Never leave pickup with needle resting on record or on turntable.

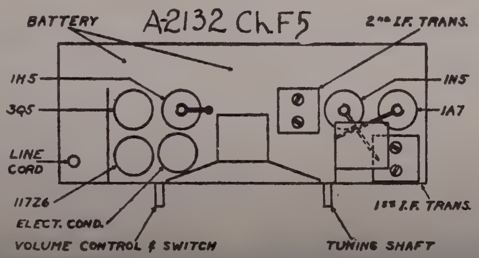
RECORD HOLDER. Eight ten-inch records may be carried in the record holder in the cabinet lid. To remove record holding clamp turn it ninety degrees. Place records in lid, replace clamp, sliding it up tight against records before turning it.

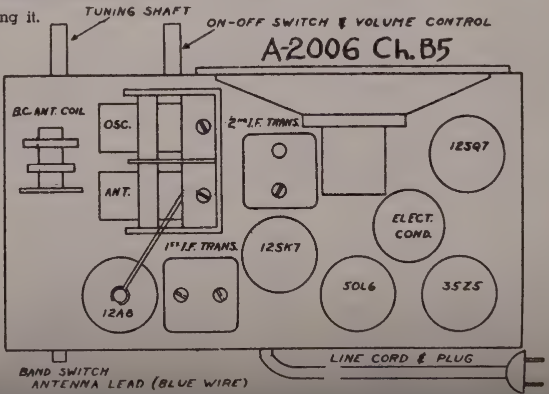
SERVICE. The phonograph motor will require oiling once every three months. Apply 3 or 4 drops of Number 10 S. A. E. oil to the turntable bearings, to the bearings at each end of the governor shaft, to the felt pad on the governor brake, and to the gears and bearings on the gear shafts.

NEEDLES

High quality needles are important to your enjoyment of recorded music. Use good half-tone steel needles or Kacti-needles to prolong the life of the records. If long playing needles are used, do not change the position of the needle in the pickup after it has once been played, as this will injure the record grooves.

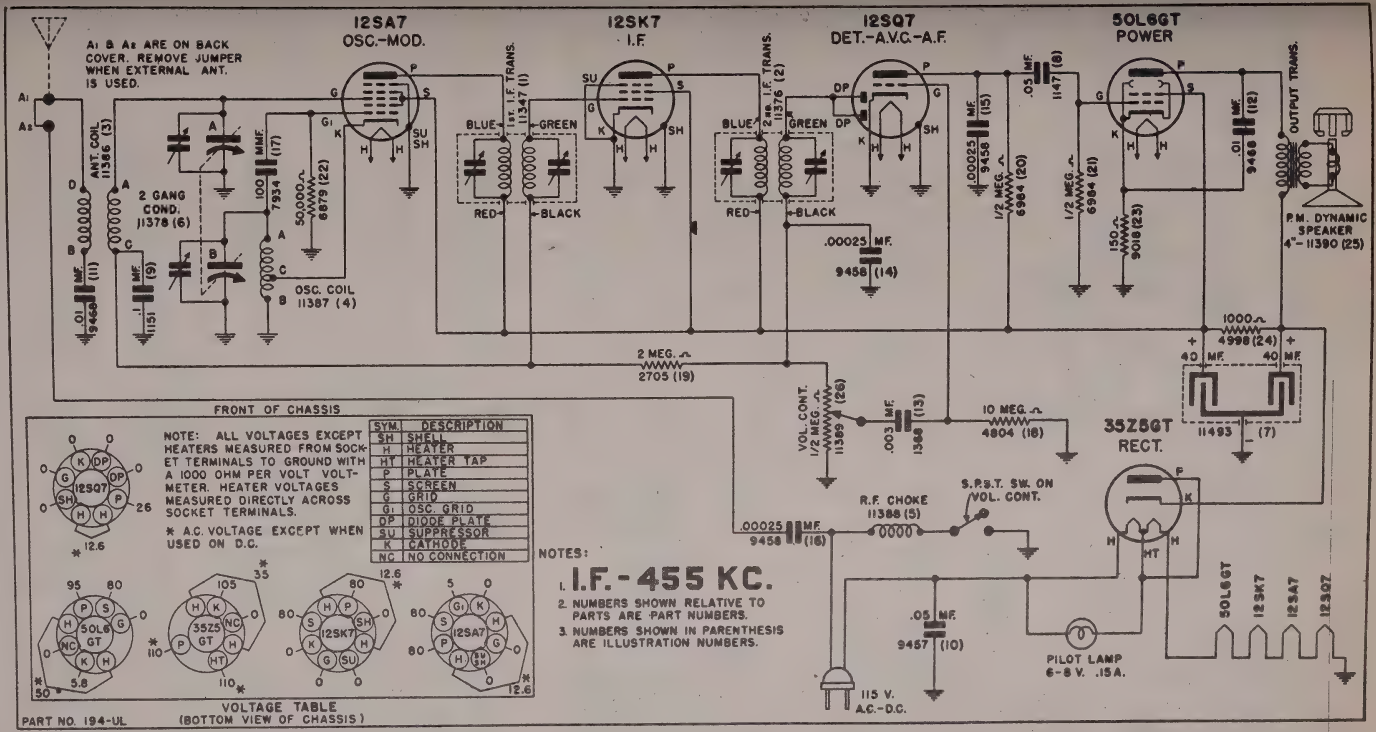
Note: The needle point wears down gradually in use and wears down in conformity with the shape of the record groove. Changing the position of the needle in the pickup after it has been played will provide a new fit to the groove and will damage the record groove by changing the shape of the groove. The life of the record depends upon maintaining the original record groove. To summarize this important message, never reinsert a used needle in the pickup, since this will do permanent injury to the record and shorten your record life materially.





SPIEGEL, INC.

MODEL A-2012
Ch. 194U



NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

* A.C. VOLTAGE EXCEPT WHEN USED ON D.C.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	GRID
G1	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

NOTES:

1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

PARTS LIST

Part No.			Description	List Price
1	11347	Coil	1st I. F. Transformer	$ .90
2	11376	Coil	2nd I. F. Transformer	.80
3	11386	Coil	Antenna	.50
4	11387	Coil	Oscillator	.45
5	11388	Coil	Antenna Line Choke	.25
6	11378	Condenser	Tuning Two Gang	1.75
7	11493	Condenser	Tubular Dry Elec. 40 Mfd.-40 Mfd.	1.00
8	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
9	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
10	9457	Condenser	Tubular .05 Mfd. 400 Volt	.18
11	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
12	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
13	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17

Part No.			Description	List Price
14	9458	Condenser	Mica .00025 Mfd	.21
15	9458	Condenser	Mica .00025 Mfd	.21
16	9458	Condenser	Mica .00025 Mfd	.21
17	7934	Condenser	Mica .0001 Mfd	.21
18	4804	Resistor	Carbon 10 Megohm ⅓ Watt	.19
19	2705	Resistor	Carbon 2 Megohm ⅓ Watt	.19
20	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
21	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
22	6879	Resistor	Carbon 50,000 Ohm ⅓ Watt	.19
23	9018	Resistor	Carbon 150 Ohm ⅓ Watt	.19
24	4998	Resistor	Carbon 1000 Ohm 1 Watt	.21
25	11390	Speaker	P. M. Dynamic 4 in	2.70
26	11389	Volume Control	With S.P.S.T. Switch	.80

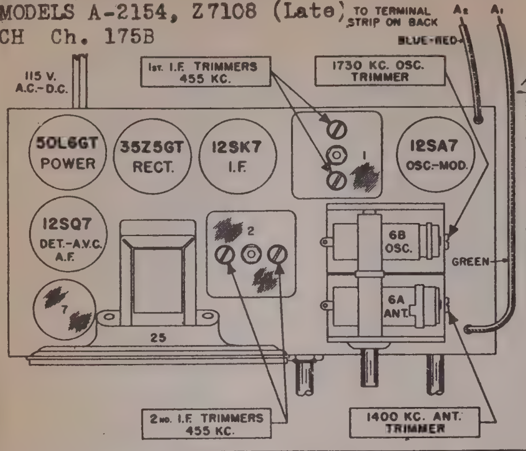
MISCELLANEOUS PARTS

Part No.		Description	List Price
11304	Bulb	6-8 Volt .150 Ampere Dial Light No. 47 Bayonet Base	.10
11381	Dial Scale	Calibrated Scale	.30
8184	Dial Cord	Dial Drive Cord	.10
11379	Dial Shaft	Dial Drive Shaft	.12
11725	Dial Pointer	For Dial-Bronze	.15
11384	Dial Pointer	For Dial	.15
11391	Dial Crystal	For Dial	.22
11563	Knob	Bakelite Tuning for Walnut Plastic Cabinet	.10
10207	Knob	Bakelite Push Button for Ivory Plastic Cabinet	.08
	Cabinet	Walnut Plastic	1.80
	Cabinet	Ivory Plastic	2.15

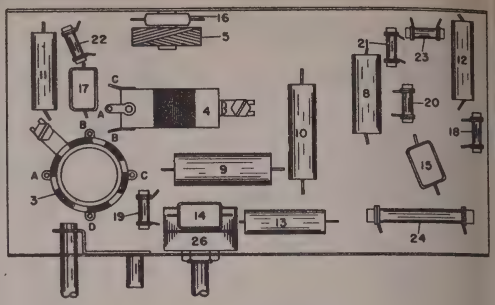
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE. W. 4,000 10-39

MODEL A-2012, Ch. 194U
MODEL A-2056, Ch. 204
MODELS A-2154, Z7108 (Late)
CH Ch. 175B

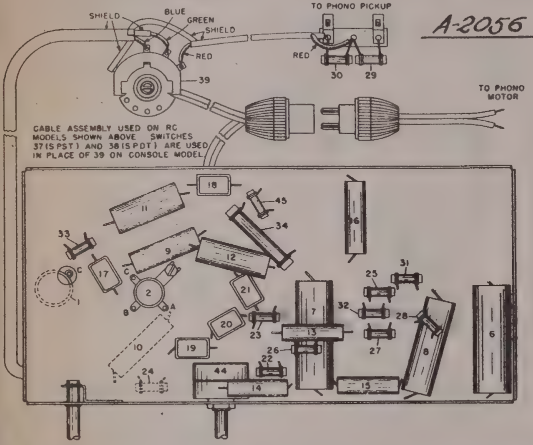
SPIEGEL, INC.

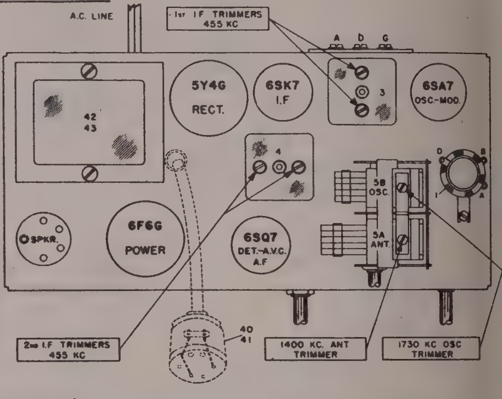


A-2012 Ch.194U



A-2056 Ch204





NO 204-A(E)

MODELS A-2012, A2056 **ALIGNMENT PROCEDURE** *A-2154, Z7108 (LATE)*

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to gang condenser frame.

	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
	I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of *12SA7 tube DO NOT REMOVE CAP.	Adjust the second I. F. transformer trimmer for maximum output then adjust each of the first I. F. trimmers for maximum output
1	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver "A1" post	Adjust 1730 K. C. oscillator trimmer for maximum output.
2	Approx. 1400 K. C.	Approx. 1400 K. C.	.00025 MFD condenser	Receiver antenna "A1" post	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.

*1A7G tube *FOR A2154, Z7108 (LATE)*

*6SA7 tube *FOR A-2056*

©John F. Rider, Publisher

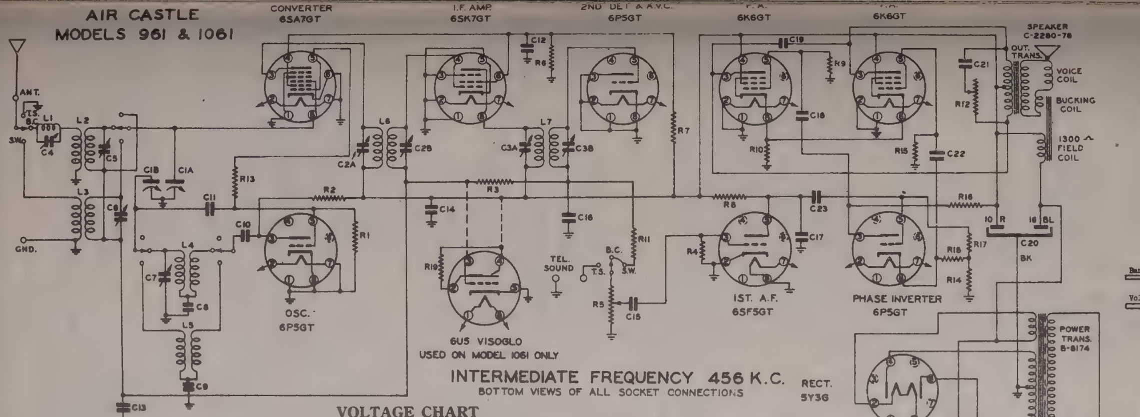
SPIEGEL, INC.

MODELS A2052, A2060, A2062
Ch. 961-1061

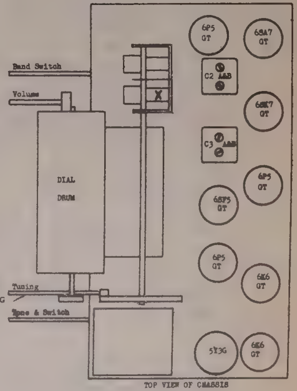
AIR CASTLE
MODELS 961 & 1061

BROADCAST BAND
540 to 1720 Kilocycles

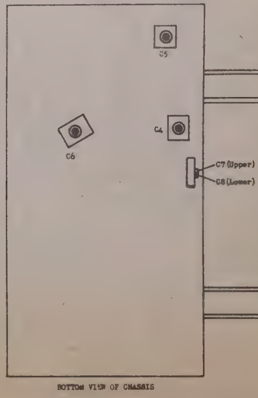
SHORT-WAVE BAND
5.7 to 21.5 Megacycles



INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

VOLTAGE CHART

Line Voltage: 117 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SA7GT	Converter	0	0	230	48	-.1C	0	*5.9	-.1c
6P5GT	Oscillator	0	0	125	230	-.1C	-	*5.9	0
6SK7GT	I-F Amplifier	0	0	0	-A	0	48	*5.9	230
6P5GT	Det - AVC	0	0	0	0	-A	-	*5.9	0
6SF5GT	1st Audio Amplifier	0	0	A	-	53B	230	*5.9	0
6P5GT	Phase Inverter	0	0	135	-	A	40	*5.9	55
6K6GT	Power Amplifier	0	0	225	230	0	-	*5.9	18.5
6K6GT	Power Amplifier	0	0	225	230	0	-	*5.9	18.5
5Y3G	Rectifier	0	*380	-	*325	-	*325	-	*380
6U5**	Tuning Indicator**	*5.9	90	-.02C	225	0	0	-	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*A.C. **On Model 1061 only.
A - Cannot be measured on 1000 ohms/volt meter.
B - 100 volt scale.
C - 1 volt scale.
D - 10 volt scale.

ALIGNMENT CHART

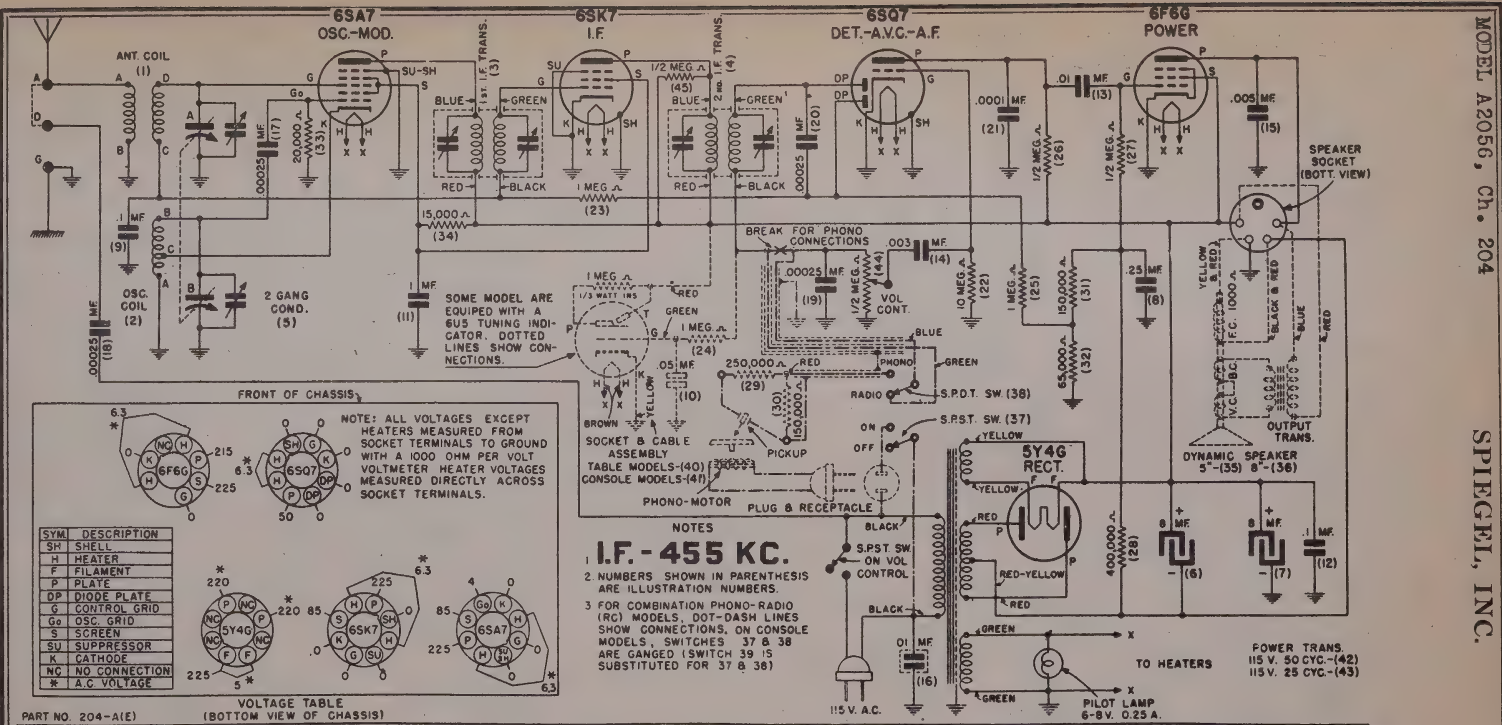
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that indicator points to last mark with gang closed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C3 A&B C2 A&B	
3	I-F Rej.	Ant.	200 mf.	456 KC	BC	Closed	C4	Adjust to minimum
4	Broadcast Band	Ant.	200 mf.	1500 KC	BC	1500 KC	C7 (Osc.) C5 (Ant.)	
5				600 KC	BC	600 KC	C8 (Pad.)	***
6	(Repeat operation 4).							
7	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
8	SW Band	Ant.	**	18 MC	SW	18 MC	C6 (Ant.)	***
9	(Check calibration and sensitivity at 6. MC and 18. MC)							
10	(Check operations 1 to 9 inclusive.)							

*Connect to point marked "X" in drawing
**100 ohms and 200 mmf. in series.
***Rock dial while adjusting for maximum output. Be sure to adjust on fundamental signal and not on image.

C1A&B	VARIABLE CONDENSER	B-7229
C2A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C3A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C4	I.F. REJECTOR TRIMMER	A-14088-4
C5	B.C. ANT. TRIMMER	A-14088-5
C6	S.W. ANT. TRIMMER	A-14088-5
C7	B.C. OSC. TRIMMER	B-7199-EY
C8	B.C. OSC. PADDER	
C9	2700 MMF. MICA	A-15451
C10	250 MMF. MICA	C-720-324
C11	50 MMF. MICA	C-720-315
C12	.1 MFD. 200V.	C-3202-38C
C13	.05 MFD. 200V.	C-3202-84C
C14	.1 MFD. 400V.	C-3204-38C
C15	.02 MFD. 200V.	C-3202-22C
C16	250 MMF. MICA	C-720-324
C17	250 MMF. MICA	C-720-324
C18	.05 MFD. 400V.	C-3204-28C
C19	.001 MFD. 600V.	C-3206-58C
C20	16-10 MFD. ELECT.	A-14799-2
C21	.015 MFD. 600V.	C-3206-77C
C22	.05 MFD. 400V.	C-3204-28C
C23	.05 MFD. 400V.	C-3204-28C
R1	56,000 ∿ .25W.	C-2795-83B
R2	22,000 ∿ .5W.	C-2796-78C
R3	1 MEGOHM .25W.	C-2795-98B
R4	4.7 MEGOHM .25W.	C-2795-106B
R5	500,000 ∿ VOL. CONT.	A-15130-3
R6	27,000 ∿ 1W.	C-2797-79B
R7	33,000 ∿ 3W.	C-2799-60A
R8	270,000 ∿ .25W.	C-2795-91B
R9	680,000 ∿ .25W.	C-2795-30B
R10	330 ∿ 1W.	C-2797-56B
R11	56,000 ∿ .25W.	C-2795-83B
R12	TONE CONT. & SW.	A-15128-3
R13	560 ∿ .25W.	C-2795-59B
R14	33,000 ∿ .5W.	C-2796-195C
R15	680,000 ∿ .25W.	C-2795-96B
R16	39,000 ∿ .5W.	C-2796-197C
R17	1 MEGOHM .25W.	C-2795-98B
R18	2700 ∿ .25W.	C-2795-169B
R19	220,000 ∿ .25W. (USED ON MODEL 1061 ONLY)	C-2795-90B
L1	I.F. REJECT. COIL	A-14677
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-8
L4	B.C. OSC. COIL	A-15377-1
L5	S.W. OSC. COIL	A-15233-3A
L6	NO. 1 I.F. COIL	A-12064-39
L7	NO. 2 I.F. COIL	A-12064-17

MODEL A2056, Ch. 204

SPIEGEL, INC.



NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
F	FILAMENT
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
Go	OSC. GRID
S	SCREEN
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION
*	A.C. VOLTAGE

NOTES

1. I.F. - 455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. FOR COMBINATION PHONO-RADIO (RC) MODELS, DOT-DASH LINES SHOW CONNECTIONS. ON CONSOLE MODELS, SWITCHES 37 & 38 ARE GANGED (SWITCH 39 IS SUBSTITUTED FOR 37 & 38)

PART NO. 204-A(E)

Part. No.			*Description*	*List Price*
1	11269	Coil	Antenna	$ .70
2	11271	Coil	Oscillator	.60
3	4404	Coil	1st I. F. Transformer	1.20
4	4404	Coil	2nd I. F. Transformer	1.20
5	11526	Condenser	Tuning (Two Gang)	2.00
6	10625	Condenser	Dry Electrolytic 8 Mfd.-350 Volt D. C. Wkg.	.55
7	10625	Condenser	Dry Electrolytic 8 Mfd.-350 Volt D. C. Wkg.	.55
8	9032	Condenser	Tubular .25 Mfd. 200 Volt	.25
9	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
10	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
11	9203	Condenser	Tubular .1 Mfd. 400 Volt	.20
12	9203	Condenser	Tubular .1 Mfd. 400 Volt	.20
13	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
14	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
15	2075	Condenser	Tubular .005 Mfd. 600 Volt	.18
16	4305	Condenser	Tubular .01 Mfd. 220 Volt (Shielded)	.30
17	9458	Condenser	.00025 Mfd. Mica	.21
18	9458	Condenser	.00025 Mfd. Mica	.21
19	9458	Condenser	.00025 Mfd. Mica	.21
20	9458	Condenser	.00025 Mfd. Mica	.21
21	7934	Condenser	.0001 Mfd. Mica	.21
22	4804	Resistor	Carbon 10 Megohm ⅓ Watt	.19
23	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
24	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
25	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
26	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
27	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
28	3133	Resistor	Carbon 400,000 Ohm ⅓ Watt	.19
29	8906	Resistor	Carbon 250,000 Ohm ⅓ Watt	.19
30	3418	Resistor	Carbon 150,000 Ohm ⅓ Watt	.19
31	3418	Resistor	Carbon 150,000 Ohm ⅓ Watt	.19
32	11599	Resistor	Carbon 65,000 Ohm ⅓ Watt	.19
33	1784	Resistor	Carbon 20,000 Ohm ⅓ Watt	.19
34	4599	Resistor	Carbon 15,000 Ohm 1½ Watt	.22
35	11278	Speaker	Electro-Dynamic 5"	3.00
36	11537	Speaker	Electro-Dynamic 8"	5.00
37	10573	Switch	S.P.S.T. (On-Off) Used with Phono Model Having Tuning Eye	.65
38	2434	Switch	S.P.D.T. (Rad-Phono) Used with Phono Model Having Tuning Eye	.70
39	10472	Switch	Radio-Phono (Used with Phono Model without Tuning Eye	1.00
40	4516	Socket & Cable Assembly	For 6U5 Tuning Eye Incl. Socket and Resistor	.65
41	10108	Socket & Cable Assembly	For 6U5 Tuning Eye Incl. Socket and Resistor (Used with Phono Model)	.65
42	11272	Transformer	Power 115 Volt 50 Cycle	2.80
43	11273	Transformer	Power 115 Volt 25 Cycle	5.00
44	4839	Volume Control		.85
45	6984	Resistor	Carbon 500,000 Ohm—⅓ Watt	.19

MISCELLANEOUS PARTS

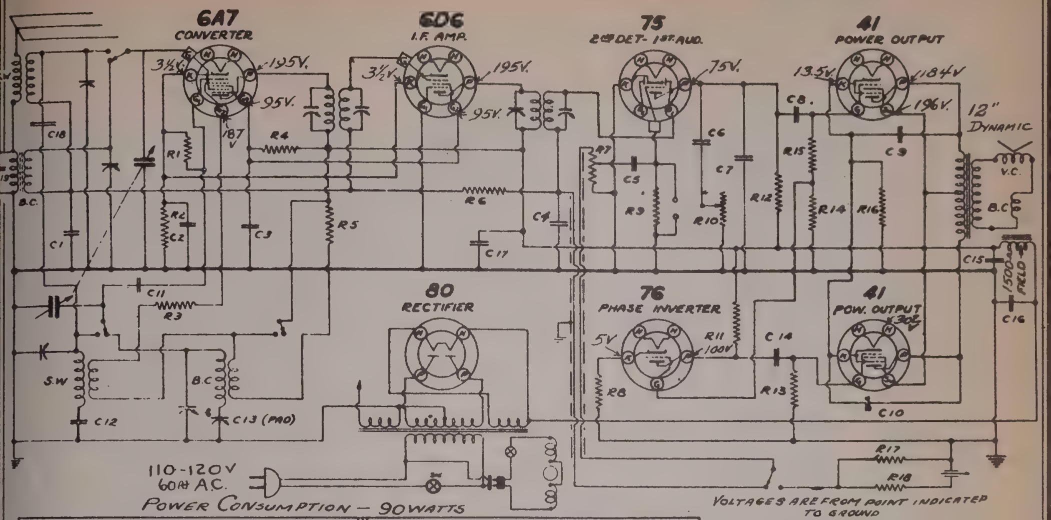
10292	Bulb	6-8 Volt .250 Amp. Type 3¼ No. 44	.10
11529	Dial Scale		.35
8184	Dial Cord	12" of 18 lb. Drive Cord	.10
11017	Dial Shaft	Dial Drive Shaft	.11
11489	Dial Pointer	Indicator Needle	.15
11140	Escutcheon	With Crystal for Dial	1.00
11339	Escutcheon	With Crystal for Dial	1.00
4519	Escutcheon	For Tuning Eye	.30
11796	Knob		.10
10473	Motor	Phono 110 Volt 60 Cycle less Turntable	7.00
10546	Motor	Phono 110 Volt 50 Cycle Less Turntable	7.50
10547	Motor	Phono 220 Volt 50 Cycle Less Turntable	8.00
10955	Pickup	Crystal Pickup and Arm	5.25
11797	Turntable	10" Velveteen Covered	1.50
11798	Turntable	12" Velveteen Covered	1.75

W. 4M PART NO. 204A

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SPIEGEL, INC.

MODELS A2080, Z7080
Ch. 7C-PH



I.F. - 455 K.C.

BAND SWITCHES SHOWN IN BROADCAST POSITION

BOTTOM VIEW OF TUBE SOCKETS SHOWN

GANG CONDENSER CAPACITY 443 μμfds.

CAPACITORS					
No.	MFDS.	VOLTS	No.	MFDS.	VOLTS
C1	.06	200	C11	.0001	MICA
C2	.25	200	C12	.004±5%	MICA
C3	.05	400	C13	300-600 μμfd.	PADDER
C4	.00025	MICA	C14	.01	400
C5	.01	400	C15	10.0	350
C6	.005	600	C16	10.0	350
C7	.00025	MICA	C17	.05	400
C8	.01	400	C18	GIMMICK	
C9	.005	600	C19	.0001	MICA
C10	.005	600			

RESISTORS					
No.	OHMS	WATTS	No.	OHMS	WATTS
R1	50,000	½	R11	50,000	½
R2	200	½	R12	250,000	½
R3	250	½	R13	500,000	½
R4	20,000	½	R14	100,000	½
R5	1,000	½	R15	400,000	½
R6	2 MEG.	½	R16	300	½
R7	500,000	VOL. CON.	R17	250,000	½
R8	3,000	½	R18	500,000	½
R9	5 MEG.	½			
R10	500,000	TONE CON.			

I.F. ALIGNMENT

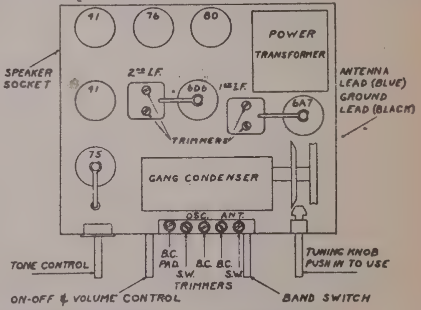
Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1730 KC and connect the output to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. The oscillator and antenna trimmers may be reached by removing the dial escutcheon. (See Fig. 3 for trimmer locations.) The next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. Next, re-set the dial pointer on the receiver and the signal generator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

D.C. voice coil resistance........................ 1.9 ohms
Voice coil impedance at 400 cycles.... 2.2 ohms



SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the signal generator to 18100 KC and connecting the output to the antenna lead through a 400 ohm resistor. Set the gang at minimum and adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the mica padding condenser, should be tested.

AUTOMATIC RECORD CHANGER

This **Record Changer** will automatically play a series of eight 10" or seven 12" records of the standard 78 R.P.M. type. Records of the last few years with the standard eccentric or spiral stopping groove on the inside and an eccentric on the outside will operate the automatic mechanism. However, records of any size up to 12" may be played manually.

OPERATION

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not, a "cycle" must be completed to bring it down. To do this, throw **Turntable Switch** "On". The turntable will begin to revolve and the cycle of motion on the pickup arm will be resumed. When the pickup arm comes down, turn off the **Turntable Switch.**

CAUTIONS

1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.

2. The use of records which have become warped or damaged through improper care, may cause the mechanism to jam and damage the instrument. Records which have become warped, will slide on one another when playing, resulting in unsatisfactory reproduction.

3. This instrument is not recommended for playing 10" and 12" records in mixed sequence. If this service is desired, all records must be perfectly flat and free from warp. **The index** and **record reject lever** must be set at "10" and after playing the last selection, the pickup will come down in position for a 10" record and repeat the playing of the record on a 10" diameter unless the **turntable switch** is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.

4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use.

5. The needle must be installed according to directions under "Pickup and Top-Loading Needle Socket" for proper operation of this instrument.

6. The two red mounting bolts which hold the Automatic Record Player solid for shipping must be removed before using the Automatic Record Player so it can "float" on the spring mountings.

7. LEVELING—When a record has been played the pickup moves out, another record is dropped down, and the needle is fed automatically into the starting groove of this record. If the needle fails to enter the starting groove, raise the right-hand side of the cabinet by inserting thin spacers under the feet on that side. If the needle slides over a few grooves, raise the left-hand side of the cabinet in a similar manner.

8. LUBRICATION—A few drops of good quality light machine oil should be applied about once every six months at the base of the spindle below the metal washer under the turntable.

CONTROLS AND MECHANISM

INDEX AND RECORD REJECT LEVER

This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"Manual", "12", "10", and "Reject" When it is desired to change record selections manually, this lever should be set in the "Manual" Position. With the lever in the "12" position, the mechanism is set to play a series of 12" records automatically. To play either a series of 10" records or 10" and 12" records mixed, the lever should be set at the "10" position. To reject a record being played, or to start the record changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "reject" position and let go. The pickup will rise and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If a series of 12" records is to be played, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "Manual" position when not actually playing records automatically.

TURNTABLE SWITCH

The Slide Switch located just in front of the **Index** and **Record Reject Lever** controls the current to the turntable motor. To start the turntable, push the switch to the "On" position. To stop the turntable, push the switch to the "Off" position.

NEEDLES

The use of high grade long playing needles is absolutely essential for the proper operation of this instrument, as the regular needles are only good for one or at the most two records. If any needle is used too long, distortion and poor quality will be obtained and also the records will be damaged.

PICKUP AND TOP-LOADING NEEDLE SOCKET

The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm in the groove and the pickup over the needle gauge plate. The pickup must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at top so that it drops down against the needle plate and then tighten the needle screw.

NEEDLE EJECTOR

The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above.

RECORD HOLDER SHELVES

To place a record on the turntable or to remove records, raise the record holder shelves by lifting with the fingers under the shelf, and swing clear of the outer edge of record. Also push back vertical lever adjacent to the rear record holder post. The turntable is now accessible. Before loading the magazine for **automatic operation**, swing the record holder shelves back into position.

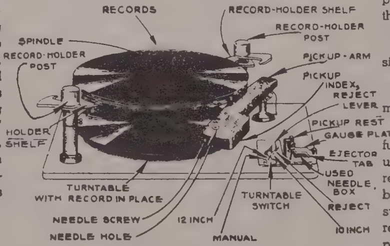


Fig. 2—Top View of Automatic Record Changer

AUTOMATIC OPERATION

1. See that the pickup is over the needle gauge plate with the needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "Operation".

2. With the **Index** and **Record Reject Lever at "Manual"**, place the first of the series of records on the turntable and the remainder of the series (up to seven 10" or six 12" records) on the record holder posts (as shown in Fig. 2). The records should be arranged in the desired order with the desired selection face up and the last selection on top.

3. Set the **Index** and **Record Reject Lever to the** proper position. (See **Controls: Index and Record Reject Lever.**)

4. Push the turntable switch to the left—**"On"** turntable should commence to revolve.

5. When the turntable has attained speed, lift pickup and lower gently on to the record so that the needle point enters the outside groove.

6. Adjust volume control to the desired intensity and tone control to the preferred setting.

7. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle. The whole series of records will now play without further attention, and the last record will repeat until the **Turntable Switch** is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with the pickup over the needle gauge plate. The record player is then ready for reloading, or for manual operation.

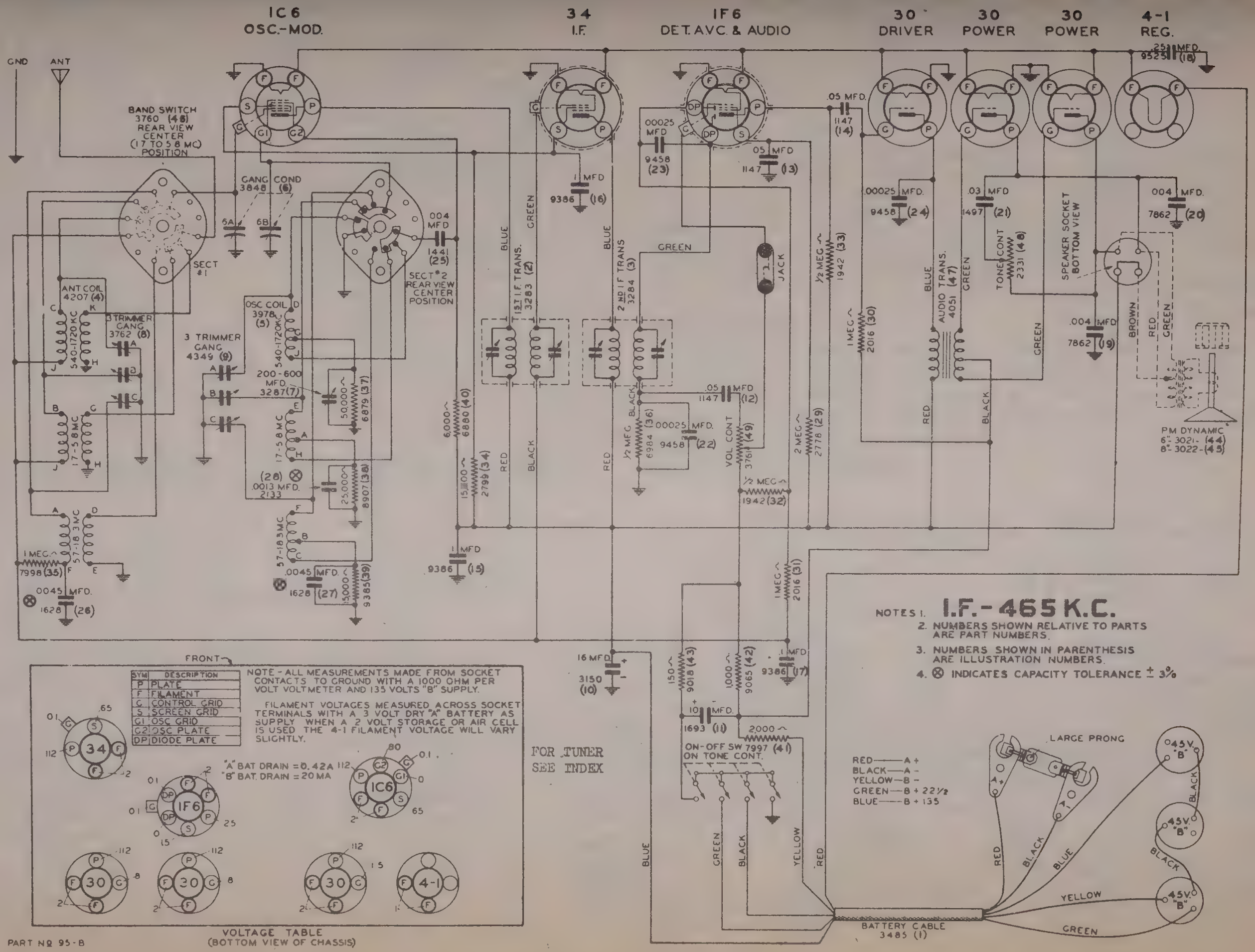
SETTING UP PUSH BUTTONS

Loosen one of the push buttons by turning the push button knob counter clockwise a turn or less and push it in; while holding the button in, tune in a desired station by means of the station selector knob. Turn the selector very slowly back and forth until the signal is clearest. Now while holding the push button in, tighten it by turning clockwise. Release the push button and turn the station selector to one end of the dial; push the tuning knob to the right and then check the button by pushing it in and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and loosen another push button and repeat the above procedure, doing this for the remaining buttons.

SPIEGEL, INC.

MODELS 2104, 2105, 2106, 2107, Ch. 1095B



NOTES
1. I.F. - 465 K.C.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ± 3%

RED——A +
BLACK——A -
YELLOW——B -
GREEN——B + 22½
BLUE——B + 135

FOR TUNER SEE INDEX

SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC GRID
G2	OSC PLATE
DP	DIODE PLATE

NOTE - ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 135 VOLTS "B" SUPPLY.

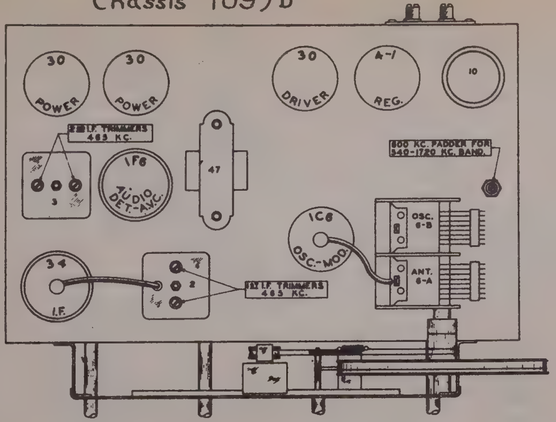
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 3 VOLT DRY "A" BATTERY AS SUPPLY. WHEN A 2 VOLT STORAGE OR AIR CELL IS USED THE 4-1 FILAMENT VOLTAGE WILL VARY SLIGHTLY.

"A" BAT DRAIN = 0.42A
"B" BAT. DRAIN = 20 MA

MODEL A2026, Ch. 10-70
MODELS 2104, 2105,
2106, 2107, Ch. 1095B

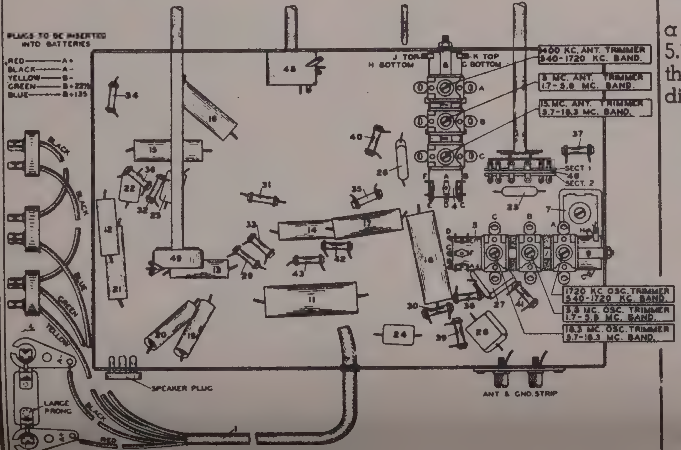
SPIEGEL, INC.

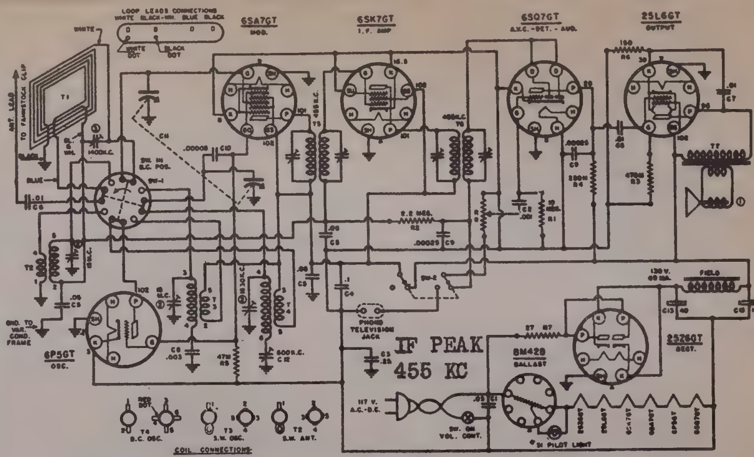
2104,2105,2106,2107
Chassis 1095B



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

DUMMY ANTENNAS:-I.F.-.02 MFD., 1720-540KC.-.00025MFD., 1.7-5.8MC.-.00025MF. WITH 400Ω IN SERIES, 5.7-18.3MC.-400Ω.


PLUGS TO BE INSERTED INTO BATTERIES
RED — A+
BLACK — A-
YELLOW — B-
GREEN — B+22½
BLUE — B+135
400 KC. ANT. TRIMMER 540-1720 KC. BAND.
5 MC. ANT. TRIMMER 1.7-5.8 MC. BAND.
15 MC. ANT. TRIMMER 5.7-18.3 MC. BAND.
J TOP H BOTTOM
K TOP G BOTTOM
SECT. 1
SECT. 2
1720 KC OSC. TRIMMER 540-1720 KC. BAND.
5.8 MC. OSC. TRIMMER 1.7-5.8 MC. BAND.
18.3 MC. OSC. TRIMMER 5.7-18.3 MC. BAND.
SPEAKER PLUG
ANT & GND. STRIP
LARGE PRONG
BLACK
BLUE
GREEN
YELLOW
RED



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

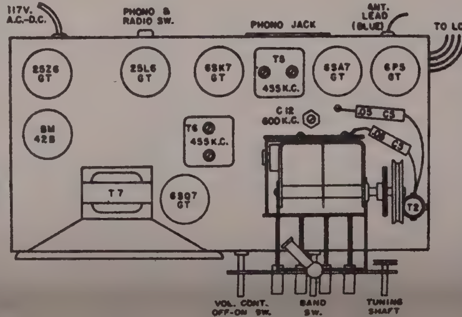
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS.

A-2026
Ch. 10-70

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

This model has been designed to cover two seperate frequency bands, a broadcast band from 540 K.C. to 1630 K.C. and a short wave band from 5.7 to 18 M.C. The dial scale has been calibrated directly in kilocycles (less the final 0) on the broadcast band, while the short wave band is calibrated directly in megacycles.

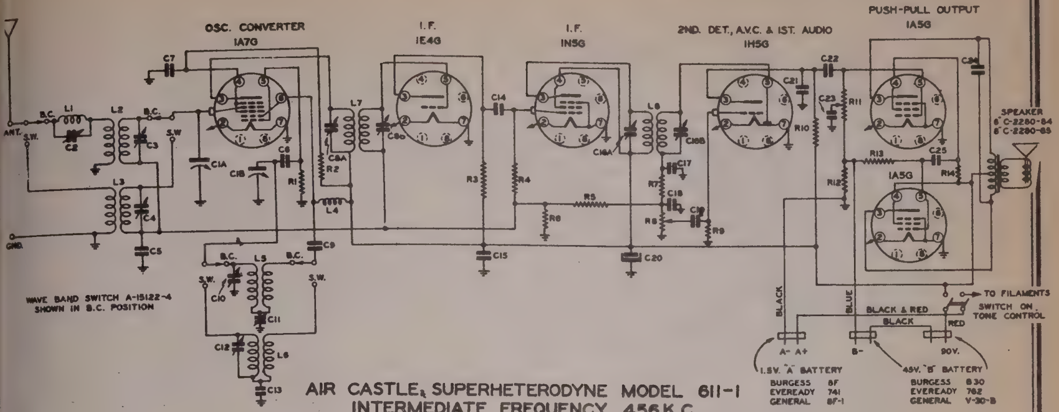
For push button data, see index.



CODE	PART NO.	DESCRIPTION
C1	1907	.05 MFD. 400V. TUBULAR CONDENSER
C2	16-124	.001 " " " "
C3	16-120	.25 " 200V. " "
C4	16-115	.1 " " " "
C5	1622	.05 " " " "
C6	16-121	.01 " " " "
C7	16-119	.01 " 600V " "
C8	16-118	.003 MFD. MICA CONDENSER
C9	1904	.00025 " " "
C10	1903	.00005 " " "
C11	16-162	2 GANG VARIABLE CONDENSER
C12	20-130	PADDING CONDENSER
C13	16-258	40 X 10 MFD. 150 W.V. ELECTROLYTIC
R1	60-193	10 MEGOHM 1/4 W. RESISTOR
R2	60-179	2.2 " " "
R3	60-176	470M OHM " "
R4	60-190	220M " " "
R5	60-177	47M " " "
R6	60-104	150 " " "
R7	60-200	27 " " "
R8	24-146	500M " VOLUME CONTROL
SW1	60-145	BAND SWITCH
SW2	60-140	PHONO "
T1	66-11	LOOP ANTENNA (B.C.)
T2	10-337	S.W. ANTENNA COIL
T3	10-338	S.W. OSCILLATOR COIL
T4	10-346	B.C. " "
T5	10-317	1ST. I.F. TRANSFORMER
T6	10-318	2ND. " "
T7	-----	OUTPUT TRANS. (ON SPKR.)
1	78-203	5" DYNAMIC SPEAKER
2	20-127	TRIMMER BLOCK
3	20-129	TRIMMER (ON LOOP)

SPIEGEL, INC.

MODELS A2100, A2150
Ch. 611



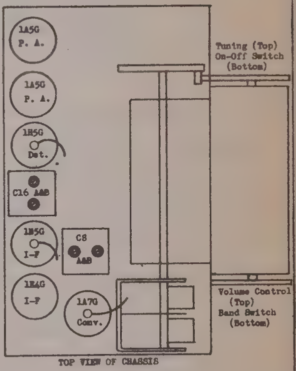
AIR CASTLE, SUPERHETERODYNE MODEL 611-1
INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

BROADCAST BAND—540 to 1720 Kilocycles

SHORT-WAVE BAND—5.8 to 18 Megacycles

R1	180,000 Ω .25W.	C-2795-89B	L1	I.F. REJECTOR COIL	A-14877
R2	68,000 Ω .25W.	C-2795-84B	L2	B.C. ANT. COIL	A-14879-1
R3	6800 Ω .25W.	C-2795-72B	L3	S.W. ANT. COIL	A-14882-4
R4	470,000 Ω .25W.	C-2795-94B	L4	OSC. CHOKE COIL	A-14718-1
R5	2.2 MEGOHM .25W.	C-2795-102B	L5	B.C. OSC. COIL	A-15232
R6	2.2 MEGOHM .25W.	C-2795-102B	L6	S.W. OSC. COIL	A-14967-2
R7	47,000 Ω .25W.	C-2795-82B	L7	NO.1 I.F. COIL	A-12064-40
R8	500,000 Ω VOL. CONT.	A-15130-3	L8	NO.2 I.F. COIL	A-12064-40
R9	10 MEGOHM .25W.	C-2795-110B			
R10	1 MEGOHM .25W.	C-2795-98B			
R11	2 MEGOHM TONE, CONT.	A-15138			
R12	470 Ω .25W.	C-2795-151B			
R13	2.2 MEGOHM .25W.	C-2795-102B			
R14	7500 Ω .25W.	C-2795-180B			

C1A&B	VARIABLE CONDENSER	B-7229	C14	250 MMF. MICA	C-720-324
C2	I.F. REJECT. TRIMMER	A-14088-4	C15	.05 MFD. 200V.	C-3202-140C
C3	B.C. ANT. TRIMMER	A-14088-5	C16A&B	NO.2 I.F. TRIMMER	B-7200-GG
C4	S.W. ANT. TRIMMER	A-14088-1	C17	100 MMF. MICA	C-720-339
C5	.05 MFD. 200V.	C-3202-140C	C18	100 MMF. MICA	C-720-339
C6	100 MMF. MICA	C-720-339	C19	.01 MFD. 200V.	C-3202-76C
C7	.05 MFD. 200V.	C-3202-28C	C20	8 MFD. 150V. ELECT.	A-14958
C8A&B	NO. 1 I.F. TRIMMER	B-7200-GG	C21	100 MMF. MICA	C-720-339
C9	.001 MFD. 200V.	C-3202-114C	C22	.01 MFD. 200V.	C-3202-76C
C10	B.C. OSC. TRIMMER	B-7199-BY	C23	.001 MFD. 200V.	C-3202-58C
C11	B.C. OSC. PADDER		C24	.001 MFD. 1000V.	C-3210-114C
C12	S.W. OSC. TRIMMER	A-15088-5	C25	.01 MFD. 200 V.	C-3202-76C
C13	2870 MMF. MICA	C-720-370			



TOP VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that last mark is directly toward front of set with gang closed.)							
2	I. F.	1A7G Grid	.1 mf.	456 KC	BC	Open	C16 A&B C8 A&B	
3	I.F. Rej.	Ant.	200 mmf.	456 KC	BC	Closed	C2	Adjust to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C10 Osc. C3 Ant.	
5				600 KC	BC	600 KC	C11 Pad.	**
6	(Repeat operation 4)							
7	(Check calibration and sensivity at 1500 KC, 900 KC and 600 KC)							
8	Shortwave Band	Ant.	*	18 MC	SW	18 MC	C12 Osc. C4 Ant.	
9	(Check calibration and sensitivity at 6 MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

*100 ohms and 200 mmf. in series.
**Rock variable condenser while adjusting for maximum output.

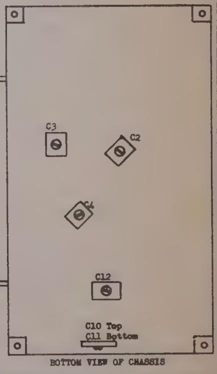
VOLTAGE CHART

"A" Battery voltage: 1½ volts
"B" Battery voltage: 90 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Osc. - Converter	0	+1.4	83	9.8B	-.2	83	0	0	0
1E4G	1st I-F	0	1.4	63	83	0	0	0	0	-
1N5G	2nd I-F	0	1.4	83	84	0	-	0	0	0
1H5G	Det. AVC-AF	-	1.4	A	83	0	0	-	-	0
1A5G	P.A.	-	1.4	80	75	-A	-	0	-	-
1A5G	P.A.	-	1.4	80	84	-A	-5.3	0	0	-

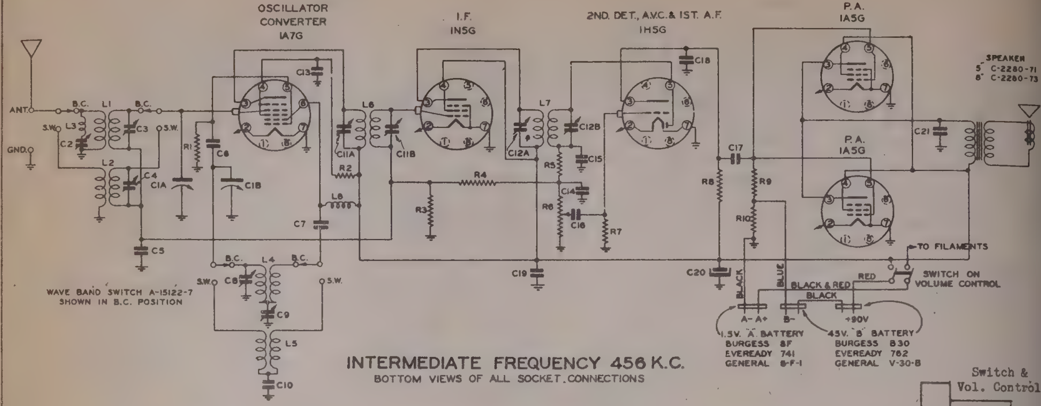
Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
A - Cannot be measured with 1000 ohms per volt voltmeter.
B - On 10 volt scale.



BOTTOM VIEW OF CHASSIS

MODELS A-2108, A-2112, A-2116
Ch. 561-561M

SPIEGEL, INC.


OSCILLATOR CONVERTER 1A7G
I.F. 1N5G
2ND. DET., A.V.C.& 1ST. A.F. 1H5G
P.A. 1A5G
P.A. 1A5G
SPEAKER 5" C-2280-71 8" C-2280-73
ANT.
GND.
B.C.
S.W.
TO FILAMENTS
SWITCH ON VOLUME CONTROL
BLACK
BLUE
BLACK & RED
RED
A- A+
B-
+90V
1.5V. "A" BATTERY BURGESS 8F EVEREADY 741 GENERAL 8-F-1
45V. "B" BATTERY BURGESS B30 EVEREADY 762 GENERAL V-30-B
WAVE BAND SWITCH A-15122-7 SHOWN IN B.C. POSITION

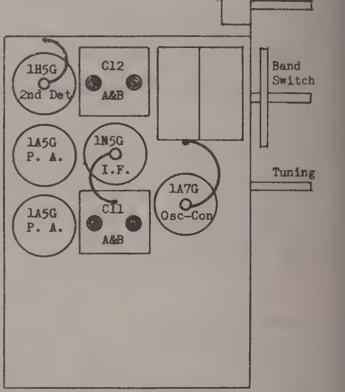
INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-8173	C12A&B	NO.2 I.F. TRIMMER	B-7200-GG
C2	I.F. REJECTOR TRIMMER	A-14088-2	C13	.05 MFD. 200V.	C-3202-28C
C3	B.C. ANT. TRIMMER	A-14200	C14	100 MMF. MICA	C-720-325
C4	S.W. ANT. TRIMMER		C15	100 MMF. MICA	C-720-325
C5	.05 MFD. 200V.	C-3202-140C	C16	.01 MFD. 200V.	C-3202-132C
C6	100 MMF. MICA	C-720-325	C17	.01 MFD. 400V.	C-3204-132C
C7	.001 MFD. 200V.	C-3202-58C	C18	100 MMF. MICA	C-720-325
C8	B.C. OSC. TRIMMER	B-7199-BY	C19	.05 MFD. 200V.	C-3202-140C.
C9	B.C. OSC. PADDER		C20	8 MFD. 150V. ELECT.	A-14958
C10	2950 MMF. MICA	C-720-382	C21	.001 MFD. 1000V.	C-3210-114C
C11A&B	NO.1 I.F. TRIMMER	B-7200-GG			

R1	180,000 Ω .25W.	C-2795-89B	L1	B.C. ANT. COIL	A-15231
R2	68,000 Ω .25W.	C-2795-84B	L2	S.W. ANT. COIL	A-14682-12
R3	2.2 MEGOHMS .25W.	C-2795-102B	L3	I.F. REJECT. COIL	A-14718-1
R4	2.2 MEGOHMS .25W.	C-2795-102B	L4	B.C. OSC. COIL	A-15232-3
R5	56,000 Ω .25W.	C-2795-83B	L5	S.W. OSC. COIL	A-15233-6
R6	500,000 Ω V.C. & SW.	A-15132-1	L6	NO.1 I.F. COIL	A-12064-35
R7	10 MEGOHM .25W.	C-2795-110B	L7	NO.2 I.F. COIL	A-12064-35
R8	1 MEGOHM .25W.	C-2795-98B	L8	OSC. PLATE CHOKE	A-14718-1
R9	2.2 MEGOHMS .25W.	C-2795-102B			
R10	560 Ω .25W.	C-2795-153B			

BROADCAST BAND—530 to 1720 Kilocycles (565 to 174 Meters)

SHORT-WAVE BAND—5.8 to 18 Megacycles (52 to 16.6 Meters)



TOP VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer parallel with horizontal lines on dial with gang fully closed.)							
2	I.F.	1A7G Grid	.1 mf.	456 KC	BC	Open	C12 A&B C11 A&B	
3	I-F Rej.	Ant.	200 mf.	456 KC	BC	Closed	C2	Adjust to minimum
4	Broad-cast Band	Ant.	200 mf.	1500 KC	BC	1500 KC	C8 (Osc.) C3 (Ant.)	
5				600 KC	BC	600 KC	C9 (Pad.)	**
6	(Repeat operation 4).							
7	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
8	SW Band	Ant.	*	18 MC	SW	18 MC	C4 (Ant.)	**
9	(Check calibration and sensitivity at 6. MC and 18. MC)							
10	(Check operations 1 to 9 inclusive.)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.

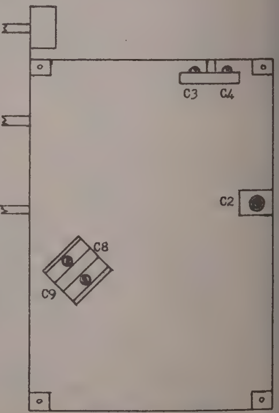
VOLTAGE CHART

"A" Battery voltage: 1½ volts
"B" Battery voltage: 90 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Osc. - Converter	83	1.3	83	18	*	83	0	83	0
1N5G	I.F Amp.	0	1.3	83	83	–	–	0	0	0
1H5G	Det. AVC-AF	–	1.3	*	–	0	0	0	–	0
1A5G	P.A.	–	1.3	78	83	0	–	0	0	–
1A5G	P.A.	–	1.3	88	82	0	-5	0	0	–

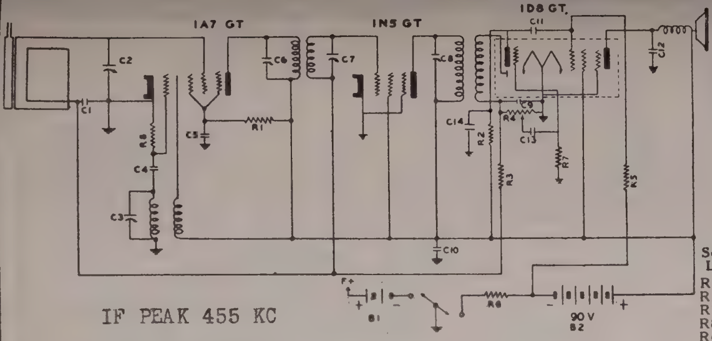
Voltage readings are for schematic diagram, Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*Cannot be measured with 1000 ohms per volt voltmeter.



BOTTOM VIEW OF CHASSIS

SPIEGEL, INC.

MODEL A2120, Ch. 130, 130U
MODELS 2208, 2209, 2210, 2211, Ch. 184



IF PEAK 455 KC

A-2120

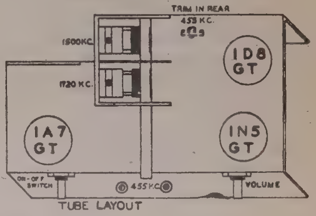
1—1A7GT Combined oscillator and 1st detector.
1—1N5GT Intermediate frequency amplifier.
1—1D8GT Combined second detector, Audio driver, and Power output.

MODEL 130U

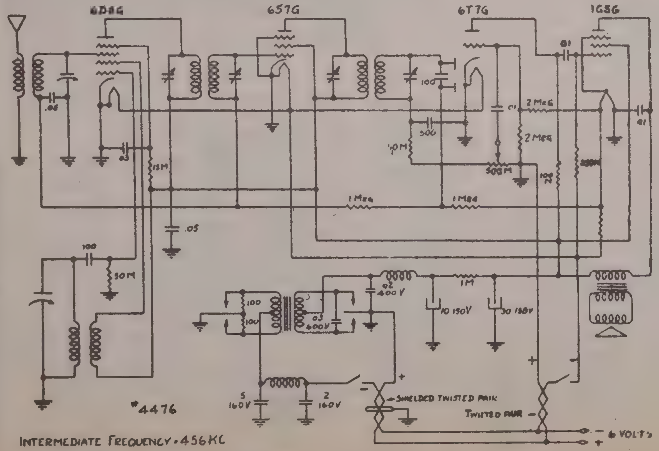
Schematic Location	Part No.	Description	Schematic Location	Part No.	Description
R1	R-105	Carbon res. 5K ohm	C1	C-45	Tubular cond. .05 mfd. 200V
R2	R-102	Carbon res. 1 meg.	C2, C3	Y-CV-46	Variable Condenser
R3, R5, R7	R-101	Carbon res. 2 meg.	C4	CM-31	Mica cond. 100 mmfd.
R8	R-99	Carbon res. 200K ohm	C5, C11	C-48	Tubular cond. .01 mfd. 400V
R6	R-103	Carbon res. 600 ohm	C6, C7	CT-1	Trimmer condenser
			C8	CT-32	Trimmer condenser
B1	1—6F1	General Battery 1.5V	C9, C14	CM-30	Mica cond. 250 mmfd.
B2	2—V30B	General Battery 45V	C10	CE-58	4 mfd. 100V Electrolytic
			C12, C13	C-47	Tubular cond. .004 mfd. 400V

MODEL 130

Schematic Location	Part No.	Description
R1	R-105	Carbon res. 5K ohm
R2 R7	R-102	Carbon res. 1 meg.
R3 R5	R-101	Carbon res. 2 meg.
R8	R-113	Carbon res. 100K ohm
R6	R-103	Carbon res. 60 ohm
B1	No. 9	Air Castle Battery No. 9 1.5V
B2	No. 3A40P	Air Castle Battery No. 3A40P 60V



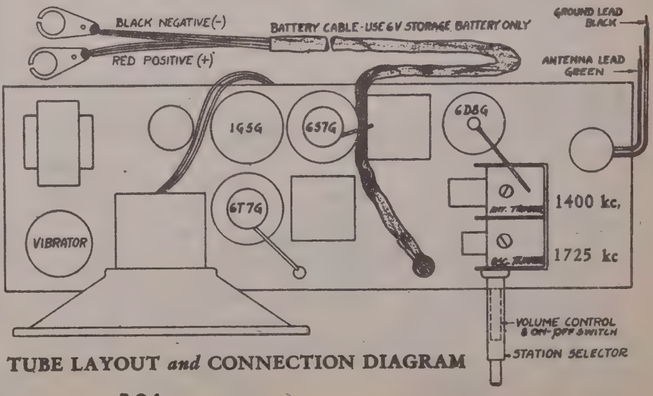
CONVENTIONAL ALIGNMENT



INTERMEDIATE FREQUENCY-456KC

MODELS 2208, 2209, 2210, 2211, ch. 184

CONVENTIONAL ALIGNMENT



TUBE LAYOUT *and* CONNECTION DIAGRAM

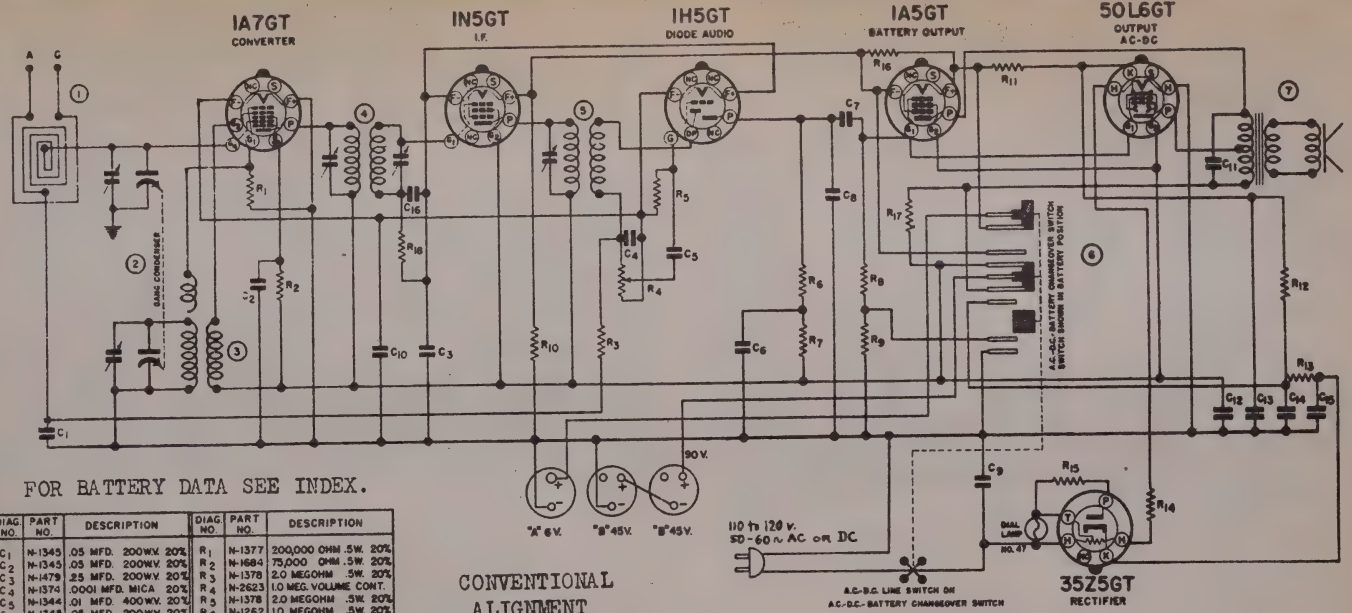
184

Range 540KC-1725KC

Tubes: Tubes required are:
1—6D8G Oscillator-Translator.
1—6S7G Intermediate frequency amplifier.
1—6T7G Detector—automatic volume control—first audio amplifier.
1—1G5G Power output.
Do not use tubes of types different from those shown above.

MODEL A-2122, Ch. KD

SPIEGEL, INC.



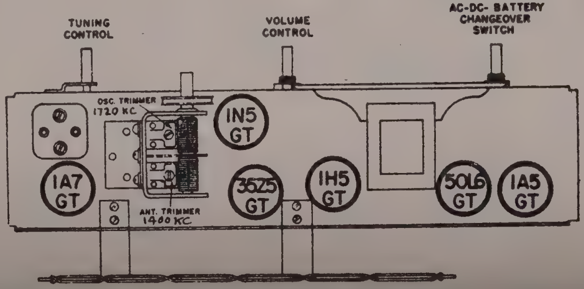
FOR BATTERY DATA SEE INDEX.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1345	.05 MFD. 200W.V. 20%	R1	N-1377	200,000 OHM .5W. 20%
C2	N-1345	.05 MFD. 200W.V. 20%	R2	N-1684	75,000 OHM .5W. 20%
C3	N-1479	.25 MFD. 200W.V. 20%	R3	N-1378	2.0 MEGOHM .5W. 20%
C4	N-1374	.0001 MFD. MICA 20%	R4	N-2623	1.0 MEG. VOLUME CONT.
C5	N-1344	.01 MFD. 400W.V. 20%	R5	N-1378	2.0 MEGOHM .5W. 20%
C6	N-1345	.05 MFD. 200W.V. 20%	R6	N-1262	1.0 MEGOHM .5W. 20%
C7	N-1344	.01 MFD. 400W.V. 20%	R7	N-1778	100,000 OHM .5W. 20%
C8	N-1343	.00025 MF. MICA 20%	R8	N-1264	500,000 OHM .5W. 20%
C9	N-1346	.05 MFD. 400W.V. 20%	R9	N-1262	1.0 MEGOHM .5W. 20%
C10	N-1351	.1 MFD. 200W.V. 20%	R10	N-1694	1000 OHM .5W. 20%
C11	N-2063	.003 MFD. 600W.V. 20%	R11	N-2713	20 OHM INS .5W. 10%
C12	N-2627	20 MFD. 150V. ELECTROLYTIC COND.	R12	N-2716	15,000 OHM 1.W. 10%
C13		100 MFD. 7.5V.	R13	N-2715	160 OHM 1.W. 10%
C14		20 MFD. 150V.	R14	N-2717	220. OHM INS. .5W. 10%
C15		40 MFD. 150V.	R15	N-2714	50 OHM 1.W. 20%
C16	N-1376	.02 MFD. 400W.V. 20%	R16	N-1257	2000 OHM .5W. 20%
			R17	N-1776	1500 OHM .5W. 20%
			R18	N-1419	6. MEGOHM .5W. 20%
1	N-2629	LOOP ANTENNA COIL			
2	N-2612	TWO GANG COND.			
3	N-1452	OSCILLATOR COIL			
4	N-2647	FIRST I.F. TRANS.			
5	N-2648	SECOND I.F. TRANS.			
6	N-2614	CHANGEOVER SWITCH			
7	N-2624	5" P.M. SPEAKER & TRAN.			

CONVENTIONAL
ALIGNMENT
SEE SPECIAL
SECTION
VOLUME VIII

TUNING RANGE
535 to 1720 KC

I.F.: 456 K.C.



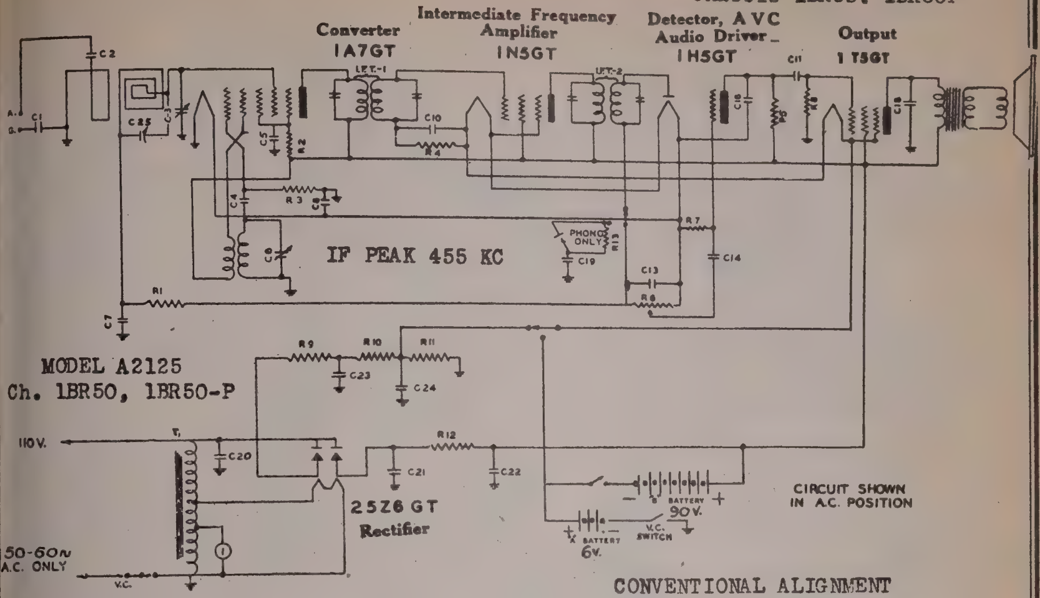
6 TUBE
BATTERY & 110-120V. AC-DC
SUPERHETERODYNE

DRWN. S.K. OCT. 31,'39
APP.

KD

SPIEGEL, INC.

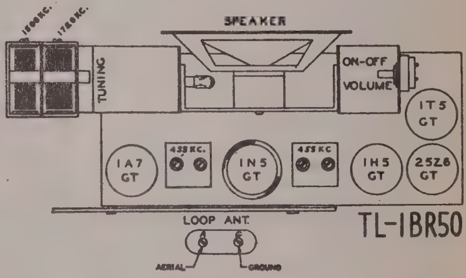
Chassis 611, 629, 631,721, 821, 961-1061, 1271
Chassis 1BR50. 1BR50P



MODEL A2125
Ch. 1BR50, 1BR50-P

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

Schematic Location	Part No.	Description
C2,C1		
C10,C17	C-15754	Tubular cond. .01 mfd. 400 V
C3 C6	Y-CV-44	Variable Condenser
C13,C4,C16	CM-21	Mica cond. 100 mmfd. 30%
C5,C7	C-15752	Tubular cond. .05 mfd. 200 V
C8	C-15761	Tubular cond. .1 mfd. 200 V
C18 C14	C-15753	Tubular cond. .002 mfd. 600V
C19	C-15761	Tubular cond. .1 mfd. 200 V
C20	C 15756	Tubular cond., .05 mfd. 400 V
C21,C22	Y-CE-47	Electr. cond. 8-16 mfd. 150WV
C23,C24	Y CE-57	Electr. cond.40-100 mfd. 50WV
T1	Y-TP-55	Power Transformer
IFT-1	Y-CI-77	1st I. F. Transformer
IFT-2	Y-CI-78	2nd I. F. Transformer
R1,R4	R-15500	Carbon res. 2 meg. ¼W20%
R2	R-15617	Carbon res. 30K ohm ¼W20%
R3	R-15523	Carbon res 200K ohm ¼W20%
R5	R-15520	Carbon res. 500K ohm ¼W20%
R6	Y-VC-41	Volume Control
R7	R-15559	Carbon res. 3 meg. ¼W20%
R8	R-15517	Carbon res. 1 meg. ¼W20%
R9,R10,R11	Y-RC-10	Vol. Div. 350 800 300 ohm 10%
R12	R-16	Carbon res. 8K ohm ¼W 20%
R13	R-15512	Carbon res. 250K ohm ¼W20%



TL-1BR50

ADJUSTING THE PUSH-BUTTON TUNER

MODELS W100, W110, W118, W152, W160, W162; 1000, 1001, 1004, 1005, 1006, 1007, 1020, 1021, 1054, 1055, 1056, 1057, 1080, 1081; V1000, V1004, V1006, V1014, V1020, V1054, V1056, V1060, V1064; Ch. 629

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles [K. C.]) will be at the low frequency end of the dial.

3. Using a small screwdriver or other tool that will fit the screw in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in Paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

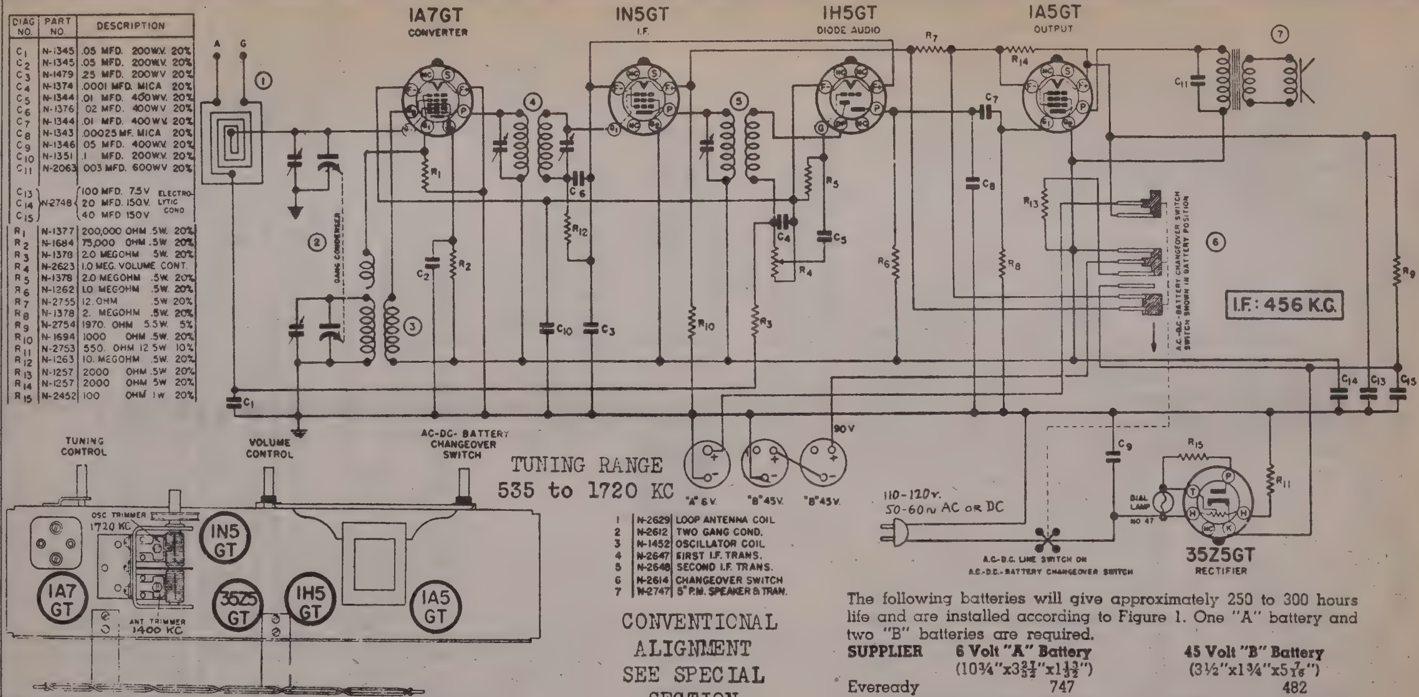
6. Insert the proper tab in each button by pressing it in position.

7. Any of the six stations to which the push-button tuner has been adjusted may now be received simply by pushing the button for the desired station.

MODEL A2000, Ch. 82
MODELS A2200, A2250 Ch. 631
MODEL A2050, Ch. 721
MODELS A2052, A2060, A2062, Ch. 961-1061
MODEL A2062, Ch.1271
MODELS A2100, A2150 Ch. 611

MODEL A2130, Ch. KB
MODEL 2122, Ch. KD

SPIEGEL, INC.



DIAG NO.	PART NO.	DESCRIPTION
C1	N-1345	.05 MFD. 200W.V. 20%
C2	N-1345	.05 MFD. 200W.V. 20%
C3	N-1479	.25 MFD. 200WV 20%
C4	N-1374	.0001 MFD. MICA 20%
C5	N-1344	.01 MFD. 400WV. 20%
C6	N-1376	02 MFD. 400WV 20%
C7	N-1344	.01 MFD. 400WV. 20%
C8	N-1343	.00025 MF. MICA 20%
C9	N-1346	05 MFD. 400W.V. 20%
C10	N-1351	.1 MFD. 200W.V. 20%
C11	N-2063	003 MFD. 600WV 20%
C13	N-2748	100 MFD. 7.5V ELECTROLYTIC COND
C14		20 MFD. 150.V.
C15		40 MFD 150V
R1	N-1377	200,000 OHM .5W. 20%
R2	N-1684	75,000 OHM .5W 20%
R3	N-1378	2.0 MEGOHM 5W. 20%
R4	N-2623	1.0 MEG. VOLUME CONT.
R5	N-1378	2.0 MEGOHM .5W. 20%
R6	N-1262	1.0 MEGOHM .5W. 20%
R7	N-2755	12. OHM .5W 20%
R8	N-1378	2. MEGOHM .5W. 20%
R9	N-2754	1970. OHM 5.5W. 5%
R10	N-1694	1000 OHM .5W. 20%
R11	N-2753	550. OHM 12 5W 10%
R12	N-1263	10. MEGOHM .5W. 20%
R13	N-1257	2000 OHM .5W 20%
R14	N-1257	2000 OHM 5W 20%
R15	N-2452	100 OHM 1W 20%

TUNING RANGE
535 to 1720 KC

1	N-2629	LOOP ANTENNA COIL
2	N-2612	TWO GANG COND.
3	N-1452	OSCILLATOR COIL
4	N-2647	FIRST I.F. TRANS.
5	N-2648	SECOND I.F. TRANS.
6	N-2614	CHANGEOVER SWITCH
7	N-2747	5" P.M. SPEAKER & TRAN.

CONVENTIONAL
ALIGNMENT
SEE SPECIAL
SECTION
VOLUME VIII

5 TUBE
BATTERY & 110-120V. AC-DC
SUPERHETERODYNE

DRWN. ə.K.
APP. DEC. 29, '39
KB

The following combined "AB" pack will give approximately 150 hours of life. The clamp arrangement is illustrated in Fig. 1. (The same clamp arrangement applies to either a pack or the type of "A" and "B" batteries illustrated.)

SUPPLIER	Combined "A" and "B" battery in one unit
Ray-O-Vac	AB694

The following batteries will give approximately 250 to 300 hours of life and are installed according to Figure 2. One "A" battery and two "B" batteries are required.

SUPPLIER	6 Volt "A" Battery (Approx. 3 13/16"x2 21/32"x5 11/32")	45 Volt "B" Battery (Approx. 4 3/16"x2 17/32"x5 11/32")
Eveready	718	762
Burgess	2F4	B30
Ray-O-Vac	698A	P5303
General Dry Battery	8F4	V-30-B
Marathon	896	3050
Usalite	638	624
Bond	4827	3017

The following batteries will give approximately 250 to 300 hours life and are installed according to Figure 1. One "A" battery and two "B" batteries are required.

SUPPLIER	6 Volt "A" Battery (10¾"x3 23/32"x1 13/32")	45 Volt "B" Battery (3½"x1¾"x5 7/16")
Eveready	747	482

The following batteries will give approximately 100 to 125 hours of life and are installed according to Figure 2. Use a third clamp to anchor the center battery. One "A" battery and two "B" batteries are required.

SUPPLIER	6 Volt "A" Battery (Approx. 2⅝"x2⅝"x4")	45 Volt "B" Battery (Approx. 3½"x2¼"x4½")
Burgess	F4PI	A30
Ray-O-Vac	694A	430P
General Dry Battery	4F4	V30A
Marathon	496	3040

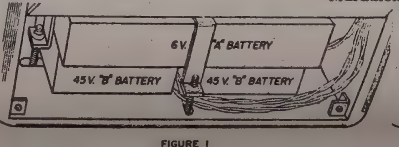


FIGURE 1

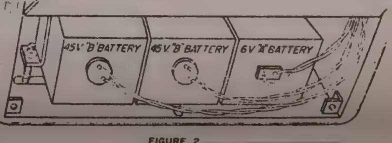
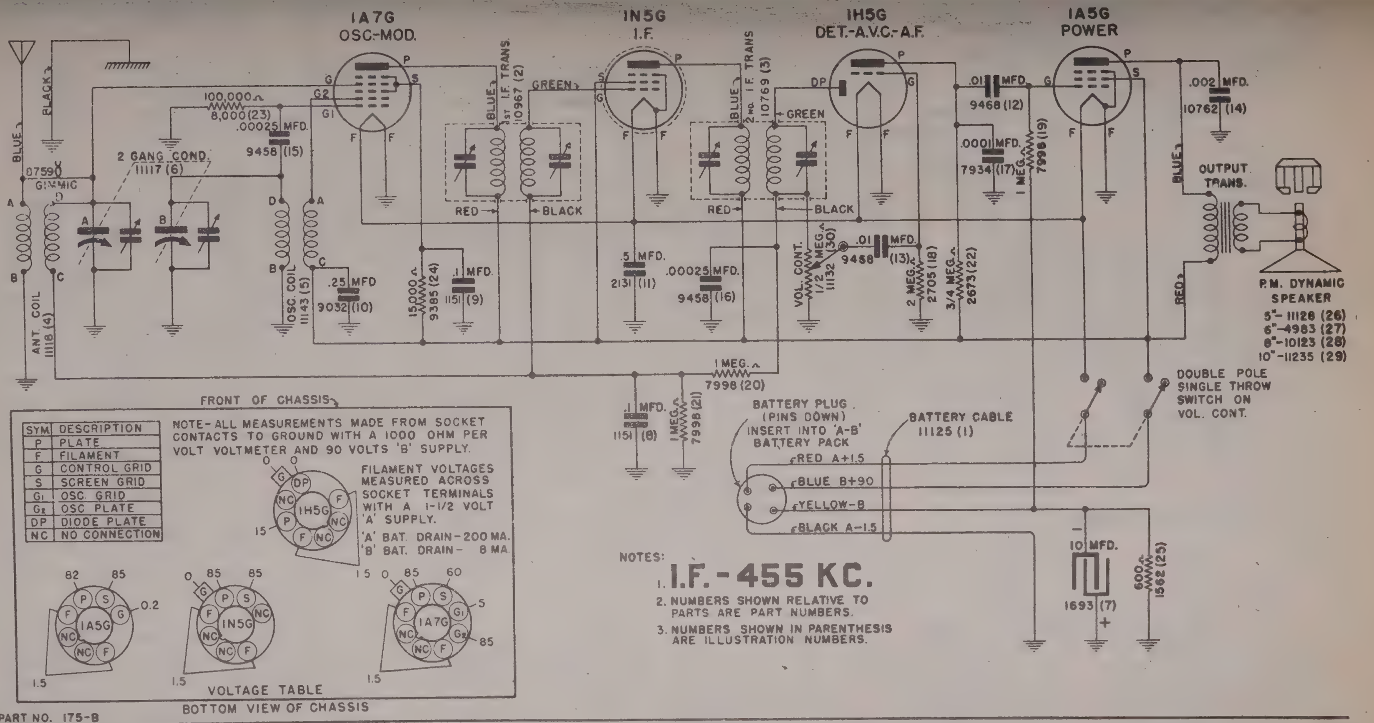


FIGURE 2

©John F. Rider, Publisher

SPIEGEL, INC.

MODELS A2154; Z7108(Late)
Ch. 175B



SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC. GRID
G2	OSC PLATE
DP	DIODE PLATE
NC	NO CONNECTION

NOTE–ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.

FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 1-1/2 VOLT 'A' SUPPLY.

'A' BAT. DRAIN–200 MA.
'B' BAT. DRAIN– 8 MA.

NOTES:
1. I.F.-455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

PART NO. 175-B

PARTS LIST

Illus. No.	Part No.		Description	List Price
1(a)	11125	Cable	Battery (With 4 Prong Plug)	$ .25
1(b)	11332	Cable	Battery (With 2-3 Prong and 1-2 Prong Plug)	.37
2	10967	Coil	1st I. F. Transformer	1.10
3	10769	Coil	2nd I. F. Transformer	1.10
4	11118	Coil	Antenna	.55
5	11143	Coil	Oscillator	.45
6	11117	Condenser	Tuning (2 Gang)	2.00
7	1693	Condenser	Tubular Dry Elec. 10 Mfd. 25 V. D. C.	.75
8	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
9	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
10	9032	Condenser	Tubular .25 Mfd. 200 Volt	.25
11	2131	Condenser	Tubular .5 Mfd. 200 Volt	.55
12	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
13	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
14	10762	Condenser	Tubular .002 Mfd. 400 Volt	.19
15	9458	Condenser	Mica .00025 Mfd	.21
16	9458	Condenser	Mica .00025 Mfd	.21
17	7934	Condenser	Mica .0001 Mfd	.21
18	2705	Resistor	Carbon 2 Megohm ⅓ Watt	.19
19	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
20	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
21	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
22	2673	Resistor	Carbon 750,000 Ohm ⅓ Watt	.19
23	8000	Resistor	Carbon 100,000 Ohm ⅓ Watt	.19
24	9385	Resistor	Carbon 15,000 Ohm ⅓ Watt	.19
25	1562	Resistor	Carbon 600 Ohm ⅓ Watt	.19
26	11128	Speaker	P. M. Dynamic 5 in.	4.00
27	4983	Speaker	P. M. Dynamic 6 in.	4.25
29	11235	Speaker	P. M. Dynamic 10 in.	7.50
30	11132	Volume Control with "off-on" Switch		.95

MISCELLANEOUS PARTS

Part No.		Description	List Price
11108	Bulb	2 Cell 2.2 Volt White Bead Type	.07
11121	Dial Scale	Calibrated Dial Scale	.40
8184	Dial Cord	24 in. of 18 lb. Cord	.10
11119	Dial Shaft		.15
11127	Dial Indicator	"Off-On" Switch	.15
11626	Dial Pointer		.30
11627	Dial Crystal	For Dial	.30
11140	Dial Escutcheon	For Cabinet	1.25
4978	Plug	4 Prong Battery Plug	.06
10207	Knob	Antique Ivory Tuning Control	.10
11145	Knob	Walnut Tuning Control	.10

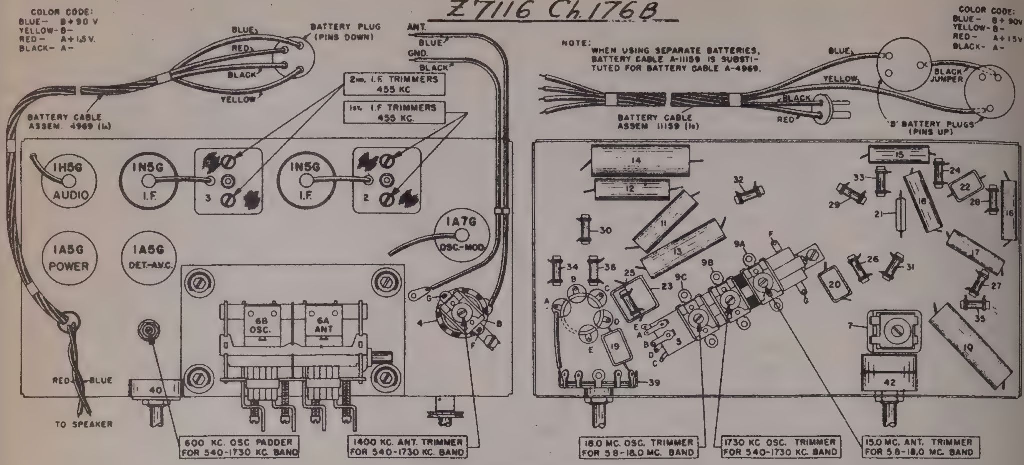
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

W. 4M 9-39 PART NO. 175B

MODELS A2154, Z7108(Late) Ch. 175B
MODEL Z7116, Ch. 176B

SPIEGEL, INC.

Z7116 Ch.176B


COLOR CODE:
BLUE- B+90 V
YELLOW-B-
RED- A+1.5V.
BLACK- A-
BLUE
RED
BLACK
YELLOW
BATTERY PLUG (PINS DOWN)
BATTERY CABLE ASSEM. 4969 (1a)
ANT.
BLUE
GND.
BLACK
2ND. I.F. TRIMMERS 455 KC
1st. I.F. TRIMMERS 455 KC.
1H5G AUDIO
1N5G I.F.
3
1N5G I.F.
2
1A7G OSC.-MOD.
1A5G POWER
1A5G DET.-AVC.
6B OSC.
6A ANT
G
4
B
F
RED
BLUE
TO SPEAKER
40
600 KC. OSC PADDER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
NOTE: WHEN USING SEPARATE BATTERIES, BATTERY CABLE A-11159 IS SUBSTITUTED FOR BATTERY CABLE A-4969.
COLOR CODE:
BLUE- B+90V
YELLOW-B-
RED- A+15V
BLACK- A-
BLUE
YELLOW
BLACK JUMPER
BLACK
RED
BATTERY CABLE ASSEM 11159 (1a)
'B' BATTERY PLUGS (PINS UP)
14
12
15
32
33
24
22
29
21
18
28
16
30
11
13
17
34
36
25
23
9A
9B
9C
F
G
26
31
20
27
35
A
B
C
D
E
19
E
A
B
D
C
5
7
19
42
39
18.0 MC. OSC. TRIMMER FOR 5.8-18.0 MC. BAND
1730 KC OSC. TRIMMER FOR 540-1730 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.8-18.0 MC. BAND

ALIGNMENT PROCEDURE

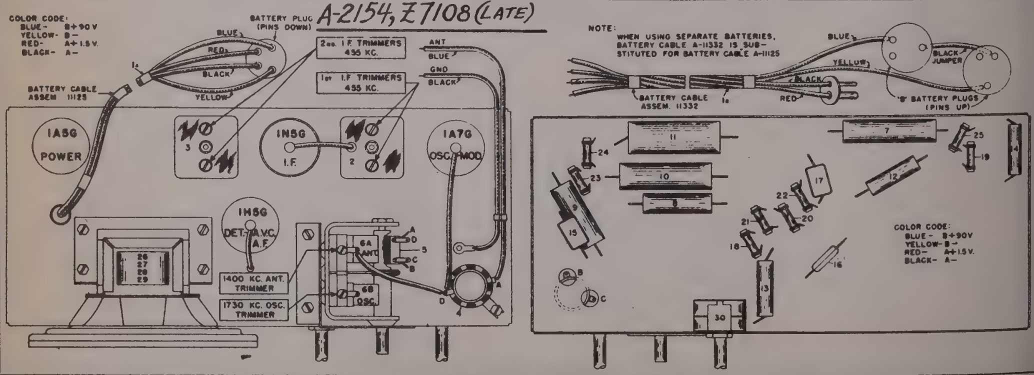
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capdcity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.

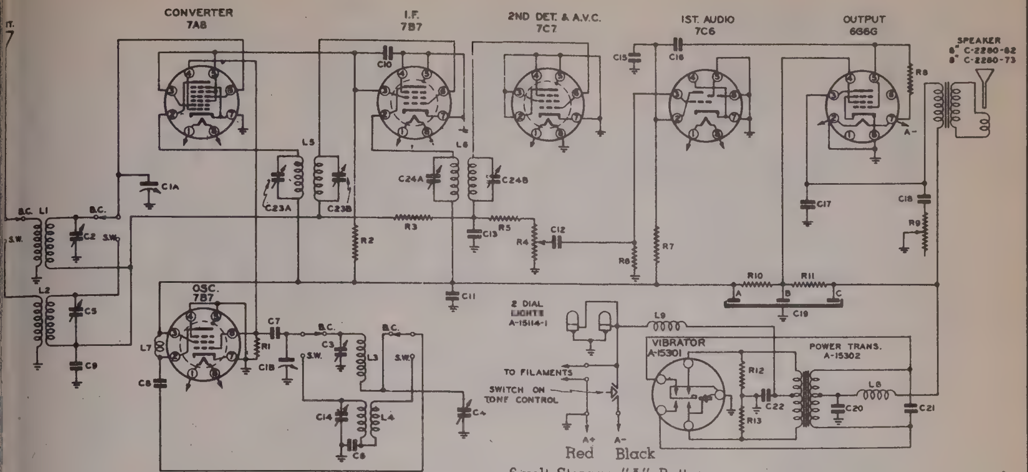
Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
I. F. Alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High Side to grid cap of 1A7G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output
	3 Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.8 to 18 M.C. Band	1 Exactly 18 M.C.	Exactly 18 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

A-2154, Z7108 (LATE)



SPIEGEL, INC.

MODELS A2200, A2250
Ch. 631



Red Black

6-volt Storage "A" Battery.

No "B" or "C" Batteries are required.

INTERMEDIATE FREQUENCY 456 K.C.

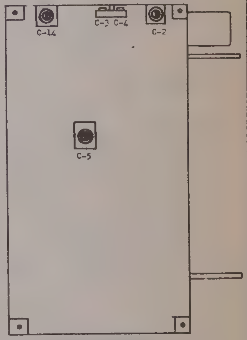
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

AIR CASTLE SUPERHETERODYNE MODEL 631-6

C1A&B	VARIABLE CONDENSER	B-7229
C2	B.C. ANT. TRIMMER	A-14086-8
C3	B.C. OSC. TRIMMER	B-7199-EY
C4	B.C. OSC. PADDER	
C5	S.W. ANT. TRIMMER	A-14086-5
C6	2700 MMF. MICA	A-15451
C7	50 MMF. MICA	C-720-315
C8	250 MMF. MICA	C-720-324
C9	.05 MFD. 200V.	C-3202-84C
C10	.1 MFD. 200V.	C-3202-38C
C11	.1 MFD. 200V.	C-3202-38C
C12	.02 MFD. 200V.	C-3202-22C
C13	250 MMF. MICA	C-720-324
C14	S.W. OSC. TRIMMER	A-14086-8
C15	250 MMF. MICA	C-720-324
C16	.05 MFD. 200V.	C-3202-28C
C17	.001 MFD. 400V.	C-3204-58C
C18	.02 MFD. 400V.	C-3204-78C
C19A,B,C	20-20-20 MFD. 150V. ELECT.	A-14684-6
C20	1000 MMF. MICA	C-720-297
C21	.01 MFD. 600V.	C-3206-132C
C22	.5 MFD. 120V.	C-3203-46B
C23	NO.1 I.F. TRIMMER	B-7200-GN
C24	NO.2 I.F. TRIMMER	B-7200-GN

R1	56,000 ∩	.25W.	C-2795-83B
R2	18,000 ∩	.5W.	C-2796-77C
R3	1 MEGOHM	.25W.	C-2795-98B
R4	500,000 ∩ VOLUME CONT.		A-15130-3
R5	47,000 ∩	.25W.	C-2795-23B
R6	4.7 MEGOHM	.25W.	C-2795-35B
R7	220,000 ∩	.25W.	C-2795-27B
R8	1 MEGOHM	.25W.	C-2795-98B
R9	TONE CONTROL & SWITCH		A-15128-2
R10	330 ∩	.5W.	C-2796-10C
R11	68 ∩	.5W.	C-2796-48C
R12	68 ∩	.5W.	C-2796-6C
R13	68 ∩	.5W.	C-2796-6C

L1	B.C. ANT. COIL	A-15349-1
L2	S.W. ANT. COIL	A-14682-3
L3	B.C. OSC. COIL	A-15352-1
L4	S.W. OSC. COIL	A-15233-5
L5	NO.1 I.F. COIL	A-12084-39
L6	NO.2 I.F. COIL	A-12084-17
L7	B+ PLATE CHOKE	A-14881-1
L8	B+ HASH CHOKE	A-14718-2
L9	"A" LEAD HASH CHOKE	A-14944



BOTTOM VIEW OF CHASSIS

BROADCAST BAND—550 to 1600 Kilocycles (545 to 187 Meters)

SHORT-WAVE BAND—6 to 18 Megacycles (50 to 16.6 Meters)

VOLTAGE CHART

Condition of Storage Battery Good (6 Volts) Position of Volume Control: Full with Antenna Disconnected
Band Switch - Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A8	Converter	6	110	45	-20	45	0	0	0
7B7	Oscillator	6	110	110	0	0	-20	0	0
7B7	I. F. Amp.	6	110	45	0	0	0	0	0
7C7	2 Det. AVC	6	0	0	0	0	0	0	0
7C6	1st Aud. Amp.	6	16	0	--	0	0	0	0
6G6G	Power Amp.	0	0	110	115	0	--	6	0

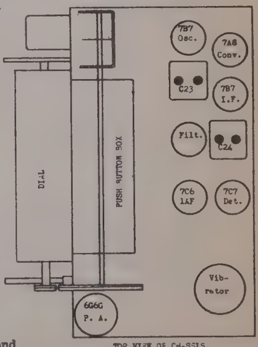
Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that indicator points to last dial mark when gang is fully closed.)							
2	I.F.	Ant.	.1 mf.	456 KC	BC	Open	C24 A&B	2nd I-F
							C23 A&B	1st I-F
3	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C3 (Osc.)	Peak accurately
							C2 (Ant.)	Peak accurately
4				600 KC	BC	600 KC	C4 (Pad.)	Peak accurately
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 600 KC, 900 KC and 1500 KC)							
7	SW Band	Ant.	*	18 MC.	SW	18 MC	C14 (Osc.)	**
							C5 (Ant.)	**
8	(Check calibration and sensitivity at 6 MC and 18 MC)							
9	(Check operations 1 to 8 inclusive.)							

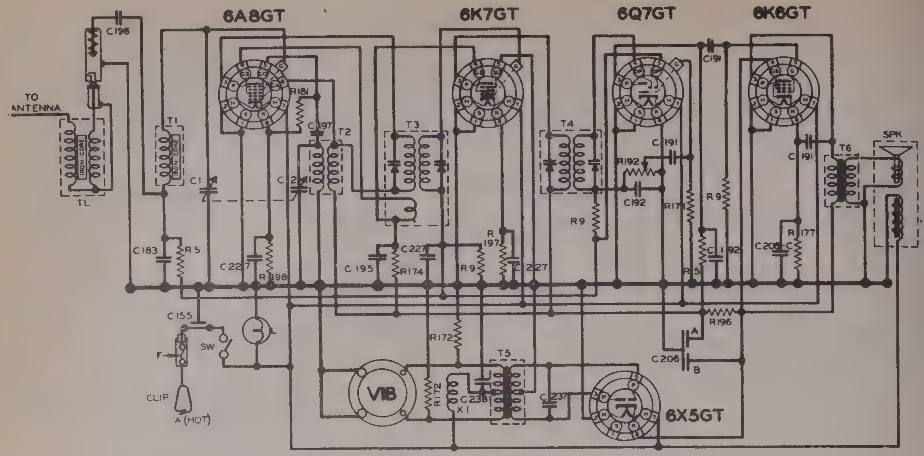
*100 ohms non-inductive resistor and 200 mmf. condenser in series.

**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.



TOP VIEW OF CHASSIS

MODELS A2454, Z7460, Ch. 510; A2456, Z7462, Ch. 610 SPIEGEL, INC.



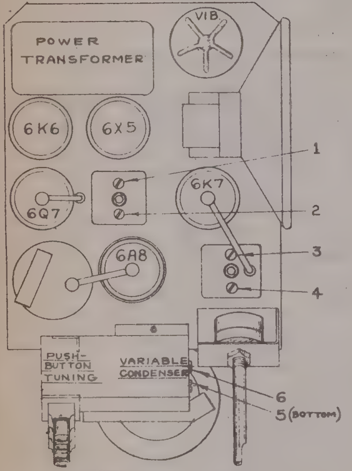
IF PEAK 455 KC
FREQUENCY RANGE 1575 TO 540 K.C.

RESISTORS			
R	OHMS	W	PART NO
5	500K	¼	17-2070
9	1M	¼	17-2080
171	15M	¼	17-14288
172	100	¼	17-14289
174	20K	¼	17-14291
177	850	¼	17-14296
181	100K	¼	17-14303
192	1M	V.C	17-16422
196	500	1	17-14340
197	800	¼	17-14342
198	400	½	17-14343

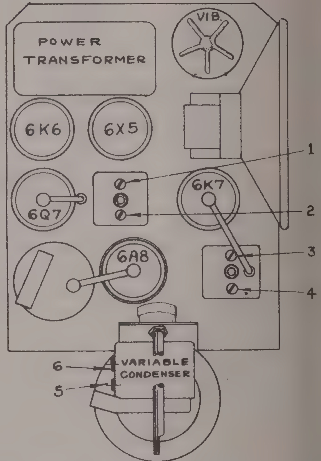
CONDENSERS			
C	CAPACITY	VOLT	PART NO
1	TWO-GANG		17-16431
2	VARIABLE		
155	.0002	200	17-14217
237	.005	1200	17-14345
208A	10 MFD	300	17-14297
208B	10 MFD	300	
208C	20 MFD	25	
191	.01	400	17-14272
192	.00025	600	17-14273
193	.003	600	17-14294
195	.03	400	17-14276
196	.1	200	17-14277
197	.0001	600	17-14278
238	.5	150	17-14346
227	.05	200	17-14323

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO
1	ANTENNA COIL	00-16441
2	OSCILLATOR COIL	00-16442
3	FIRST I F COIL	00-16443
4	SECOND I F COIL	00-16444
5	POWER TRANS	00-16446
6	OUTPUT TRANS	00-16445
X	CHOKE	
1	SUPPRESSION CHOKE	29-16457

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
F	FUSE - 20 AMP	17-2228
L	DIAL LIGHT BULB - MAZDA NO 44	17-13805
SPK	SPEAKER ASSEMBLY	17-16458
SW	POWER SWITCH	17-16422
TL	TRANSMISSION LINE	00-16436
VIB	VIBRATOR	17-14747



MODEL 610



MODEL 510

Model 610 PUSH BUTTON ADJUSTMENT:

Any button may be set to any station desired. First, tune in the desired station by means of the thumb wheel. Second, turn the push button counter-clockwise two full turns. Then depress this button the full length of its stroke, and while depressed, tighten the button again by turning it clockwise. The button may now be released. To check the correct setting for this button, turn the thumb wheel to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully. Each of the remaining buttons may be set to other stations in a like manner.

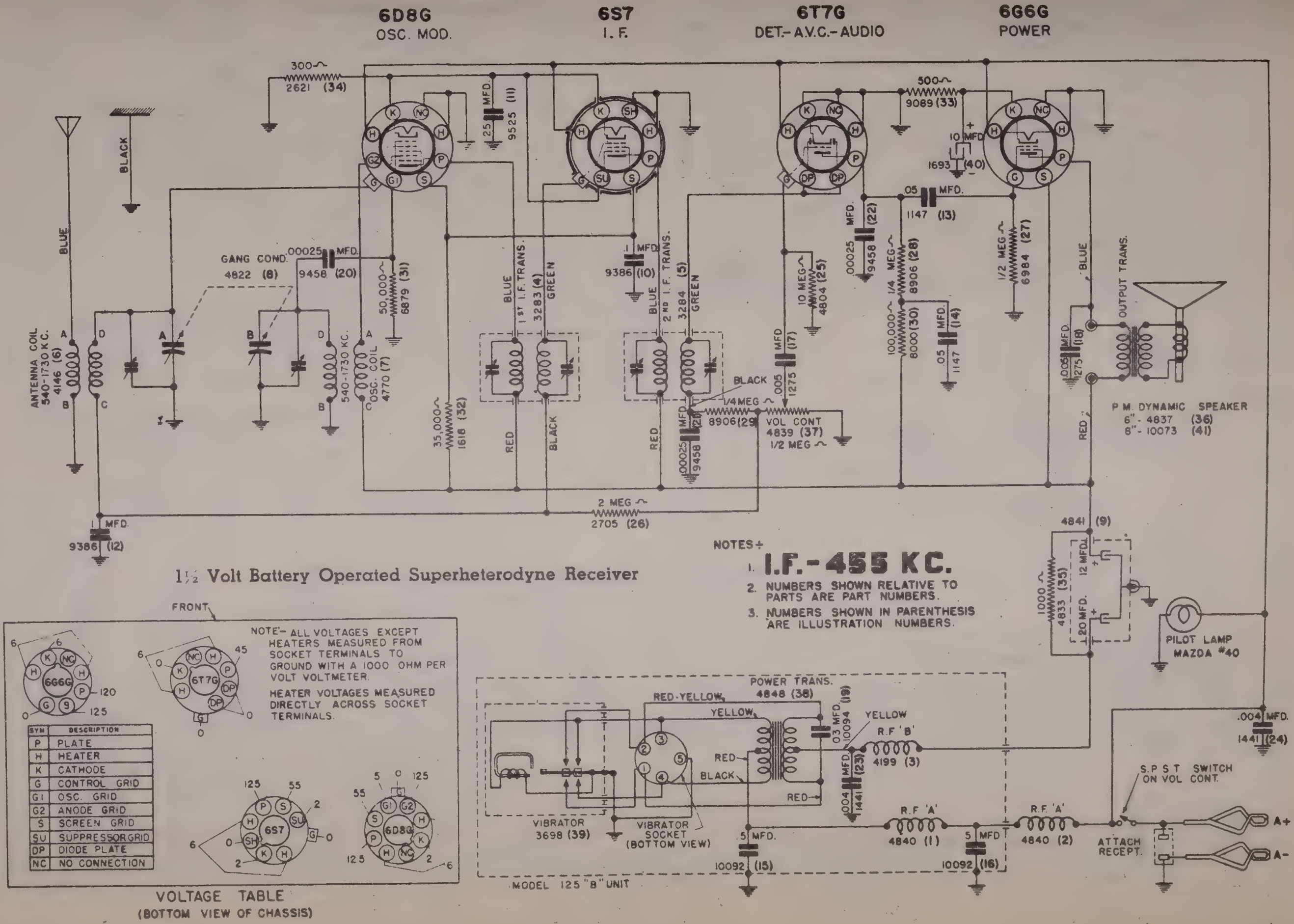
BALANCING INSTRUCTIONS:

All sensitivities given for ½ watt output = 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455	1, 2, 3 & 4	550 KC	50 uv
2	Ant. Coupler Through 20 uuf	1400	5	1400	
3	“	1400	6	1400	10 uv

SPIEGEL, INC.

MODELS A2204, Z7208
Ch. 119B



1½ Volt Battery Operated Superheterodyne Receiver

NOTES:—

1. I.F.-455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

NOTE—ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.

HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

SYM	DESCRIPTION
P	PLATE
H	HEATER
K	CATHODE
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID
DP	DIODE PLATE
NC	NO CONNECTION

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

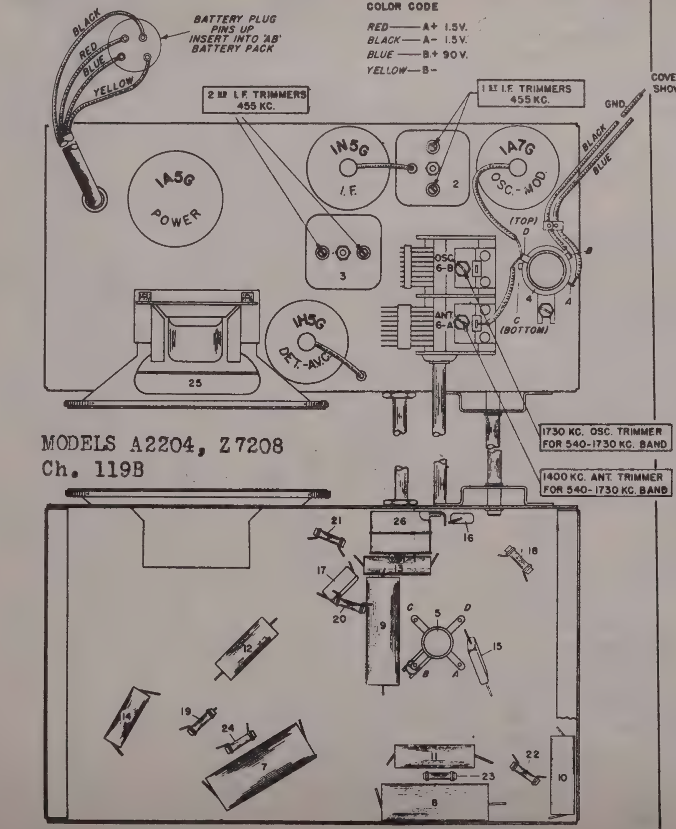
MODEL Z7108(Early), Ch. 118B
MODELS A2204, Z7208, Ch. 119B

SPIEGEL, INC.

ALIGNMENT:-I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 1A7G TUBE--DO NOT REMOVE GRID CAP--ADJUST IF TRIMMERS TO MAXIMUM OUTPUT AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAXIMUM. AT 1400 KC ANT. TRIMMER TO MAX

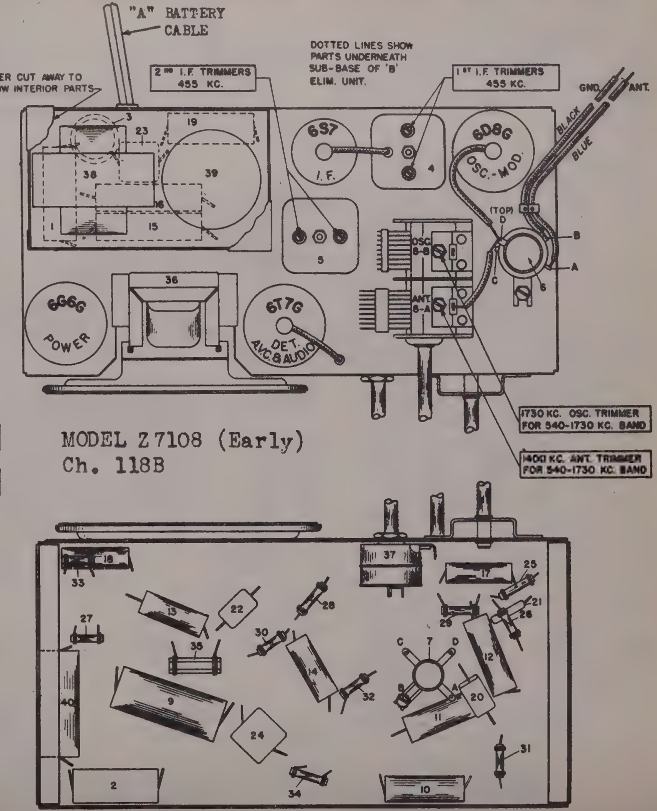
COLOR CODE

RED —— A+ 1.5V.
BLACK —— A- 1.5V.
BLUE —— B+ 90V.
YELLOW —— B-


BATTERY PLUG PINS UP INSERT INTO 'AB' BATTERY PACK
BLACK
RED
BLUE
YELLOW
2ND I.F. TRIMMERS 455 KC.
1ST I.F. TRIMMERS 455 KC.
GND.
BLACK
BLUE
1A5G POWER
1N5G I.F.
2
1A7G OSC.-MOD.
3
(TOP)
D
B
4
A
C (BOTTOM)
OSC 6-B
ANT. 6-A
1H5G DET.-AVC
25
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
26
16
21
18
17
13
20
9
C
5
D
15
B
A
12
14
19
24
7
11
22
23
10
8

MODELS A2204, Z7208
Ch. 119B

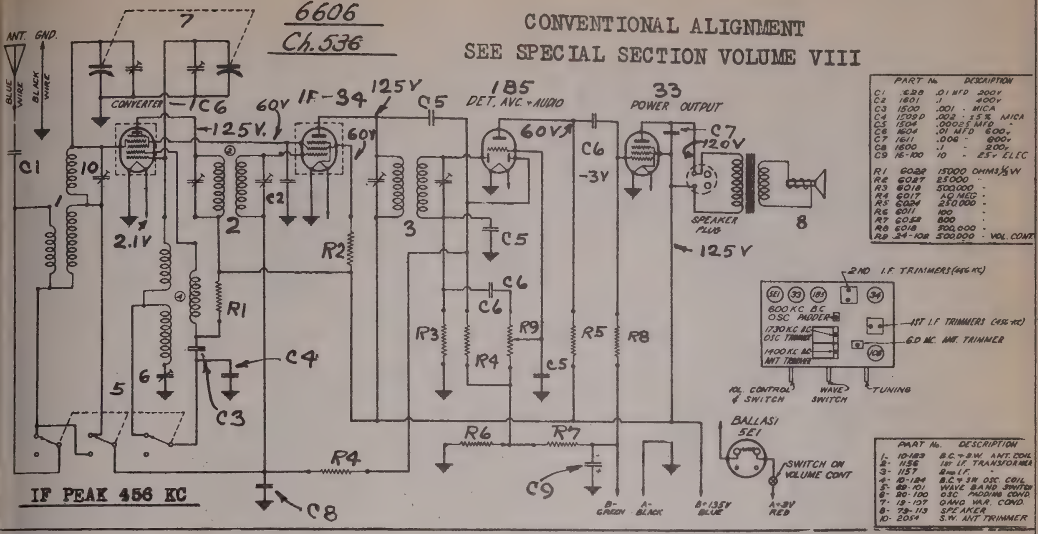
ALIGNMENT:- I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 6D8G TUBE--DO NOT REMOVE CAP-- ADJUST IF TRIMMERS TO MAXIMUM OUTPUT. AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAX. AT 1400 KC, ANTENNA TRIMMER TO MAX.


"A" BATTERY CABLE
COVER CUT AWAY TO SHOW INTERIOR PARTS
2ND I.F. TRIMMERS 455 KC.
DOTTED LINES SHOW PARTS UNDERNEATH SUB-BASE OF 'B' ELIM. UNIT.
1ST I.F. TRIMMERS 455 KC.
GND.
ANT.
BLACK
BLUE
3
23
19
38
39
16
15
1
6S7 I.F.
4
6D8G OSC.-MOD.
5
(TOP)
D
B
C
A
6
OSC 8-B
ANT. 8-A
6G6G POWER
36
6T7G DET. AVC & AUDIO
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
37
18
33
17
25
21
26
29
28
13
22
27
35
30
14
C
7
D
12
B
A
20
40
9
32
11
24
31
2
34
10

MODEL Z7108 (Early)
Ch. 118B

SPIEGEL, INC.

MODEL 6606, Ch. 536
MODEL Z7126, Ch 5N



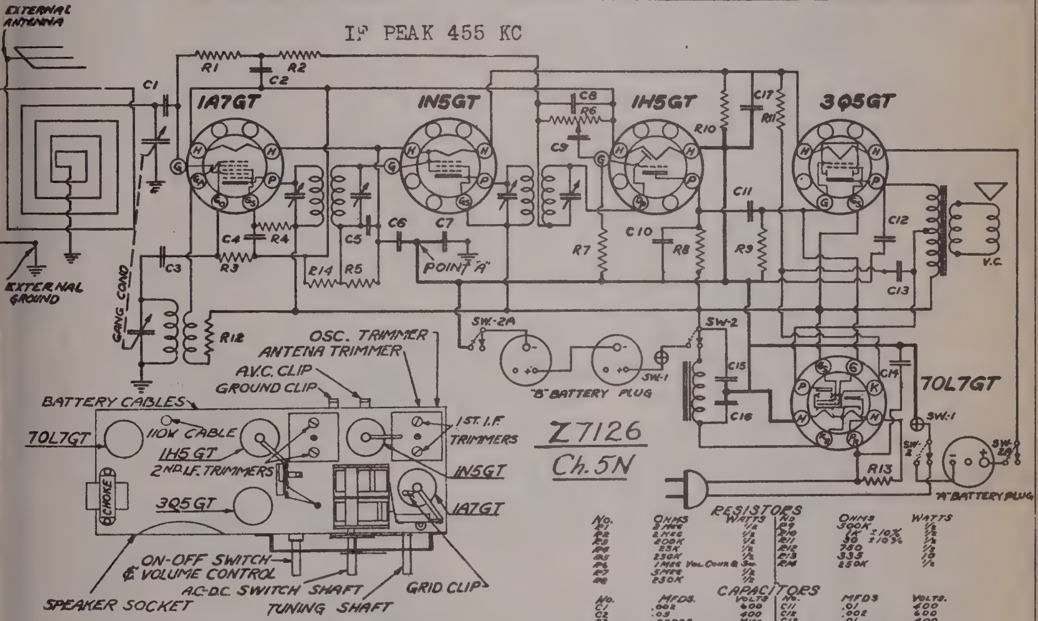
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

IF PEAK 456 KC

	PART No.	DESCRIPTION
C1	1628	.01 MFD 200v
C2	1601	.1 " 400v
C3	1500	.001 " MICA
C4	1509D	.002 " ±5% MICA
C5	1504	.00025 MFD "
C6	1604	.01 MFD 600v
C7	1611	.006 " 600v
C8	1600	.1 " 200v
C9	16-100	10 " 25v ELEC
R1	6022	15000 OHMS ⅓W
R2	6027	25000 "
R3	6018	500,000 "
R4	6017	10 MEG "
R5	6024	250,000 "
R6	6011	100 "
R7	6052	600 "
R8	6018	500,000 "
R9	24-102	500,000 " VOL. CONT.

	PART No.	DESCRIPTION
1-	10-123	B.C. + S.W. ANT. COIL
2-	1156	1ST I.F. TRANSFORMER
3-	1157	2ND I.F. "
4-	10-124	B.C. + SW OSC. COIL
5-	60-101	WAVE BAND SWITCH
6-	20-100	OSC PADDING COND.
7-	19-107	GANG VAR. COND.
8-	79-113	SPEAKER
10-	2054	S.W. ANT TRIMMER

IF PEAK 455 KC



RESISTORS

No.	OHMS	WATTS	No	OHMS	WATTS
R1	3 MEG	½	R9	500K	½
R2	2 MEG	½	R10	1K ±10%	½
R3	200K	½	R11	30 ±10%	½
R4	25K	½	R12	750	½
R5	250K	½	R13	335	10
R6	1 MEG Vol. Cont. & Sw.		R14	250K	½
R7	5 MEG	½			
R8	250K	½			

CAPACITORS

No.	MFDS.	VOLTS	No.	MFDS	VOLTS
C1	.002	400	C11	.01	400
C2	.05	400	C12	.002	600
C3	.00005	Mica	C13	.01	400
C4	.05	400	C14	.05	400
C5	.02	400	C15	20 (ELECT)	150
C6 (C17)	40 (ELECT.)	25	C16	30 (ELECT)	150
C7	.25 (5NL ONLY)	200	C17 (C6)	40 (ELECT.)	25
C8	.00025	Mica			
C9	.01	400			
C10	.00025	Mica			

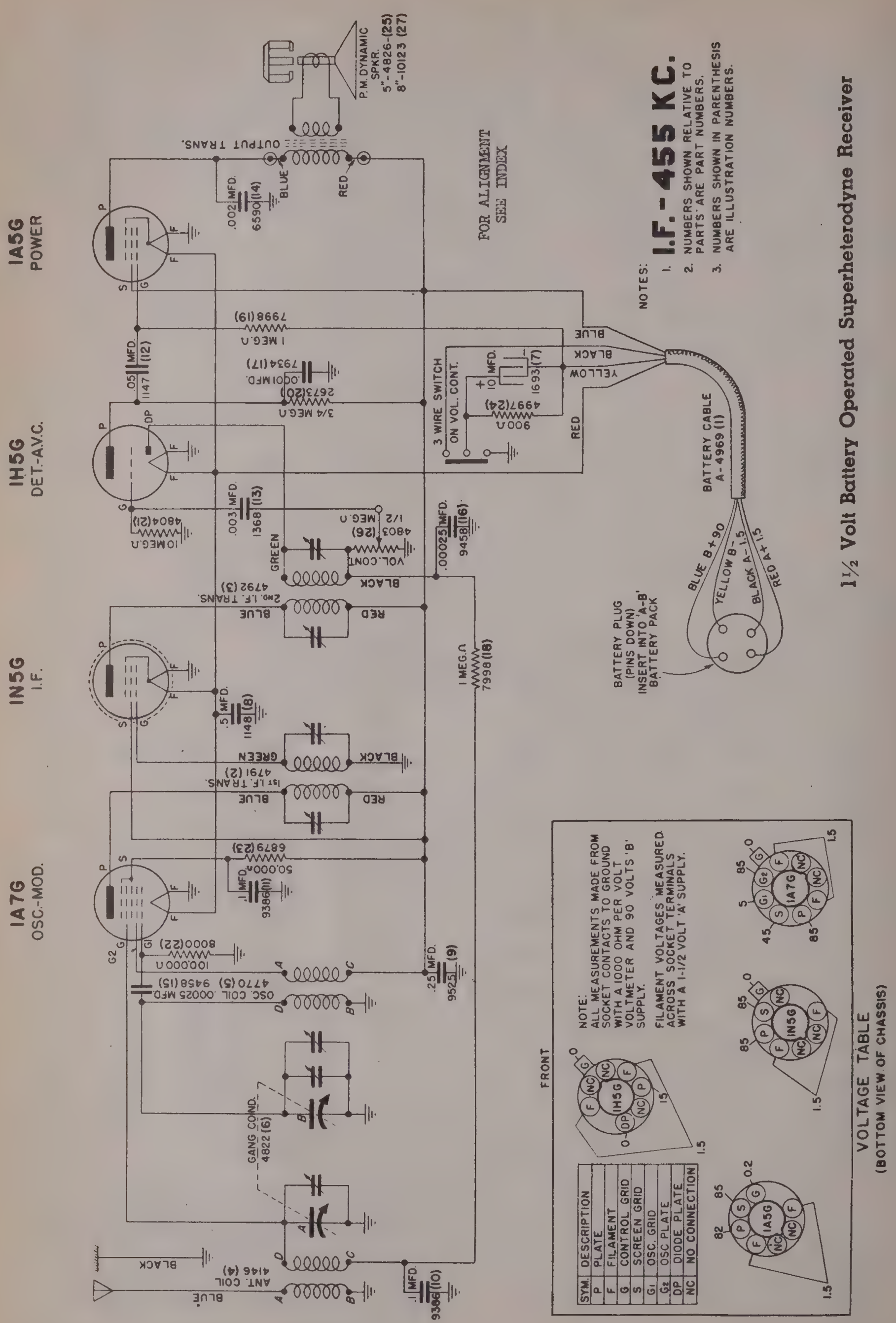
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.
TRIM OSC- 1550 KC, TRIM ANT- 1400 KC
PAD- 600 KC

TUBE FUNCTIONS
1A7GT- MIXER-OSCILLATOR
1N5GT- I.F. AMPLIFIER
1H5GT- 2ND DET-AVC-1ST A.F.
3Q5GT- OUTPUT
70L7GT-RECTIFIER

NOTE:-
C7 USED ON MODEL 5NL ONLY.
ON MODEL 5N POINT "A" IS CONNECTED TO CHASSIS.
SWITCH-1 IS ON-OFF.
SWITCH-2 IS A.C.-D.C. & BATTERY.
SWITCH-2 SHOWN FOR A.C.-D.C.
I.F. 455 K.C.
ON MODEL 5N SWITCH, SWITCH 2A NOT USED.

MODEL Z7108, Ch. 118B
(Early)

SPIEGEL, INC.



NOTES:

1. **I.F. - 455 KC.**
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G1	OSC. GRID
G2	OSC PLATE
DP	DIODE PLATE
NC	NO CONNECTION

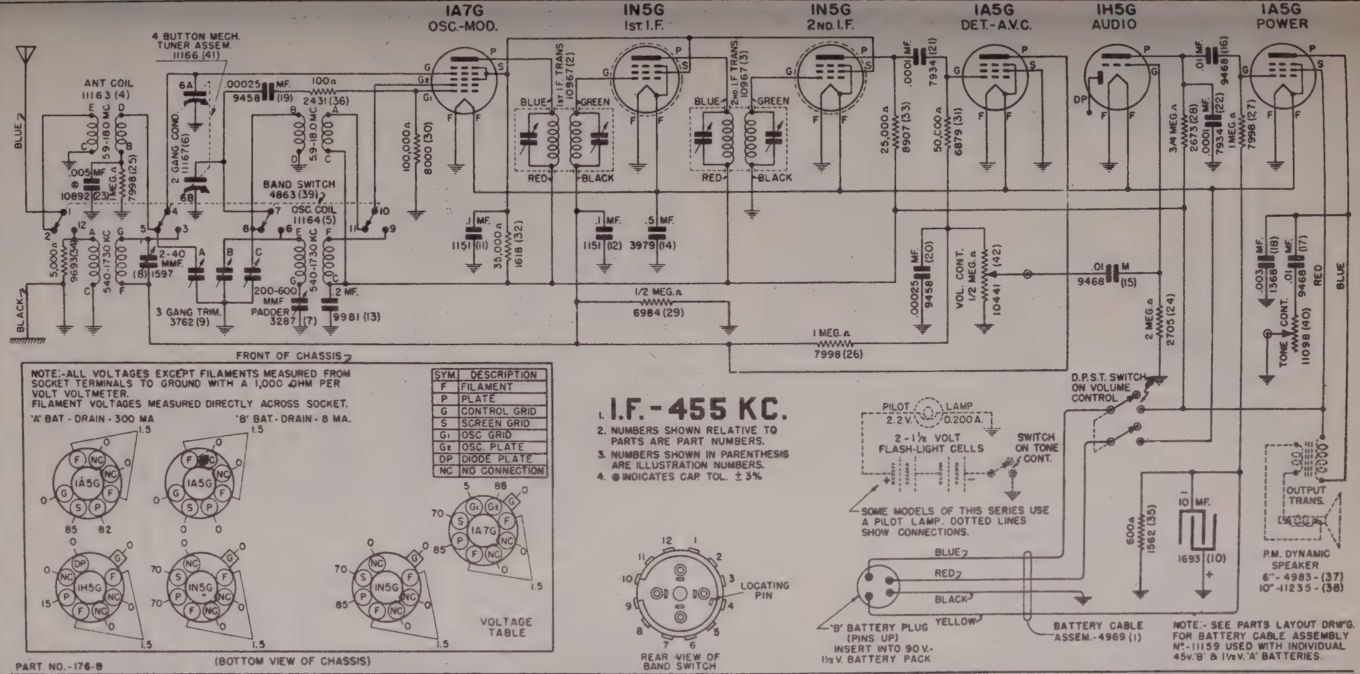
NOTE:
ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.

FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 1-1/2 VOLT 'A' SUPPLY.

1½ Volt Battery Operated Superheterodyne Receiver

SPIEGEL, INC.

MODEL Z7116, Ch. 176B



NOTE:-ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER.
FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET.

SYM.	DESCRIPTION
F	FILAMENT
P	PLATE
G	CONTROL GRID
S	SCREEN GRID
G₁	OSC GRID
G₂	OSC. PLATE
DP	DIODE PLATE
NC	NO CONNECTION

1. I.F.-455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊕ INDICATES CAP. TOL. ±3%

SOME MODELS OF THIS SERIES USE A PILOT LAMP. DOTTED LINES SHOW CONNECTIONS.

NOTE:- SEE PARTS LAYOUT DRW'G. FOR BATTERY CABLE ASSEMBLY Nº-11159 USED WITH INDIVIDUAL 45v.'B' & 1½v.'A' BATTERIES.

PARTS LIST

Illus. No.	Part No.		Description	List Price
1A	4969	Cable	Battery with Four Prong Plug	$ .35
1B	11159	Cable	Battery with 2-3 Prong "B" and 1-2 Prong "A" Plugs	.55
2	10967	Coil	1st I. F. Transformer	1.10
3	10967	Coil	2nd I. F. Transformer	1.10
4	11163	Coil	Antenna	.70
5	11164	Coil	Oscillator	.60
6	11167	Condenser	Two Gang with Four Button Mechanical Tuner Assembly	3.00
7	3287	Condenser	Padder 200-600 Mmf.	.45
8	1597	Condenser	Trimmer	.21
9	3762	Condenser	Trimmer Three Gang	.47
10	1693	Condenser	Tubular Dry Electrolytic 10 Mfd. · 25 Volt D.C. Wkg	.75
11	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
12	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
13	9981	Condenser	Tubular .2 Mfd. 200 Volt	.29
14	3979	Condenser	Tubular .5 Mfd. 200 Volt	.40
15	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
16	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
17	9468	Condenser	Tubular .01 Mfd. 400 Volt	.17
18	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
19	9458	Condenser	Mica .00025 Mfd.	.21
20	9458	Condenser	Mica .00025 Mfd.	.21
21	7934	Condenser	Mica .0001 Mfd.	.21
22	7934	Condenser	Mica .0001 Mfd.	.21
23	10892	Condenser	Mica .005 Mfd. ± 3%	.30
24	2705	Resistor	Carbon 2 Megohm ⅓ Watt	.19
25	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
26	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
27	7998	Resistor	Carbon 1 Megohm ⅓ Watt	.19
28	2673	Resistor	Carbon 750,000 Ohm ⅓ Watt	.19
29	6984	Resistor	Carbon 500,000 Ohm ⅓ Watt	.19
30	8000	Resistor	Carbon 100,000 Ohm ⅓ Watt	.19
31	6879	Resistor	Carbon 50,000 Ohm ⅓ Watt	.19
32	1618	Resistor	Carbon 35,000 Ohm ⅓ Watt	.19
33	8907	Resistor	Carbon 25,000 Ohm ⅓ Watt	.19
34	9693	Resistor	Carbon 5,000 Ohm ⅓ Watt	.19
35	1562	Resistor	Carbon 600 Ohm ⅓ Watt	.19
36	2431	Resistor	Carbon 100 Ohm ⅓ Watt	.19
37	4983	Speaker	P. M. Dynamic 6"	4.25
38	11235	Speaker	P. M. Dynamic 10"	7.50
39	4863	Switch	Wave	.60
40	11098	Tone Control	With Dial Light Switch	.80
41	11166	Tuner Unit	Complete with Four Button Mech. Assem. Two Gang Condenser and Mechanical Drive Assembly	3.95
42	10441	Volume Control	With D. P. S. T. "On-Off" Switch	.95

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

WHEN ORDERING PARTS BE SURE TO ORDER BY PART NUMBER

MISCELLANEOUS PARTS

Illus. No.	Part No.		Description	List Price
	8184	Cord	12" of 18 lb. Drive Cord	.10
	11189	Dial Scale	Calibrated Scale Only	.55
	11173	Dial Assembly	Complete Drive Mechanism Less Scale	.75
	11193	Dial Pointer	For Dial	.16
	11198	Escutcheon	For Dial with Mtg. Screw Holes in Corners	1.25
	11199	Escutcheon	For Dial with Mtg. Screw Holes away from Corners	1.25
	11200	Escutcheon	Pushbutton Used with 11198 Dial Escutcheon	.35
	11201	Escutcheon	Pushbutton Used with 11199 Dial Escutcheon	.35
	4958	Knob	Marked "Tuning"	.12
	4959	Knob	Marked "Off-Volume"	.12
	4960	Knob	Marked "Tone"	.12
	4961	Knob	Marked "Band Switch"	.12
	3487	Plug	3 Prong "B"	.10
	10351	Plug	2 Prong "A"	.10
	4978	Plug	4 Prong "AB"	.10
	11197	Dial Spring	Gear Drive Shaft Tension	.16
	4589	Dial Spring	Cord Tension	.04
	11185	Dial Shaft	Gear Drive Shaft Assembly	.35

4M W. 12-39 PART NO. 176B

MODEL A-2462, Ch. 710

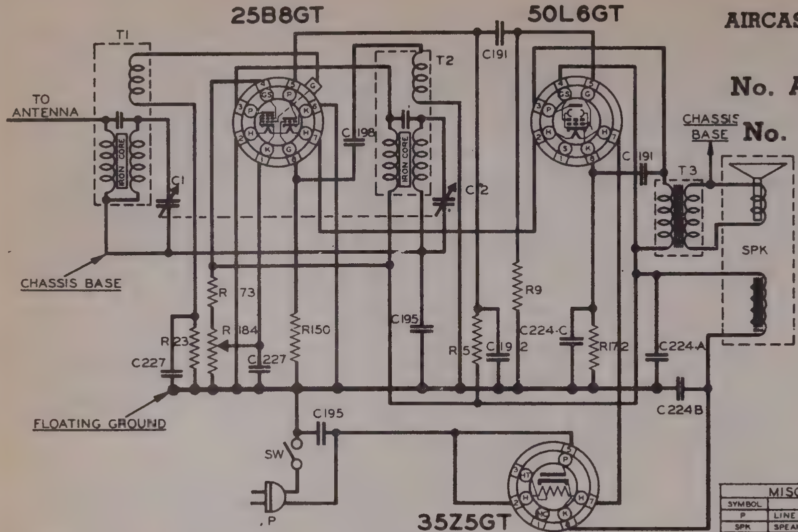
MODELS AP-2004, AP-2005, Ch. 402

SPIEGEL, INC.

AIRCASTLE HOME RADIO
MODEL 402

No. AP-2004 Walnut

No. AP-2005 Ivory



115 volts AC or DC. Power consumption is 25 watts.

FREQUENCY RANGE
1700 K.C. TO 540 K.C.

RESISTORS			
R	OHM	W	PART NO.
5	500K	1/4	17-2070
9	1M	1/4	17-2080
23	250K	1/4	17-3011
73	30K	1/4	17-4278
150	5M	1/4	17-14242
172	100	1/4	17-14289
184	10 K	V.C.	17-14320

CONDENSERS			
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-18318
2	VARIABLE		
191	.01	400	17-14272
192	.00025	600	17-14273
195	.05	400	17-14276
198	.005	400	17-14279
224A	10 MFD.	150	17-14319
224B	20 MFD.	150	
224C	20 MFD.	25	
227	.05	200	17-14323

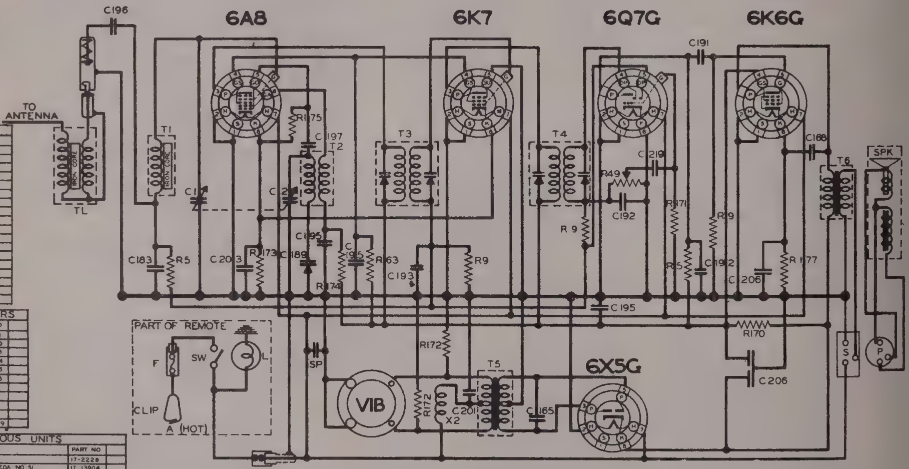
MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
P	LINE CORD & PLUG ASSEMBLY	17-18338
SPK	SPEAKER ASSEMBLY	17-18489
SW	LINE SWITCH	17-14320
T1	ANTENNA COIL	00-18508
T2	R.F. COIL	00-18509
T3	OUTPUT TRANSFORMER	00-18510

RESISTORS				
R	OHMS	W	PART NO	
5	500K	1/4	17-2070	
9	1M	1/4	17-2080	
49	500K	V.C.	7-4536	
63	25K	1/4	17-14091	
170	800	1	17-14287	
171	15M	1/4	17-14288	
172	100	1/4	17-14289	
173	200	1/4	17-14290	
174	20K	1/4	17-14291	
175	4[illegible]K	1/4	17-14292	
177	650	1/4	17-14296	

CONDENSERS				
C	CAPACITY	VOLT	PART [illegible]	
1	TWO-GANG		29-16254	
2	VARIABLE			
165	.005	1200	17-14230	
183	.003	800	17-14294	
189	.0005	PAD	17-14266	
191	.01	400	17-4272	
192	.00025	600	17-14273	
193	.05	200	17-14274	
195	.05	400	17-14276	
196	1	200	17-14277	
197	.0001	600	17 14278	
219	.003	200	17 14312	
201	5	150	17-14285	
203	.2	200	17-16242	
206	10-10MFD	300	17-14297	
208	20MFD.	15		
168	.002	400	17-14234	

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO	
1	ANTENNA COIL	00-16219	
2	OSCILLATOR COIL	00-16220	
3	FIRST I F COIL	00-16263	
4	SECOND I F COIL	00-16264	
5	POWER TRANS.	00-16265	
6	OUTPUT TRANS	00-16266	
X	CHOKES		
2	SUPPRESSION CHOKE	29-13459	

MISCELLANEOUS UNITS			
SYMBOL	DESCRIPTION	PART NO	
F	FUSE - 20 AMP	17-2228	
L	DIAL LIGHT BULB - MAZDA NO 51	17 13904	
P	SPEAKER PLUG	17-4760	
S	SPEAKER SOCKET	17-15631	
SPK	SPEAKER ASSEMBLY	17-16517	
SW	POWER SWITCH	———	
TL	TRANSMISSION LINE	00-16233	
SP	SPARK PLATE	———	
VIB	VIBRATOR	17-14747	



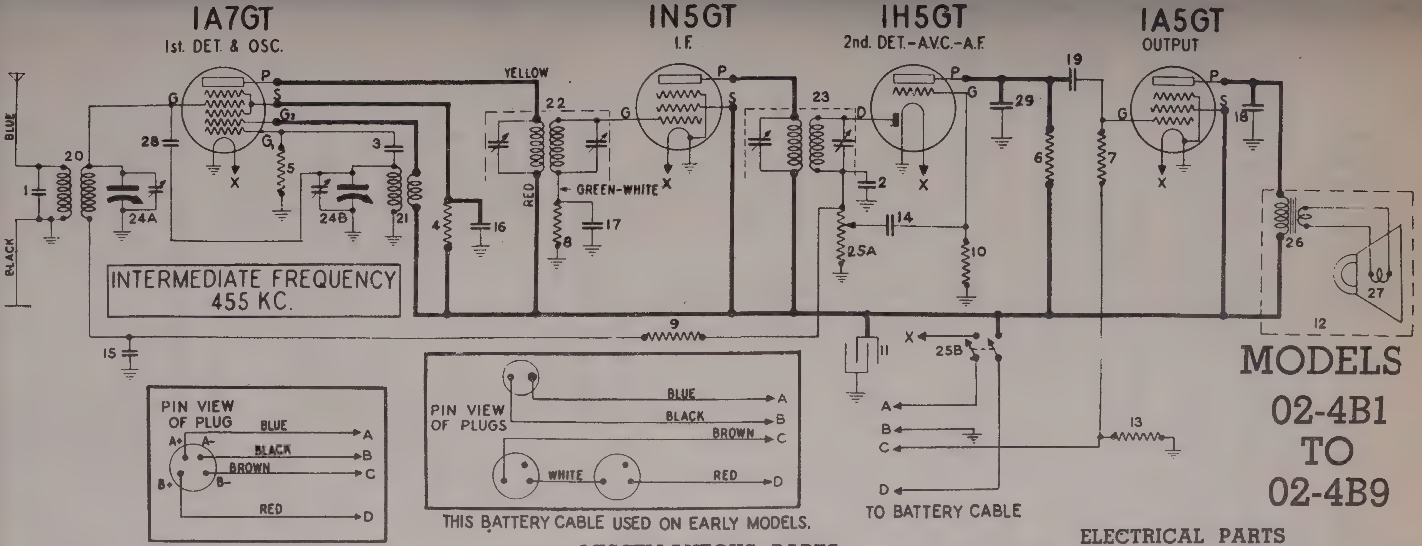
I.F PEAK 455 K.C.
FREQUENCY RANGE 1575 TO 540 K C.

MODEL A-2462 Ch. 710

BALANCING INSTRUCTIONS

All sensitivities given for ½ watt output equals 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455 kc	1, 2, 3 & 4	550 kc	50 uv
2	Ant. Coupler Through 20 uuf	1400 kc	5	1400 kc	
3	Through 20 uuf	1400 kc	6	1400 kc	10 uv
4	Through 20 uuf	600 kc	7	600 kc	10 uv



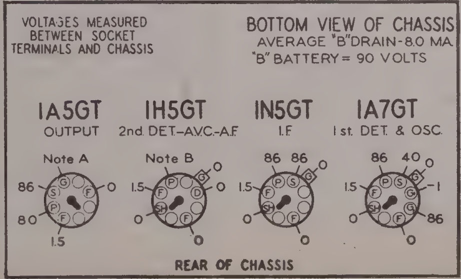
THIS BATTERY CABLE USED ON EARLY MODELS.

THIS BATTERY CABLE USED ON LATE MODELS.

MODELS 02-4B1 TO 02-4B9

SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 540 KC



NOTE A: The bias for the control grid of the 1A5GT tube is —4 volts measured across resistor 13.

NOTE B: Due to the high resistance of plate resistor No. 6 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

MISCELLANEOUS PARTS

Part Number	Description	List Price
119453	Battery cable (3 plug type)	$0.80
119906	Battery—cable (single plug, 4 prong type)	.90
119439	Cabinet—complete with window and decalcomania (02-4B1 only)	2.40
119438	Cabinet back	.08
119150	Cabinet (wood)—see decal 119427 below (02-4B4 only)	7.20
112745	Clip—coil mounting	.01
116948	Cord—dial drive (supplied in 6 ft. lengths)	.18
119427	Decal—"Off"—for cabinet 119150 (02-4B4 only)	.16
119444	Dial scale	.10
119441	Knob—ivory—Volume (02-4B1)	.16
119442	Knob—ivory—Tuning (02-4B1)	.16
119175	Knob—tan—(02-4B4)	.10
88631	Plug—4 prong male—for 119906 cable	.06
116397	Plug—2 prong male—for 119453 cable	.05
116567	Plug—3 prong male—for 119453 cable	.04
119011	Pointer	.06
85040	Screw—No. 6 Hex. Hd.	Per C .35
118953	Shaft—tuning	.15
116592	Shield—tube	.10
116690	Socket—small octal base	.12
111981	Spring—for dial cord tension	.03
117411	Trimount stud	.01

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83783	Condenser—mica 110 mmfd.	$0.20
3	85061	Condenser—mica 51 mmfd.	.15
4	110552	Resistor—carbon 47,000 ohms 1/4 watt	.12
5	110553	Resistor—carbon 220,000 ohms 1/4 watt	.12
6	110554	Resistor—carbon 1 meg. 1/4 watt	.12
7	110570	Resistor—carbon 2.2 meg. 1/4 watt	.15
8-9-10	110580	Resistor—carbon 3.3 meg. 1/4 watt	.12
11	113118	Condenser—electrolytic 8 mfd. 150 volt	.56
12	R-115090	Speaker—P.M. 4"	5.25
13	116078	Resistor—560 ohms 1/4 watt	.12
14	116647	Condenser—.004 mfd. 600 volt	.15
15-16-17	116819	Condenser—.05 mfd. 600 volt	.20
18	117022	Condenser—.002 mfd. 600 volts	.15
19	119193	Condenser—.01 mfd. 600 volt	.15
20	119407	Coil—antenna	.52
21	119408	Coil—oscillator	.32
22	119409	Transformer—1st I.F.	1.10
23	119411	Transformer—2nd I.F.	1.10
24A-24B	119425	Condenser—variable tuning	3.00
25A-25B	119426	Volume control (1 meg.) with switch	1.10
26	R-119457	Transformer—output for R-115090 spkr.	1.65
27	R-119458	Cone & Voice Coil for R-115090 speaker	1.65
28	119466	Capacitor—wire (2 mmfd.)	.12
29	83783	Condenser—mica, 110 mmfd.	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

02-4B . 02-4C CHASSIS

ALIGNMENT PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

Connect the output meter across the voice coil or between the plate of the 1A5GT output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

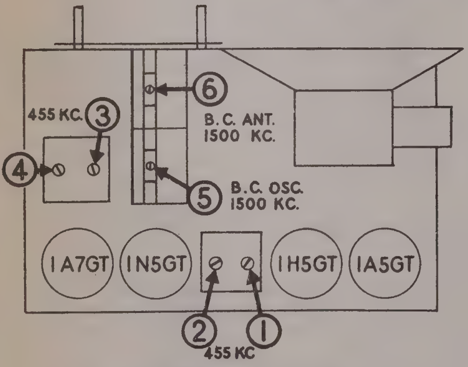
Connect the ground lead of the signal generator to the Ground Terminal or the chassis.

Turn the volume control to the maximum volume position and keep it in this position while aligning.

With the gang condenser in full mesh, set the dial pointer to the last mark on the left hand end of the dial scale.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Control Grid of 1A7GT	455 KC	Any Point Where It Does Not Affect Signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.

MODELS 02-4B1 TO 02-4B9



BATTERY CABLES

Two types of battery cables were used on this model. On the early production a battery cable having 3 plugs was used (Part No. 119453). The three-pronged plugs on this cable will fit the sockets on standard 45 volt "B" batteries and the two-pronged plug will fit the socket on a standard 1½ volt "A" battery. Single unit battery packs suitable for use with this cable are listed in the adjoining column. Late models of this radio use a battery cable having a single four-pronged plug. This plug will fit the socket on a standard combination "A"-"B" battery pack, some of which are listed in the adjoining column.

SINGLE UNIT BATTERIES

FOR USE WITH 3 PLUG BATTERY CABLE	FOR USE WITH SINGLE PLUG BATTERY CABLE
Eveready No. 748 Burgess 17G-D60 (with adapter) General 60DL-11L Ray-O-Vac AB28U	Eveready No. 748 Burgess 17G-D60 General 60DL-11L Ray-O-Vac AB82

POWER LINE OPERATION

To use this set on 110 volt 50-60 cycle A.C. power lines, use one of the following power packs:

Porta-Power Model "G"
Porta-Power Model "U"

These units are manufactured by the General Transformer Corporation, 1250 W. Van Buren, Chicago, Ill.

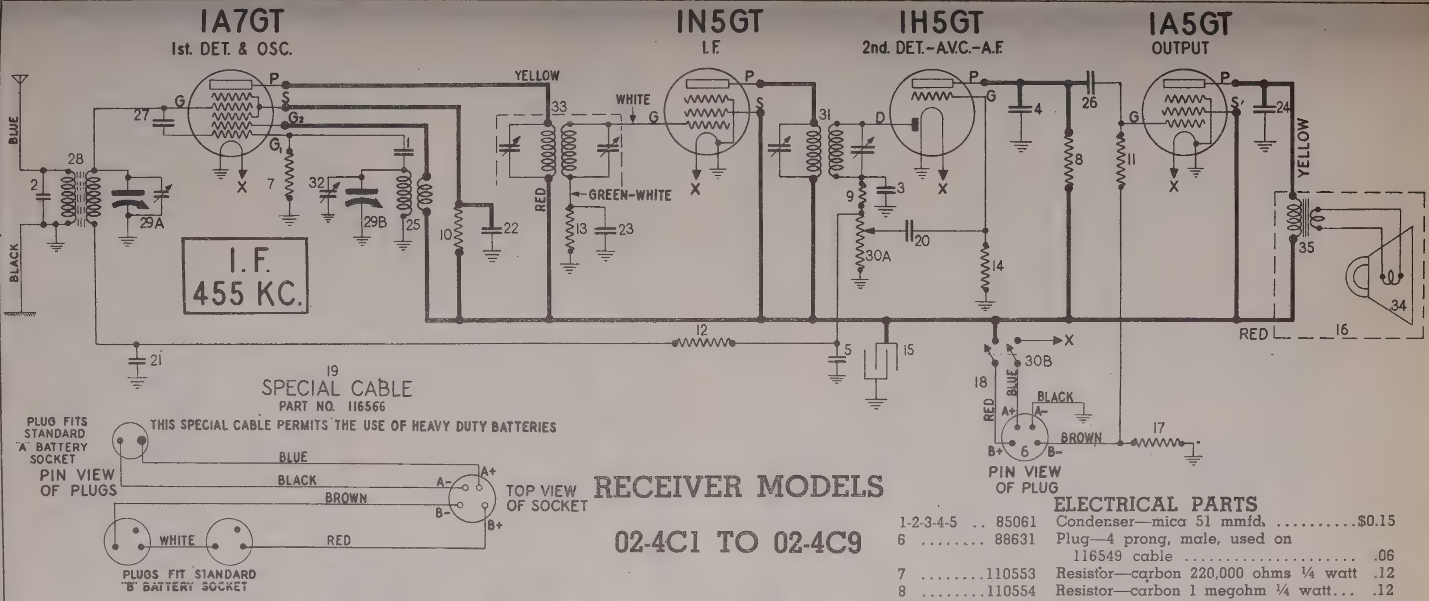
SPECIAL BATTERY CABLE

A special battery cable assembly (Part No. 116566) is available for use with sets using the single plug battery cable. This cable will allow the use of heavy duty batteries which are larger than those contained in the single unit battery packs and will give longer service. The special cable available is 30 inches in length and it will permit locating these batteries beneath the table or behind the receiver cabinet. Complete instructions for use are packed with each cable, which may be purchased from the Stewart-Warner Corporation, Chicago, Illinois. It has a list price of 85c.

STEWART-WARNER CORP.

Chassis 02-4C

MODELS 02-4C1 to 02-4C9



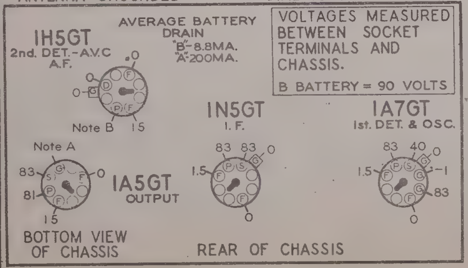
RECEIVER MODELS

02-4C1 TO 02-4C9

SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



NOTE A: The bias for the control grid of the 1A5GT tube is —8 volts measured across resistor 17.

NOTE B: Due to the high resistance of plate Resistor No. 8 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

MISCELLANEOUS PARTS

Part Number	Description	List Price
114955	Clamp—for dial cord	$0.01
110140	Clip—grid	.01
117057	Cord—drive supplied in 3 ft. lengths.	.15
119532	Dial scale	.24
119710	Escutcheon dial	1.50
116411	Indicator lever assembly	.09
119167	Knob—tuning or volume	.10
12349	Nut—8-32 for speaker mtg. Per C	.45
119718	Pointer	.14
81145	Retaining ring—for drive shaft. Per C	.50
119587	Screw—Escutcheon Mounting	.02
83624	Screw—self tapping 8 x 1/4	.01
116690	Socket—small octal base	.12
114968	Spring—dial cord tension	.03
119525	Tuning Shaft	.10
111456	Washer—spring washer Per C	.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

ELECTRICAL PARTS

1-2-3-4-5	85061	Condenser—mica 51 mmfd.	$0.15
6	88631	Plug—4 prong, male, used on 116549 cable	.06
7	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
8	110554	Resistor—carbon 1 megohm ¼ watt	.12
9	110565	Resistor—carbon 22,000 ohms ¼ watt.	.12
10	110568	Resistor—carbon 33,000 ohms ¼ watt.	.12
11	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
12-13-14	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
15	112898	Condenser—electrolytic 16 mfd. 150 volt	.50
16	M-115095	Speaker—P.M. 6"	7.10
17	116078	Resistor—560 ohms ¼ watt	.12
18	116549	Cable—Battery	.45
19	116566	Battery cable—for heavy duty batteries (not supplied with receiver)	.85
20	116647	Condenser—.004 mfd. 600 volt	.15
21-22-23	116819	Condenser—.05 mfd. 600 volt	.20
24	117022	Condenser—.002 mfd. 600 volt	.15
25	117741	Coil—oscillator	.35
26	119193	Condenser—.01 mfd. 600 volt	.15
27	119466	Capacitor—wire (2 mmfd.)	.12
28	119473	Coil—B. C. antenna	1.10
29A-29B	119528	Condenser—tuning (with drum)	2.90
30A-30B	119529	Volume control 1 meg. (with switch)	1.25
31	119673	Transformer—2nd I.F.	1.25
32	119719	Condenser—trimmer	.16
33	119720	Transformer—1st I.F.	1.25
34	M-119748	Cone & Voice coil for M-115095 speaker	1.60
35	M-119749	Transformer—output for M-115095 speaker	1.75

MODELS 02-4B1,02-4B4
Chassis 02-4B

STEWART-WARNER CORP.

MODEL 02-5T1
Chassis 02-5T
MODEL 02-4C1
Chassis 02-4C

June 4, 1940

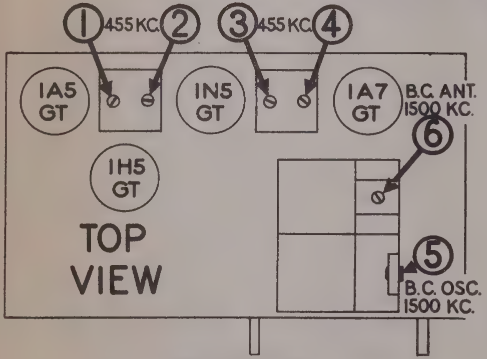
Chassis Number	Radio Model
02-4B	02-4B1, 02-4B4
02-4C	02-4C1
02-5T	02-5T1

The first production release of the 02-4B chassis used a three plug type of battery cable so that it could be connected to separate A and B batteries. Most battery packs on the market are equipped with sockets for this three plug cable as well as for a single large plug so that they could be used with this set if desired. However, some battery manufacturers put out special battery packs that were equipped only with the single large socket. To use this special battery pack with the early production 02-4B chassis, obtain the correct adapter from the battery manufacturer.

Later production 02-4B as well as all 02-4C and 02-5T sets used the single large plug to connect to any battery pack. For those preferring to use separate A and B batteries, we provide our part #116566 battery cable and adapter. This cable is priced at $.85 list.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 02-4C1 TO 02-4C9



OSCILLATION

Be sure the antenna and ground wires are pulled straight out from the set and that they do not pass close to the antenna coil or to the tubes.

These wires have been attached to the cabinet at the factory and should be reattached in a similar manner after the set has been serviced.

Failure to observe this precaution may cause oscillation and instability in this receiver.

FOR POWER LINE OPERATION

To use this set on 110 volt 50-60 cycle A.C. power lines, use one of the following power packs:

Porta-Power Model "G"
Porta-Power Model "U"

These units, are manufactured by the General Transformer Corporation, 1250 W. Van Buren, Chicago, Ill.

INSTALLATION OF BATTERIES

BATTERIES REQUIRED: This receiver is designed to operate from a single unit battery pack which fits into the receiver cabinet directly behind the chassis. The following battery packs will fit into the receiver cabinet in back of the chassis:

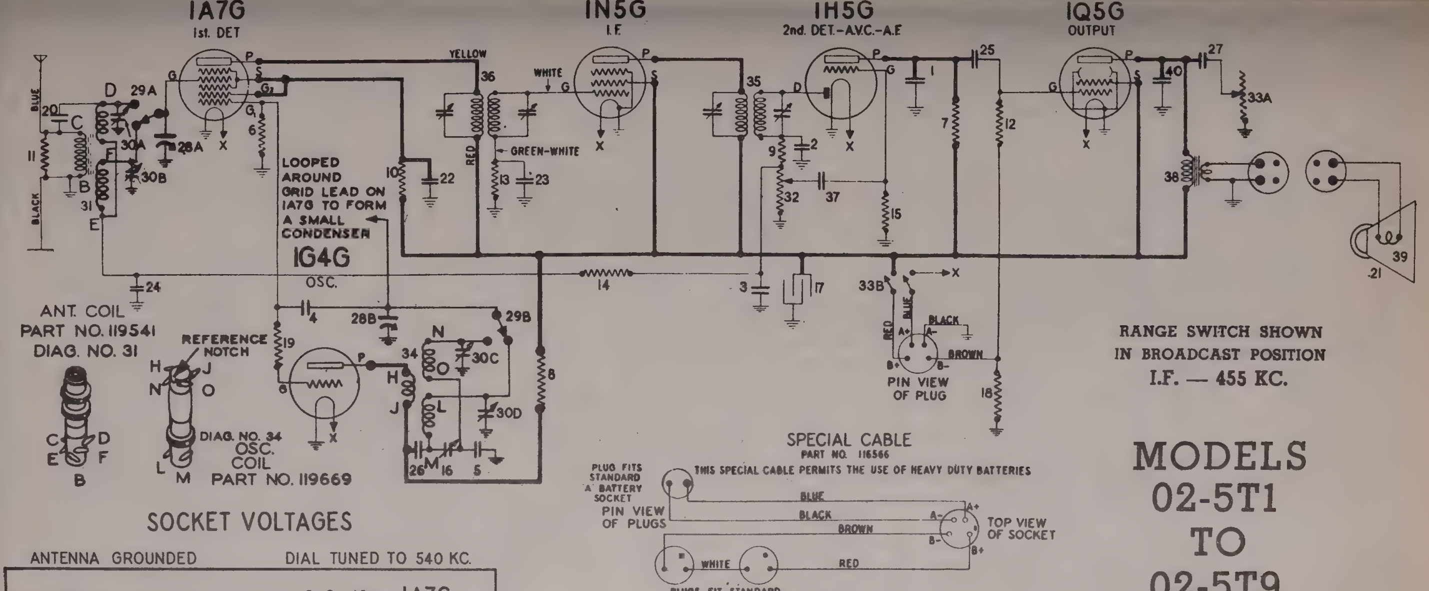
Burgess 17G-D60
General 60DL-11L
Eveready No. 748
Ray-O-Vac AB82
or equivalent

The 4-prong plug on the end of the cable extending from the chassis is plugged into the 4-hole socket on top of the battery pack. No other battery connections are necessary.

HEAVY-DUTY BATTERIES: A special battery cable assembly (Part No. 116566) is available so that heavy duty batteries may be used with this receiver. These batteries are larger than those contained in the single unit power pack and will give considerably longer service, but due to their larger size, they will not fit into the cabinet. The special cable available is 30 inches in length and it will permit locating these batteries beneath the table, behind the receiver cabinet, or in the bottom portion of the console cabinet. Complete instructions for use are packed with each cable, which may be purchased from the Stewart-Warner Corporation, Chicago, Illinois.

STEWART-WARNER CORP. MODELS 02-5T1 to 02-5T9

Chassis 02-5T



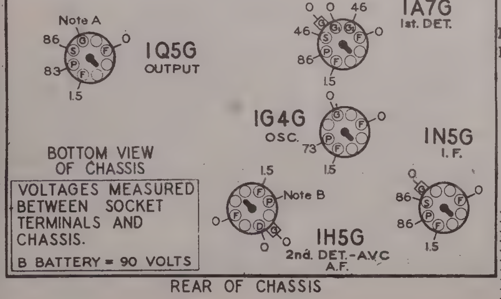
RANGE SWITCH SHOWN
IN BROADCAST POSITION
I.F. — 455 KC.

MODELS 02-5T1 TO 02-5T9

SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

B BATTERY = 90 VOLTS

REAR OF CHASSIS

NOTE A: The bias for the control grid of the 1Q5G tube is —4 volts measured across resistor 18.

NOTE B: Due to the high resistance of plate Resistor No. 7 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

Diagram Number	Part Number	Description	List Price
1	83783	Condenser—mica, 110 mmfd.	$0.20
2-3-4	85061	Condenser—mica, 51 mmfd.	.15
5	88587	Condenser—mica .0042 mfd.	.35
6	110553	Resistor—carbon 220,000 ohms ¼ watt	12
7	110554	Resistor—carbon 1 megohm ¼ watt	12
8	110557	Resistor—carbon 4,700 ohms ¼ watt	12
9	110565	Resistor—carbon 22,000 ohms ¼ watt	12
10	110566	Resistor—carbon 33,000 ohms ¼ watt	12
11	110569	Resistor—carbon 10,000 ohms ¼ watt	12
12	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
13-14-15	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
16	112799	Condenser—padder	.36
17	112898	Condenser—electrolytic 16 mfd. 150 volt	.50
18	112951	Resistor—carbon 400 ohms ¼ watt	.12
19	112994	Resistor—carbon 220 ohms ¼ watt	.16
20	114969	Condenser—mica 15 mmfd.	.12
21	O-115099	Speaker—P. M. (6")	7.00
22-23-24	116819	Condenser—.05 mfd. 600 volt	.20
25-26	119193	Condenser—.01 mfd. 600 volt	.15
27	119414	Condenser—.02 mfd. 600 volt	.15
28A-28B	119533	Condenser—tuning (with drum)	3.00
29A-29B	119534	Range switch	.80
30A-30D	119536	Condenser—trimmer (4 section)	.60
31	119541	Coil—antenna	1.25
32	119551	Volume control—1 meg.	.95
33A-33B	119552	Tone control—100,000 ohms with switch	.95
34	119669	Coil—oscillator	.75
35	119673	Transformer—2nd I.F.	1.25
36	119720	Transformer—1st I.F.	1.25
37	119817	Condenser—.004 mfd. 600 volt	.15
38	O-119862	Transformer—output for O-115099 speaker	1.20
39	O-119873	Cone & Voice Coil for O-115099 speaker	1.86
40	119875	Condenser—.002 mfd. 600 volt	.15

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PRICES BELOW ARE SUBJECT TO CHANGE WITHOUT NOTICE

RECEIVER MODELS 02-5T1 TO 02-5T9 ALIGNMENT PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

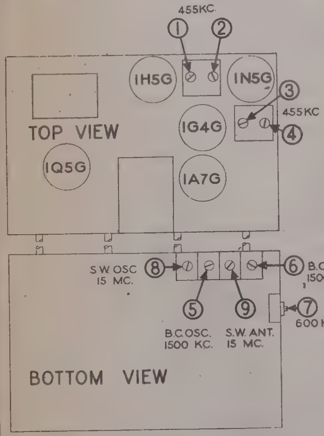
Connect the output meter across the voice coil or between the plate of the 1Q5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

Connect the ground lead of the signal generator to the black wire or the chassis.

Turn the volume control to the maximum volume position and keep it in this position while aligning.

With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7G	455 KC	Broadcast	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Broadcast	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	600 KC	Broadcast	Tune To 600 KC Generator Signal	7	Broadcast Oscillator (Series Pad	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	15 MC	8	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Antenna Lead (Blue Wire)	15 MC	Foreign	Tune To 15 MC Gen. Signal	9	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



FOR POWER LINE OPERATION

To use this set on 110 volt 50-60 cycle A.C. power lines, use one of the following power packs:

Porta-Power Model "G"

Porta-Power Model "U"

These units are manufactured by the General Transformer Corporation, 1250 W. Van Buren, Chicago, Ill.

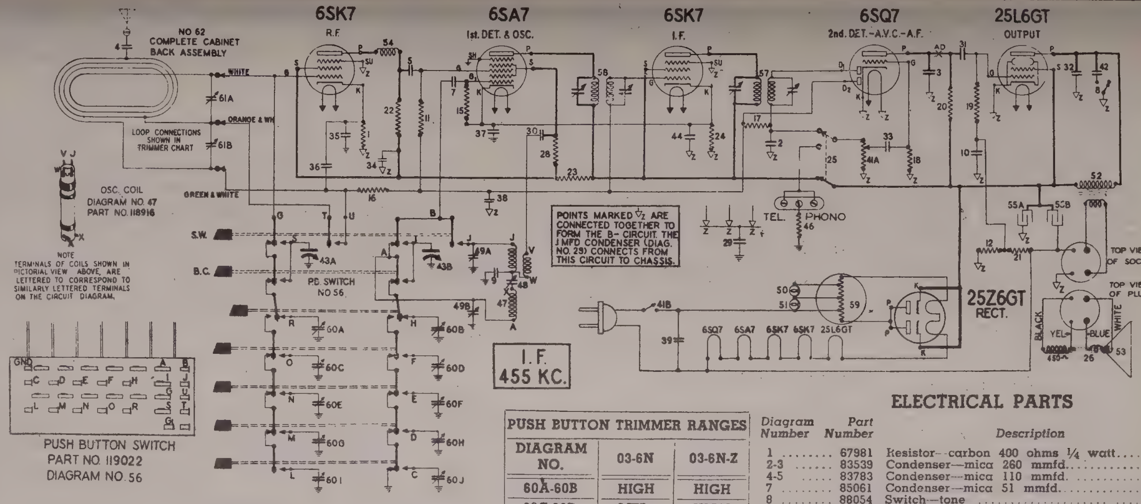
BATTERIES REQUIRED: One of the following or its equivalent is required: Eveready No. 748, Burgess 17G-D60, General 60DL-11L, Ray-O-Vac AB82. A special battery cable assembly (Part No. 116566) is available so that heavy duty batteries may be used with this receiver.

MISCELLANEOUS PARTS

Part Number	Description	List Price
116566	Battery cable—for heavy duty batteries	$0.85
116549	Cable—battery	.45
114955	Clamp—for dial cord	.01
112745	Clip—coil mounting	.01
110140	Clip—grid	.01
117057	Cord—drive—supplied in 3 ft. lengths	.15
119828	Dial escutcheon	.20
119830	Dial scale	.38
77208	Flat steel washer for gang condenser mtg.	.01
119167	Knob—tuning or volume	.10
12349	Nut—8-32 for gang mtg. ....Per C	.45
88631	Plug—4 prong, male (for battery cable)	.06
119855	Pointer	.16
81145	Retaining ring—for drive shaft ....Per C	.50
119587	Screw—for escutcheon	.02
116392	Shield base—tube	.03
116395	Shield-tube	.08
110501	Socket—4 prong (for speaker)	.16
85427	Socket—octal base (standard)	.15
111090	Spacer—steel mtg. (for gang condenser)	.02
114968	Spring—dial cord tension	.03
113169	Spring—for indicator lever	.01
119525	Tuning shaft	.10
116530	Washer (paper) for back of knobs	.005
111456	Washer—spring washer ....Per C	.50

STEWART-WARNER CORP.

MODELS 03-6N-1,03-6N1-Z
Chassis 03-6N
03-6NZ

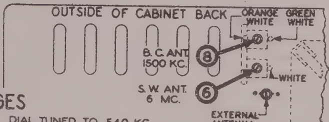


Note: If excessive hum is encountered, placing a 40 mfd.—150 volt condenser (Part No. 113472) across 55B and changing condenser No. 33 from .004 mfd. to .04 mfd. (Part No. 119880) will correct the condition in many cases.

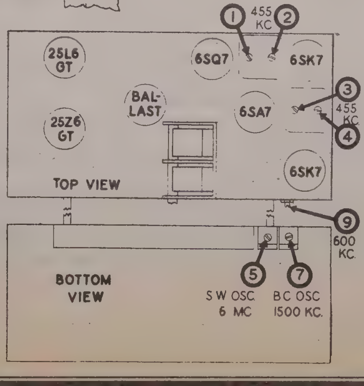
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PUSH BUTTON TRIMMER RANGES		
DIAGRAM NO.	03-6N	03-6N-Z
60A-60B	HIGH	HIGH
60C-60D	MED.	HIGH
60E-60F	LOW	MED.
60G-60H	LOW	MED.
60I-60J	LOW	LOW

SEE PARTS LIST BELOW FOR RANGES IN KILOCYCLES

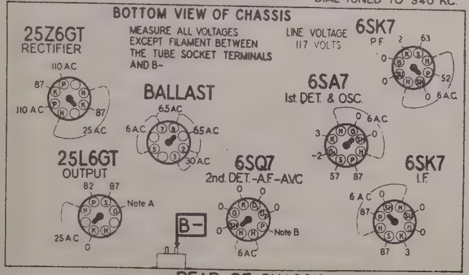


FOR ALIGNMENT SEE INDEX



SOCKET VOLTAGES

VOLUME ON FULL WITH NO SIGNAL
DIAL TUNED TO 540 KC.



These readings taken using a voltmeter of 1000 ohms per volt.

NOTE A: The bias on the 25L6GT grid is -4 volts measured across resistor No. 12.

NOTE B: Due to the high resistance of resistor No. 20, only a small voltage will be read at the plate of the 6SQ7 when using a voltmeter having a resistance of 1000 ohms per volt.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	67981	Resistor—carbon 400 ohms ¼ watt	$0.25
2-3	83539	Condenser—mica 260 mmfd.	.20
4-5	83783	Condenser—mica 110 mmfd.	.20
7	85061	Condenser—mica 51 mmfd.	.15
8	88054	Switch—tone	.30
9	89275	Condenser—mica .002 mfd.	.40
10	116625	Condenser—.1 mfd. 600 volt	.25
11	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
12	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
15	110564	Resistor carbon 100,000 ohms ¼ watt	.12
16	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
17-18	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
19	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
20-21	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
22	112952	Resistor—carbon 3,300 ohms ¼ watt	.10
23	112964	Resistor—carbon 1,500 ohms ¼ watt	.15
24	112994	Resistor—carbon 220 ohms ¼ watt	.12
25	114141	Switch—D.P.D.T.	.44
26	R-115083	Speaker—dynamic (5")	4.00
28	116068	Resistor—carbon 680 ohms ¼ watt	.12
29	116625	Condenser—.1 mfd. 600 volt	.25
30-31-32	116640	Condenser—.01 mfd. 600 volt	.15
33	116647	Condenser—.004 mfd. 600 volt	.15
34	116706	Condenser—.2 mfd. 600 volt	.35
35 to 39	116819	Condenser—.05 mfd. 600 volt	.20
41A-41B	116834	Volume control 1 megohm (with switch)	1.10
42	116984	Condenser—.04 mfd. 600 volts	.20
43A-43B	117625	Condenser—tuning (with drum)	3.00
44	118206	Condenser—.25 mfd. 600 volts	.35
46	110553	Resistor—220,000 ohms ¼ watt (on Underwriters' approved sets)	.12
47	118916	Coil—oscillator	.52
48	118919	Condenser—padding	.40
49A-49B	118920	Trimmer strip (2 section)	.30
50-51	110629	Lamp—dial 6.3 volts .25 amps.	.15
52	118996	Transformer—output	1.00
53	R-118999	Cone & Voice coil for R-115083 speaker	1.70
54	119001	Coil—R. F.	.28
55A-55B	119021	Condenser—electrolytic—20-40 mfd. 150 volt.	1.00
56	119022	Switch—push button	3.00
57	119024	Transformer—2nd I.F.	1.15
58	119042	Transformer—1st I.F.	1.10
59	119109	Ballast tube	.75
60A-60J	119662	Push button trimmer (Low 540 to 1000 KC)	.24
	119663	Push button trimmer (Med. 750 to 1375 KC	.24
	119664	Push button trimmer (High 980 to 1550 KC)	.24
61A-61B	119126	Trimmer condenser—2 section	.35
62	119946	Cabinet back & loop antenna assembly	1.40

03-6N and 03-6N-Z CHASSIS

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil, or using a .1 mfd. condenser in series connect between the 25L6GT tube plate and B— as shown on the voltage chart.
2. Connect the ground lead of the signal generator through a .25 mfd. condenser to B— as shown on the voltage chart.
3. Connect the loop antenna to the radio, being sure to connect the wires to the proper receptacles on the loop antenna as shown in drawing below.
4. With the gang condenser in full mesh, the pointer should be in a horizontal position. If it is not, it should be moved to this position before alignment.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Push Button Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Lug on Rear Section of Variable Condenser	455 KC	"Broadcast" Button Pushed In	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Aerial Terminal	6 MC	"Short Wave" Button Pushed In	6 MC	5	Short Wave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6 MC. with Trimmer Screw farther out. Recheck Image.
200 MMFD. Mica Condenser	External Aerial Terminal	6 MC	"Short Wave" Button Pushed In	Tune to 6 MC Generator Signal	6*	Short Wave Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	External Aerial Terminal	1500 KC	"Broadcast" Button Pushed In	1500 KC	7*	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	External Aerial Terminal	1500 KC	"Broadcast" Button Pushed In	Tune to 1500 KC Generator Signal	8*	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	External Aerial Terminal	600 KC	"Broadcast" Button Pushed In	Tune to 600 KC Generator Signal	9*	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

*NOTE: When making these adjustments, the loop should be in the same relative position to the chassis as when mounted in the cabinet. Adjustments 6 & 8 should be repeated after the set and loop have been replaced in the cabinet.

ALIGNMENT PROCEDURE FOR 11-7A CHASSIS

NOTE: This chassis may be completely aligned while in the cabinet.

1. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes through a .1 mfd. condenser.
2. Connect the ground lead of the signal generator to the receiver chassis. Turn the volume control to position of maximum volume and keep it in this position throughout the alignment procedure.
3. Connect the loop as shown in diagram on back page. The loop must remain in the circuit at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Gen. Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Section of Gang Cond Nearest the Dial Drum	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Orange and White Wire from Loop	16 MC	Short Wave	16 MC	5	Short Wave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Orange and White Wire from Loop	16 MC	Short Wave	Tune to 16 MC Generator Signal	6	Short Wave Antenna	Adjust for Maximum Output.
Chassis must be in cabinet before the following adjustments are made.							
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. Placed Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series Padder)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

CHASSIS 11-7A

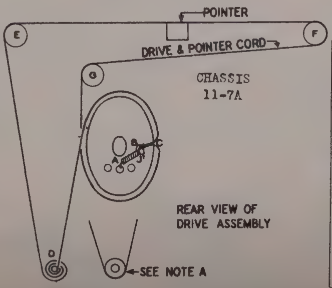
REPLACING DIAL AND POINTER DRIVE CORD

1. Hook a tension spring (Part No. 119823) through small hole at point A and fasten end of dial cord (Part No. 113178) to spring at point B.
2. Pass the other end of the dial cord through hole C in drum.
3. Make three and one half turns of the cord about tuning shaft D. (NOTE A: In some sets of this model there is a grommet (Part No. 113672) on the drive shaft. In this case the drive cord is simply passed under the grommet—approximately ½ turn.)
4. Continue cord around pulley E and thence to and around pulley F.
5. From Pulley F pass cord over pulley G and around drum in counter-clockwise direction (in reference to diagram) to hole C in drum.
6. Slip cord through loop at end of spring B, adjust tension until spring is stretched to approximately seven-eighths inch, and tie securely.

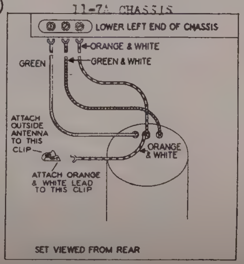
TO SET POINTER

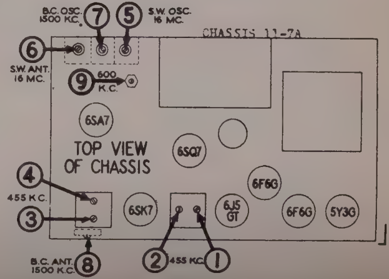
The pointer should be set to 540 K.C. on the dial scale when the tuning condenser is in full mesh. Cement pointer to cord at this point and allow to dry before moving.

REPLACING THE DRIVE CORD



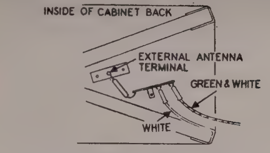
LOOP CONNECTIONS


11-7A CHASSIS
LOWER LEFT END OF CHASSIS
ORANGE & WHITE
GREEN
GREEN & WHITE
ATTACH OUTSIDE ANTENNA TO THIS CLIP
ORANGE & WHITE
ATTACH ORANGE & WHITE LEAD TO THIS CLIP
SET VIEWED FROM REAR

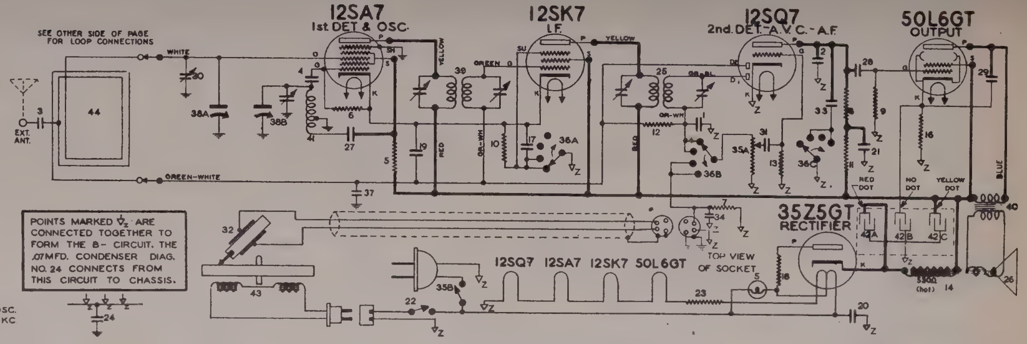


STEWART-WARNER CORP.

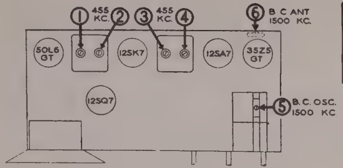
MODEL 11-5V9
Chassis 11-5V



LOOP CONNECTIONS



POINTS MARKED ∇_Z ARE CONNECTED TOGETHER TO FORM THE B- CIRCUIT. THE .07MFD. CONDENSER DIAG. NO. 24 CONNECTS FROM THIS CIRCUIT TO CHASSIS.



I.F. 455 KC

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil; or, using a condenser in series, connect between the plate of the 50L6GT output tube and B— as shown on the voltage chart. The more sensitive type should be connected across the voice coil.
2. Connect the ground lead of the signal generator to the B— lug (shown on the voltage chart) through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to use the series condenser may have serious results, as one side of the power line may be grounded in the signal generator, or hum may be encountered.
3. Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.
4. Set the Dial Pointer to last mark after 55 on the dial with the gang condenser in full mesh.
5. The loop must be connected at all times.

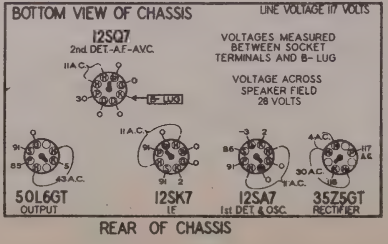
Dummy Ant. in Series with Signal Generator	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	White wire of Loop (loop must be connected)	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
No Connection	Place Lead from Signal Generator near Loop	1500 KC	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
No Connection	Place Lead from Signal Generator near Loop	1500 KC	Tune to 1500 KC Generator Signal	6*	Broadcast Antenna (Shunt)	Adjust for maximum output.

*Make adjustment of trimmer No. 6 with the chassis in the cabinet, and with the loop mounted to the cabinet by the top-center mounting screw. The loop and cabinet back may be tilted on this screw to permit reaching the trimmer.

ELECTRICAL PARTS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser mica 260 mmfd.	$0.20
3	83783	Condenser—mica 110 mmfd.	.20
4	85061	Condenser mica 51 mmfd.	.15
5	85296	Lamp dial 6 to 8 volt (Mazda 51)	.16
6	110552	Resistor carbon 47,000 ohms ¼ watt	.12
7	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
8 9	110559	Resistor -carbon 470,000 ohms ¼ watt	.12
10	110560	Resistor -carbon 100 ohms ¼ watt	.12
11	110564	Resistor -carbon 100,000 ohms ¼ watt	.12
12	110570	Resistor -carbon 2.2 meg. ¼ watt	.15
13	112975	Resistor carbon 10 meg. ¼ watt	.12
14	R-115102	Speaker dynamic (5")	$4.30
15	118803	Resistor 680 ohms ¼ watt	.12
16	116092	Resistor 140 ohms 1 watt W.W.	.15
17	116706	Condenser -.2 mfd. 600 volt	.35
18	116752	Resistor 33 ohms 1 watt wire wound	.15
19 to 21	116819	Condenser -.05 mfd. 600 volt	.20
22	116964	Switch - "on-off" for phono motor	.32
23	117395	Resistor -20 ohms 1 watt	.16
24	118487	Condenser-.07 mfd. 600 volts	.25
25	118903	Transformer -2nd I.F.	1.10
26	118999	Cone & Voice Coil for R-115102 speaker	1.70
27 to 29	119193	Condenser —.01 mfd. 600 volt	.15
30	119345	Condenser- trimmer	.20
31	119817	Condenser .004 mfd. 600 volt	.15
32	119864	Crystal cartridge with leads and needle screw	5.25
33-34	119875	Condenser .002 mfd. 600 volt	.15
35A-35B	119912	Volume control - 1 meg. (with switch)	1.40
36A-36B-36C	119921	Switch tone & phonograph (See table for switch positions)	1.00
37	119193	Condenser -.01 mfd. 600 volt	.15
38A-38B	119928	Condenser variable tuning	2.40
39	119935	Transformer - 1st I.F.	1.10
40	R-119944	Transformer output for R-115102 Speaker	1.60
41	119854	Coil oscillator	.36
42A-42B-42C	160012	Condenser - electrolytic, A 40 mfd.—200 volt; B 20 mfd. - 25 volt; C—20 mfd. 200 volt	1.15
43	160093	Phonograph motor 60 cycle (less turntable)	6.00
44	160140	Loop antenna & back (complete)	1.40



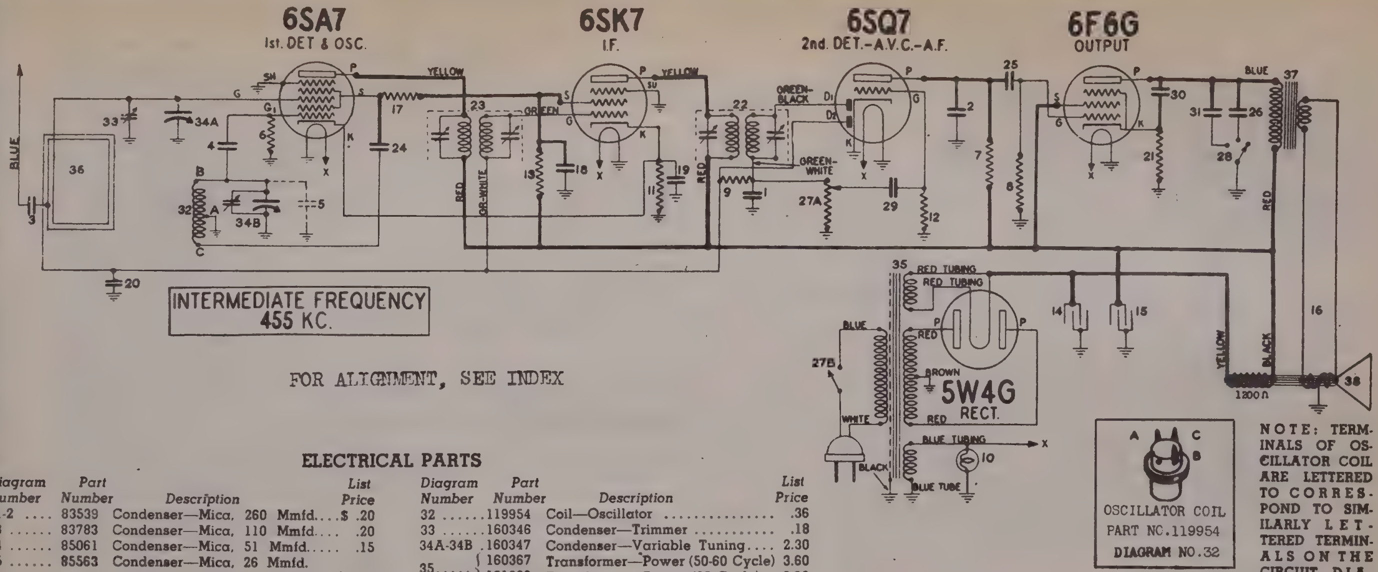
Use a Voltmeter of 1000 ohms per volt.

Sept.10,1940

CIRCUIT CHANGE--TOP OF PHONO PICK-UP SOCKET HAS ONE OF ITS TERMINALS CONNECTED DIRECTLY TO "Z" (B- return lead) AS SHOWN ABOVE. ON LATER PRODUCTION, A 220,000 ohm ¼ watt RESISTOR (carbon) is connected BETWEEN THIS SOCKET TERMINAL AND "Z".

MODELS 11-5W1 to 11-5W9
Chassis 11-5W

STEWART-WARNER CORP.



INTERMEDIATE FREQUENCY
455 KC.

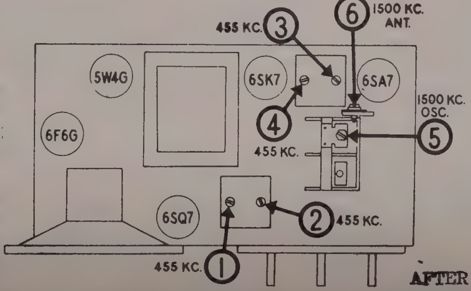
FOR ALIGNMENT, SEE INDEX

NOTE: TERMINALS OF OSCILLATOR COIL ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

ELECTRICAL PARTS

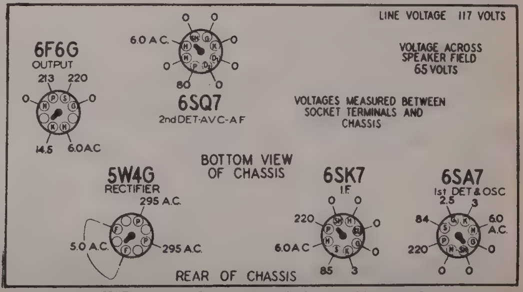
Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—Mica, 260 Mmfd.	$ .20
3	83783	Condenser—Mica, 110 Mmfd.	.20
4	85061	Condenser—Mica, 51 Mmfd.	.15
5	85563	Condenser—Mica, 26 Mmfd. (used only on some sets)	.15
6	110552	Resistor—Carbon, 47,000 Ohms, ¼ Watt	.12
7-8	110553	Resistor—Carbon, 220,000 Ohms, ¼ Watt	.12
9	110580	Resistor—Carbon 3.3 meg. ¼ W.	.12
10	110629	Dial Light—6.3 Volt (Mazda No. 44)	.15
11	112974	Resistor—Carbon—220 Ohms, ¼ Watt	.15
12	112975	Resistor—Carbon—10 Meg, ¼ W.	.12
13	112997	Resistor—Carbon—22,000 Ohms, 1 Watt	.15
14-15	114258	Condenser—Electrolytic—8 mfd., 450 Volt	.98
16	U-115114	Speaker—Dynamic (5")	4.50
17	116068	Resistor—680 Ohms, ¼ Watt	.12
18-19	116625	Condenser—.1 Mfd., 600 Volt	.25
20	116819	Condenser—.05 Mfd., 600 Volt	.20
21	116978	Resistor — 420 Ohm — ½ Watt Wire Wound	.15
22	119024	Transformer—2nd I. F.	1.15
23	119042	Transformer—1st I.F.	1.10
24-25-26	119193	Condenser—.01 Mfd., 600 Volt	.15
27A-27B	119629	Vol. Control—(1 meg.) & Switch	1.30
28	119630	Tone Switch	.65
29-30	119817	Condenser—.004 Mfd., 600 Volt	.15
31	119880	Condenser—.04 Mfd., 600 Volt	.20
32	119954	Coil—Oscillator	.36
33	160346	Condenser—Trimmer	.18
34A-34B	160347	Condenser—Variable Tuning	2.30
35	160367 161230	Transformer—Power (50-60 Cycle) Transformer—Power (25 Cycle)	3.60 3.90
36	160388	Loop Antenna (Complete)	.80
37	U-160458	Transformer—Output for U-115114 Speaker	1.50
38	U-160459	Cone & Voice Coil for U-115114 Speaker	1.5.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



SOCKET VOLTAGES

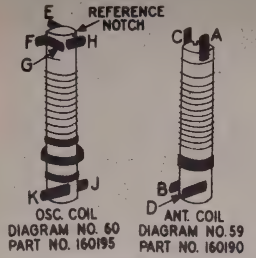
VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC



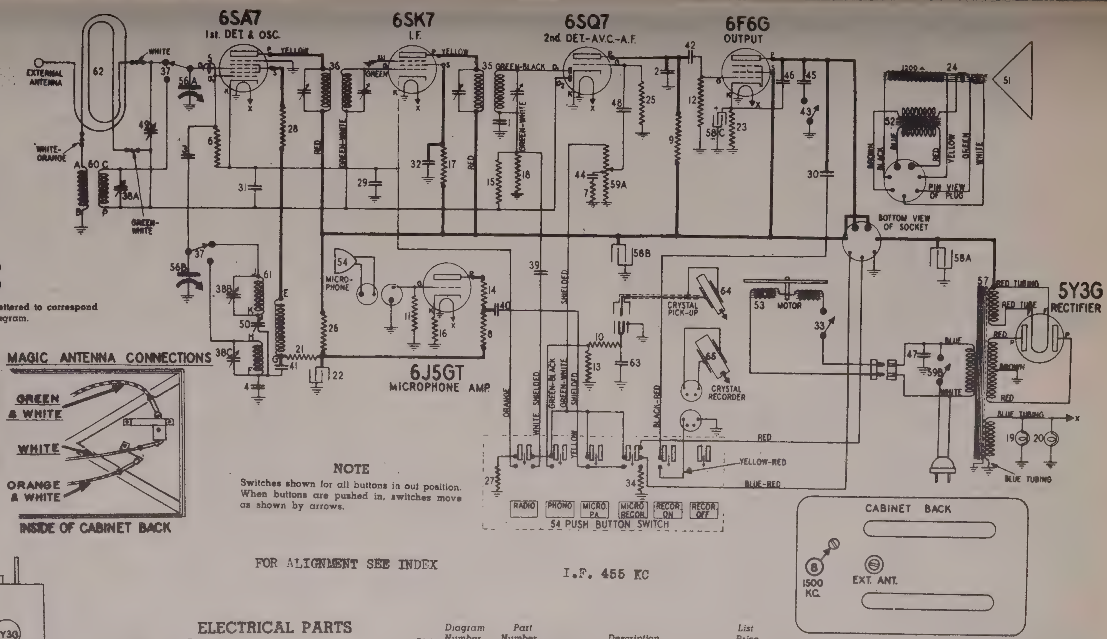
USE A 1000 OHM PER VOLT — VOLTMETER

AFTER ALIGNMENT— Replace the set in the cabinet and using a weak signal generator or station signal at 1500 KC., readjust trimmer No. 6.

STEWART-WARNER CORP. MODELS 11-6T1 to 11-6T9
11-6T1S to 11-6T9S
Chassis 11-6T,11-6TS



The terminals of the coils illustrated above are lettered to correspond to similarly lettered terminals on the circuit diagram.

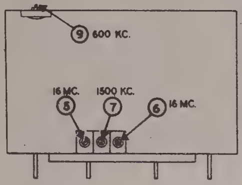


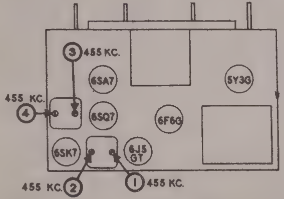
NOTE

Switches shown for all buttons in out position. When buttons are pushed in, switches move as shown by arrows.

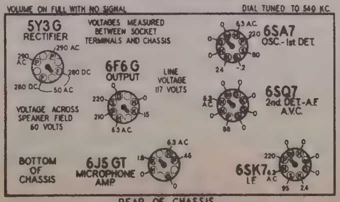
FOR ALIGNMENT SEE INDEX

I.F. 455 KC





SOCKET VOLTAGES



Use a high resistance voltmeter of 1000 ohms per volt.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3	88173	Condenser—mica 50 mmfd.	.20
4	88587	Condenser—mica .0042 mfd.	.35
5	110510	Condenser—wire 3 mmfd.	.12
6-7-8	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
9-10	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
11	110554	Resistor—carbon 1 megohm ¼ watt	.12
12	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
13	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
14	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
15	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
16	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
17	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
18	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
19-20	110629	Dial light—6.3 volt	.15
21	112952	Resistor—carbon 3,300 ohms ¼ watt	.10
22	114009	Condenser—electrolytic 4 mfd. 350 volt	.72
23	114335	Resistor—wire wound 430 ohms 2 watts	.20
24	U-115107	Speaker—dynamic 6"	6.10
25	116050	Resistor—insulated 10 meg. ¼ watt	.12
26	116055	Resistor—carbon 22,000 ohms ½ watt	.12
27-28	116062	Resistor—150 ohms ¼ watt	.12
29-30	116625	Condenser—.1 mfd. 600 volt	.25
31-32	116819	Condenser—.05 mfd. 600 volt	.20
33	116964	Switch—on-off for phono motor with escutcheon	.32
34	118819	Resistor—5 ohms 1 watt wire wound	.14
35	119024	Transformer—2nd I.F.	1.15
36	119042	Transformer—1st I.F.	1.10
37	119085	Range switch	.50
38A to 38C	119174	Condenser—trimmer—3 section	.45
39-40-41-42	119193	Condenser—.01 mfd. 600 volt	.15
43	119214	Switch—tone control	.48
44-45	119414	Condenser—.02 mfd. 600 volt	.15
46	119416	Condenser—.008 mfd. 600 volt	.15
47	119757	Condenser—(metal clad) .01 mfd. 600 volt	.20
48	119817	Condenser—.004 mfd. 600 volt	.15
49	119845	Condenser—trimmer (on loop)	.16
50	119934	Condenser—padder	.36
51	U-160028	Cone & voice coil for U-115107 speaker	1.60
52	U-160029	Transformer—output for U-115107 speaker	1.55
53	160036	Motor (less turntable)	8,00
54	160038	Microphone	12.50
55	160111	Push button switch	2.30
56A-56B	160170	Condenser—variable tuning	2.40
57	160172	Transformer—power (50-60 cycles)	4.20
58A to 58C	160174	Condenser—electrolytic Section A—20 mfd. 400 volt Section B—15 mfd. 400 volt Section C—10 mfd. 25 volt	1.30
59A-59B	160175	Volume control—1 meg. (with switch)	1.40
60	160190	Coil—antenna (S.W.)	.44
61	160195	Coil—oscillator	.75
62	160279	Loop antenna & cabinet back (complete) (Model 11-6T9)	1.40
	160783	Loop antenna & cabinet back (with trimmer) (Model 11-6T8)	1.40
63	160430	Condenser—.001 mfd. 600 volt	.15
64	161289	Crystal Pickup Cartridge	5.00
65	161288	Crystal Recorder Cartridge	9.50
	117117	Cable—motor	$0.38
	114955	Clamp—for dial cord	.01
	113019	Clip—dial scale retaining	.01
	117057	Cord—drive (supplied in 3 ft. lengths)	.15
	160200	Dial scale	.28
	119208	Escutcheon—dial	.80
	119167	Knob	.10
	119166	Knob—push button	.08
	117769	Name Plate (S.W.) (Model 11-6T8)	.07
	117779	Name Plate (Off-Vol.) (Model 11-6T8)	.05
	117780	Name Plate (Tuning) (Model 11-6T8)	.05
	161206	Name Plate (Tone) (Model 11-6T8)	.06
	161207	Name Plate (F-B) (Model 11-6T8)	.06
	160033	Needle cup	.08
	160127	Phonograph needles. Envelope of 10	.10
	116883	Pointer	.16
	81145	Retaining ring for drive shaft Per C	.50
	119218	Screw—escutcheon mounting	.02
	119204	Shaft—tuning	.10
	111008	Socket—dial lamp	.12
	160037	Socket—2 prong	.10
	160171	Socket—4 prong	.12
	160158	Socket—7 prong for speaker	.14
	119791	Socket—8 prong	.12
	114876	Socket—octal	.15
	160039	Socket for pick up	.08
	113177	Spring—dial cord tension	.09
	161245	Tabs & windows for recorder push buttons	.10
	111456	Washer—spring washer Per C	.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 11-6T1 to 11-6T9
11-6T1S to 11-6T9S
Chassis 11-6T,11-6TS

STEWART-WARNER CORP.

MODELS 11-9B1 to 11-9B9
11-9B1-Z to 11-9B-Z
Chassis 11-9B.11-9B-Z

ALIGNMENT PROCEDURE FOR 11-9B & 11-9B-Z CHASSIS

1. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis and change the black wire from the outer to the inner clip on top of the loop drum.
3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
4. Push in the Manual button and keep it pushed in.
5. The loop must be connected as indicated in circuit diagram at all times.
6. With some signal generators, it may be found that the signal cannot be reduced to a useable value using the dummy antennas recommended below. On the Short Wave and Intermediate positions the shield wire (black) may be disconnected from its jack and the output of the signal generator connected to the black wire terminal through a 400 ohm resistor.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Front Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
No Connection	Place Lead from Signal Generator Near Loop	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
No Connection	Place Lead from Signal Generator Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	6*	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Generator Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	7*	Broadcast Oscillator (Series Padder)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Clip on Side of Loop Drum	5 MC	Intermediate	5 MC	8	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 4.1 MC. If Image does not appear, Realign at 5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Clip on Side of Loop Drum	5 MC	Intermediate	Tune to 5 MC Generator Signal	9	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Clip on Side of Loop Drum	16 MC	Foreign	16 MC	10	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Clip on Side of Loop Drum	16 MC	Foreign	Tune to 16 MC Generator Signal	11	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

*Realign trimmer No. 6 on 1500 KC, and trimmer No. 7 on 600 KC, after set is in cabinet.

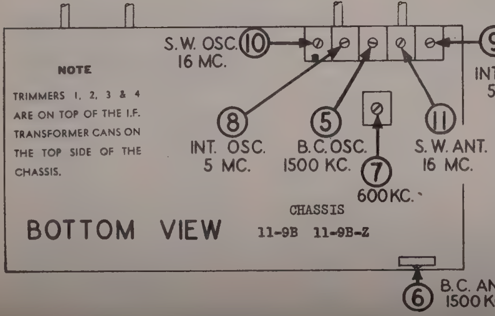
ALIGNMENT PROCEDURE FOR 11-6T & 11-6T-S CHASSIS

IMPORTANT:

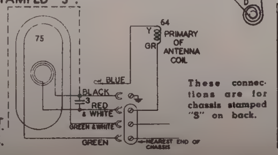
1. The loop must be connected to the receiver at all times.
2. Push in button marked "Radio."
3. Connect an output meter to the receiver. Connect the ground lead of the signal generator to the receiver chassis.
4. With gang condenser in full mesh, set the dial pointer so that its position is horizontal.
5. Turn the volume control to maximum and keep it in this position throughout the alignment procedure.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Gen. Output to Receiver	Sig. Gen. Frequency	Band Switch Position	Receiver Dial Setting	Trimmer No.	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Stator Lug on Rear Section of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
No Connection	Disconnect Signal Generator Leads from Set and Place Near Loop	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear, re-align at 16 MC with trimmer screw farther out.
No Connection	Disconnect Signal Generator Leads from Set and Place Near Loop	16 MC	Foreign	Tune to 16 MC. Gen. Signal	6	Foreign Antenna	Adjust for maximum output. Try to increase output by de-tuning trimmer and re-tuning receiver dial.
200 MMFD Mica Condenser	Antenna Terminal on Loop	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal on Loop	1500 KC	Broadcast	Tune to 1500 KC Gen. Signal	8	Broadcast Antenna	Place loop antenna in same position relative to chassis as it occupies when in cabinet. Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal on Loop	600 KC	Broadcast	Tune to 600 KC Gen. Signal	9	Broadcast Oscillator Series Padder	Adjust for maximum output. Try to increase output by de-tuning trimmer and re-tuning receiver dial until maximum output is obtained.

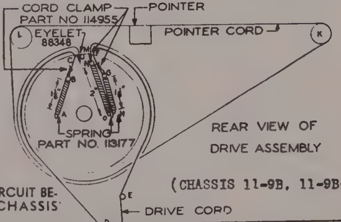
Install speaker, chassis and loop in the cabinet, then repeat adjustment of trimmers 8 and 9.



LOOP CONNECTION CIRCUIT BELOW APPLIES TO CHASSIS STAMPED "S".

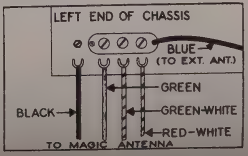


These connections are for chassis stamped "S" on back.

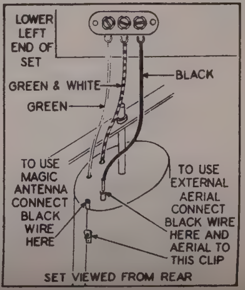


REAR VIEW OF DRIVE ASSEMBLY

(CHASSIS 11-9B, 11-9B-Z)



CHASSIS 11-9B,11-9B-Z CONNECTIONS SHOWN BELOW APPLY TO THE CHASSIS NOT STAMPED WITH A LETTER ON THE BACK


LOWER LEFT END OF SET
GREEN & WHITE
GREEN
BLACK
TO USE MAGIC ANTENNA CONNECT BLACK WIRE HERE
TO USE EXTERNAL AERIAL CONNECT BLACK WIRE HERE AND AERIAL TO THIS CLIP
SET VIEWED FROM REAR

RECORDER SERVICE DATA

PUSH BUTTONS

The six push buttons shown on this circuit control the various functions of this receiver. The **"RADIO," "PHONO," "MICRO.-P.A."** and **"MICRO.-RECOR."** buttons are mechanically interconnected so that when any one of them is pushed in, it releases any of the other three buttons which was pushed in.

The **"RECOR. ON"** and **"RECOR. OFF"** buttons are mechanically coupled to each other, but are independent of the other four buttons. Pushing in the "RECOR. ON" button releases the "RECOR. OFF" button, and vice versa.

ACTION OF VARIOUS PUSH BUTTONS

RADIO—Button in: Cathode circuits of 6SA7 and 6SK7 completed to ground through resistor No. 27. Volume control connected across diode load resistor No. 18.

Button out: 6SA7 and 6SK7 Cathode circuits opened. Volume control disconnected from diode load resistor No. 18.

PHONO—Button in: Output of crystal pick-up connected across Volume Control.

Button out: Crystal pick-up disconnected from Volume Control.

MICRO-P.A.—Button in: Output of microphone amplifier connected across volume control. Loudspeaker connected to reproduce sound.

Button out: Output of microphone amplifier disconnected from Volume Control.

MICRO-RECOR.—Button in: Microphone amplifier connected as under "MICRO-P.A." In addition speaker is silenced by disconnecting the voice coil and connecting the output transformer secondary to resistor No. 34. This prevents acoustical feed-back from speaker to microphone when recording.

Button out: Microphone amplifier disconnected from volume control. Voice coil of speaker connected to output transformer secondary.

RECOR-ON—Button in: This button connects the crystal recorder to the output of the receiver.

Button out: Crystal recorder disconnected from receiver output.

RECOR.-OFF—Button in: This releases "RECOR.-ON" button, as it is mechanically coupled to it.

Button out: This indicates "RECOR.-ON" button has been pushed in, thus connecting the recorder to the set's output stage. The "RECOR.-ON" and "RECOR.-OFF" buttons operate independently of the four buttons described previously.

GENERAL RECORDER TROUBLE DATA

For complete recording mechanism service data, refer to the separate Recorder Service Manual, Form No. 9948, which will be published later. The receiver instructions, Form 9741, give complete data for the use of this recorder.

IMPORTANT: It is essential that the recorder be placed on a level surface when making recordings. If the recorder does not stand in a level position, it will change the effective pressure of the cutting head and proper results cannot be obtained.

ADJUSTMENT OF CUTTING HEAD

Before attempting any adjustments of the cutting head, first make certain that such adjustments are required. It is advisable to try a new cutting needle, or one known to be in perfect condition. Also the serviceman should have available a record blank of known quality. If a cutting head is suspected of being out of adjustment, make a test recording, using the new needle.

DEFECTIVE CUTTING NEEDLE

A cutting needle is considered worn when the background hiss becomes objectionable, or when the thread cut from the record becomes ragged. A dull needle may also cause the depth of cut to be incorrect.

The condition of the cutting needle can be determined by examining the point by means of a powerful magnifying glass or low power microscope, and comparing it with a good needle viewed in a similar manner. Another good check on the condition of the cutting needle is the appearance of a freshly cut record. If the record has a dull or grayish appearance instead of its usual shiny appearance, the needle should be replaced.

ADJUSTING THICKNESS OF SHAVING

The proper thickness of the shaving produced when a record is cut is about the thickness of a human hair. If the cutting needle is sharp and in good condition, and the cutting head adjusted to give the correct depth of cut, the shaving should come off as a long continuous ribbon. With some types of recording blanks, the ribbon cut by the cutting needle will come off as a straight band, while with others it may produce a curly thread. This ribbon should not, however, be too fine or extremely crinkly as this indicates a dull cutting needle or insufficient pressure of the recording head.

When the cutting head is placed on a record blank, the needle locking screw should be halfway between the top and bottom of the hole in the head. The position of the cutting needle screw may be changed by raising the cutter arm and adjusting the screw and locknut under this arm. Turning this screw clockwise will raise the stylus screw—counter clockwise rotation will lower it.

The depth of cut can be varied by means of the adjusting screw on the recorder arm. This screw is located on top of the arm and is readily accessible for adjustment. Turning this screw clockwise increases the thickness of the shaving, while turning it counter-clockwise decreases the thickness. However, if the cutting needle is dull or damaged, turning this adjusting screw will have very little effect on the depth of cut.

The proper depth of cut may be determined by cutting several grooves with no voltage impressed on the cutter head (RECOR.-OFF button pushed in). Then examine these blank grooves by reflecting light from the record and viewing the grooves through a low-power microscope. The width of the space between the grooves should be slightly less than the width of the grooves.

PROPER RECORDING LEVEL

When recording, the volume control should be adjusted to a setting somewhat higher than that required for good room volume, but below the point of overloading and distortion. If too high a volume level is used, an echo may be heard when playing back or "overcutting" of the grooves may result—that is, on loud passages one groove may actually cut into the adjacent groove, causing distortion when the record is being played. If this occurs the volume control setting should be decreased while recording, until the recorded level is normal.

On the other hand, if the level of the program being recorded is too low, it will necessitate increasing the volume control setting when playing back the recording, and the hiss and background noise will be excessive.

RECORDER HEAD INOPERATIVE

A quick check of the recorder head can be made by pushing in the "RECOR.-ON" button and the "RADIO" button and then tuning in a station. If the recorder is operating, this fact is easily determined by holding the cutting stylus of the cutter between the thumb and forefinger. Vibration of this stylus indicates that the cutter head is in operating condition.

If the recorder does not operate, check first to determine if an A.C. voltage exists across the terminals of the recorder socket. This can best be measured using the 0-150 volt scale of a rectifier type A.C. Voltmeter. With proper recording volume the peaks of the voltage appearing across these terminals should be 80 to 120 volts. If no voltage exists under these conditions, check the contacts of the "RECOR.-ON" switch, and the condenser No. 30 coupling the recorder to the 6F6G plate. If these circuits are found to be all right check the recorder crystal cartridge and replace if necessary.

CORRECT NEEDLE ANGLE

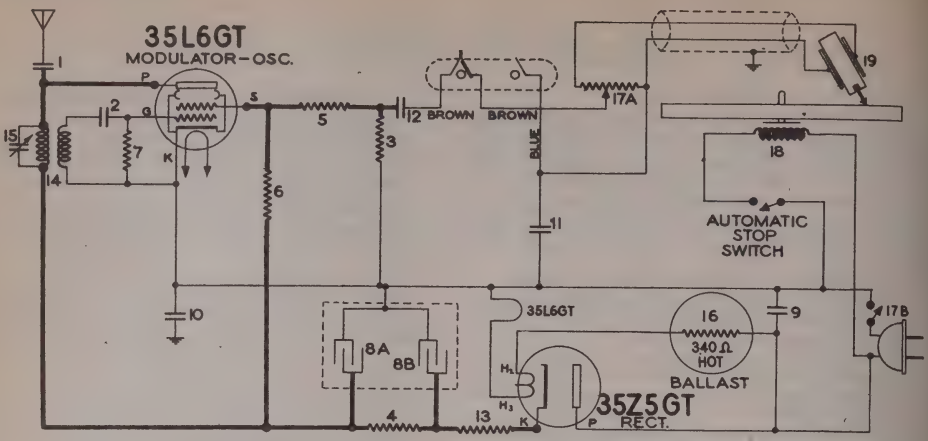
When making a recording, the cutting needle should be set at such an angle that the thread cut from the record will be thrown toward the center of the record. Otherwise the thread may be caught under the cutting needle, causing it to cut the grooves improperly.

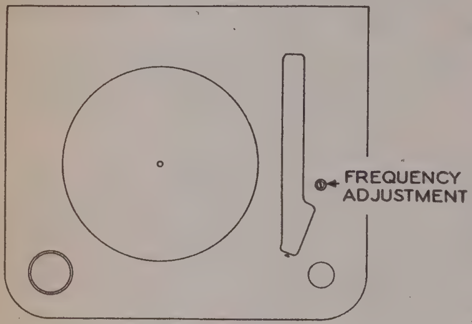
If the thread is not thrown toward the center of the record, loosen the thumb screw holding the recording needle in the cutter head, then retightening it again. This will generally change the angle of the needle slightly, causing the thread to wind about the center pin of the turntable.

CAUTION: Never use thorn, cactus or wooden playback needles on home recordings. Their friction coefficient is high, and they score the grooves.

MODEL 11-2A1 Chassis 11-2A
Wireless Record-Player
Chassis 11-2A

STEWART-WARNER CORP.





ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica, 260 mmfd.	$0.20
2	83783	Condenser—mica, 110 mmfd.	.20
3	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
4	110569	Resistor—carbon 10,000 ohms ¼ watt	.12
5	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
6	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
7	116051	Resistor—insulated 33,000 ohms ¼ watt	.15
8A-8B	116470	Condenser—electrolytic 20-20 mfd. 150 volt	.95
9-10	116625	Condenser—.1 mfd. 600 volt	.25
11-12	116819	Condenser—.05 mfd. 600 volt	.20
13	118823	Resistor—1000 ohms 1 watt Wire Wound	.15
14	160499	Coil—oscillator	.26
15	160501	Condenser—tuning	.22
16	160540	Ballast tube	.60
17A-17B	160576	Volume control—250,000 ohms with switch	1.45
18	160603	Motor—less turntable	5.65
19	160617	Crystal cartridge	4.50

ADJUSTMENTS

Set the receiver that is to be used with this record player to some frequency between 540 and 750 KC. Choose a frequency that is clear and free from interfering stations. Keep in mind the fact that strong signals may be present at night where there are no signals in the daytime. Remove the plug near the volume control on top of the record player. Using an insulated screwdriver turn the screw, located beneath this plug, until the signal from the record player is heard in the receiver. This will be heard as a reduction in noise as the signal comes in tune with the receiver. If a record is being played, the music or sound from it may be tuned in. If it is desired to change the frequency, set the receiver to the new frequency and turn the screw until the signal is heard. Turning the adjusting screw clockwise increases the frequency and turning it counter-clockwise lowers the frequency.

When the record player is located at some distance from the receiver, or under conditions when the signal from it is too weak, the coil of wire from the record player should be uncoiled enough to give a satisfactory signal. Under no conditions should more wire be uncoiled than is necessary for a reasonably strong signal in the receiver.

TO REMOVE THE CHASSIS

1. Unsolder the shielded pickup lead from the chassis.
2. Unsolder the two brown leads from the microphone input jack and the black lead from the volume control.
3. Remove the two nuts holding the chassis to the cabinet.
4. Remove the strap holding the power cord.
5. The chassis may now be turned for inspection or repair.

HOWLS OR SQUEALS

Howls or squeals from this unit may be caused by the following:

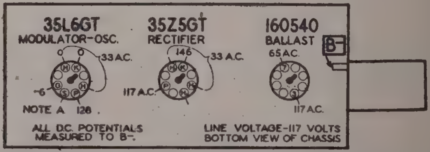
1. Interference caused by choosing a frequency which is not clear. To remedy, change the record player frequency to one where there is no interference.
2. Too weak a signal permitting interference from a weak station. To remedy, uncoil some of the wire from the coil under the record player, or move the record player nearer the set.
3. Too strong a signal permitting vibration from the speaker to cause microphonics. (The record player and receiver are in this case usually very close together.) To remedy, place the record player on another support or mount it on sponge rubber. Coiling up the wire coming from the chassis may help if the signal is too strong.

MISCELLANEOUS PARTS

Part Number	Description	List Price
119619	Automatic stop for phonograph	$1.70
116467	Base for mtg. electrolytic condenser	.04
112798	Clip—for mtg. oscillator coil	.01
160617	Crystal cartridge	4.50
160588	Escutcheon plate & terminal strip	.32
161104	Idler wheel with rubber rim	1.00
160219	Knob—push on	.06
160033	Needle cup	.08
160575	Phono pickup arm complete	6.25
113463	Rubber bushing—motor mtg.	.03
119791	Socket—8 prong	.12
114876	Socket—octal base	.15
119729	Turntable—9"	1.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SOCKET VOLTAGES



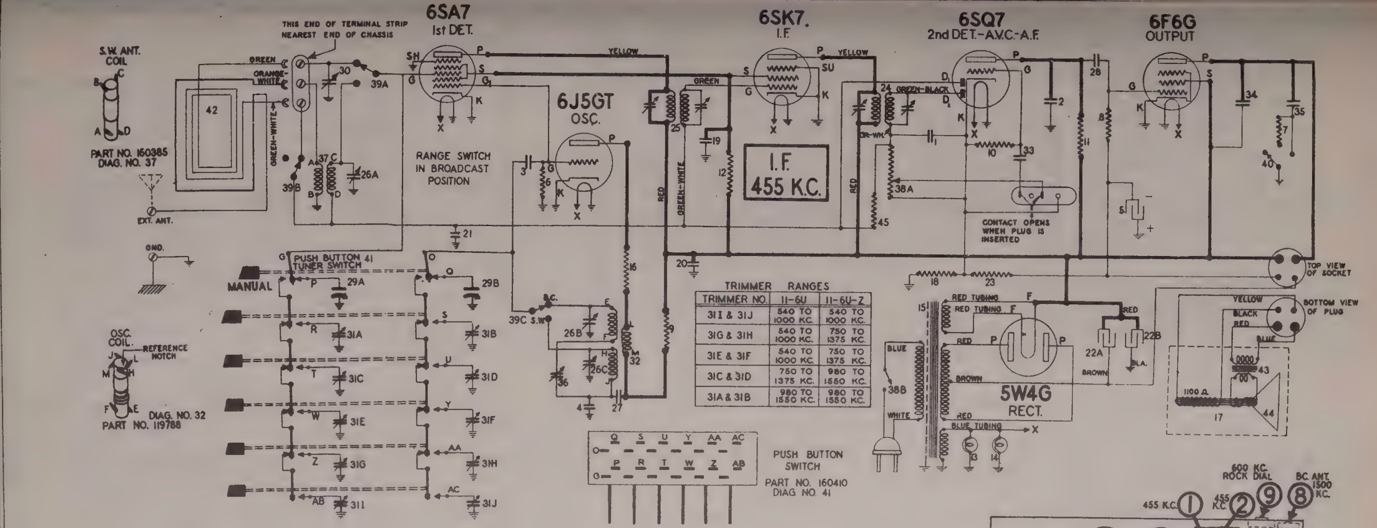
NOTE A: Voltage on the screen of the 35L6GT cannot be measured with the ordinary voltmeter because of the high resistance of resistor No. 6.

Use a voltmeter of at least 1000 ohms per volt.

STEWART-WARNER CORP.

MODELS 11-6U1 to 11-6U9
11-6U1-Z to 11-6U9-Z

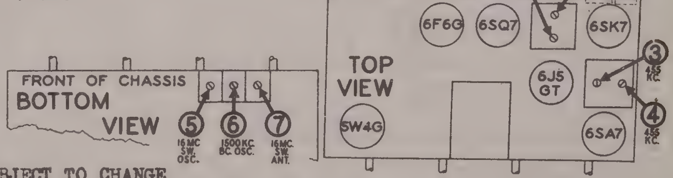
Chassis 11-6U,11-6U-Z



TRIMMER RANGES

TRIMMER NO.	11-6U	11-6U-Z
31I & 31J	540 TO 1000 KC.	540 TO 1000 KC.
31G & 31H	540 TO 1000 KC.	750 TO 1375 KC.
31E & 31F	540 TO 1000 KC.	750 TO 1375 KC.
31C & 31D	750 TO 1375 KC.	980 TO 1550 KC.
31A & 31B	980 TO 1550 KC.	980 TO 1550 KC.

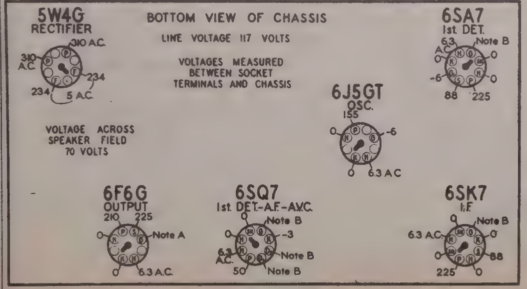
FOR ALIGNMENT, DRIVE CORD DATA, SEE INDEX



SOCKET VOLTAGES

VOLUME ON FULL WITH NO SIGNAL

DIAL TUNED TO 540 KC.



REAR OF CHASSIS

NOTE A: Bias for the 6F6G output tube is 14 volts measured across resistors 18 and 23.

NOTE B: Bias for the 6SA7 1st selector, and 6SK7 I. F. tubes and the voltage appearing on the diodes and grid of the 6SQ7 is 3 volts measured across resistor No. 18.

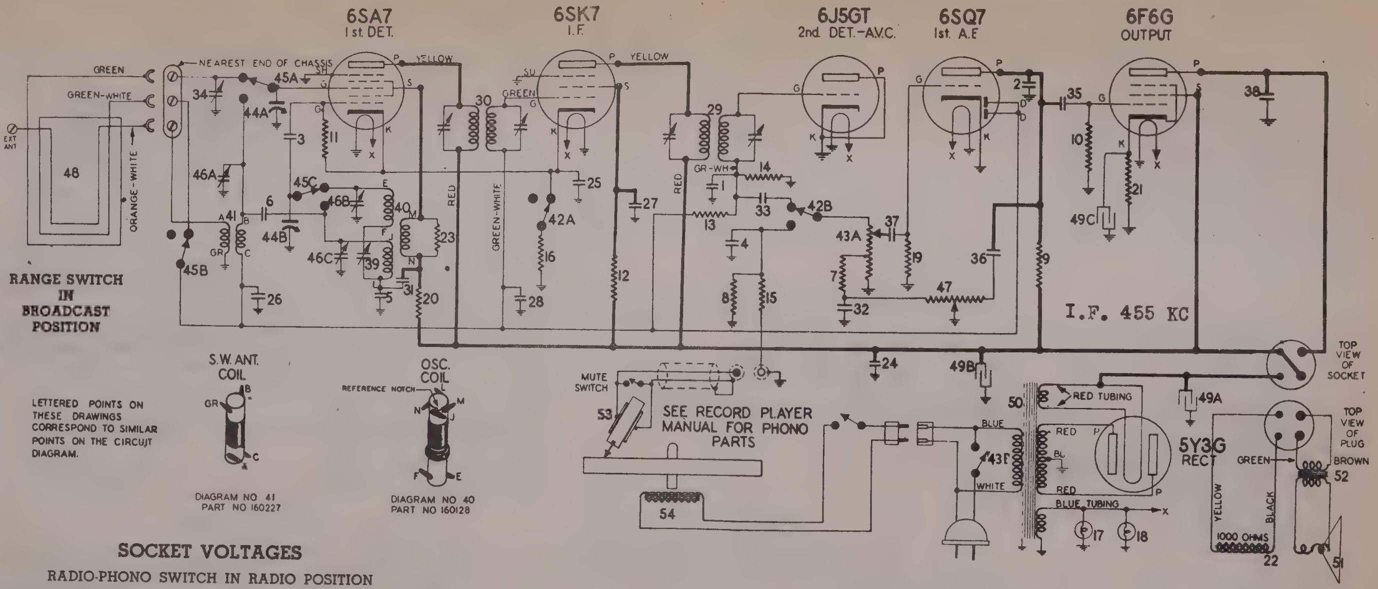
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3	85061	Condenser—mica 51 mmfd.	.15
4	88587	Condenser—mica .0042 mfd.	.35
5	110377	Condenser—electrolytic 10 mfd. 35 volt	.80
6	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
7	110557	Resistor—carbon 4,700 ohms ¼ watt	.12
8	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
9	110576	Resistor—carbon 10,000 ohms ½ watt	.12
10	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
11	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
12	110592	Resistor—carbon 22,000 ohms 1 watt	.12
13-14	112636	Lamp—dial (frosted) 6-8 volt .25 amp.	.25
15	112887	Transformer—power 117 volt 60 cycle	3.50
	112836	Transformer—power 117 volt 25 cycle	5.00
16	112994	Resistor—carbon 220 ohm ¼ watt	.16
17	M-115115	Speaker—dynamic—8"	6.80
18	116275	Resistor—wire wound 50 ohms ½ watt	.15
19-20	116625	Condenser—.1 mfd. 600 volt	.25
21	116819	Condenser—.05 mfd. 600 volt	.20
22A 22B	117034	Condenser (Electrolytic) 15 mfd. 450 volt 10 mfd. 450 volt	1.45
23	118812	Resistor 180 ohms 1 watt wire wound	.12
24	119024	Transformer—2nd I. F.	1.15
25	119042	Transformer—1st I. F.	1.10
26A to 26C	119174	Condenser—trimmer (3 section)	.45
27-28	119193	Condenser—.01 mfd. 600 volt	.15
29A-29B	119291	Condenser—variable tuning	2.75
30	119345	Condenser—trimmer	.20
31A to 31J	119663	Condenser—P. B. trimmers (med. freq.)	.24
	119664	Condenser—P. B. trimmers (high freq.)	.24
	119753	Condenser—P. B. trimmers (low freq.)	.24
32	119788	Coil—oscillator	.85
33-34	119817	Condenser—.004 mfd. 600 volt	.15
35	119880	Condenser—.04 mfd. 600 volt	.20
36	119934	Condenser—padder	.36
37	160385	Coil—short wave antenna	.60
38A-38B	160407	Volume control—with switch	1.40
39A to 39C	160408	Switch—range	.76
40	160409	Switch—tone	.60
41	160410	Switch—push button	2.50
42	160454	Loop antenna—complete	1.60
43	M-160618	Transformer—output for M-115115 spkr.	1.50
44	M-160619	Cone & Voice coil for M-115115 spkr.	1.25
45	110580	Resistor carbon 3.3 meg. ¼ watt	.12

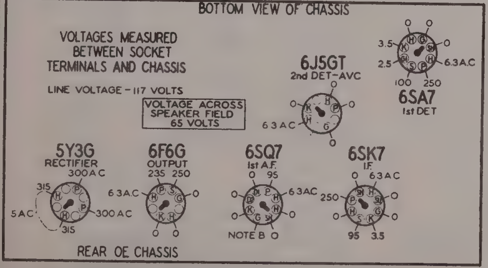
MODELS 11-6V1 to 11-6V9
Chassis 11-6V

STEWART-WARNER CORP.



SOCKET VOLTAGES

RADIO-PHONO SWITCH IN RADIO POSITION
VOLUME ON FULL WITH NO SIGNAL   DIAL TUNED TO 540 KC



USE A 1000 OHM PER VOLT — VOLTMETER

NOTE B: The bias for 6SQ7 grid, provided by resistor No. 19, can not be measured with any ordinary instrument.

FOR ALIGNMENT, TRIMMER LOCATIONS, DIAL DRIVE, SEE INDEX

ELECTRICAL PARTS

Diagram No.	Part No.	Description	List Price
1-2	83783	Condenser—mica 110 mmfd.	$ .20
3	85061	Condenser—mica 51 mmfd.	.15
4	85394	Condenser—mica 510 mmfd.	.25
5	88587	Condenser—mica .0042 mfd.	.35
6	161315	Condenser—wire 5 mmfd.	.18
7	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
8-9	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
10	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
11-12	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
13	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
14-15	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
16	110590	Resistor—carbon 180 ohms ¼ watt	.12
17-18	110629	Dial Light Bulb—6.3 volt (Mazda No. 44)	.15
19	112975	Resistor—carbon 10 meg. ¼ watt	.12
20	112997	Resistor—carbon 22,000 ohms 1 watt	.15
21	114335	Resistor—wire wound 430 ohms 2 watts	.20
22	M-115112	Speaker—dynamic (10")	8.20
23	116068	Resistor—680 ohms ¼ watt	.10
24	116625	Condenser—.1 mfd. 600 volt	.25
25	116706	Condenser—.2 mfd. 600 volt	.35
26 to 28	116819	Condenser—.05 mfd. 600 volt	.20
29	119024	Transformer—2nd I.F.	1.15
30	119042	Transformer—1st I.F.	1.10
31-32-33	119193	Condenser—.01 mfd. 600 volt	.15
34	119345	Condenser—trimmer	.20
35	119414	Condenser—.02 mfd. 600 volt	.15
36	119417	Condenser—.006 mfd. 600 volt	.15
37	119817	Condenser—.004 mfd. 600 volt	.15
38	119875	Condenser—.002 mfd. 600 volt	.15
39	119934	Condenser—padder	.36
40	160128	Coil—oscillator	.70
41	160227	Coil—S. W. antenna	.58
42A-42B	160237	Switch—"Radio-Phono"	.60
43A-43B	160238	Volume control—1 meg. (with switch)	1.40
44A-44B	160247	Condenser—tuning—complete with P. B. tuner	5.15
45A to 45C	160334	Range switch	.70
46A to 46C	160344	Condenser—trimmer (3 section)	.45
47	160361	Tone control—1 meg.	.95
48	161189	Loop antenna complete	1.70
49A to 49C	161193	Condenser—electrolytic A-20 mfd.—450 volt B-15 mfd.—450 volt C-10 mfd.— 25 volt	1.60
50	161200	Transformer—power (50-60 cycles)	4.20
51	M-161214	Cone & Voice coil for M-115112 speaker	1.80
52	M-161215	Transformer—output for M-115112 speaker	1.60
53	161289	Crystal cartridge	5.00
54	160086	Motor (60 cycle)	6.95

ALIGNMENT PROCEDURE

CHASSIS 15-5Y

1. Connect the output meter across the voice coil of the speaker between the plate of the 3Q5GT output tube and chassis through a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis through a .25 mfd. condenser.
3. The set can be aligned either using battery or power line operation.
4. Turn the volume control to the maximum volume position and keep it in this position while aligning. The cabinet back must be connected as shown in the figure below.
5. With the gang condenser in full mesh, the dial pointer should point to the last mark on the low frequency end of the dial scale. If the pointer is incorrectly set, hold the gang in full mesh and move the pointer to the correct position by hand.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Condenser	Lug on Front Section of Gang Condenser	455 KC.	Any Point Where It Does Not Affect Signal	1*	2nd I.F.	Adjust the screws on the top of each I.F. can for maximum output. Then repeat adjustment.
				2-3	1st I.F.	
200 MMFD. Condenser	"A" Terminal	1500 KC.	1500 KC	4 (On rear section of variable condenser)	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Condenser	"A" Terminal	1500 KC.	Tune To 1500 KC Generator Signal	5 (Located on cabinet back)	Broadcast Antenna	Adjust for maximum output.

Now disconnect the output meter and signal generator leads and replace the chassis and batteries in the cabinet being sure to connect the loop. Bring the antenna lead of the signal generator near the loop until the 1500 KC. signal is heard weakly and readjust trimmer No. 5 for maximum output by ear.

ALIGNMENT PROCEDURE FOR 11-6U and 11-6U-Z CHASSIS
RECEIVER MODELS 11-6U1 to 11-6U9 and 11-6U1-Z to 11-6U9-Z

1. Connect the ground lead of the signal generator to the chassis.
2. Turn the volume control to maximum volume during entire alignment.
3. Set the pointer to last mark on low frequency end of dial with gang in full mesh.
4. Connect an output meter to read audio output.

Dummy Ant. in Series with Sig Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Rear Lug of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
400 OHM Carbon Resistor	External Antenna Terminal	16 MC	Foreign	16 MC	5	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear realign at 16 MC. with trimmer screw farther out. Recheck image.
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for maximum output.
400 OHM Carbon Resistor	External Antenna Terminal	16 MC	Foreign	Tune to 16 MC Generator Signal	7	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	8*	Broadcast Antenna	PLACE CHASSIS IN CABINET BEFORE MAKING ADUSTMENTS No. 8 & 9. Adjust for maximum output.
No Connection	Lead from Sig. Gen. Placed Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	9*	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

*NOTE: Chassis must be in cabinet when making adjustments 8 & 9.,

ALIGNMENT PROCEDURE FOR 11-6V CHASSIS

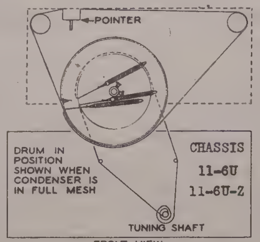
NOTE: THIS SET MAY BE COMPLETELY ALIGNED WITHOUT REMOVING FROM THE CABINET.

1. Connect the loop as indicated in the circuit diagram and keep it in the circuit at all times.
2. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to ground through a .1 mfd. condenser. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn volume control to the maximum position and keep it in this position throughout alignment procedure.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Section of Gang Cond. Nearest Drum	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 Ohm Carbon Resistor	Screw on Side of Loop Antenna	16 MC	Short Wave	16 MC	5	Short Wave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 Ohm Carbon Resistor	Screw on Side of Loop Antenna	16 MC	Short Wave	Tune to 16 MC Generator Signal	6	Short Wave Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Screw on Side of Loop Antenna	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	Screw on Side of Loop Antenna	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	8*	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Screw on Side of Loop Antenna	600 KC	Broadcast	Tune to 600 KC Generator Signal	9*	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

*NOTE: ADJUSTMENTS No. 8 AND No. 9 MUST BE MADE WITH THE SET IN THE CABINET AND WITH LOOP LEADS IN THEIR FINAL POSITION.

REPLACING THE DIAL CORDS

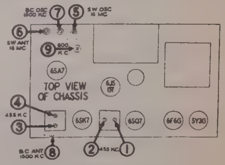


FRONT VIEW

The set-screws holding the drum may be loosened so that the most convenient positions for stringing the cords may be found, since it will be necessary to turn the drum on the condenser shaft in order to reach the tabs.

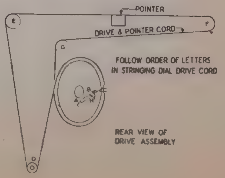
A pair of long-nosed pliers is useful for attaching the springs.

If the dial scale is to be replaced, it will be found that there is a notch in the metal dial plate behind it, permitting easy access to the drive mechanism.



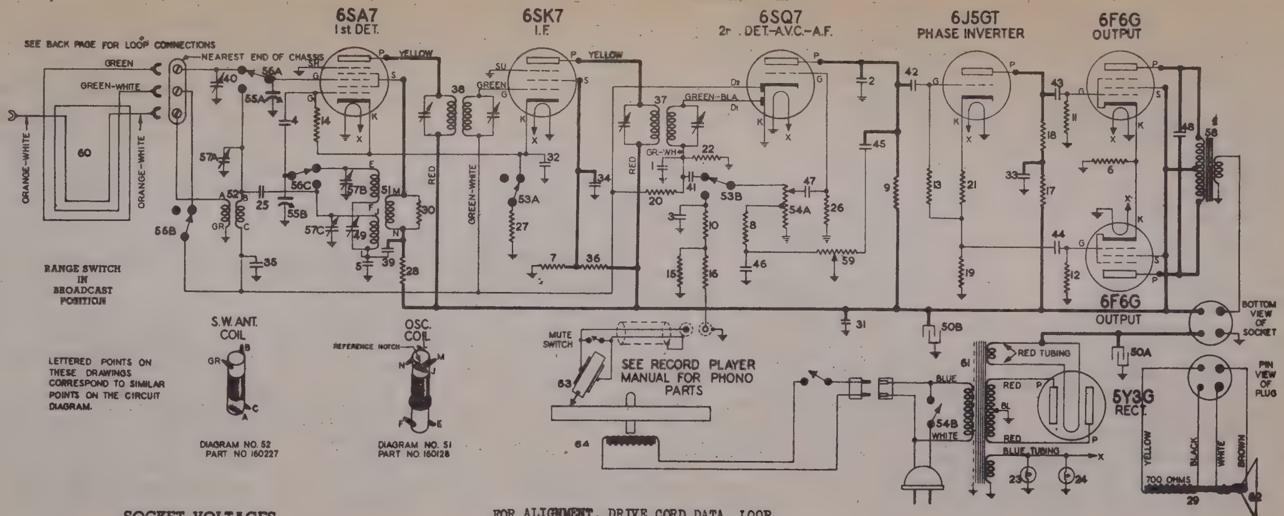
CHASSIS 11-6V

DIAL DRIVE ASSEMBLY


POINTER
E
F
DRIVE & POINTER CORD
G
FOLLOW ORDER OF LETTERS IN STRINGING DIAL DRIVE CORD
A
B
C
H
REAR VIEW OF DRIVE ASSEMBLY
D

MODELS 11-7A1 to 11-7A9
Chassis 11-7A

STEWART-WARNER CORP.



FOR ALIGNMENT, DRIVE CORD DATA, LOOP CONNECTIONS AND TRIMMER LOCATIONS, SEE INDEX

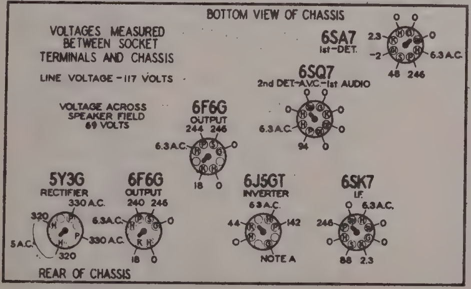
I.F. 455 KC

SOCKET VOLTAGES

RADIO-PHONO SWITCH IN RADIO POSITION.

VOLUME ON FULL WITH NO SIGNAL

DIAL TUNED TO 540 K.C.



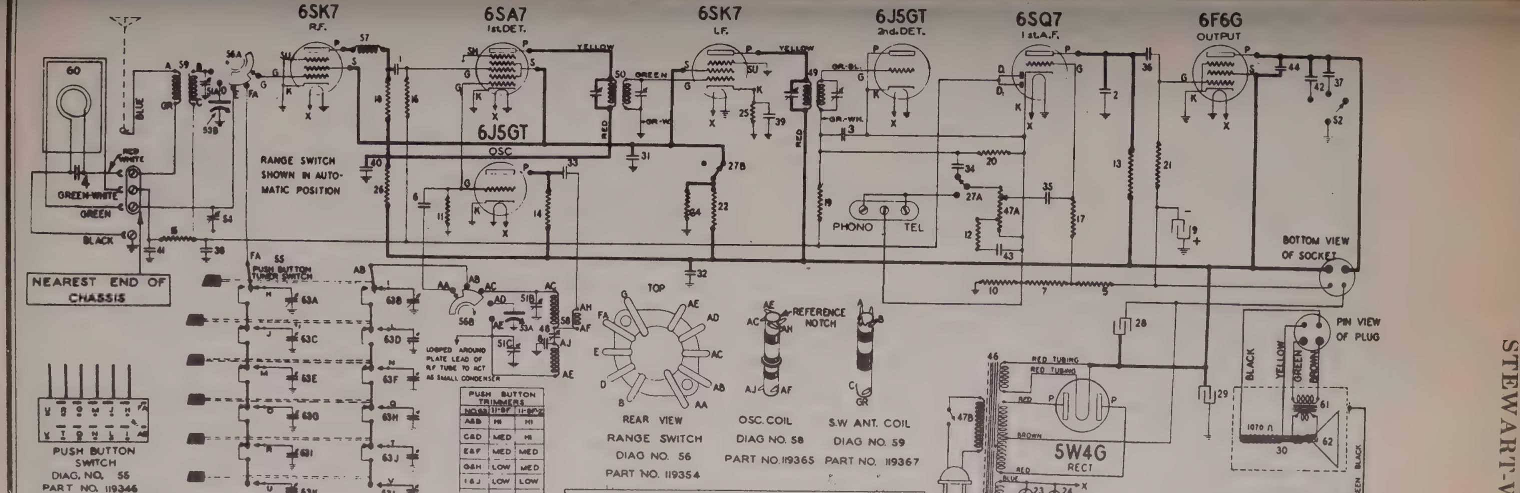
USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT.

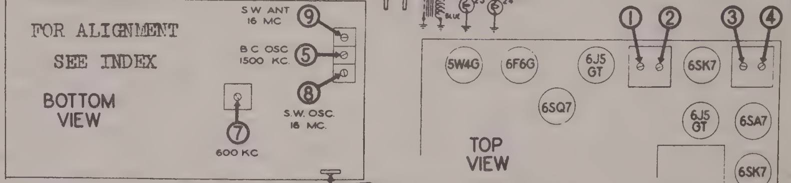
NOTE A: Bias for the 6J5GT phase inverter is --2.5 volts measured across resistor No. 21.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3	83539	Condenser—mica 260 mmfd.	$ .20
4	85061	Condenser—mica 51 mmfd.	.15
5	88587	Condenser—mica .0042 mfd.	.35
6	89439	Resistor—240 ohms 2 watts wire wound	.12
7-8	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
9-10	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
11 to 13	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
14 to 16	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
17 to 19	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
20	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
21	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
22	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
23-24	110629	Dial Lamp—6.3 volt (Mazda No. 44)	.15
25	161315	Condenser—(twisted wire) 5 mmfd.	.18
26	112975	Resistor—carbon 10 meg. ¼ watt	.12
27	112994 88461	Resistor—carbon 220 ohms ¼ watt (used in some sets) Resistor—carbon 150 ohms ¼ watt	.16 .12
28	112997	Resistor—carbon 22,000 ohms 1 watt	.15
29	M-115109	Speaker	7.00
30	116068	Resistor—680 ohms ¼ watt	.10
31	116625	Condenser—.1 mfd. 600 volt	.25
32-33	116706	Condenser—.2 mfd. 600 volt	.35
34-35	116819	Condenser—.05 mfd. 600 volt	.20
36	118820	Resistor—carbon 47,000 ohms 1 watt	.12
37	119024	Transformer—2nd I.F.	1.15
38	119042	Transformer—1st I.F.	1.10
39	119193	Condenser—.01 mfd. 600 volt	.15
40	119345	Condenser—trimmer	.20
41	119875	Condenser—.002 mfd. 600 volt	.15
42 to 44	119414	Condenser—.02 mfd. 600 volt	.15
45	119417	Condenser—.006 mfd. 600 volt	.15
46	119817	Condenser—.004 mfd. 600 volt	.15
47-48	119875	Condenser—.002 mfd. 600 volt	.15
49	119934	Condenser—padder	.36
50A-50B	160008	Condenser—electrolytic (A-30 mfd. 450 volts, B-15 mfd. 450 volts)	1.50
51	160128	Coil—oscillator	.70
52	160227	Coil—S. W. Antenna	.58
53A-53B	160237	Switch—(Radio-Phono)	.60
54A-54B	160238	Volume control—1 meg. (with switch)	1.40
55A-55B	160247	Condenser—tuning—complete with P.B. tuner	5.15
56A to 56C	160334	Range switch	.70
57A to 57C	160344	Condenser—trimmer (3 section)	.45
58	160358	Transformer—output	1.58
59	160361	Tone control—1 meg.	.95
60	160377 160383	Loop antenna—complete (for Model 11-7A8 only) Loop antenna—complete (for Model 11-7A9 only)	3.00 3.00
61	160390	Transformer—power (50-60 cycle)	4.80
62	M-160457	Cone & Voice coil for M-115109 Speaker	1.80
63	161289	Crystal cartridge	5.00
64	160086	Motor (60 cycle)	6.95

STEWART-WARNER CORP. ·MODELS 11-8F1 to 11-8F9
11-8F1-Z to 11-8F9-Z
Chassis 11-8F, 11-8F-Z



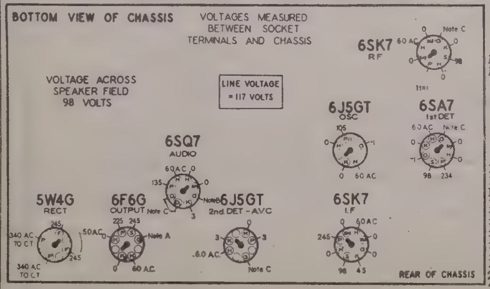


PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

VOLUME ON FULL WITH NO SIGNAL

DIAL TUNED TO 540 KC.



All measurements made with a voltmeter of 1000 ohms per volt.

NOTE A: Bias for the 6F6G output tube is —23.5 volts measured across resistors No. 10, 7 & 5.

NOTE B: Voltage on the triode grid of the 6SQ7 audio tube is —2 volts measured across resistor No. 7.

NOTE C: Bias for the 6SK7 R.F and 6SA7 1st det. grids and voltage on the 6J5GT 2nd det. grid and diode plates on 6SQ7 is —3 volts measured across resistor No. 10.

Diagram Number	Part Number	Description	List Price
1-2-3	83539	Condenser—mica 260 mmfd.	$0.20
4	83783	Condenser—mica 110 mmfd.	.20
5	88460	Resistor—wire wound 150 ohms ½ watt	.12
6	85061	Condenser—mica 51 mmfd.	.15
7	88465	Resistor—25 ohms ½ watt W.W.	.15
8	88587	Condenser—mica .0042 mfd.	.35
9	110377	Condenser—electrolytic 10 mfd. 35 volt	.80
10	110534	Resistor—wire wound 40 ohms ½ watt	.12
11-12	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
13	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
14	110558	Resistor—carbon 33,000 ohms ½ watt	.12
15	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
16	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
17	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
18	112954	Resistor—carbon 10,000 ohm—1 watt	.16
19	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
20-21	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
22	112953	Resistor—carbon 10,000 ohms 3 watts	.25
23-24	110629	Lamp—6.3 volt—.25 amps.	.15
25	112978	Resistor—insulated 470 ohms ¼ watt	.12
26	112980	Resistor—carbon 1000 ohms ¼ watt	.15
27A-27B	114141	Switch—D.P.D.T.	.44
28-29	114972	Condenser—electrolytic 16 mfd. 450 volt	.78
30	U-115091	Speaker—dynamic 10"	8.75
31-32	116625	Condenser—.1 mfd. 600 volt	.25
33 to 37	116640	Condenser—.01 mfd. 600 volt	.15
38 to 41	116819	Condenser—.05 mfd. 600 volt	.20
42-43	116893	Condenser—.02 mfd. 600 volt	$0.15
44	117022	Condenser—.002 mfd. 600 volt	.15
46	118665	Transformer—power	6.00
47A-47B	118669	Volume control with switch 1 meg.	1.40
48	118919	Condenser—padding	.40
49	119024	Transformer—2nd I.F.	1.15
50	119042	Transformer—1st I.F.	1.10
51A-51B-51C	119174	Condenser—trimmer—3 section	.45
52	119289	Switch—tone	.60
53A-53B	119291	Condenser—variable tuning	2.75
54	119345	Condenser—trimmer	.20
55	119346	Switch—push button	2.25
56A-56B	119354	Switch—range	.90
57	119362	Coil—compensating	.25
58	119365	Coil—oscillator	.75
59	119367	Coil—S. W. antenna	.65
60	161301	Loop Antenna Complete	3.00
61	U-119464	Transformer—output for U-115091 speaker	1.50
62	U-119465	Cone & Voice coil for U-115091 speaker	2.50
63A to 63L	119662	Condenser—push button trimmer (Low) 540 to 1000 KC	.24
	119663	Condenser push button trimmer (Med.) 750 to 1375 KC	.24
	119664	Condenser push button trimmer (Hi) 980 to 1550 KC	.24
64	112999	Resistor carbon 33,000 ohm 1 watt	.20

Chassis 11-8F,11-8F-Z
Chassis 11-10A,11-10A-Z

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE FOR 11-8F & 11-8F-Z CHASSIS

1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to ground through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
4. Check the pointer to see that it is correctly set to 540 KC with gang in full mesh.
5. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Rear Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
No Connection	Lead from Sig. Gen. placed near Loop	1500 KC	Broadcast	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. placed near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	6*	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. placed near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Wire from Chassis	16 MC	Foreign	16 MC	8	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Wire from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	9	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

*NOTE: Realign trimmer No. 6 after set is in cabinet by placing range switch in broadcast position, and adjusting for maximum output on a weak signal at approximately 1500 KC.

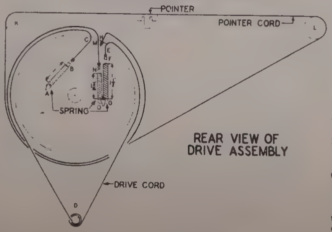
NOTES FOR 11-10A and 11-10A-Z CHASSIS

AUDIO HOWLS

For proper operation, this chassis must be allowed to float on the rubber cushions on which it is mounted. If this is not done, the set may howl when receiving strong signals. Loosen the four bolts holding the chassis to the cabinet. The wood strips which support some chassis during shipment should be removed. Make sure that neither the control knobs, their shafts, nor any part of the dial mechanism touches the cabinet or the set may still howl.

NOTE: On chassis not stamped with the letter "S", tendency to howl or rumble may be eliminated in most cases by changing the value of condenser No. 60 from .01 mfd. to .002 mfd. Removing the rear rubber grommet on which the gang condenser is mounted and replacing it with a soft gum rubber grommet will also help. The washers and mounting bolt should not be replaced if this is done.

REPLACING THE DRIVE CORDS



REAR VIEW OF DRIVE ASSEMBLY

TO SET DRUM ON CONDENSER SHAFT

With the tuning condenser plates in the horizontal (half mesh) position, the holes in the drum should be at the top. To change position of drum, loosen set screws.

TO REPLACE DIAL DRIVE CORD

1. Make a one inch loop in end of cord (Part No. 117057) using a dial cord clip (Part No. 114955).
2. Fasten a tension spring (Part No. 113177) to tab A and one end of the cord to the spring at point B.
3. Pass the other end of the dial cord through hole C on the rear of the drum.
4. Make two and one half turns of the cord about tuning shaft D.
5. Continue the cord to hole E in the rear of the drum.
6. The cord length should be adjusted so that the springs will be stretched to approximately the dimension indicated. Fasten a tension spring (Part No. 113177) to the cord by forming a new loop at F and then fasten spring to tab G.

TO REPLACE THE POINTER DRIVE CORD

1. Fasten an eyelet (Part No. 88348) at a point one-half inch from one end of the cord (Part No. 117057).
2. Pass cord through hole H at the front of the drum.
3. Continue cord clockwise around drum and around pulley K.
4. From pulley K go over pulley L and around front of drum through hole M.
5. The length of cord should be adjusted until the spring is stretched to approximately the length indicated. Fasten cord to spring at point N with a loop and clip as indicated.
6. Fasten spring to tab O.

TO SET POINTER

The pointer should be set to 540 K.C. on the dial scale when the tuning condenser is in full mesh. Cement pointer to cord at this point and allow to dry before moving.

ALIGNMENT PROCEDURE FOR 11-10A & 11-10A-Z CHASSIS

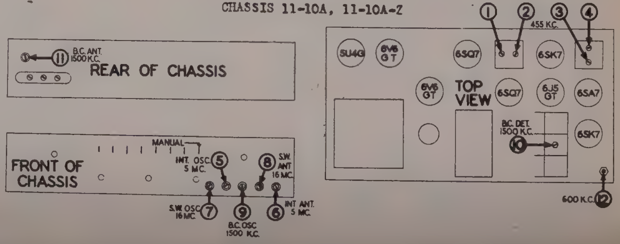
1. Connect the output meter across the voice coil or from plate to plate of the 6V6GT output tubes through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis and change the black wire from the outer to the inner clip on top of the loop drum.
3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
4. Push in the Manual button and keep it pushed in.
5. The loop must be connected as indicated in circuit diagram at all times.
6. With some signal generators, it may be found that the signal cannot be reduced to a useable value using the dummy antennas recommended below. In such cases the signal generator may be disconnected entirely from the set and the R. F. lead of the signal generator placed in the vicinity of the loop. On the Short Wave position the shield wire (black) may be disconnected from its jack and the output of the signal generator connected to the black wire through a 400 ohm resistor.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Black Wire from Loop	5 MC	Intermediate	5 MC	5	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 4.1 MC. If Image does not appear, Realign at 5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Black Wire from Loop	5 MC	Intermediate	Tune to 5 MC Generator Signal	6	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Black Wire from Loop	16 MC	Short Wave	16 MC	7	Short Wave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Black Wire from Loop	16 MC	Short Wave	Tune to 16 MC Generator Signal	8	Short Wave Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Clip on Side of Loop Drum	1500 KC	Broadcast	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Trimmers 10, 11 & 12 must be aligned after chassis and loop are placed in the cabinet.							
200 MMFD. Mica Condenser	Clip on Side of Loop Drum	1500 KC	Broadcast	1500 KC	10	Broadcast Detector	Adjust for Maximum Output.
					11*	Broadcast Antenna	
200 MMFD. Mica Condenser	Clip on Side of Loop Drum	600 KC	Broadcast	Tune to 600 KC Generator Signal	12*	Broadcast Oscillator (Series Padder)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

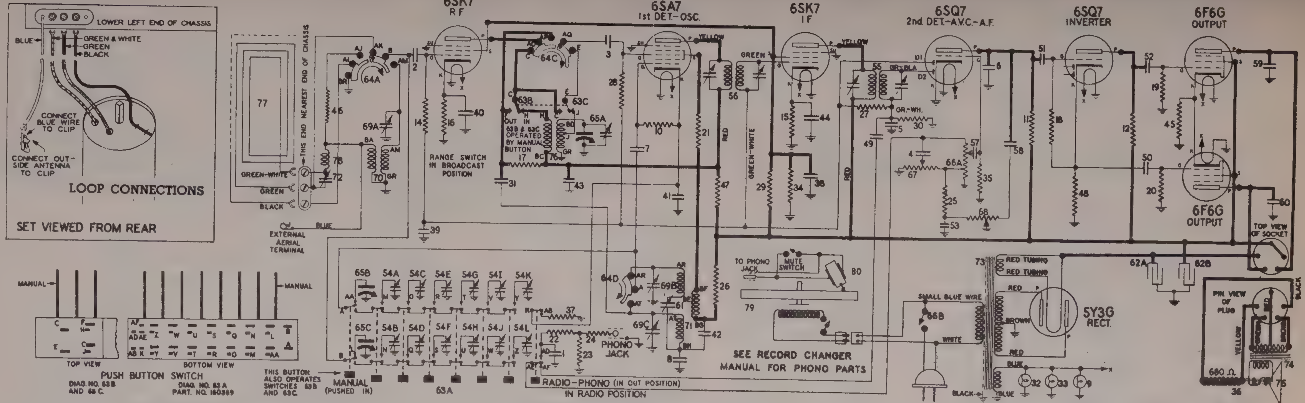
*Trimmers 11 and 12 may be adjusted using the radiated signal from the signal generator.

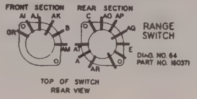
TRIMMER LOCATIONS

CHASSIS 11-10A, 11-10A-Z

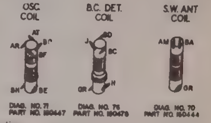


STEWART-WARNER CORP. MODELS 11-8D1 to 11-8D9
11-8D1-Z to 11-8D9-Z
Chassis 11-8D, 11-8D-Z





FOR OTHER DATA SEE INDEX


OSC COIL
B.C. DET. COIL
S.W. ANT COIL
DIAG. NO. 71 PART NO. 160447
DIAG. NO. 76 PART NO. 160478
DIAG. NO. 70 PART NO. 160444

PUSH BUTTON TRIMMER RANGES

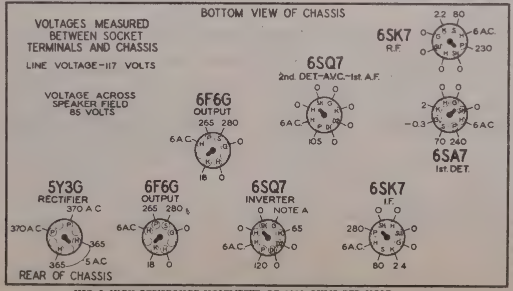
TRIMMER CONDENSERS	11-8D RANGE	11-8D-Z RANGE
54K & 54L	540 KC. to 1000 KC.	540 KC. to 1000 KC.
54I & 54J	540 KC. to 1000 KC.	540 KC. to 1000 KC.
54G & 54H	540 KC. to 1000 KC.	750 KC to 1375 KC.
54E & 54F	750 KC to 1375 KC.	750 KC to 1375 KC.
54C & 54D	750 KC to 1375 KC.	980 KC. to 1550 KC.
54A & 54B	980 KC. to 1550 KC.	980 KC. to 1550 KC.

I.F. 455 KC

SOCKET VOLTAGES

RANGE SWITCH IN BROADCAST POSITION
VOLUME ON FULL WITH NO SIGNAL

MANUAL BUTTON PUSHED IN
DIAL TUNED TO 540 KC



USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT

NOTE A: The voltage between chassis and the grid of the 6SQ7 Phase Inverter is 65 volts. This voltage cannot be measured with a meter of 1000 ohms per volt because of the high resistance of resistor No. 18.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	81155	Condenser—500 mmfd. mica	$ .25
2 to 4	83539	Condenser—mica, 260 mmfd.	.20
5-6	83783	Condenser—mica, 110 mmfd.	.20
7	85563	Condenser—mica 26 mmfd.	.15
8	88587	Condenser—mica .0042 mfd.	.35
9	85296	Lamp—Turntable light, 6 to 8 volt (Mazda 51)	.16
10	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
11 to 13	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
14	110554	Resistor—carbon 1 megohm ¼ watt	.12
15-16	110556	Resistor—carbon 330 ohms ¼ watt	.12
17	110557	Resistor—carbon 4700 ohms ¼ watt	.12
18 to 20	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
21	110560	Resistor—carbon 100 ohms ¼ watt	.12
22 to 24	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
25	110566	Resistor—carbon 33,000 ohms ¼ watt	.12
26	110567	Resistor—carbon 15,000 ohms ½ watt	.15
27	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
28	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
29	110581	Resistor—carbon 18,000 ohms 2 watt	.30
30	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
31	161315	Condenser—5 mmfd. (twisted wire)	.18
32-33	112636	Lamp—dial (frosted) 6-8 volt	.25
34	112954	Resistor—carbon 10,000 ohms 1 watt	.16
35	112975	Resistor—carbon 10 meg. ¼ watt	.12
36	M-115110	Speaker—12 inch	12.00
37	116077	Resistor—carbon 150 ohms ¼ watt	.12
38	116625	Condenser—.1 mfd. 600 volt	.25
39 to 44	116819	Condenser—.05 mfd. 600 volt	.20
45	117570	Resistor—wire wound 260 ohms 2 watt	.24
46	118804	Resistor—carbon 400 ohms ¼ watt	.10
47	118824	Resistor—carbon 1500 ohms ½ watt	.12
48	118825	Resistor—carbon 180,000 ohms ¼ watt	.12
49 to 52	119193	Condenser—.01 mfd. 600 volt	.15
53	117571	Condenser—.008 mfd. 600 volt	.15
54A to 54L	119662	Condenser—P. B. Trimmer (low freq.)	.24
	119663	Condenser—P. B. Trimmer (med. freq.)	.24
	119664	Condenser—P. B. Trimmer (high freq.)	.24
55	119024	Transformer—2nd I. F.	1.15
56	119042	Transformer—1st I. F.	1.10
57-58	119817	Condenser—.004 mfd. 600 volt	.15
59-60	119875	Condenser—.002 mfd. 600 volt	.15
61	119934	Condenser—padder	.36
62A-62B	160008	Condenser—electrolytic { A-30 mfd. 450 volts B-15 mfd. 450 volts }	1.50
63A to 63C	160369	Push button switch	3.00
64A to 64D	160371	Range switch	1.00
65A to 65C	160373	Condenser—variable tuning	3.20
66A-66B	160412	Volume control—2 meg. (with switch)	1.40
67	160413	Tone control (5 meg.) treble	.85
68	160414	Tone control (1 meg.) bass	.95
69A to 69C	160415	Condenser—trimmer 3 section	.48
70	160444	Coil—short wave antenna	.54
71	160447	Coil—oscillator	.80
72	160449	Condenser—trimmer for loop	.18
73	160450	Transformer—power (50-60 cycle)	6.35
74	M-160464	Transformer—output for M-115110 speaker	1.60
75	M-160465	Cone & voice coil for M-115110 speaker	1.60
76	160478	R. F. coil (interstage B.C.)	.60
77	160572	Loop antenna complete	3.60
78	161228	Coil—loop compensating	.25
79	160086	Motor (60 cycle)	6.95
80	161289	Crystal cartridge	5.00

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Chassis 11-8D,11-8D-Z
Chassis 11-8R

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE FOR 11-8D & 11-8D-Z CHASSIS

RECEIVER MODELS 11-8D1 TO 11-8D9 & 11-8D1-Z TO 11-8D9-Z

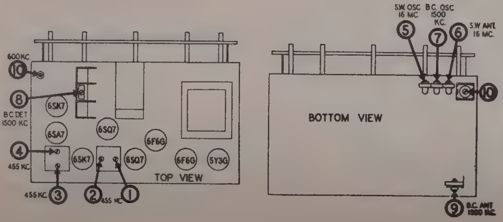
1. PUSH THE MANUAL BUTTON IN AND KEEP IT PUSHED IN.

2. Connect the signal generator ground lead to the receiver chassis. Adjust the volume control to the maximum volume position and leave it in this position during entire alignment procedure.

3. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes through a .1 mfd. condenser.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Blue Lead on Lower Left Chassis End	16 MC	Shortwave	16 MC	5	Shortwave Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead on Lower Left Chassis End	16 MC	Shortwave	Tune to 16 MC Generator Signal	6	Shortwave Antenna	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Place chassis in cabinet before making adjustments 8, 9 and 10.							
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	8	Broadcast Detector	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. Placed Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	9	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Lead from Sig. Gen. Placed Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	10	Broadcast Oscillator Series Padder	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

TRIMMER LOCATIONS- CHASSIS 11-8D and 11-8D-Z



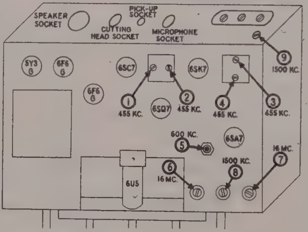
ALIGNMENT PROCEDURE FOR 11-8R CHASSIS

NOTE: This receiver may be completely aligned without removing the chassis from the cabinet.

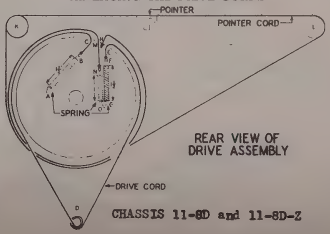
1. Connect the ground lead of the signal generator to the chassis, and the loop antenna to the proper terminals on the chassis back.
2. Push in the buttons marked "RADIO" and "RECOR.-OFF."
3. Connect the output meter across the voice coil or from plate to plate of the 6F6G output tubes through a .1 mfd. condenser.
4. Turn the volume and mixer control to the maximum clockwise position and keep it in this position throughout the entire alignment procedure.
5. With the gang condenser in full mesh, set the pointer so that it is in line with the graduation at the extreme left end of the dial scale.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Position	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Gang Condenser Farthest From Drum	455 KC	Broadcast Position "B"	Any Point Where It Does Not Affect Signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
400 OHM Resistor	Ext. Antenna Terminal	16 M.C.	Foreign Position "F"	16 M.C.	6	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak is obtained by tuning in image at approx. 15.1 M.C. If image does not appear realign at 16 M.C. with trimmer screw farther out.
400 OHM Resistor	Ext. Antenna Terminal	16 M.C.	Foreign Position "F"	Tune in 16 M.C. Generator Signal	7	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and re-tuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	Ext. Antenna Terminal	1500 KC	Broadcast Position "B"	1500 KC	8	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Ext. Antenna Terminal	1500 KC	Broadcast Position "B"	Tune in 1500 KC Generator Signal	9	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Condenser	Ext. Antenna Terminal	600 KC	Broadcast Position "B"	Tune in 600 KC Generator Signal	5	Broadcast Oscillator (Series)	Adjust for maximum output. Try to increase output by detuning trimmer and re-tuning receiver dial until maximum output is obtained.

TRIMMER LOCATIONS-CHASSIS 11-8R



REPLACING THE DRIVE CORDS



CHASSIS 11-8D and 11-8D-Z

DRIVE ASSEMBLY DATA
CHASSIS 11-8D,11-8D-Z

TO REPLACE DIAL DRIVE CORD

1. Make a loop in end of cord (Part No. 117057) using a dial cord clip (Part No. 114955).
2. Fasten a tension spring (Part No. 113177) to tab A and one end of the cord to the spring at point B.
3. Pass the other end of the dial cord through hole C on the rear of the drum.
4. Make two and one half turns of the cord about tuning shaft D.
5. Continue the cord to hole E in the rear of the drum.
6. The cord length should be adjusted so that the springs will be stretched to approximately the dimension indicated. Fasten a tension spring (Part No. 113177) to the cord by forming a loop at F and then fastening spring to tab G.

TO REPLACE THE POINTER DRIVE CORD

1. Fasten an eyelet (Part No. 88348) at a point one-half inch from one end of the cord (Part No. 117057).
2. Pass cord through hole H at the front of the drum.
3. Continue cord around drum and around pulley K.
4. From pulley K go over pulley L and around front of drum through hole M.
5. The length of cord should be adjusted until the spring is stretched to approximately the length indicated. Fasten a spring to the cord at point N with a loop and clip as indicated.
6. Fasten spring to tab O.

TO SET POINTER

The pointer should be set to 540 K.C. on the dial scale when the tuning condenser is in full mesh. Cement pointer to cord at this point and allow to dry before moving.

REPLACING RANGE SWITCH

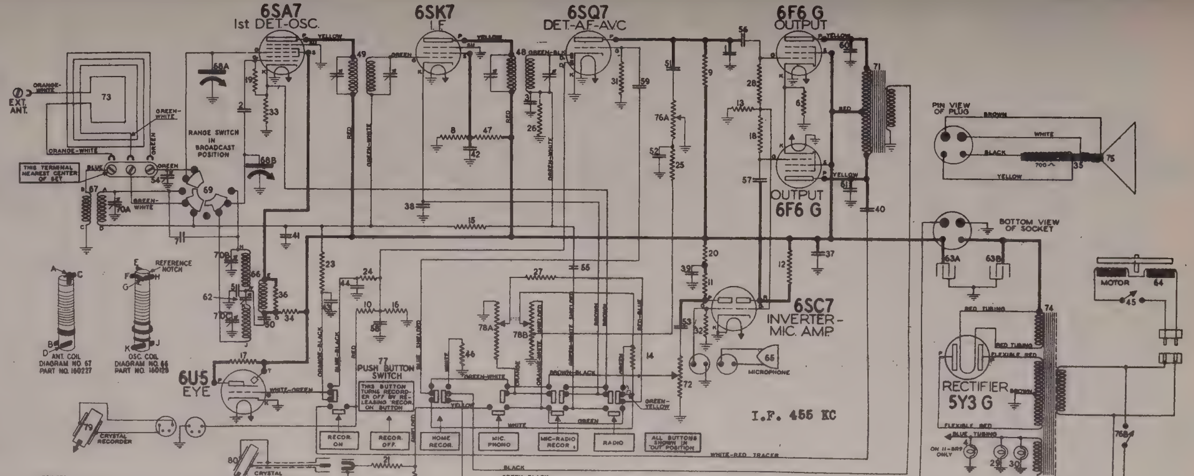
When replacing range switch, the simplest method of installation is to connect section nearest the top of the chassis first.

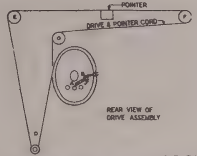
TO SET DRUM ON CONDENSER SHAFT

With tuning condenser plates in the horizontal (half mesh) position, the holes in the drum should be approximately in the position shown in the diagram. To change position of drum, loosen set screws.

STEWART-WARNER CORP. MODELS 11-8R8,11-8R9

Chassis 11-8R



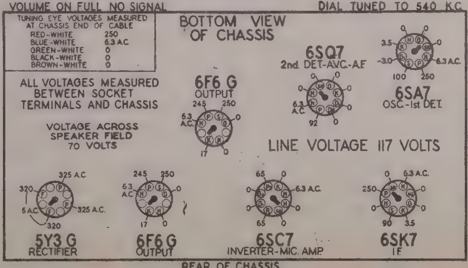


1. Hook a tension spring (Part No. 119823) through a small hole at point A and fasten end of cord (Part No. 113178) to spring at point B.
2. Pass the other end of the dial cord through hole C in Drum.
3. Continue up over dial drum, down through hole in dial mounting plate, around rubber grommet on tuning shaft and up to pulley E.
4. Pass cord over pulley E, thence around pulley F, and back over pulley G.
5. From pulley G place cord down around drum and up through hole C.
6. Slip cord through loop at end of spring B, adjust tension until spring is stretched to approximately seven-eighths inch and tie securely.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FOR ALIGNMENT AND TRIMMER LOCATIONS, SEE INDEX

SOCKET VOLTAGES



USE A 1000 OHM PER VOLT — VOLTMETER

NOTE: ALL voltages measured with push button marked "Radio" pushed in.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica 260 mmfd.	$ .20
2-3	85061	Condenser—mica, 51 mmfd.	.15
4	85296	Lamp—6 to 8 volt (Mazda 51) (11-8R9 only)	.16
5	88587	Condenser—mica .0042 mfd.	.35
6	89439	Resistor—240 ohms 2 watt wire wound	.12
7	161315	Condenser—wire 5 mmfd.	.16
8	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
9-10-11-12-13-14	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
15-16-17	110554	Resistor—carbon 1 megohm ¼ watt	.12
18	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
19-20-21-22	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
23-24	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
25	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
26	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
27	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
28	110594	Resistor—carbon 390,000 ohms ¼ watt	.12
29-30	110629	Dial light—6.3 volt	.15
31-32	112975	Resistor—carbon 10 meg. ¼ watt	.12
33	112994	Resistor—carbon 220 ohms ¼ watt (on early sets)	.16
	116077	Resistor—carbon 150 ohms, ¼ watt (on late sets)	.12
34	112997	Resistor—carbon 22,000 ohms 1 watt	.15
35	M-115109	Speaker—dynamic 10"	7.00
36	116068	Resistor—680 ohms ¼ watt	.10
37	116625	Condenser—.1 mfd. 600 volt	.25
38-39-40	116706	Condenser—.2 mfd. 600 volt	.35
41-42-43-44	116819	Condenser—.05 mfd. 600 volt	.20
45	116964	Switch—"on-off" for phono motor (with escutcheon)	.32
46	118818	Resistor—3 ohms 2 watts wire wound	.15
47	118820	Resistor—carbon 47,000 ohms 1 watt	.12
48	119024	Transformer—2nd I.F.	1.15
49	119042	Transformer—1st I.F.	$1.10
50-51-52-53	119193	Condenser—.01 mfd. 600 volt	.15
54	119345	Condenser—trimmer	.20
55-56-57	119414	Condenser—.02 mfd. 600 volt	.15
58	119416	Condenser—.008 mfd. 600 volt	.15
59	119817	Condenser—.004 mfd. 600 volt	.15
60-61	119875	Condenser—.002 mfd. 600 volt	.15
62	119934	Condenser—padder	.36
63A-63B	160008	Condenser—electrolytic 30-15 mfd. 450 W. V.	1.50
64	160036	Motor for recorder (60 cycle)—11-8R8 & 11-8R9	8.00
65	160038	Microphone	12.50
66	160128	Coil—oscillator	.70
67	160227	Coil—S. W. antenna	.58
68A-68B	160247	Condenser—tuning—complete with P. B. tuner	5.15
69	160334	Range switch	.70
70A-70B-70C	160344	Condenser—trimmer (3 section)	.45
71	160358	Transformer—output	1.58
72	160361	Microphone Gain Control	.95
73	160377	Loop antenna—complete for model 11-8R8 only	3.00
	160383	Loop antenna—complete for model 11-8R9 only	3.00
74	160390	Transformer—power (50-60 cycle)	4.80
75	M-160457	Cone & voice coil for M-115109 speaker	1.80
76	160486	Tone control with switch	.95
77	160487	Switch—push button	2.30
78A-78B	160489	Volume control & mixer dual 1 meg.	2.00
79	161288	Crystal cartridge (recorder)	9.50
80	161289	Crystal cartridge (pickup)	5.00

MODELS 11-8R8,11-8R9
Chassis 11-8R

STEWART-WARNER CORP.

RECORDER SERVICE DATA

ADDITIONAL RECORDER DATA GIVEN IN RECORDER SERVICE MANUAL FORM 9948

PUSH BUTTONS

The six push buttons shown on this circuit control the various functions of this receiver. The "RADIO," "MIC-RADIO-RECOR.", "MIC-PHONO" and "HOME RECOR." buttons are mechanically interconnected so that when any one of them is pushed in, it releases any of the other three which was pushed in.

The "RECOR. ON" and "RECOR. OFF" buttons are mechanically coupled to each other, but are independent of the other four buttons. Pushing in the "RECOR. ON" button releases the "RECOR. OFF" button and vise versa.

FUNCTIONS OF PUSH BUTTON CONTROLS

RADIO

Button In: Top of volume control, section (78B) of "Mixer & Volume Control" connects to diode load resistor No. 26 through coupling condenser No. 55. Slider of this control connects directly to grid of 6SQ7 through condenser No. 59, as resistor No. 14 is shorted out. Cathode circuit of 6SK7 tube completed through resistor No. 33.

Button Out: 6SK7 cathode circuit broken. Volume control disconnected from diode load resistor. Grid of 6SQ7 connected to slider of volume control section (78B) of "Mixer & Volume Control" through resistor No. 14 and to slider of Mixer Control, section 78A through resistor No. 27.

MIC-RADIO-RECOR.

Button In: Volume Control section, 78B of "Mixer & Volume Control" connected to diode load resistor No. 26 through coupling condenser No. 55. 6SK7 cathode circuit completed through resistor No. 33. Mixer Control, section 78A connected to slider of microphone gain control.

Button Out: Volume control, section 78B disconnected from diode load resistor. 6SK7 cathode circuit opened. Mixer, section 78A of control disconnected from slider of microphone gain control.

MIC. PHONO

Button In: Volume control, section 78B of "Mixer & Volume Control" connected to output of crystal pickup. Mixer, section 78A of control connected to slider of microphone gain control.

Button Out: "Mixer & Volume Control" disconnected from phonograph pickup and from microphone gain control.

HOME RECOR.

Button In: Silences speaker by opening voice coil and connecting secondary of output transformer to resistor No. 46. It also connects the grid of the 6SQ7 tube to the slider of the microphone gain control. "Mixer & Volume Control" is disconnected from the circuit.

Button Out: Speaker again operative—microphone gain control disconnected from 6SQ7 grid.

RECOR. OFF

Button In: Releases "RECOR. ON" button thus disconnecting recorder and volume indicator circuits.

Button Out: This indicates "RECOR. ON" button is pushed in, as described below.

RECOR. ON

Button In: Recorder crystal connected to 6F6G plate through condenser No. 40. Also causes recorder head voltage to be applied across resistors No. 10 and No. 16 and applies part of this voltage to diode of 6SQ7. The other section of this switch disconnects the 6U5 eye tube from the A.V.C. circuit and connects it to indicate the rectified voltage appearing across resistor No. 16 thus the eye indicates the voltage across the recorder crystal.

Button Out: This disconnects the recorder from the output tube and at the same time connects the 6U5 tube to the A.V.C. circuit so it functions as a conventional tuning indicator.

GENERAL RECORDER TROUBLE DATA

For complete recording mechanism service data, refer to the separate Recorder Service Manual, Form No. 9948, which will be published later. For data on the automatic record changer mechanism, refer to the service notes, in Form No. J-22200.

Receiver instructions, Form 9893, give complete data for the use of the recorder used in Model 11-8R8, Form 9895 Instructions give data for the operation of the recorder and record changer used in the model 11-8R9.

NOTE: Always turn the microphone gain control fully counterclockwise when microphone is not being used. Howling may occur if this precaution is not observed.

IMPORTANT: It is essential that the recorder be placed on a level surface when making recordings. If the recorder does not stand in a level position, it will change the effective pressure of the cutting head and proper results cannot be obtained.

ADJUSTMENT OF CUTTING HEAD

Before attempting any adjustments of the cutting head, make certain that such adjustments are necessary by making a test recording using a new needle and a record blank of known quality.

DEFECTIVE CUTTING NEEDLE

A cutting needle is considered worn when the background hiss becomes objectionable, or when the thread cut from the record becomes ragged. A dull needle may also cause the depth of cut to be incorrect.

The condition of the cutting needle can be determined by examining the point by means of a powerful magnifying glass or low power microscope, and comparing it with a good needle viewed in a similar manner. Another good check on the condition of the cutting needle is the appearance of a freshly cut record. If the record has a dull or grayish appearance instead of its usual shiny appearance, the needle should be replaced.

ADJUSTING THICKNESS OF SHAVING

The proper thickness of the shaving produced when a record is cut is about the thickness of a human hair. If the cutting needle is sharp and in good condition, and the cutting head adjusted to give the correct depth of cut, the shaving should come off as a long continuous ribbon. With some types of recording blanks, the ribbon cut by the cutting needle will come off as a straight band, while with others it may produce a curly thread. This ribbon should not, however, be too fine or extremely crinkly as this indicates a dull cutting needle or insufficient pressure of the recording head.

When the cutting head is placed on a record blank, the needle locking screw should be halfway between the top and bottom of the hole in the head. The position of the cutting needle screw may be changed on the Model 11-8R8 by raising the cutter arm and adjusting the screw and lock nut under this arm. On Model 11-8R9 it is only necessary to adjust the screw near the pivot end of the recording arm, with a screwdriver.

The depth of cut can be varied on Model 11-8R8 by adjusting the screw at the center of the recording arm with a screwdriver. Clockwise rotation increases the thickness, while counter-clockwise rotation decreases the thickness of the shaving. This adjustment will have little effect if the needle is dull or damaged.

On Model 11-8R9 this adjustment is made by varying the position of the knob on the top of the recording arm. This knob has engraved upon it the letters "L," "M" and "H" indicating light, medium and heavy shavings. Adjustment should be made to compensate for different types of needles and record blanks if an examination of the record and shavings indicates that an adjustment is necessary. BEFORE ADJUSTING FOR THICKNESS OF SHAVING MAKE CERTAIN THAT THE CUTTING NEEDLE IS PROPERLY MOUNTED. ALSO TRY A NEW CUTTING NEEDLE, SINCE THE OLD ONE MAY BE WORN OR DAMAGED.

RECORDER HEAD INOPERATIVE

A quick check of the recorder head can be made by pushing in the "RECOR. ON" button and the "RADIO" button and then tuning in a station. If the recorder is operating, this fact is easily determined by holding the cutting needle of the cutter between the thumb and forefinger. Vibration of the needle indicates that the cutter head is in operating condition.

If the recorder does not operate, check first to determine if an A.C. voltage exists across the terminals of the recorder socket. This can best be measured using the 0-150 volt scale of a rectifier type A. C. Voltmeter. With proper recording volume the peaks of the voltage appearing across these terminals should be 80 to 120 volts. If no voltage exists under these conditions, check the contacts of the "RECOR. ON" switch, and the condenser No. 40 coupling the recorder to the 6F6G plate. If these circuits are found to be all right check the recorder crystal cartridge and replace if necessary.

CORRECT NEEDLE ANGLE

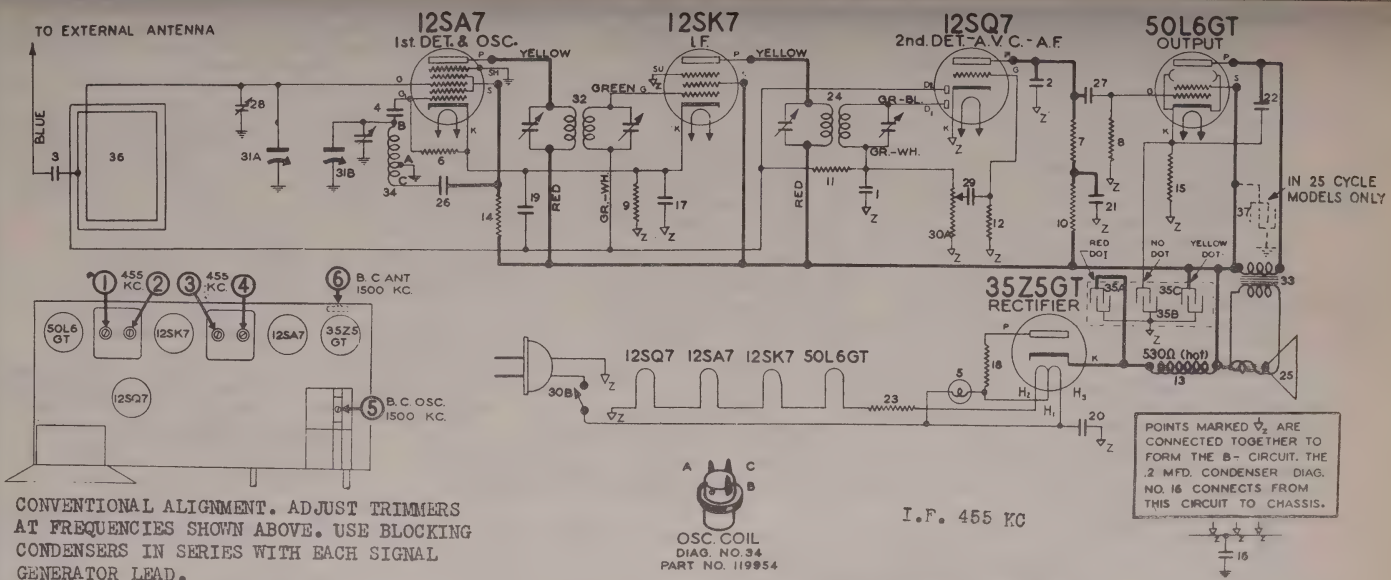
When making a recording, the cutting needle should be set at such an angle that the thread cut from the record will be thrown toward the center of the record. Otherwise the thread may be caught under the cutting needle, causing it to cut the grooves improperly.

If the thread is not thrown toward the center of the record, loosen the thumb screw holding the recording needle in the cutter head, turn the needle VERY SLIGHTLY so that the flat side of the cutting tip faces more toward the center of the record and retighten thumb screw. This will change the angle of the needle sufficiently to cause the thread to wind about the center pin of the turntable.

Use care in making this adjustment as the needle will not cut properly if it is turned too far.

STEWART-WARNER CORP.

MODELS 13-5U1 to 13-5U9
Chassis 13-5U



CONVENTIONAL ALIGNMENT. ADJUST TRIMMERS AT FREQUENCIES SHOWN ABOVE. USE BLOCKING CONDENSERS IN SERIES WITH EACH SIGNAL GENERATOR LEAD.

OSC. COIL
DIAG. NO. 34
PART NO. 119954

I.F. 455 KC

POINTS MARKED ∇_Z ARE CONNECTED TOGETHER TO FORM THE B- CIRCUIT. THE .2 MFD. CONDENSER DIAG. NO. 16 CONNECTS FROM THIS CIRCUIT TO CHASSIS.

SOCKET VOLTAGES

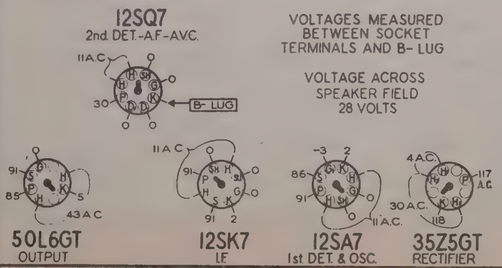
Volume on full with no signal. Dial tuned to 540 KC

BOTTOM VIEW OF CHASSIS

LINE VOLTAGE 117 VOLTS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG

VOLTAGE ACROSS SPEAKER FIELD 28 VOLTS



REAR OF CHASSIS

Use a voltmeter of 1000 ohms per volt.

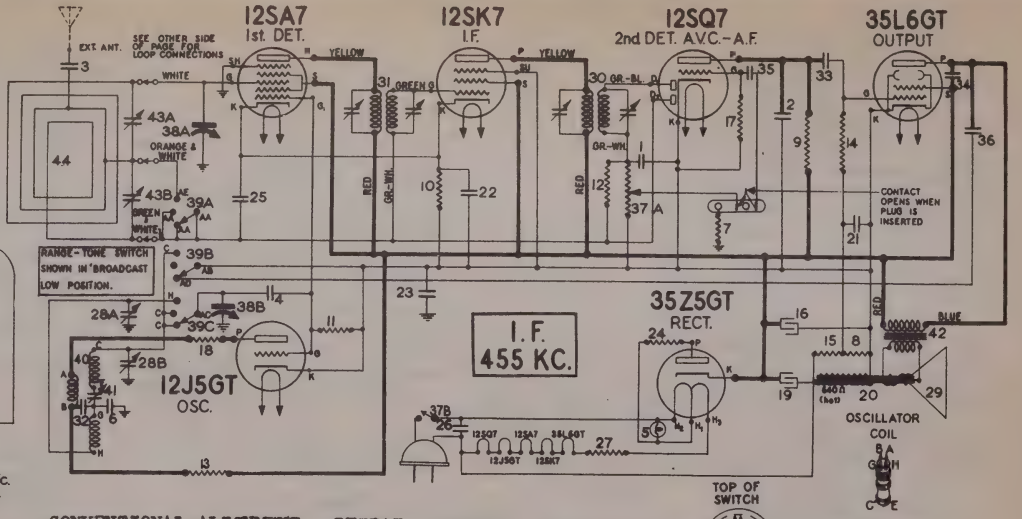
ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3	83783	Condenser—mica, 110 mmfd.	.20
4	85061	Condenser—mica, 51 mmfd.	.15
5	85296	Lamp—dial 6 to 8 volt (Mazda 51)	.16
6	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
7-8	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
9	110560	Resistor—carbon 100 ohms ¼ watt	.12
10	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
11	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
12	112975	Resistor—carbon 10 meg. ¼ watt	.12
13	R-115102	Speaker—dynamic (5")	4.30
14	118803	Resistor—680 ohms ¼ watt	.12
15	116092	Resistor—140 ohms 1 watt Wire Wound	.15
16-17	116706	Condenser—.2 mfd. 600 volt	.35
18	116752	Resistor—33 ohms 1 watt wire wound	.15
19 to 21	116819	Condenser—.05 mfd. 600 volt	.20
22	116893	Condenser—.02 mfd. 600 volt	.15
23	117395	Resistor—20 ohms 1 watt wire wound	$0.16
24	118903	Transformer—2nd I.F.	1.10
25	R-118999	Cone & Voice coil for R-115102 speaker	1.70
26-27	119193	Condenser—.01 mfd. 600 volt	.15
28	119345	Condenser—trimmer for loop	.20
29	119817	Condenser—.004 mfd.—600 volt.	.15
30A-30B	119912	Volume control—1 meg. (with switch)	1.40
31A-31B	119928	Condenser—variable tuning	2.40
32	119935	Transformer—1st I.F.	1.10
33	R-119944	Transformer—output for R-115102 speaker	1.60
34	119954	Coil—oscillator	.36
35A-35B-35C	160012	Condenser—Electrolytic A—40 mfd.—200 volts B—20 mfd.—25 volts C—20 mfd.—200 volts	1.15
36	160081	Loop Antenna	.60
37	118911	Condenser — Electrolytic — 20-20 mmfd.—150 v., one section used	.75

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 13-6P1 to 13-6P9
Chassis 13-6P

STEWART-WARNER CORP.



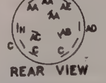
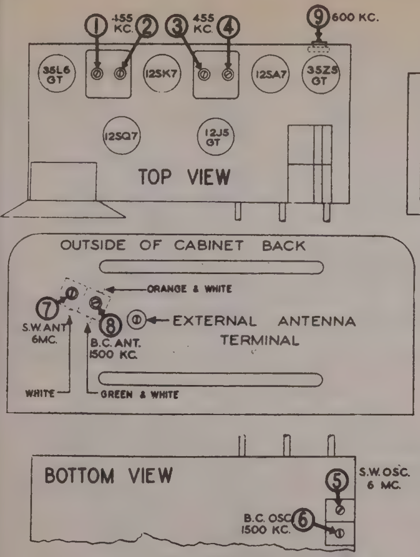


DIAGRAM NO. 40
PART NO. 119933

DIAGRAM NO. 39
PART NO. 119916

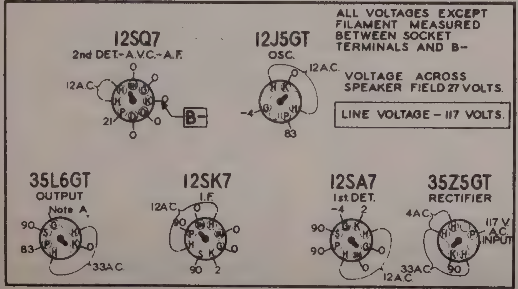
ALL LETTERED POINTS ON THESE DRAWINGS CORRESPOND TO SIMILAR POINTS ON CIRCUIT DIAGRAM.



CONVENTIONAL ALIGNMENT. REPEAT ALIGNMENT OF RF AND OSC AFTER REPLACING CHASSIS IN CABINET.

SOCKET VOLTAGES

RANGE-TONE SWITCH IN BROADCAST "HI" POSITION. (CENTER) VOLUME ON FULL WITH NO SIGNAL. DIAL SET TO 540 KC.



ALL VOLTAGES EXCEPT FILAMENT MEASURED BETWEEN SOCKET TERMINALS AND B-

VOLTAGE ACROSS SPEAKER FIELD 27 VOLTS.

LINE VOLTAGE – 117 VOLTS.

REAR OF CHASSIS

NOTE A: The bias on the grid of the 35L6GT output tube is —6.4 volts. This voltage can not be measured on a 1000 ohm per volt meter because of the high resistance of resistors 15 and 8. (Use a voltmeter of 1000 ohms per volt.)

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

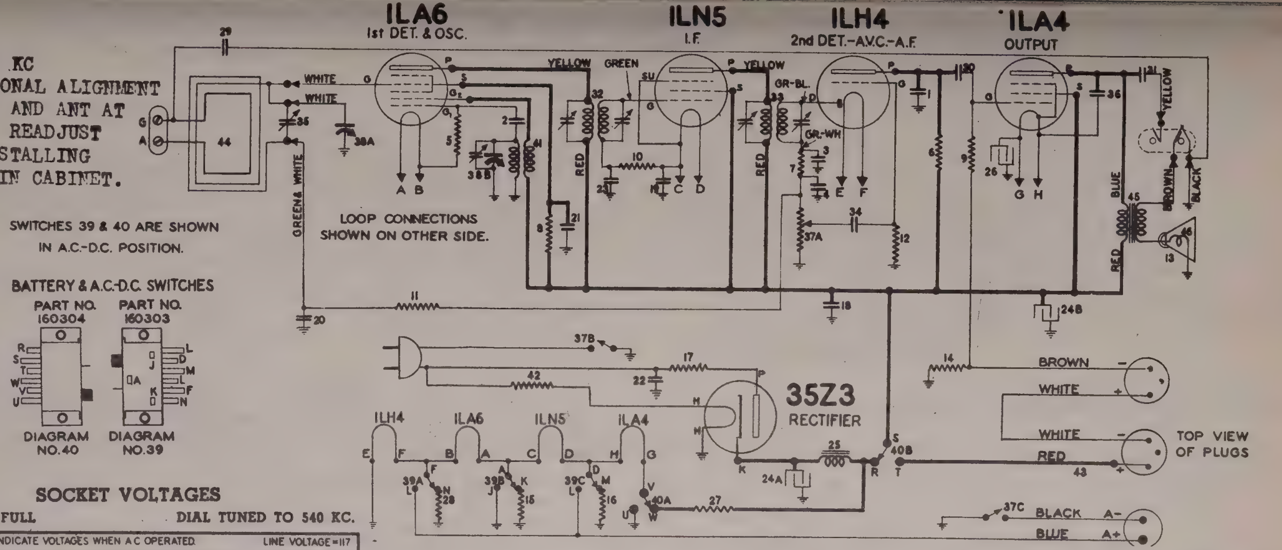
ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica, 260 mmfd.	$0.20
3-4	83783	Condenser—mica, 110 mmfd.	.20
5	85296	Lamp—dial 6 to 8 volt (Mazda 51)	.16
6	89275	Condenser—mica .002 mfd.	.40
7-8	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
9	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
10	110560	Resistor—carbon 100 ohms ¼ watt.	.12
11	110564	Resistor—carbon 100,000 ohms ¼ watt	.12
12	110570	Resistor—carbon 2.2 meg. ¼ watt.	.15
13	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
14	110584	Resistor—carbon 330,000 ohms ¼ watt	.12
15	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
16	112898	Condenser—electrolytic 16 mfd. 150 volt	.50
17	112975	Resistor—carbon 10 meg. ¼ watt	.12
18	112994	Resistor—carbon 220 ohms ¼ watt.	.16
19	113472	Condenser—electrolytic 40 mfd. 150 volt	.56
20	R-115102	Speaker—dynamic (5")	$4.30
21	116625	Condenser—.1 mfd. 600 volt	.25
22-23	116706	Condenser—.2 mfd. 600 volt	.35
24	116752	Resistor—33 ohms 1 watt wire wound	.15
25-26	116819	Condenser—.05 mfd. 600 volt	.20
27	117395	Resistor—20 ohms 1 watt wire wound	.16
28A-28B	118920	Trimmer strip (2 section)	.30
29	R-118999	Cone & voice coil for R-115102 Speaker	1.70
30	119024	Transformer—2nd I. F.	1.15
31	119042	Transformer—1st I. F.	1.10
32 to 34	119193	Condenser—.01 mfd. 600 volt	.15
35	119817	Condenser—.004 mfd. 600 volt	.15
36	119880	Condenser—.04 mfd. 600 volt	.20
37A-37B	119912	Volume control—1 meg. (with switch)	1.40
38A-38B	119914	Condenser—variable tuning	2.30
39A to 39C	119916	Switch—tone & range (see table)	.90
40	119933	Coil—oscillator	.36
41	119934	Condenser—padder	.36
42	R-119944	Transformer—output for R-115102 Speaker	1.60

©John F. Rider, Publisher

STEWART-WARNER CORP.

MODELS 15-5X1 to 15-5X9
Chassis 15-5X



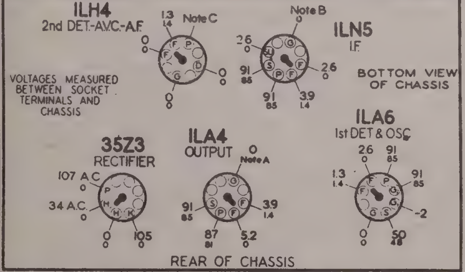
I.F. 455 KC
CONVENTIONAL ALIGNMENT
TRIM OSC AND ANT AT
1500 KC. READJUST
AFTER INSTALLING
CHASSIS IN CABINET.

SWITCHES 39 & 40 ARE SHOWN IN A.C.-D.C. POSITION.

SOCKET VOLTAGES

VOLUME ON FULL DIAL TUNED TO 540 KC.

LARGE NUMBERS INDICATE VOLTAGES WHEN A C OPERATED. LINE VOLTAGE = 117
SMALL NUMBERS INDICATE VOLTAGES WHEN BATTERY OPERATED B BATTERY = 90 VOLTS



NOTE A: The 1LA4 grid bias during battery operation is —5 volts measured across resistor 14.

NOTE B: During A.C.-D.C. operation the grid of the 1LN5 is slightly positive with respect to chassis. This voltage cannot be measured properly on ordinary meters.

NOTE C: Due to the high resistance of resistor 6, only a small voltage will be read on a meter having a resistance of 1000 ohms per volt.

NOTE: Later sets have an iron core 2nd I.F. transformer (Part No. 161248) which has only one adjustment for alignment. Adjust the large screw projecting from the top of the can for maximum output.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83783	Condenser—mica, 110 mmfd.	$ .20
2-3-4	85061	Condenser—mica, 51 mmfd.	.15
5	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
6	110554	Resistor—carbon 1 megohm ¼ watt	.12
7	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
8	110566	Resistor—carbon 33,000 ohms ¼ watt	.12
9-10	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
11-12	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
13	R-115119	Speaker—dynamic (4")	4.50
14	116078	Resistor—560 ohms ¼ watt	.12
15-16	116079	Resistor—carbon 1200 ohms ¼ watt	.12
17	116088	Resistor—100 ohms 1 watt W. W.	.14
18	116625	Condenser—.1 mfd. 600 volt	.25
19	116706	Condenser — .2 mfd. 600 volt (used only on sets having 119411 I.F.)	.35
	118290	Condenser—.5 mfd. 150 volt (used on sets having 161248 I.F.)	.50
20 to 23	116819	Condenser—.05 mfd. 600 volt	.20
24A-24B	117559	Condenser—electrolytic 30-30 mfd. 150 volt	1.20
5	117888	Filter choke	.85
26	118452	Condenser—electrolytic—100 mfd. 8 v.	.55
27	118822	Resistor—2000 chms 5 watts W. W.	.40
28	118827	Resistor—carbon 270 ohms ¼ watt	.10
29 to 31	119193	Condenser—.01 mfd. 600 volt	.15
32	119409	Transformer—1st I.F.	1.10
33	119411	Transformer—2nd I.F.	1.10
	161248	Transformer—2nd I.F. (iron core) used on some sets	1.35
34	119817	Condenser— .004 mfd. 600 volt	.15
35	119845	Condenser—trimmer (on loop)	.16
36	119875	Condenser—.002 mfd. 600 volt	.15
37A to 37C	160297	Volume control—1 meg.—with switch	1.30
38A-38B	160298	Condenser—variable tuning with drum	2.80
39A to 39C	160303	Battery & A.C.-D.C. switch	.68
40A-40B	160304	Battery & A.C.-D.C. switch	.48
41	160475	Coil—oscillator	.44
42	160492	Power cord (resistor type)	.95
43	160493	Battery cable	.54
44	160570	Loop antenna—complete with condenser & terminals	1.50
45	R-160632	Transformer—output for R-115119 spkr.	1.60
46	R-160633	Cone & Voice coil for R-115119 spkr.	1.50

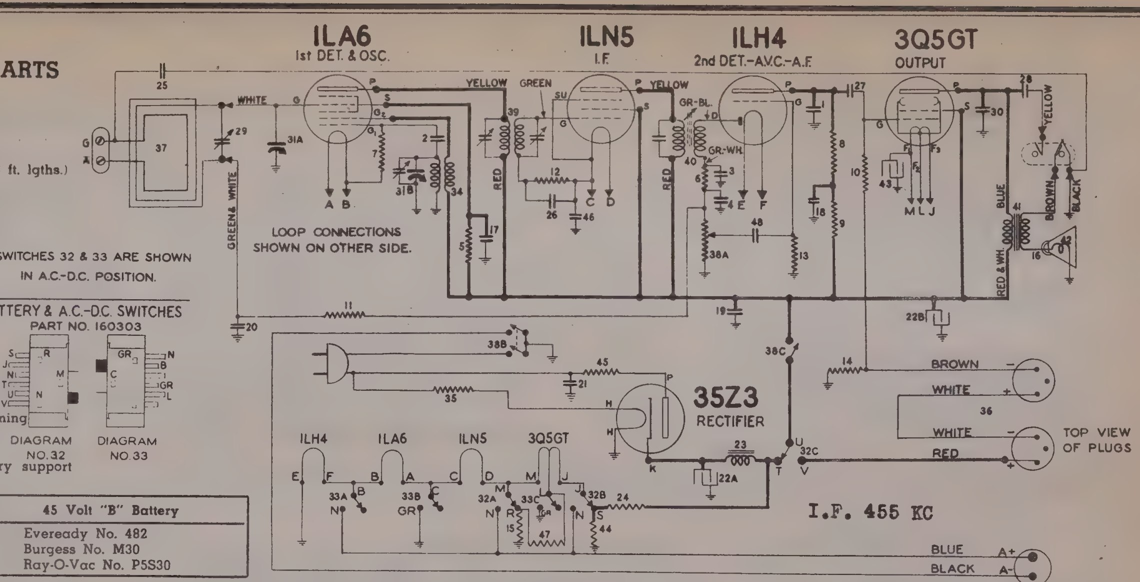
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 15-5Y1 to 15-5Y9
Chassis 15-5Y

STEWART-WARNER CORP.

MISCELLANEOUS PARTS

Part Number	Description
161219	Block—battery retaining
112745	Clip—coil mounting
113019	Clip—dial scale retaining
116948	Cord—dial drive (supplied in 6 ft. lgths.)
161250	Dial scale
160490	Knob volume
160491	Knob—tuning
117769	Name plate (Stewart-Warner)
117779	Plate (Off-Volume)
117780	Plate (tuning)
116397	Plug—2 prong male for cable
116398	Plug—3 prong male for cable
119911	Phono—terminal strip
81145	Retaining ring for tuning shaft
160392	Socket—octal
160294	Socket—8 prong Loktal
111981	Spring—for dial cord
160621	Terminal strip G-A
160301	Tube shield
111456	Washer—spring washer for tuning shaft
160291	Window—dial
116488	Wing Nut—No. 8-32 (for battery support block)



LOOP CONNECTIONS SHOWN ON OTHER SIDE.

SWITCHES 32 & 33 ARE SHOWN IN A.C.-D.C. POSITION.

BATTERY & A.C.-DC. SWITCHES PART NO. 160303

TOP VIEW OF PLUGS

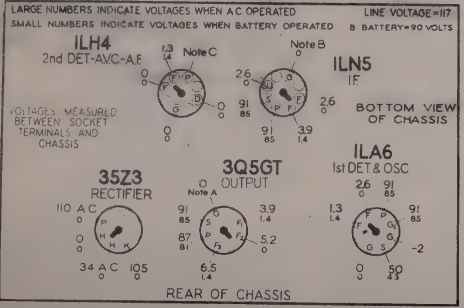
I.F. 455 KC

1½ Volt "A" Battery	45 Volt "B" Battery
Eveready No. 745	Eveready No. 482
Burgess No. 8FL	Burgess No. M30
Ray-O-Vac No. P98L	Ray-O-Vac No. P5S30

*NOTE: If I.F. oscillation is encountered, it may be reduced in some cases by reversing the connections of the red and yellow wires coming from the 2nd I.F. transformer (Part No. 161248).

SOCKET VOLTAGES

VOLUME ON FULL DIAL TUNED TO 540 KC.



NOTE A: The 3Q5GT grid bias during battery operation is —5 volts measured across resistor 14.

NOTE B: During A.C.-D.C. operation the grid of the 1LN5 is slightly positive with respect to chassis. This voltage cannot be measured properly with ordinary meters.

NOTE C: Due to the high resistance of resistor 8, only a small voltage will be read on a meter having a resistance of 1000 ohms per volt.

FOR ALIGNMENT SEE INDEX

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	81158	Condenser—mica, 100 mmfd.	$ .25
2-3-4	85061	Condenser—mica, 51 mmfd.	.15
5-6	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
7	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
8	110554	Resistor—carbon 1 megohm ¼ watt	.12
9	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
10	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
11-12-13	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
14-15	112977	Resistor—insulated 470 ohm ¼ watt	.15
16	U-115120	Speaker—P.M. (5")	5.50
17-18-19	116625	Condenser—.1 mfd. 600 volt	.25
20-21	116819	Condenser—.05 mfd. 600 volt	.20
22A-22B	117559	Condenser—electrolytic 30-30 mfd. 150 volt	1.20
23	117888	Filter choke	.85
24	118842	Resistor—1680 ohms 5 watts W. W.	.15
25 to 28	119193	Condenser—.01 mfd. 600 volt	.15
29	119845	Condenser—trimmer (on loop)	.16
30	119875	Condenser—.002 mfd. 600 volt	$ .15
31A-31B	160298	Condenser—variable tuning with drum	2.80
32-33	160303	Battery & A.C. switches	.68
34	160475	Coil—oscillator	.44
35	160492	Power cord (resistor type)	.95
36	160493	Battery cable	.54
37	160570	Loop antenna—complete	1.50
38A to 38C	161227	Volume control—(1 meg.) & switch	1.30
39	161247	Transformer—1st I.F.	1.20
40	161248	Transformer—2nd I.F. (iron core)	1.35
41	U-161255	Transformer—output for U-115120 spkr.	1.50
42	U-161256	Cone & Voice coil for U-115120 speaker	1.40
43	161273	Condenser—electrolytic 50 mfd. 25 volt	.50
44	116082	Resistor—insulated 1500 ohms ¼ watt	.15
45	116275	Resistor—50 ohms, ½ watt W. W.	.15
46	118290	Condenser—.5 mfd. 150 volt	.50
47	118827	Resistor—carbon, 270 ohms, ¼ watt	.10
48	119817	Condenser—.004 mfd., 600 volt	.15

GENERAL INSTRUCTIONS

1. FUNCTION OF RECORD CHANGER WHEN IT IS GOING THRU A CHANGE CYCLE --

The Model "J" Record Changer plays and automatically changes 14 or less ten-inch records or 10 or less 12-inch records.

The Record Changer is started by turning the switch control knob, (Item 65, Fig. 4) to "ON" this starts the motor and moves trip rod (Item 32, Fig. 1), which rotates trip lever assembly (Item 20, Fig. 1), causing it to disengage from Engagement Clutch Cam, (Item 79, Fig. 2). The Engagement Clutch Cam will then rotate due to tension from spring, (Item 27, Fig. 1). This causes it to contact the pin on the top side of Drive Gear Assembly, (Item 4, Fig. 1), as it rotates, and in turn, moves the Drive Link Assembly, (Item 31, Fig. 1), and the Selector Shaft Crank Assembly #1 and #2 to the position shown in Fig. 2. Also the tone arm reset link (Item 80, Fig. 2), has moved to where it has released the latch, (Item 18, Fig. 1), and carried the tone arm to its extreme outward position. The Tone Arm lifter link (Item 81, Fig. 2), has raised the tone arm to its extreme height, by means of the Lifter Plate Assembly, (Item 21, Fig. 1). The tone arm is kept from "floating" free by the friction of the Tone Arm Brake Spring which also compresses the tone arm booster spring, (Item 13, Fig. 1) due to its very light tension.

The Drive Gear Assembly (Item 4, Fig. 1), continues to rotate which causes the top pin to disengage from the Automatic Engagement Clutch Cam which is moved back to latch with the tone arm trip lever, and the lower pin to engage the drive link assembly, moving it back to its initial position. This swings in the tone arm to either the 10-inch or 12-inch record playing position and lowers it to the record. At the same time it releases the Tone Arm Brake Spring allowing the Tone Arm Booster Spring to act.

2. PHONOGRAPH NEEDLES --

Various types and kinds of needles are available for use in phonograph tone arms.

For playing ten or more records at one setup with this Record Changer, no attempt should be made to use ordinary needles with steel or fiber points since continued use of worn needle points will damage the records being played.

Any needle can be used that is designed to play 15 or more records.

It is well to keep in mind that even if the amplifying system, speaker and tone arm are of the best quality, a poor needle will result in poor reproduction of music.

There are a number of good semi-permanent types of needles on the market which are rated in number of plays. It is usually more economical to use one of these needles which is rated at 1000 plays or more.

It is very important to remember not to remove and then replace any needle that has been used.

3. CHASSIS MOUNTING

On the bottom surface of the panel are four mounting studs, each threaded to take a 1/4-20" machine screw. The mounting panel rests on four tapered coil springs, the small end of each spring is pressed over a mounting stud and the large end of each spring fits into a socket in the top surface of the mounting shelf in cabinet.

Four spacing blocks 1/2" thick and with a 5/8" hole are fastened to the lower side of the mounting shelf. The 5/8" hole in each is centered with the center of the 7/16" screw clearance hole. These are to be provided and located on the lower side of the mounting shelf into which each of the lower mounting springs are to fit.

The 1/4"-20 machine screws are turned through the four wing nuts until the head of each screw is against the bottom side of each wing nut.

The four lower springs which are of smaller diameter than the upper springs are slipped over the ends of each of the 1/4"-20 machine screws with the tapered end toward the head and resting on the wing nuts.

OPERATING INSTRUCTIONS

1. TO PREPARE CHANGER FOR OPERATION --

(A) Setting Record Changer to Play Ten Inch Records:
Turn both knobs until the arrows are pointing toward the center of the turntable. When in this position any number up to and including fourteen 10-inch records can be played.

(B) Setting Record Changer to Play Twelve Inch Records:
Turn both knobs until the arrows marked "12" are pointing toward the center of the turntable. When in this position any number up to and including ten 12-inch records can be played.

2. LOADING --

(A) If 10-inch records are to be played, set knobs as described in (A) above and place any number up to and including 14 records (ten inch only) over center pin so that they will rest on the selecting arms.

(B) If 12-inch records are to be played, set knobs as described in (B) above and place any number up to and including 10 records (twelve inch only) over center pin so that they will rest on the arms.

3. STARTING THE RECORD CHANGER --

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and throw the phonograph-radio knob or control to the phonograph position.
2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

4. PLAYING AN INDIVIDUAL RECORD --

An individual record can be played in the same manner as a stack of records would be played, i.e., if it is a 10-inch record, follow the instructions pertaining to 10-inch records. If it is a 12-inch record, follow the instructions pertaining to 12-inch records.

A 10-inch record may be played manually by turning the selecting arm knobs to the unloading position and leaving them in this position--records may then be put on or taken off the turntable by merely moving the tone arm outward until it catches, and placing the 10-inch records over the spindle and down onto the turntable. The "ON" and "OFF" switch knob is then pushed down and the 10-inch record will be played and repeated if left on the turntable. To remove the record it is only necessary to move the tone arm outward until it catches, and lift the record off of the turntable.

5. TURNING OFF RECORD CHANGER --

Turn switch knob to "OFF" position while the tone arm is still on the record. If the switch knob should be turned off while Record Changer is going through a change cycle, it will be difficult to adjust the selector arms correctly for the automatic playing of 10-inch or 12-inch records.

MODEL J
Record-changer

STEWART-WARNER CORP.

Figure 1

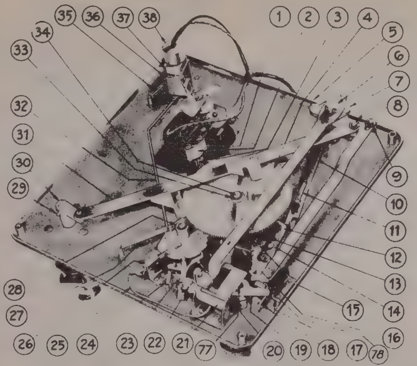
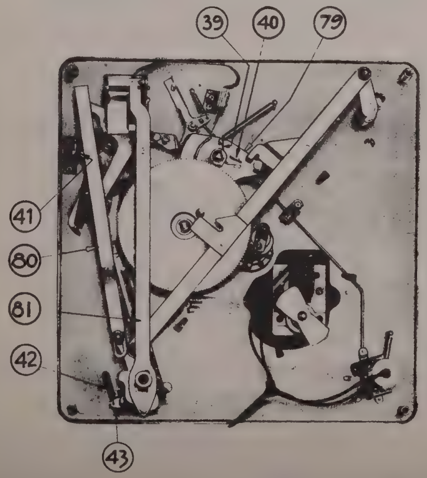


Figure 2



MODEL "J" RECORD CHANGER

Fig. 1

ITEM NO.	PART NO.	DESCRIPTION	NO. USED
1	J-22096	Spindle Thrust Plate	1
2	J-22808	Spindle Bearing Housing Assy.	1
3	J-22010	Drive Pinion	1
4	J-22810	Drive Gear Assy.	1
5	J-22149	Panel, Post & Stud Assy.	1
6	F-1063	Selector Shaft Collar	1
7	J-22803	Selector Shaft Crank Assy. Post #1	1
8	J-72021	Flat Washer	3
9	H-22065	"C" Washer	3
10	J-22041	12" Set Link	1
11	J-22121	12" Reset Link Spring	1
12	J-22147	Tone Arm Locator & Bushing Assy.	1
13	H-20129	Tone Arm Booster Spring	1
14	J-22036	Tone Arm Locator Shoe 12"	1
15	J-22037	Tone Arm Locator Shoe 10"	1
16	J-22094	Tone Arm Locator Spring	1
17	J-22038	Tone Arm Latch & Guide Bracket	1
18	J-22101	Tone Arm Latch Lever	1
19	J-22807	Tone Arm Lever Assy.	1
20	J-22812	Trip Lever Assy.	1
21	J-22813	Tone Arm Lift Plate Assy.	1
22	J-10380	Thumb Nut	1
23	J-10355	Tone Arm Trip Shoe	1
24	J-22058	Trip Lever Spring	1
25	J-22136	Pickup Shielded Wire	1
26	J-22116	Muting Switch	1
27	J-22090	Clutch Spring	1
28	J-72024	Flat Washer	1
29	J-80035	Taper Pin	3
30	J-22805	Selector Shaft Drive Crank Assy. Post #2	1
31	J-22816	Drive Link Assy.	1
32	J-22055	Trip Rod	1
33	J-72024	Flat Washer	1
34	J-22002	Drive Gear Stud	1
35	J-22121	Switch Spring	1
36	J-22102	Switch Mounting Bracket	1
37	J-22103	Switch Retainer Bracket	1
38	J-22118	Switch	1
77	J-22067	Tone Arm Shaft	1
78	J-22134	Reset Arm Stop Washer	1
		Fig. 2	
39	J-22017	Clutch Reset Pawl Spring	1
40	J-22016	Clutch Reset Pawl	1
41	J-22123	Latch Lever Shoulder Screw	1
43	J-22811	12" Set Arm Assy.	1
79	J-22802	Engagement Clutch Cam Assy.	1
80	J-22804	Tone Arm Reset Link	1
81	J-22806	Tone Arm Lifter Link Assy.	1

Figure 3

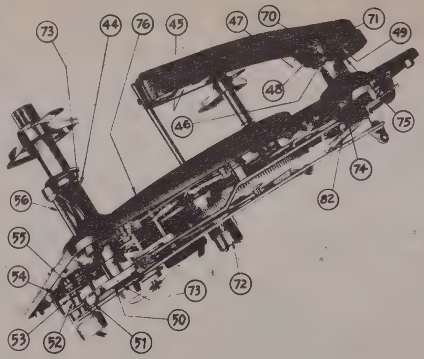
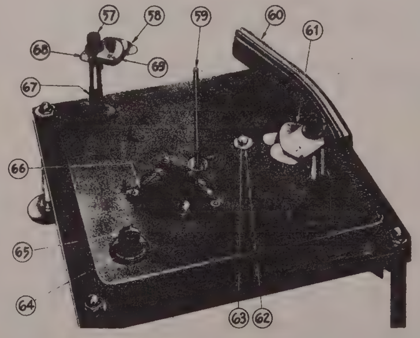


Figure 4



MODEL "J" RECORD CHANGER

Fig. 3

ITEM NO.	PART NO.	DESCRIPTION	NO. USED
44	J-22061	Record Support Post #1	1
45	J-22125	Tone Arm Cartridge	1
46	J-22080	Tone Arm Swivel Bracket	1
47	J-22081	Tone Arm Mounting Bracket	1
48	J-22068	Tone Arm Lift Pin	1
49	J-22133	Counter Balance Spring	1
50	J-22129	Spring Washer	1
51	J-22014	Roller	2
52	J-22131	Switch Return Spring	1
53	J-72050	Flat Washer	2
54	J-22104	Switch Reject Slide	1
55	J-22809	Switch Collar & Reject Pin Assy.	1
56	J-22063	12" Set Rod	1
70	H-20157	Tone Arm Adjusting Screw	1
71	H-20039	Adjusting Screw Lock Spring	1
72	J-22117	Thrust Wafer	1
73	H-20014	Thrust Washer	5
74	H-20513	Ball Race Assy.	1
75	H-20101	Rubber Bumper	1
76	J-22078	Turntable	1
82	J-22025	Tone Arm Lifter Reset Spring	1
		Fig. 4	
57	J-22077	Control Knob	2
58	J-22098	Selector Blade 10"	2
59	J-22148	Turntable Spindle	1
60	J-22079	Tone Arm	1
61	J-22071	Selector Arm #1	1
62	J-22152	Special Washer	1
63	J-22150	Drive Gear Stud Locknut	1
64	J-22106	Switch Escutcheon	1
65	J-22105	Switch Control Knob	1
66	J-22009	Motor	1
67	J-22062	Record Support Post #2	1
68	J-22099	Selector Blade 12"	2
69	J-22072	Selector Arm #2	1

STEWART-WARNER CORP.

MODEL J
Record-changer

(3)

6. UNLOADING RECORDS --

   1. Turn switch knob to "Off" position.
   2. Remove any records remaining on the selector arms.
   3. Move tone arm outward until it catches in outward position.
   4. Turn selector arms so that records will clear them.
   5. Remove records from turntable.

7. LUBRICATION --

(A) Motor: The motor is equipped with oilless bearing and requires no lubrication.

(B) Turntable Spindle Bearings: Are lubricated at the factory and do not require any lubrication for one year. After one year they should be oiled with 1 or 2 drops of a light grade oil.

The top bearing can be oiled by lifting off turntable. Make sure when replacing turntable to see that pin in Turntable Spindle slips into slot on bottom surface of Turntable hub and also care should be taken not to injure Rubber Idler Drive Wheel.

Never under any circumstance allow oil to come in contact with Rubber Idler Drive Wheel.

(C) Squeak Due To Records Rubbing On Turntable Spindle: This can be eliminated by gently lining up the stack of records.

SERVICE NOTES

1. ADJUSTMENT FOR REST POSITION OF TONE ARM --

(A) Swing tone arm outward until tone arm lever assembly, (Item 19, Fig. 1) latches with tone arm latch lever, (Item 18, Fig. 1) which is held to tone arm shaft, (Item 77, Fig. 1) by two setscrews.

(B) Make sure these setscrews are tight and that there is a slight play between the tone arm lever assembly and the panel, (Item 5, Fig. 1). This will give proper clearance at ball race assembly, (Item 74, Fig. 3).

The tone arm lever assembly, (Item 19, Fig. 1) is held against tone arm latch lever, (Item 18, Fig. 1) by the tension of tone arm locator lever spring, (Item 16, Fig. 1).

(C) Next loosen the clamping screw in the Swivel Bracket Assembly (Item 46, Fig. 3.)

(D) Now move tone arm, (Item 60, Fig. 4) until its outside edge is 1/8" from the outside edge of the panel (Item 5, Fig. 1) and retighten screw securely.

2. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE AT END OF RECORD --

(A) Worn or Damaged Stop Groove: If the stop groove in the record is worn out or damaged, discard such a record.

(B) Cut-off Adjustment May Be Incorrect: The Record Changer should go into its changing cycle when the needle enters the stop groove and has traveled to within a distance of 1-7/8" from the center of the turntable shaft.

(4)

If the Record Changer does not go into its changing cycle when the needle has reached the above mentioned distance, the Tone Arm Trip Lever Shoe, (Item 23, Fig. 1), should be moved toward the outside edge of the panel. To do this, it is necessary to loosen the thumb nut, (Item 22, Fig. 1), and then retighten after adjustment has been made.

If the Record Changer goes into its changing cycle before the needle has reached a distance of 1-7/8" from the center of the turntable, the Tone Arm Trip Lever Shoe should be moved inward toward the center of the Record Changer.

3. RECORD CHANGER DOES NOT GO INTO ITS CHANGING CYCLE WHEN SWITCH KNOB IS TURNED ON --

When the switch is turned to "ON" the Record Changer should start its changing cycle. If it does not, the following points should be checked.

   1. Make sure motor is running.
   2. Check Trip Rod, (Item 32, Fig. 1), to make sure it releases Trip Lever Assembly, (Item 20, Fig. 1), from Engagement Clutch Cam Assembly, (Item 79, Fig. 2), when Switch Knob is being turned on. If Trip Lever Assembly is not released, Trip rod should be shortened by bending until Trip Lever clears Engagement Clutch Cam Assembly, when Switch Knob is turned.
   3. Make sure that Clutch Reset Pawl, (Item 40, Fig. 2,) clears Drive Link Assembly, Item 31, Fig. 1.

4. RECORD CHANGER CONTINUES TO REPEAT ITS CHANGING CYCLE WITHOUT PLAYING RECORDS --

(A) Trip Lever Assembly, (Item 20, Fig. 1) does not latch in Engagement Clutch Cam Assembly (Item 79, Fig. 2), which may be due to causes listed below:

   1. Trip Rod (Item 32, Fig, 1), may be bent so that it is too short, holding Trip Lever Assembly fron contacting Engagement Clutch Cam Assembly.
   2. Springs (Item 24 or 35, Fig. 1) may be disconnected.

5. NO SOUND WHEN NEEDLE IS ON MOVING RECORD --

   1. Muting switch (Item 26, Fig. 1), may be out of adjustment. The contacts of this switch should be open whenever its long blade is not resting on the shoe of the Engagement Clutch Cam Assembly (Item 79, Fig. 2). If the contacts remain closed after the long blade has left the shoe, they should be adjusted by bending until there is a separation of approximately 1/32".

      Switch should be checked to make sure contacts are closed when long blade is resting on the shoe of the Engagement Clutch Cam Assembly.
   2. The lugs on the Muting switch may have been bent together.
   3. Pickup cartridge in Tone Arm may have been damaged or may be defective.

6. TONE ARM ADJUSTMENTS FOR 12" RECORDS --

   1. Turn both Control Knobs until the arrows marked "12" are pointing toward the center of the turntable.

2. Place a twelve inch record on the turntable.
3. Start Record Changer and note where needle contacts record. Correct contacting is about 1/8" from the outside edge of record.
4. Set Rod (Item 56, Fig. 3) is operated by Selector Arm (Item 61, Fig. 4). The 12" Set Link (Item 10, Fig. 1) operates as a stop when Record Changer is set for 12" records. When Tone Arm Locator Assembly (Item 12, Fig. 1) contacts 12" Set Link the Tone Arm should be in the correct position to play a 12" reocrd.

   If at this point, the position of Tone Arm is incorrect, loosen the screw which holds the Tone Arm Locator Shoe 12" Item 14, Fig. 1) and move in either direction as required and tighten screw.

7. TONE ARM ADJUSTMENTS FOR 10" RECORDS --

1. Turn both knobs until the arrows marked "10" are pointing toward the center of the turntable.
2. Place a 10" record on the turntable and start Record Changer.
3. Note where needle contacts record. Correct contacting is about 1/8" from the outside edge of record. If contacting of needle is not correct as mentioned, loosen the screw which holds Tone Arm Locator Shoe 10" (Item 15, Fig. 1) and slide shoe in or out as required, then tighten screw.

8. TONE ARM HEIGHT ADJUSTMENTS --

Set the Record Changer for ten-inch records, turn Switch to "ON" and allow Record Changer to go thru a changing cycle with no record on the Turntable. The clearance between Turntable and the bottom surface of the Tone Arm should be approximately 1/8". Usually this clearance can be obtained by adjusting the Tone Arm Adjustment Screw (Item 70, Fig. 3). It is well to check the following points before making any adjustment.

Check clearance between Roller (Item 51, Fig. 3) and Selector Crank Shaft Assembly (Item 7, Fig. 1). There should be approximately 1/32" clearance at this point. If the clearance is greater, it would be due to the pressure on the Spring Washer (Item 50, Fig. 3) being too great. This will prevent the Tone Arm Lifter Reset Spring (Item 82, Fig. 3) from returning the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) sufficiently. To relieve the pressure on the Spring Washer, lower the Selector Shaft Collar (Item 6, Fig. 1) slightly.

9. TONE ARM LOWERS ON RECORD TOO SUDDENLY --

If the Tone Arm lowers too suddenly, the Spring Washer (Item 50, Fig. 3) which is located between the Tone Arm Lifter Link Assembly (Item 81, Fig. 2) and Selector Shaft Crank Assembly Post (Item 7, Fig. 1) is not under sufficient pressure. The setscrews in the Selector Shaft Collar (Item 6, Fig. 1) should be loosened and the Selector Shaft Collar pressed upward slightly and set screws tightened.

NEEDLE DRAGS ACROSS RECORD:

If the needle drags across the record, the long portion of the Tone Arm Lever Assembly (Item 19, Fig. 1) is contacting the pin on the top side of the gear assembly (Item 4, Fig. 1) and is being moved by it. The remedy is to bend the long portion of the Tone Arm Lever Assembly upward so that it clears the pin.

In some radios models the lever may be reached without removing the record changer from the cabinet; however, if easy access is not possible, removal of the complete record changer is recommended.

TONE ARM LANDS IMPROPERLY ON BOTH 10" AND 12" RECORDS:

If the Tone Arm lands improperly on one size of record but properly on the other size, the adjustments described under 6 or 7 of "Service Notes" should be made. Improper landing on both 12" and 10" records is due to a dislocated Tone Arm. This may be remedied by loosening the screw located on the Tone Arm Swivel Bracket (Item 46, Fig. 3) and moving the Tone Arm to the proper position and then retightening the screw. A rough check as to the proper position is to place the Tone Arm in its rest position and see if the outside of the Tone Arm is flush with the edge of the Motorboard. The two set screws on the Tone Arm Shaft (Item 77, Fig. 2) should be checked to see if they are tight.

ALIGNMENT PROCEDURE
MODELS 11-5W1 TO 11-5W9 & 12-4D1 TO 12-4D9

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

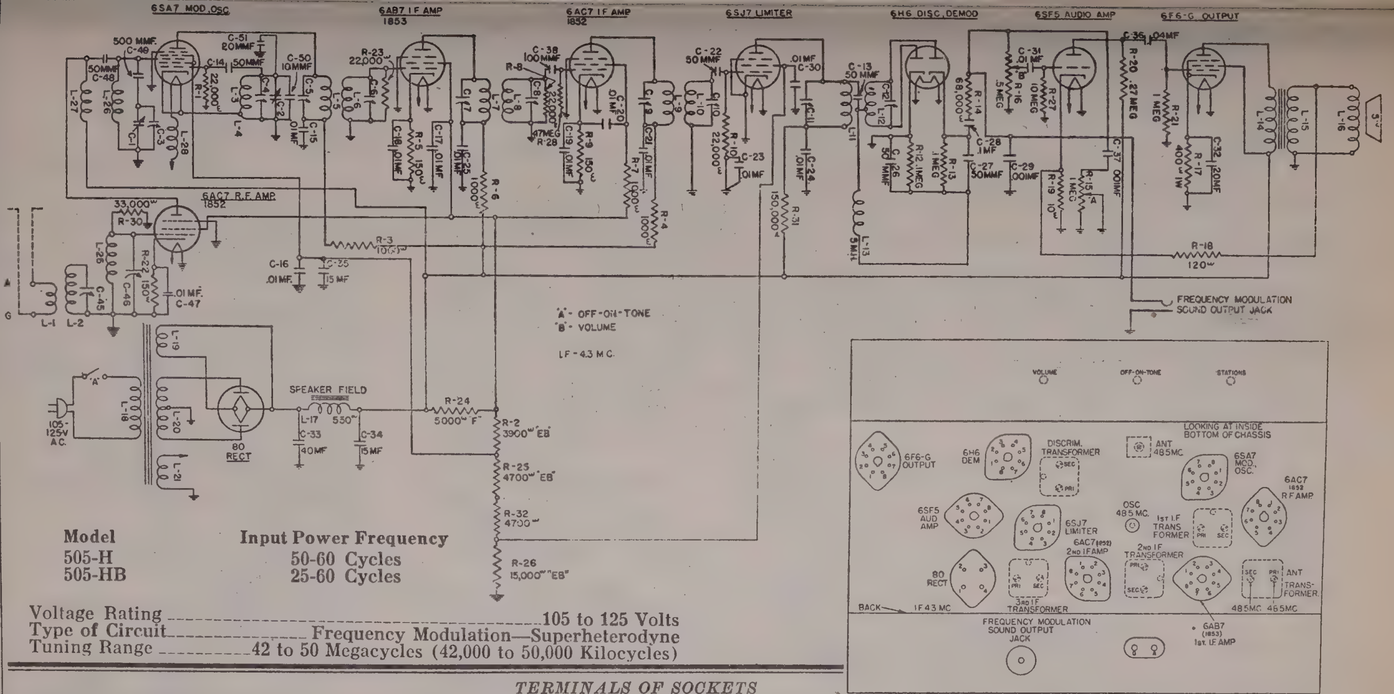
1. Connect the output meter across the voice coil or between the plate of the 1A5GT** output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the Black Wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	*Control Grid of 1A7GT	455 KC	Any Point Where It Does Not Affect Signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	Tune To 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.

ON CHASSIS 11-5W --- *CONNECT TO GANG-COND. FRONT-SECTION LUG   ** 6F6G output tube

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 505H,
505HB



Model
505-H
505-HB

Input Power Frequency
50-60 Cycles
25-60 Cycles

Voltage Rating ....105 to 125 Volts
Type of Circuit...............Frequency Modulation—Superheterodyne
Tuning Range ....42 to 50 Megacycles (42,000 to 50,000 Kilocycles)

TERMINALS OF SOCKETS

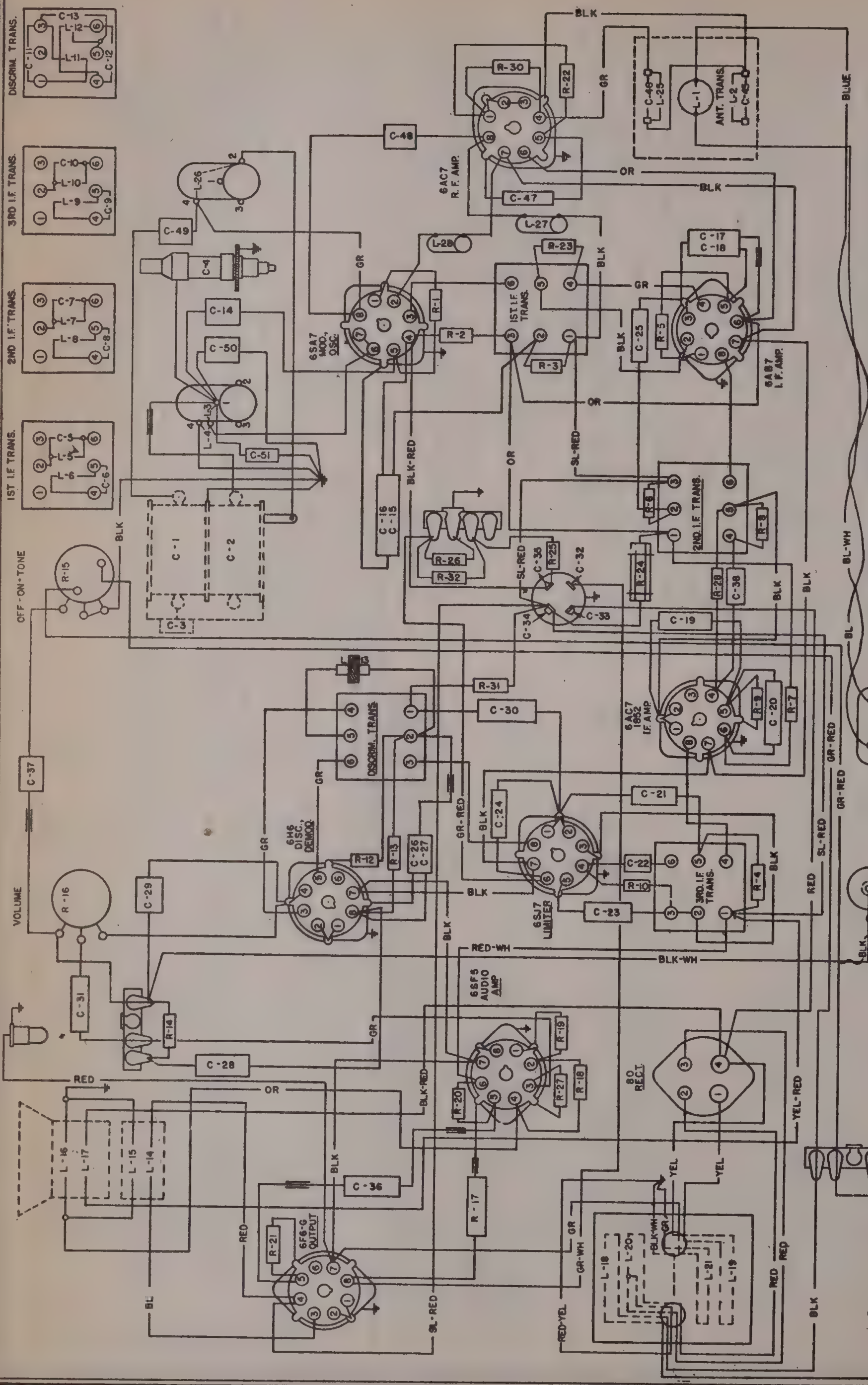
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8
6AC7	R. F. Amp.	—	0	0	0	0	+2*	+75	6.3	+220
6SA7	Osc. and Mod.	—	0	0	+240	+90	0	0	6.3	0
6AB7	1st I. F. Amp.	—	0	0	0	0	+2*	+75	6.3	+230
6AC7	2nd I. F. Amp.	—	0	0	0	0	+2*	+145	6.3	+230
6SJ7	Limiter	—	0	0	0	0	0	+50	6.3	+57
6H6	Demod. (Discr.)	—	0	0	0	0	−10*	0	6.3	0
6SF5	Audio Amp.	—	0	0	0	0	+90	+245	6.3	0
6F6G	Output	—	0	0	+230	+245	0	0	6.3	+15*
80	Rectifier	—	+300	310	310	+300	—	—	—	—

*Read on lowest possible scale of voltmeter.

ALIGNMENT FOR MODEL 505 IS THE SAME AS THE F-M ALIGNMENT OF MODEL 515 WITH THE EXCEPTIONS AS NOTED.
ALSO SEE NOTES ON USING MODEL 505 AS A CONVERTER AND ON PLAYING RECORDS

MODELS 505H
505HB

STROMBERG-CARLSON TEL. MFG. CO.



ADJUSTING DIAL LAMP. One dial lamp is used to illuminate the dial on the No. 505 Receiver. To adjust the dial lamp for proper illumination of the dial, slide the lamp socket back and forth on its mounting bracket until maximum illumination is obtained.

Input Power Rating (120 Volt line)------79 Watts
Intermediate Frequency------4.3 Megacycles (4300 Kilocycles)
Speaker Voice Coil Impedance at 400 Cycles------Approximately 5 Ohms
Speaker Field Coil Resistance------Approximately 550 Ohms

©John F. Rider, Publisher

Important. Before proceeding to align the frequency modulation chassis of this receiver tune the receiver to 48.5 megacycles and mark this point with a pencil on the large pulley of the frequency modulation chassis. Carefully remove the drive cord from this pulley noting the relation of the point marked with the setting of the variable capacitor.

This note applies only to Model 515

I. **Discriminator Adjustment.** (Frequency Modulation)

1. Tune the set to the extreme low frequency, plates of variable capacitor all the way in.
2. Connect the center "O" microammeter with a one megohm resistor in series across the whole discriminator load from the high side of R-13 to ground.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce an unmodulated signal of 4.3 megacycles to the grid (Terminal No. 4) of the 6SJ7 limiter tube using a 0.1 microfarad capacitor in series with the output lead of the signal generator. (Approximately one volt signal is necessary).
5. Adjust the secondary of the discriminator transformer for "O" reading of the microammeter.
6. Remove the microammeter and one megohm resistor from the high side of R-13 Resistor and connect them across one half of the discriminator load (from ground to the junction of the two 100,000 ohm resistors R-12 and R-13).
7. Adjust the primary of the discriminator transformer for maximum reading of the microammeter.

   NOTE: To check for correct adjustment of the discriminator circuit connect the center "O" microammeter across the whole discriminator load, noting that the microammeter reads "O". If a discrepancy exists it may be corrected by readjusting the secondary trimmer for "O" reading of the microammeter, then tune the receiver on either side of 4.3 megacycles, noting that the reading of the microammeter is approximately the same on either side of "O". If a discrepancy exists it may be corrected by adjusting the primary trimmer for maximum swing of the microammeter on either side of "O".

II. **Intermediate Frequency Adjustments.** (Frequency Modulation)

Important: All intermediate frequency adjustments are made using the same unmodulated signal of 4.3 megacycles. Each I. F. stage must be adjusted independently and in the order given. **Do not make any overall adjustments after the previous stage is aligned.**

*1. Disconnect the jumper wire from the low side of the limiter grid resistor (R-10) and connect the microammeter directly to this wire without using the one megohm resistor.

1. Disconnect the 10000 ohm resistor (R17) from ground and connect the microammeter between the resistor and ground.
2. Connect the output lead from the signal generator with the 0.1 microfarad capacitor in series to the grid of the 6AC7 second I. F. tube (Terminal No. 4).
3. Adjust the secondary of the third I. F. transformer for maximum reading of the microammeter.
4. Adjust the primary of the third I. F. transformer for maximum reading of the microammeter.
5. Connect the output lead from the signal generator with the 0.1 microfarad capacitor in series to the grid of the 6AB7 first I. F. tube (Terminal No. 4).
6. Adjust the secondary of the second I. F. transformer for maximum reading of the microammeter.
7. Adjust the primary of the second I. F. transformer for maximum reading of the microammeter.
8. Disconnect the green wire to the R. F. coil from the grid terminal of the 6SA7 modulator tube (Terminal No. 8), connect a 150000 ohm resistor from Terminal No. 8 to ground, and connect the output lead from the signal generator with the 0.1 microfarad capacitor in series to this terminal.
9. Adjust the secondary of the first I. F. transformer for maximum reading of the microammeter.
10. Adjust the primary of the first I. F. transformer for maximum reading of the microammeter.

III. **Radio Frequency Adjustments.** (Frequency Modulation)

(Leave the signal generator connected to the grid of the 6SA7 tube in the same manner as when adjusting the first I. F. transformer).

1. Set the signal generator frequency and the receiver tuning dial to exactly 48.5 megacycles.
2. Adjust the oscillator aligning capacitor (air trimmer) for maximum reading of the microammeter.
3. Remove the output lead and the 0.1 microfarad capacitor in series with it from the grid of the 6SA7 tube and re-solder in its original position the wire which was removed from this terminal. Remove the 150,000 ohm resistor.
4. Remove the green wire from the grid of the 6AC7 R. F. tube (Terminal No. 4) and connect the output lead from the signal generator with a 0.1 microfarad capacitor in series with it to this terminal. Adjust the R. F. Aligning Capacitor for maximum reading of the microammeter. A slight adjustment of the oscillator (air trimmer) may also be made at this point to obtain maximum reading of the microammeter. Resolder the green wire in its original position.
5. Replace the 0.1 microfarad capacitor in series with the output lead from the signal generator with a 100 ohm carbon type resistor and connect it to the antenna terminal of the receiver.
6. Adjust the antenna aligning capacitor for maximum reading of the microammeter.
7. Check for correct antenna circuit adjustment by setting the signal generator and tuning the receiver to 42 megacycles, noting that the sensitivity is approximately the same as at 48.5 megacycles. If a discrepancy exists the secondary of the antenna transformer may be adjusted to obtain maximum reading of the microammeter. Set the signal generator frequency and the receiver tuning dial to 48.5 megacycles and readjust both the primary and secondary of the antenna transformer for maximum reading of the microammeter.
8. Re-solder the 10000 ohm resistor (R17) to its original position.

*8. Re-solder the jumper wire to the low side of the limiter grid resistor (R-10).

* Apply to Model 505

ALIGNMENT DATA FOR A-M CHASSIS AND OTHER
NOTES BELOW APPLY ONLY TO MODEL 515

IV. **Intermediate Frequency Adjustments.** (Amplitude Modulation)

1. Set the range switch to Standard Broadcast position.
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the grid cap of the 6A8 tube, using a 0.1 microfarad capacitor in series with the output lead of the signal generator. (Do not remove the grid clip from this tube.)
5. Adjust the I. F. Aligners for maximum output in the following order:
   - A. Secondary of second I. F. transformer.
   - B. Primary of second I. F. transformer.
   - C. Secondary of first I. F. transformer.
   - D. Primary of first I. F. transformer.

V. **Radio Frequency Adjustments.** (Amplitude Modulation)

Short Wave Range (C Band)

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator with a 400 ohm carbon type resistor, and connect it to the antenna terminal of the chassis.
2. Set the range switch to the short-wave range (C Band).
3. Set the signal generator frequency and the receiver tuning dial to 6 megacycles.
4. Adjust the 6 megacycles oscillator and antenna (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 17 megacycles.
6. Adjust the 17 megacycles oscillator and antenna aligning capacitors for maximum signal.
7. Repeat operations three and four.
8. Repeat operations five and six.

Standard Broadcast Range (A Band)

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the Standard Broadcast Range (A Band).
3. Set the signal generator frequency and the receiver tuning dial to 600 Kc.
4. Adjust the 600 Kc. oscillator, Bi-Resonator and antenna (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 1500 Kc.
6. Adjust the 1500 Kc. oscillator, Bi-Resonator and antenna aligning capacitors for maximum signal.
7. Repeat operations three and four.
8. Repeat operations five and six.

VI. **Wave Trap Adjustment.**

(Leave the receiver connected in the same manner as when adjusting the Standard Broadcast Range (A Band)).

1. Tune set to 1000 Kc.
2. Set the signal generator frequency to 455 Kc. and introduce a fairly strong modulated signal to the receiver.
3. Adjust the wave trap aligner for minimum signal.

REMOVING THE CHASSIS FROM CABINET

Do not remove the chassis from the shelves; instead, remove the chassis and shelf assembly by taking out the six wood screws from the top shelf and the four wood screws from the bottom shelf, thus removing chassis and shelves as a unit.

ADJUSTING DIAL LAMP

The dial on this receiver is edge lighted, and for proper illumination it is very important that the dial light be adjusted so that the filament is exactly opposite the edge of the glass.

To make this adjustment simply slide the pilot light socket back and forth on its mounting bracket until maximum illumination is obtained.

INSTRUCTIONS FOR SETTING UP PUSH BUTTONS

IMPORTANT: The stations selected should be the local or favorite stations which give good reception at all times.

Set up stations in the daytime to avoid unnecessary interference.

Allow the set to run for about twenty minutes before setting up stations.

Always use the tuning indicator unit when setting up stations in order to determine when the station is exactly in tune.

1. Remove the dial escutcheon by removing the screws and pulling downward and outward.
2. Put the call letters of the selected stations in place above the push buttons. The stations should be arranged according to frequency with the highest frequency at the right and the lowest frequency at the left, just as on the dial. (The call letters will be found inside the envelope stapled inside or underneath the cabinet.)
3. Tune in manually the highest frequency station to be set up and note carefully the program being transmitted.
4. Turn the range switch to the push button position and push the highest frequency button.
5. Using a very small screwdriver adjust the slot in the inner screw until it coincides with the slot in the outer screw.
6. Using a larger screwdriver, adjust both screws at the same time until the desired station is tuned in as well as possible.
7. Using the small screwdriver again, adjust the small inner screw for maximum closing of the tuning indicator. (Be sure the outer screw does not move while adjusting the inner screw.)
   Operations 5, 6 and 7 can be greatly simplified by using Stromberg-Carlson SD-70 Adjusting Tool which is a double screwdriver designed to fit both of these screws at the same time.
8. Set up the other stations in the same manner.
9. Recheck the adjustment of each adjusting screw.

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned manually to 1000 Kc. or 47 Mc.—no signal.

Use a line voltage of 120 volts, or make allowance for the variation.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all D. C. readings on the 500 volt scale except when an asterisk appears.

Read from indicated terminals to chassis base.

See location chart for position of terminals.

A. C. voltages are indicated by italics.

To measure voltages of 6AF6G tube remove the metal cover on the tuning indicator socket and read from indicated terminals.

			TERMINALS OF SOCKETS							
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8
AMPLITUDE MODULATION CHASSIS										
6A8	Mod. and Osc.	0	0	0	+250	+110	—8*	+173	*6.3*	+3*
6K7	I. F. Amp.	0	0	0	+253	+108	+4*	—	*6.3*	+4*
6H6	Dem. and A. V. C.	—	0	0	0	0	0	0	*6.3*	0
6SQ7	Audio Amp.	—	0	0	0	0	0	+108	*6.3*	0
6SQ7	Audio Inv.	—	0	0	0	0	0	+108	*6.3*	0
6V6G	Output	—	0	0	+250	+254	0	—	*6.3*	+14
6V6G	Output	—	0	0	+250	+254	0	—	*6.3*	+14
6AF6G	Tuning Indicator	—	—	0	+52	+110	+220	—	*6.3*	+90
80	Rectifier	—	+382	*375*	*375*	+382	—	—	—	—
—	Speaker Socket	—	—	+382	0	0	+382	+382	—	—
FREQUENCY MODULATION CHASSIS										
6AC7	R. F. Amp.	—	0	0	0	0	+2*	+148	*6.3*	+230
6SA7	Mod. and Osc.	—	0	0	+240	+90	0	0	*6.3*	0
6AB7	1st I. F. Amp.	—	0	0	0	0	+2*	+148	*6.3*	+230
6AC7	2nd I. F. Amp.	—	0	0	0	0	+2*	+145	*6.3*	+230
6SJ7	Limiter	—	0	0	0	0	0	+50	*6.3*	+57
6H6	Demod. (Discr.)	—	0	0	0	0	—10*	0	*6.3*	0
6SK7	Tun. Ind. Amp.	—	0	0	0	0	0	+275	*6.3*	+275
80	Rectifier	—	+300	*310*	*310*	+300	—	—	—	—

*Read on lowest possible scale of voltmeter

5 volts AC between terminals 1 and 4 of rectifier sockets (No. 80 tube)

PLAYING RECORDS. To obtain the best quality of phonograph reproduction, a Stromberg-Carlson record player is recommended. They are designed for use with this receiver and all that is necessary is to connect the record player to the single prong socket provided in the chassis, operate the "Radio-Phono" switch located on the back of the chassis to "Phono" position, push in the frequency modulation button on the front of the receiver and proceed to operate. The volume and tone may be controlled with the controls at the receiver or (if such is provided), the volume control on the record player may be used.

A low impedance pick-up may be used, but a matching transformer must be placed between the phonograph pick-up and the chassis.

USING THE 505 RECEIVER AS A CONVERTER. This receiver may be used as a converter so that the audio system of a good high fidelity receiver of the ordinary amplitude modulation type may be utilized to provide the type of high fidelity reception only possible with frequency modulation.

It is only necessary to connect the single pin jack on the back of the chassis (labeled Frequency Modulation Sound Output Jack) to the Phono Input of any other receiver or sound system by means of the cord provided.

•In this way, the speaker of the 505 Receiver will act as a "tweeter" or treble speaker and the speaker system of the amplitude modulation receiver will serve as the bass speaker. The balance between the two speakers can be controlled by operating the two volume controls.

PLAYING RECORDS. To obtain the best quality of phonograph reproduction, a Stromberg-Carlson record player is recommended. If this set is used as a converter, the phonograph should be attached to the amplitude modulation receiver in the regular way. (The installation of a simple switch will eliminate plugging and unplugging).

If this set is used as a receiver, the sound output jack may be readily converted to a phonograph input jack by removing the black-white wire which comes from this jack from the terminal block to which it is connected and connecting it to the high side of the volume control (this is the terminal on the volume control to which resistor R-11 is attached).

After this has been done, it is only necessary to plug in a record player, tune to a quiet place on the dial and proceed to operate.

MODELS 505 and 515

WEAK OR NO SIGNAL ON F-M BAND

Remove R8 (22,000 ohms) connected between 2nd i-f transformer and ground. If regeneration or oscillation occurs afterwards, connect 22,000-ohm resistor between the secondary of 2nd i-f transformer (terminals 4 and 5) and ground.

CONTINUITY TEST

Remove all tubes and disconnect the receiver from the power supply before making continuity test.

Test speaker socket with speaker left out.

Leave speaker plug in socket for all other tests of the amplitude modulation chassis.

Use a good meter capable of measuring up to several megohms.

The resistances given are often approximate owing to electrolytic capacitors in the circuit. When this is the case, be sure to reverse the test-leads and read th highest resistance.

Read from indicated terminals to chassis base unles otherwise specified.

See location chart on Page 5 for position and numbering of terminals.

			TERMINALS OF SOCKETS							
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8
AMPLITUDE MODULATION CHASSIS										
6A8	Mod. and Osc.	3M	S	S	20000¶	200000¶	48000¶	200000¶	S	270¶
6K7	I. F. Amp.	3M	S	S	19000¶	200000¶	390¶	200000¶	S	390¶
6H6	Dem. and A. V. C.	—	S	S	500000¶	S	500000¶	20000¶	S	S
6SQ7	Audio Amp.	—	S	10M	S	S	S	300000¶	S	S
6SQ7	Audio Inv.	—	S	10M	S	S	S	300000¶	S	S
6V6G	Output (A)	—	S	S	16000¶	16000¶	270000¶	100000¶	S	200¶
6V6G	Output	—	S	S	16000¶	16000¶	400000¶	O	S	200¶
6AF6G	Tuning Indicator	—	O	S	O	200000¶	16000¶	O	S	6500¶
80	Rectifier	—	19000¶	100¶	120¶	19000¶	—	—	—	—
—	Speaker Socket	—	100000¶ or Greater	S	S	O	100000¶ or Greater	O	16000¶	—
FREQUENCY MODULATION CHASSIS										
6AC7	R. F. Amp.	—	S	S	S	S	150¶	15000¶	S	15000¶
6SA7	Mod. and Osc.	—	S	S	30000¶	20000¶	20000¶	S	S	S
6AB7	1st I. F. Amp.	—	S	S	S	3¶	150¶	15000¶	S	15000¶
6AC7	2nd I. F. Amp.	—	S	S	S	500000¶	150¶	B	S	30000¶
6SJ7	Limiter	—	S	S	S	32000¶	S	15000¶	S	15000¶
6H6	Demod. (Discr.)	—	S	S	100000¶	S	100000¶	O	S	200000¶
6SK7	Tun. Ind. Amp.	—	S	S	S	2.2M	S	40000¶	S	40000¶
80	Rectifier	—	29000¶	250¶	250¶	29000¶	—	—	—	—

Symbols used on chart are as follows: ¶—ohms; M—megohms; S—short; O—open

A. 6V6G tube socket nearest to the front of the chassis

B. Radio-Phono switch in "Radio" position .... 24,000 ohms
Radio-Phono switch in "Phono" position .... "open"

Other Tests Not Shown on Chart
(Amplitude Modulation Chassis)

Antenna terminal to chassis base	75 ohms
Ground terminal to chassis base	"short"
Audio connector socket to chassis base	"open"
Between terminals of A. C. plug:	
A. C. switch open	"open"
A. C. switch closed	5 ohms
Terminals of A. C. plug to chassis base	"open"

R. F. coil tests measured directly across R. F. coil terminals with range switch in standard broadcast position. ("A" Range)

L3—.8 ohm; L4—.8 ohm; L5—.1 ohm; L6—3 ohms; L7—.3 ohm; L8—4 ohms; L9—.1 ohm; L10—"short"; L11—.1 ohm; L12—"short".

Other Tests Not Shown on Chart
(Frequency Modulation Chassis)

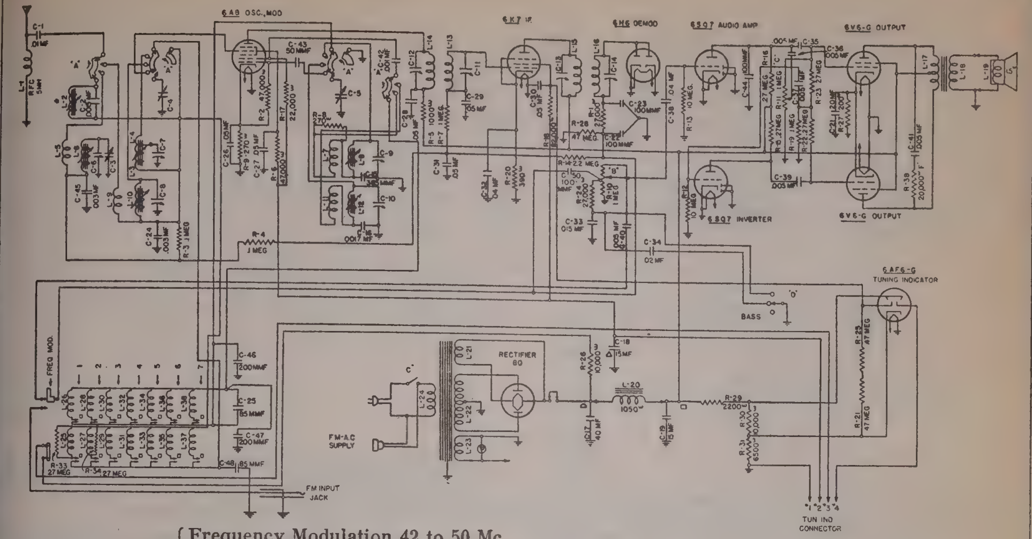
Antenna terminal to chassis base	"open"
Ground terminal to chassis base	"short"
Phono jack to chassis base	"open"
Terminals of A. C. plug to chassis base	"open"
Between terminals of A. C. plug	9 ohms
Relay socket to chassis base:	
Terminal No. 1	40,000 ohms
Terminal Nos. 2 and 3	"open"
Terminal No. 4	"short"
Audio connector plug to chassis base:	
Prong of plug	"open"
Shield of plug	"short"
Between prong of audio connector plug and contact of phono jack:	
Radio-Phono switch in "Phono" position	"short"
Radio-Phono switch in "Radio" position	"open"

R. F. coil tests measured directly across R. F. coil terminals.

L1 — .2 ohm; L2 — "short"; L3 — "short"; L4—"short"; L13—55 ohms.

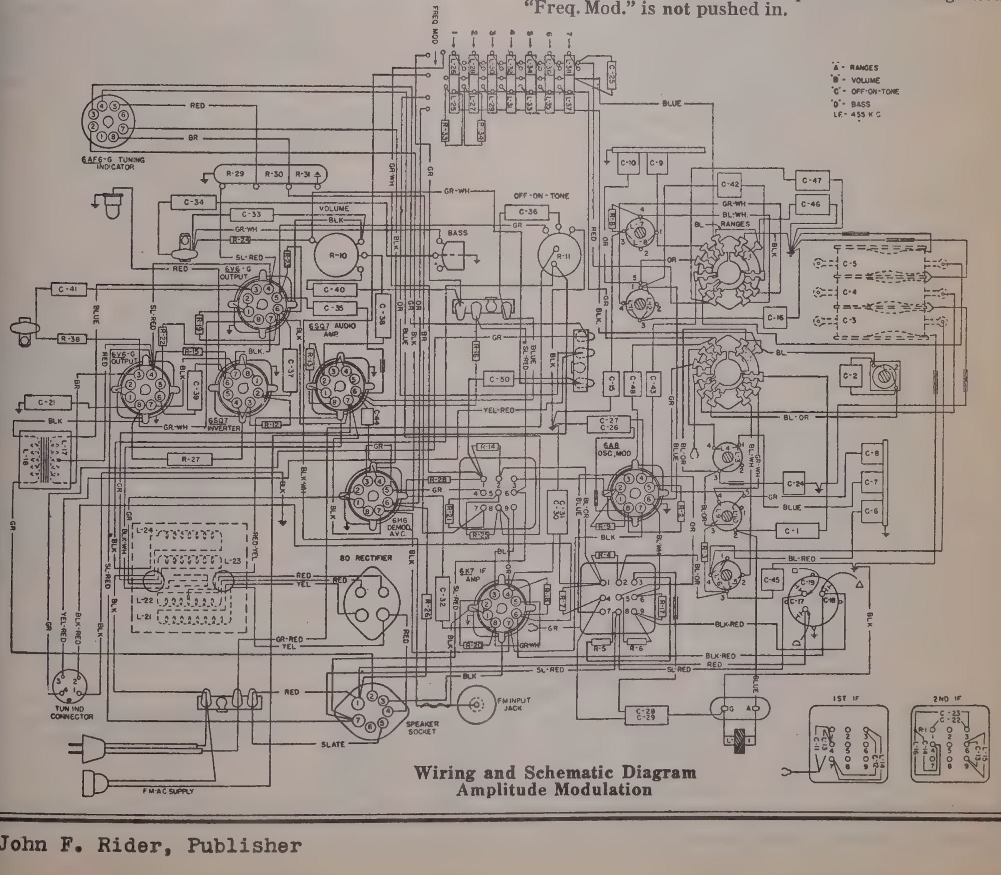
STROMBERG-CARLSON TEL. MFG. CO.

MODEL 515M
Ch. AM



Tuning Ranges	Frequency Modulation 42 to 50 Mc. Short Wave 5.8 to 18 Mc. Standard Broadcast .54 to 1.7 Mc.
Voltage Rating	105 to 125 Volts

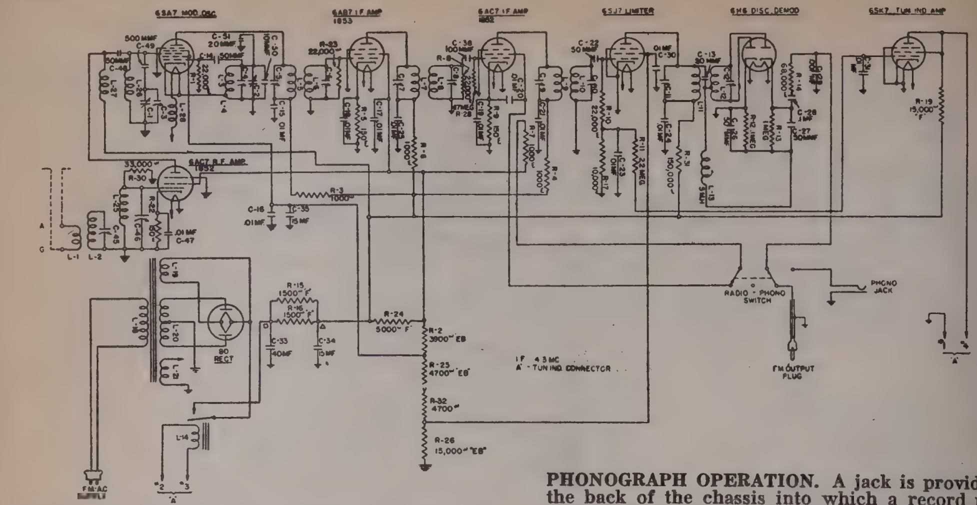
MANUAL TUNING. Important. When tuning stations manually in the Standard Broadcast or Short Wave ranges be sure that the push button designated "Freq. Mod." is not pushed in.



Wiring and Schematic Diagram
Amplitude Modulation

MODEL 515M
Ch. FM

STROMBERG-CARLSON TEL. MFG. CO.



PHONOGRAPH OPERATION. A jack is provided on the back of the chassis into which a record player may be plugged and a switch is provided next to it for switching from "Radio" to "Phonograph".

TELEVISION. Switching to phonograph also makes the audio amplifier and loud speaker available for use with television receivers designed for this type of sound reproduction.

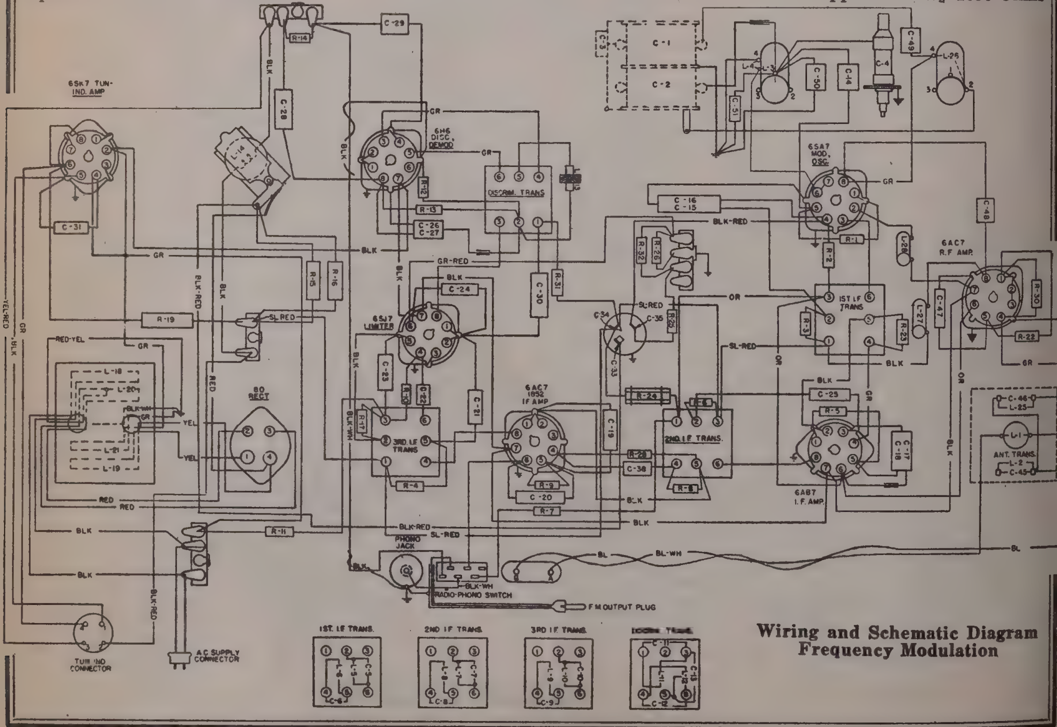
SPECIAL CIRCUITS. A tuning indicator having two apertures is used in this receiver. One aperture will operate when tuning stations in the standard broadcast and short-wave ranges and the other aperture will operate when tuning stations in the frequency modulation range. Stations should be tuned for maximum closing of the tuning indicator.

Input Power Rating ---------- 140 Watts

Intermediate Frequency ---------- { 455 Kilocycles (Amplitude Modulation) / 4.3 Megacycles (Frequency Modulation)

Speaker Voice Coil Impedance at 400 Cycles ---------- Approximately 1.5 Ohms

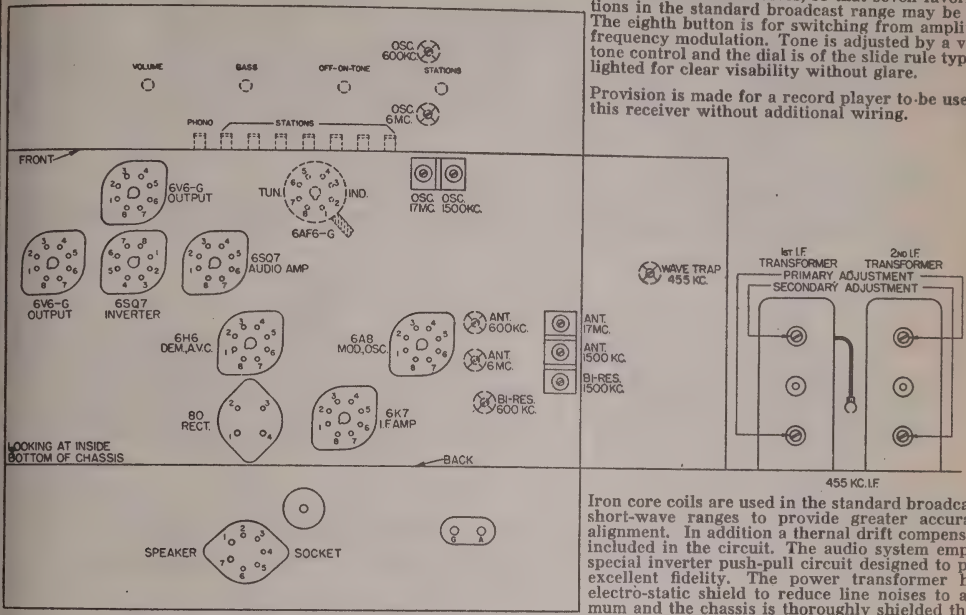
Speaker Field Coil Resistance ---------- Approximately 1050 Ohms



Wiring and Schematic Diagram
Frequency Modulation

©John F. Rider, Publisher

This is a seventeen tube, three gang, three range receiver, designed for the reception of both amplitude and frequency modulated stations.



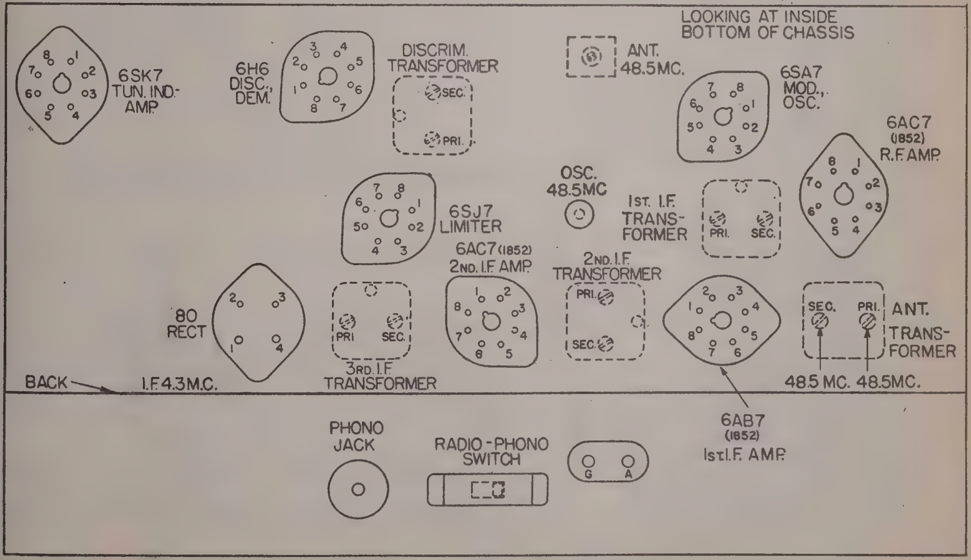
Location Chart (Amplitude Modulation)

Eight button automatic tuning is provided. The tuning unit is composed of a group of coils which are adjusted by means of iron cores, so that seven favorite stations in the standard broadcast range may be set up. The eighth button is for switching from amplitude to frequency modulation. Tone is adjusted by a variable tone control and the dial is of the slide rule type edge, lighted for clear visability without glare.

Provision is made for a record player to be used with this receiver without additional wiring.

Iron core coils are used in the standard broadcast and short-wave ranges to provide greater accuracy of alignment. In addition a thernal drift compensator is included in the circuit. The audio system employs a special inverter push-pull circuit designed to provide excellent fidelity. The power transformer has an electro-static shield to reduce line noises to a minimum and the chassis is thoroughly shielded throughout.

AUTOMATIC TUNING. An adjustable iron core coil type of automatic tuning is employed and the stations may be easily located by properly utilizing the concentric adjusting screws provided. A special tool identified as SD-70 Screwdriver will help materially in setting up the automatic tuning.



Location Chart—(Frequency Modulation)

MODEL 515-M

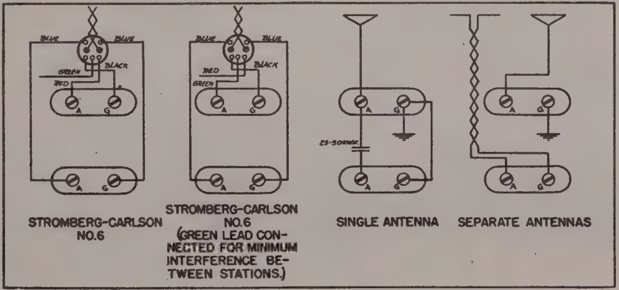
ACCESSORIES

ANTENNA. For best results use a Stromberg-Carlson No. 6 Antenna. This antenna is designed to provide improved pick-up on both the amplitude and frequency modulation bands.

If it is desired, two ordinary antennas may be used, one for amplitude modulation, which should be a straight wire "L" type antenna about 75 feet long, and one for frequency modulation. This latter antenna may be a straight wire about 40 feet in length or of the dipole type with two arms approximately 5½ feet in length. The dipole antenna will exhibit a marked directional effect and should be erected as high as possible above the ground and adjusted so as to receive the desired frequency modulated stations with best results.

For average reception, a single straight wire antenna may be used for both amplitude and frequency modulation.

The various types of antennas should be connected to the No. 515 Receiver as follows:



PARTS LIST MODEL 505

Capacitors

Piece No.	Circuit Designation	Part
24402	C-28	.1 mf. Capacitor
24405	C-36	.04 mf. Capacitor
25487	C-29, 37	.001 mf. Capacitor
27305	C-14, 22, 48	50 mmf. Capacitor
27999	C-26, 27	2—50 mmf. Capacitors
28568	C-38	100 mmf. Capacitor
31480	C-15, 16, 17, 18	2—.01 mf. Capacitors
31481	C-19, 20, 21, 23, 24, 25, 30, 31	.01 mf. Capacitor
30399	C-32, 33, 34, 35	Electrolytic Capacitor (1—40 mf., 2—15 mfs., 1—20 mf.)
32669	C-1, 2	Variable Capacitor (2 gang)
30311	C-4	Capacitor (Air Trimmer)
31377	C-51	20 mmf. Capacitor
31457	C-3, 4	Aligning Capacitor
31481	C-47	.01 mf. Capacitor
32806	C-50	10 mmf. Capacitor

Coils, Transformers and Speaker

Piece No.	Circuit Designation	Part
30332	L-13	R. F. Choke Coil
32691	L-1, 2, 25	Antenna Coil
32677	L-26	R. F. Coil
32678	L-3, 4	Oscillator Coil
32679	L-5, 6—C-5, 6	1st. I. F. Transformer
32696	L-7, 8—C-7, 8	2nd I. F. Transformer
32698	L-9, 10—C-9, 10	3rd I. F. Transformer
32681	L-11, 12—C-11, 12	Discriminator I. F. Transformer
31437	L-18, 19, 20, 21	Power Transformer, 50/60 Cycles
31438	L-18, 19, 20, 21	Power Transformer, 25/60 Cycles
31451	L-14, 15, 16, 17	Speaker Complete with Output Transformer
30528	L-16	Cone for Speaker
31453	L-14, 15	Output Transformer
32060	L-27	R. F. Choke Coil
32687	L-28	Heater Choke Coil

Controls and Knobs

Piece No.	Circuit Designation	Part
27811	R-15	Switch Off-On and Tone Control
30136	R-16	Volume Control
29297		Dial Drive Shaft
27668		"C" Washer for Dial Drive Shaft
28843		Knob

Resistors

Piece No.	Circuit Designation	Part
26309	R-19	10 ohm Resistor
26322	R-18	120 ohm Resistor
26323	R-5, 9	150 ohm Resistor
26333	R-3, 4, 6, 7	1000 ohm Resistor
26341	R-32	47,000 ohm Resistor
26349	R-1, 10, 23	22,000 ohm Resistor
26351	R-30	33,000 ohm Resistor
26355	R-14	68,000 ohm Resistor
26357	R-12, 13	.1 megohm Resistor
26359	R-31	.15 megohm Resistor
26362	R-20	.27 megohm Resistor
26365	R-28	.47 megohm Resistor
26369	R-21	1 megohm Resistor
26381	R-27	10 megohm Resistor
28165	R-2	3,900 ohm Resistor
28166	R-25	4,700 ohm Resistor
28172	R-26	15,000 ohm Resistor
28758	R-17	400 ohm, 1 watt Resistor
31479	R-24	5,000 ohm, 1 watt Resistor

Miscellaneous Parts

Piece No.	Circuit Designation	Part
SD-67		Dial Drive Cord
24135		Felt Foot for Cabinet
26122		Antenna and Ground Terminal Strip
28632		Power Supply Cord
28694		Pilot Lamp Socket Assembly
28695		Dial Pointer
29137		Pulley Assembly
29479		Screw for Dial Escutcheon
29628		Spring for Dial Drive Cord
29956		Pilot Lamp
30151		8-Prong Tube Socket
30153		4-Prong Tube Socket
30224		F. M. Sound Output Plug
30225		Guard for F. M. Sound Output Jack
30226		F. M. Sound Output Jack
30388		Dial Escutcheon
32683		Dial
31478		Shielded Cable for Connecting to Amplitude Modulation Receiver

REPLACEMENT PARTS (FREQUENCY MODULATION)

MODEL 515-M

Capacitors

Piece No.	Circuit Designation	Part
24402	C-28	.1 mf. Capacitor
25487	C-29, 37	.001 mf. Capacitor
27305	C-14, 22, 48	50 mmf. Capacitor
27999	C-26, 27	2—50 mmf. Capacitors
28568	C-38	100 mmf. Capacitors
29283	C-52	15 mmf. Capacitor
30311	C-4	Air Trimmer
31377	C-51	20 mmf. Capacitor
31480	C-15, 16, 17, 18	2—.01 mf. Capacitors
31481	C-19, 20, 21, 23, 24, 25, 30, 31, 47	.01 mf. Capacitor
31856	C-32, 33, 34, 35	Electrolytic Capacitor (1—40 mf., 350 V.; 1—15 mf., 300 V.; 1—15 mf., 150 V.)
32669	C-1, 2	Variable Capacitor (2 gang)
31457	C-3, 4	Aligning Capacitor
32806	C-30	10 mmf. Capacitor

Coils and Transformers

Piece No.	Circuit Designation	Part
30332	L-13	R. F. Choke Coil
32691	L-1, 2	Antenna Coil
32677	L-26	R. F. Coil
32678	L-3, 4	Oscillator Coil
32679	L-5, 6	1st I. F. Transformer
32696	L-7, 8	2nd I. F. Transformer
32681	L-11, 12	Discriminator I. F. Transformer
32698	L-9, 10	3rd I. F. Transformer
31850	L-18, 19, 20, 21	Power Transformer, 50/60 Cycles
32060	L-27	R. F. Choke Coil
32687	L-28	Heater Choke Coil

Resistors

Piece No.	Circuit Designation	Part
25526	R-19	15,000 Ohm Resistor, 1 Watt
26323	R-5, 9, 22	150 Ohm Resistor
26333	R-3, 4, 6, 7	1000 Ohm Resistor
26341	R-32	4700 Ohm Resistor
26349	R-1, 8, 10, 23	22,000 Ohm Resistor
26351	R-30	33,000 Ohm Resistor
26353	R-14	47,000 Ohm Resistor
26355	R-14	68,000 Ohm Resistor
26357	R-12, 13	.1 Megohm Resistor
26359	R-31	.15 Megohm Resistor
26365	R-11, 28	.47 Megohm Resistor
26373	R-11	2.2 Megohm Resistor
27049	R-15, 16	1,500 Ohm Resistor, 1 Watt
28165	R-2	3,900 Ohm Resistor
28166	R-25	4,700 Ohm Resistor
28172	R-26	15,000 Ohm Resistor
31479	R-24	5,000 Ohm Resistor, 1 Watt

Miscellaneous Parts

Piece No.	Circuit Designation	Part
26122		Antenna and Ground Terminal Strip
29128		Pulley Assembly
30151		8-Prong Tube Socket
30153		4-Prong Tube Socket
30224		Phono. Plug
30225		Guard
30226		Radio-Phono Jack
31512		A. C. Cord
31861		Radio-Phono Switch

REPLACEMENT PARTS (AMPLITUDE MODULATION)

Capacitors

Piece No.	Circuit Designation	Part
24405	C-32, 38	.04 mf. Capacitor
24559	C-44	100 mmf. Capacitor
24637	C-16	.0017 mf. Capacitor
25149	C-1	.01 mf. Capacitor
25150	C-34	.02 mf. Capacitor
25487	C-42	.001 mf. Capacitor
26151	C-41	.005 mf. Capacitor
27108	C-26, 27, 28, 29, 30, 31	2—.05 mf. Capacitors
27305	C-43	50 mmf. Capacitor
28594	C-33	.015 mf. Capacitor
28568	C-50	100 mmf. Capacitor
30116	C-45	.003 mf. Capacitor
30237	C-15	385 mmf. Capacitor
30322	C-35, 36, 37, 39, 40	.005 mf. Capacitor
30559	C-46, 47	200 mmf. Capacitor
30560	C-48	85 mmf. Capacitor
27685	C-21	Electrolytic Capacitor, 20 mf., 25 V.
30499	C-17, 18, 19	Electrolytic Capacitor (1—40 mf., 450 V.; 1—15 mf., 350 V.; 1—15 mf., 300 V.)
30258	C-6, 7, 8	Aligning Capacitor Assembly (3 unit)
30502	C-9, 10	Aligning Capacitor Assembly (2 unit)
30375	C-3, 4, 5	Tuning Capacitor (3 gang)

Coils, Transformers and Speakers

Piece No.	Circuit Designation	Part
30149	L-3, 4	Bi-resonator Coil
30150	L-7, 8	Oscillator Coil "A" Band
30238	L-2	Wave Trap
30232	L-1	R. F. Choke Coil
30401	L-9, 10	Antenna Coil "C" Band
30402	L-11, 12	Oscillator Coil "C" Band
30500	L-5, 6	Antenna Coil "A" Band
27134	L-17, 18	Output Transformer
30424	L-21, 22, 23, 24	Power Transformer (50/60 Cycles)
30432	L-25, 26, 27, 28, C-25	Push Button Coil and Switch Assembly
30245	L-15, 16, C-13, 14	Second I. F. Transformer
30504	L-13, 14, C-11, 12	First I. F. Transformer
30359		Speaker
30421		Cone for Speaker

Resistors

Piece No.	Circuit Designation	Part
26326	R-8, 9	270 Ohm Resistor
26328	R-20	390 Ohm Resistor
26333	R-5	1000 Ohm Resistor
26336	R-18	82,000 Ohm Resistor
26349	R-17	22,000 Ohm Resistor
26350	R-34	27,000 Ohm Resistor
26353	R-2, 6	47,000 Ohm Resistor
26357	R-7, 9, 34	.1 Megohm Resistor
26362	R-15, 16, 22, 32, 33, 34	.27 Megohm Resistor
26365	R-24, 25, 28	.47 Megohm Resistor
26373	R-14	2.2 Megohm Resistor
26381	R-12, 13	10 Megohm Resistor
26775	R-33	20,000 Ohms, 1 Watt
28956	R-27	200 Ohm Resistor, I. R. C.
30400	R-23, 30, 31	"B" Voltage Divider
30417	R-26	10,000 Ohm Resistor, Type G

Miscellaneous Parts

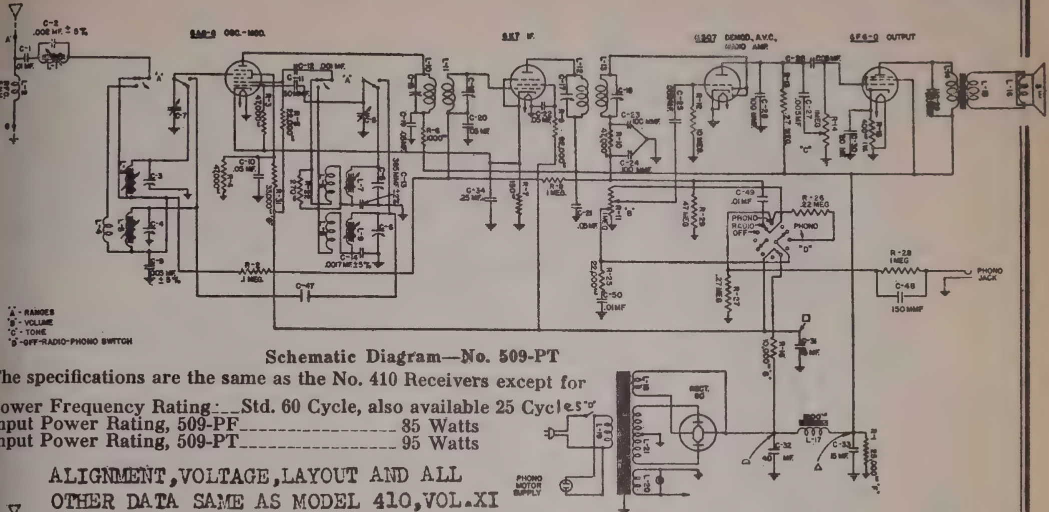
Piece No.	Circuit Designation	Part
SD-233		Dial Drive Cord
26122		Antenna and Ground Terminal Strip
26677		3-Prong Plug
27088		Spring Washer for Mounting Coils
27969		Phono. Cord and Plug
28652		Power Supply Cord
28694		Pilot Lamp Socket
29956		Pilot Lamp
32686		Dial Scale
30269		Corner Rubber for Dial Scale
30151		8-Prong Tube Socket
30152		7-Prong Tube Socket
30153		4-Prong Tube Socket
30169		Station Call Letters
30172		Dial Escutcheon

Controls and Knobs

Piece No.	Circuit Designation	Part
27311	R-11	Off-On Switch and Tone Control
29560	R-10	Volume Control
30501		Range Switch
30250		Bass Control Switch
27802		Large Tuning Knob
28827		Small Knob with Arrow
28843		Small Plain Knob
29084		Large Knob with Arrow
29461		Large Plain Knob
27628		Felt Washer for Knobs

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 509-PF
509-PFB
MODELS 509-PT
509-PTB

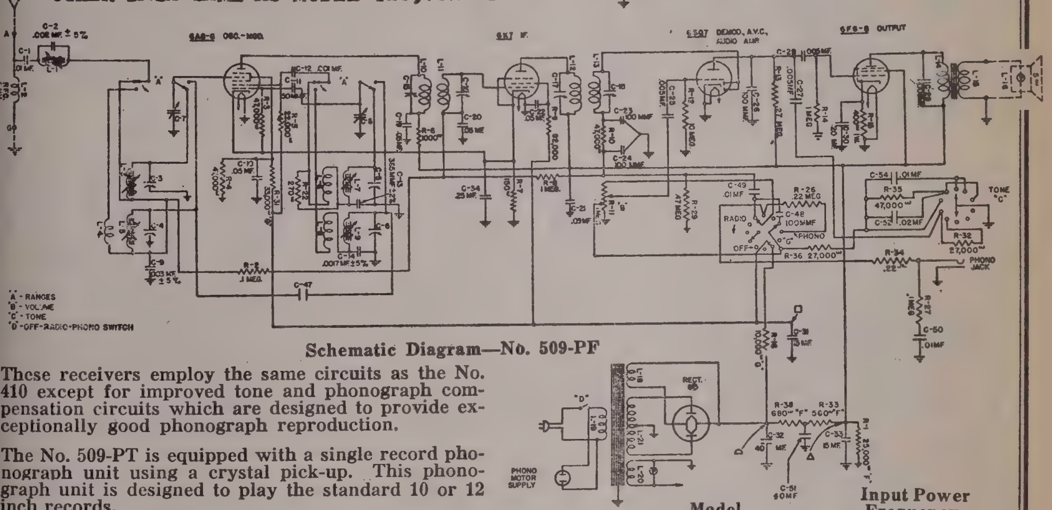


Schematic Diagram—No. 509-PT

The specifications are the same as the No. 410 Receivers except for

Power Frequency Rating:___Std. 60 Cycle, also available 25 Cycles
Input Power Rating, 509-PF________________85 Watts
Input Power Rating, 509-PT________________95 Watts

ALIGNMENT, VOLTAGE, LAYOUT AND ALL OTHER DATA SAME AS MODEL 410, VOL. XI



Schematic Diagram—No. 509-PF

These receivers employ the same circuits as the No. 410 except for improved tone and phonograph compensation circuits which are designed to provide exceptionally good phonograph reproduction.

The No. 509-PT is equipped with a single record phonograph unit using a crystal pick-up. This phonograph unit is designed to play the standard 10 or 12 inch records.

The No. 509-PF Receivers are equipped with an automatic record changer using a crystal pick-up. This record player shifts and plays the standard 10 or 12 inch records.

Model	Input Power Frequency
509-PF	60 Cycles
509-PFB	25 Cycles
509-PT	60 Cycles
509-PTB	25 Cycles

Replacement parts are the same as used on the No. 410 Receivers except for the following:

Piece No.	Circuit Designation	Part
25054	C-48	150 mmf. Capacitor, 509-PT
25150	C-52	.02 mf. Capacitor, 509-PF
26349	R-25	22,000 Ohm Resistor, 509-PT
26350	R-32, 36	27,000 Ohm Resistor, 509-PF
26353	R-35	47,000 Ohm Resistor, 509-PF
26357	R-27	.1 Megohm Resistor, 509-PF
26361	R-26 (R-37, 509-PF)	.22 Megohm Resistor
26362	R-27	.27 Megohm Resistor, 509-PT
26365	R-29	.47 Megohm Resistor
26369	R-28	1 Megohm Resistor, 509-PT
27313		Tone Control Switch, 509-PF
28568	C-48	100 mmf. Capacitor, 509-PF
29084		Knob for OFF-ON, Radio Phono. Switch
29560	R-11	Volume Control
30477	C-51	40 mf. 400 Volts, 509-PF
30566		Tone Control, 509-PT
31481	C-49, 50 (C-54, 509-PF)	.01 mf. Capacitor
32305		Speaker, 509-PF
32314		Switch OFF-ON Radio Phono.
32319	R-33	560 Ohm Resistor, 509-PF
32320	R-38	680 Ohm Resistor, 509-PF

TELEVISION. A foil is provided on the back of the chassis into which a television receiver may be plugged. Switching to phonograph makes the audio amplifier and loud speaker available for use with television receivers designed for this type of sound reproduction.

PHONOGRAPH OPERATION. A jack is provided on the back of the chassis of all receivers not already equipped with phonograph mechanism, into which a record player may be plugged, and a push button is provided on the front of the receiver for switching from "Radio" to "Phonograph".

ALIGNING INFORMATION

Never re-align unless absolutely necessary.

Use a good modulated signal generator (test oscillator with variable output voltage and a sensitive output meter across the voice coil of the speaker.)

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments inaccurate.

Always have the volume control "full on".

ALIGNING PROCEDURE. (Follow this order exactly.)

I. **Dial pointer adjustment.**

With the plates of the gang tuning capacitor fully engaged, check to be sure that the dial pointer is in a vertical position directly on the calibration marks located at the low frequency end of the dial scale. Adjust if necessary.

II. **Intermediate frequency adjustments.**

1. Set range switch to Standard Broadcast position.
2. Turn set to extreme low frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 kilocycles to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8) using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. aligners for maximum output in the following order:
   - A. Secondary of second I. F. Transformer.
   - B. Primary of second I. F. Transformer.
   - C. Secondary of first I. F. Transformer.
   - D. Primary of first I. F. Transformer.

III. **Radio frequency adjustments.**

Short Wave Range (C Band).

1. Remove the output lead of the signal generator and the 0.1 microfarad capacitor from the grid of the 6SA7 tube.
2. Disconnect the output lead from the signal generator and replace with a few turns of wire connected to the signal generator output terminals.
3. Place the signal generator two or three feet from the receiver's loop.
4. Set the range switch to the short-wave range position (C Band).
5. Set the signal generator frequency and the receiver tuning dial to 0.6 megacycles.
6. Adjust the 0.6 megacycle iron core for maximum signal.
7. Adjust the spacing of the short-wave loop leads for maximum signal.
8. Set the signal generator frequency and the receiver tuning dial to 17 megacycles.
9. Adjust the oscillator and loop aligning capacitors for maximum signal.
10. Repeat operations 5, 6, and 7.
11. Repeat operations 8 and 9.

Standard Broadcast Range (A Band).

1. Set the range switch to the "Loop" position.
2. Set the signal generator frequency and the receiver tuning dial to 600 kilocycles.
3. Adjust the 600 K. C. oscillator iron core for maximum signal.
4. Set the signal generator frequency and the receiver tuning dial to 1500 kilocycles.
5. Adjust the 1500 K. C. oscillator and loop aligning capacitors for maximum signal.
7. Repeat operations 2 and 3.
8. Repeat operations 4 and 5.

IV. **Wave Trap Adjustment** (520 Table Models only)

1. Tune the receiver to 1000 kc.
2. Set the signal generator frequency to 455 kc., and introduce a fairly strong modulated signal to the receiver.
3. Adjust the wave trap aligning capacitor for minimum signal.

INSTRUCTIONS FOR SETTING UP PUSH BUTTONS

IMPORTANT: The stations selected should be the local or favorite stations which give good reception at all times.

Set up stations in the daytime to avoid unnecessary interference.

Allow the set to run for about twenty minutes before setting up stations.

Always use the tuning indicator unit when setting up stations, in order to determine when the station is exactly in tune.

1. Turn the receiver "On".
2. Push in the "Radio" button.
3. Set the Range Switch as follows:
   - a. If an external antenna is used, set knob so arrow points to designation "ANT.".
   - b. If the built-in loop antenna is used, set knob so arrow points to designation "Loop".
4. Turn volume control about three-quarters of the way on (in a clockwise direction).
5. Pull the six station push buttons off their levers.
6. Remove the call letters of the six selected stations from the call letter sheets, which are in an envelope stapled to the cabinet. Insert the station call letters part way in the slots at the sides of the buttons. Next, insert a transparent tab in each slot in front of the station letters. Then push both the transparent tabs and the call letters all the way into the slot. A pencil eraser may be helpful.
7. Loosen the set screw of the lever to be set up.
8. Push in the lever and manually tune in the desired station, observing the tuning indicator in order to obtain exact resonance.

   IMPORTANT: For accurate set-up, be sure that the lever is pushed in, in the same manner and with the same amount of pressure as will be used when operating the push buttons.
9. Tighten the set screw. Be sure not to disturb the adjustment in any way while tightening the screw.
10. Place the proper button on the lever.
11. Check the accuracy of the adjustment by detuning the station and retuning with the button several times, pushing the button with an even pressure. Readjust if necessary.
12. Set up the other five stations in the same manner.

Tuning Ranges	A—540 to 1600 Kc., C—5700 to 18000 Kc.
Voltage Rating	A.C. 105 to 125 Volts
Input Power Rating, 520-H, J, and L	78 Watts
Input Power Rating, 520-PF	95 Watts
Input Power Rating, 520-PL, and PG	110 Watts
Intermediate Frequency	455 Kilocycles
Speaker Voice Coil Impedance at 400 Cycles	Approximately 1.5 Ohm
Speaker Field Coil Resistance	Approximately 1050 Ohms

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned manually to 1000 kc.—No signal.

Use a line voltage of 120 volts or make allowance for the variations.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all D.C. readings on the 500 volt scale except when an asterisk appears.

Read from indicated terminals to chassis base.

See location chart on page 2 for position of terminals. A.C. voltages are indicated by italics.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	0	0	0	0	+3*	+115	*6.3*	+200
6SA7	Modulator and Oscillator	0	0	+250	+115	0	0	*6.3*	0
6SK7	I. F. Amplifier	0	0	0	0	+2	+100	*6.3*	+250
6SQ7	Demodulator, A. V. C., Audio	0	0	0	0	0	+95	*6.3*	0
6V6GT	Output	0	0	+300	+250	0	0	*6.3*	+12*
6U5	Tuning Indicator	*6.3*	+90	0	+250	0	0	—	—
5Y3G	Rectifier	0	+400	0	*385*	0	*385*	0	+400
Speaker Socket	—	+310	0	0	+400	+400	0	+400	—

*Read on lowest possible scale of voltmeter

CONTINUITY TEST

CAUTION: Remove all tubes and disconnect the receiver from the power supply before making continuity test.

Test speaker socket with speaker left out. Plug speaker in socket for all other tests.

Use a good meter capable of measuring accurately up to several megohms.

The resistances given are often approximate, owing to the electrolytic capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals to chassis base unless otherwise specified.

See location chart on page 2 for position and numbering of terminals.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SK7	R. F. Amp.	S	S	S	A	B	20000¶	S	7300¶
6SA7	Mod. and Osc.	S	S	2200¶	20000¶	33000¶	C	S	47000¶
6SK7	I. F. Amp.	S	S	S	D	220¶	85000¶	S	2200¶
6SQ7	Demod., A. V. C., Audio Amp.	S	10M	S	E	S	F	S	S
6V6GT	Output	S	S	200¶	2200¶	470000¶	S	S	240¶
6U5	Tuning Indicator	S	100000¶	G	2200¶	S	S		
5Y3G	Rectifier	O	O	O	130¶	O	140¶	O	O
Loop	3 Prong	O	O	S	—	—	—	—	—
Loop	4 Prong	O	S	2200¶	O	—	—	—	—

Symbols used on chart are as follows: ¶—ohms; M—megohms; S—short; O—open

A.	Push "Radio" button in	3.2 Megohms
	Push "Phono" button in	"Open"
B.	Range switch in Loop position	1700 Ohms
	Range switch in external antenna position	220 Ohms
	Range switch in short-wave position	220 Ohms
C.	Range switch in Loop position	5 Ohms
	Range switch in external antenna position	5 Ohms
	Range switch in short-wave position	"Short"
D.	Push "Radio" button in	3.2 Megohms
	Push "Phono" button in	"Open"
E.	Push "Radio" button in	1 Megohm
	Push "Phono" button in	"Open"
F.	Range switch in Loop position	240,000 Ohms
	Range switch in external antenna position	240,000 Ohms
	Range switch in short-wave position	270,000 Ohms
G.	Push "Radio" button in	3.3 Megohms
	Push "Phono" button in	3.3 Megohms

Other tests not shown on chart—

Test from phono jack on back of chassis base:

Push "Radio" button in	"Open"
Push "Phono" button in	1 Megohm

Test from Television jack on back of chassis base:

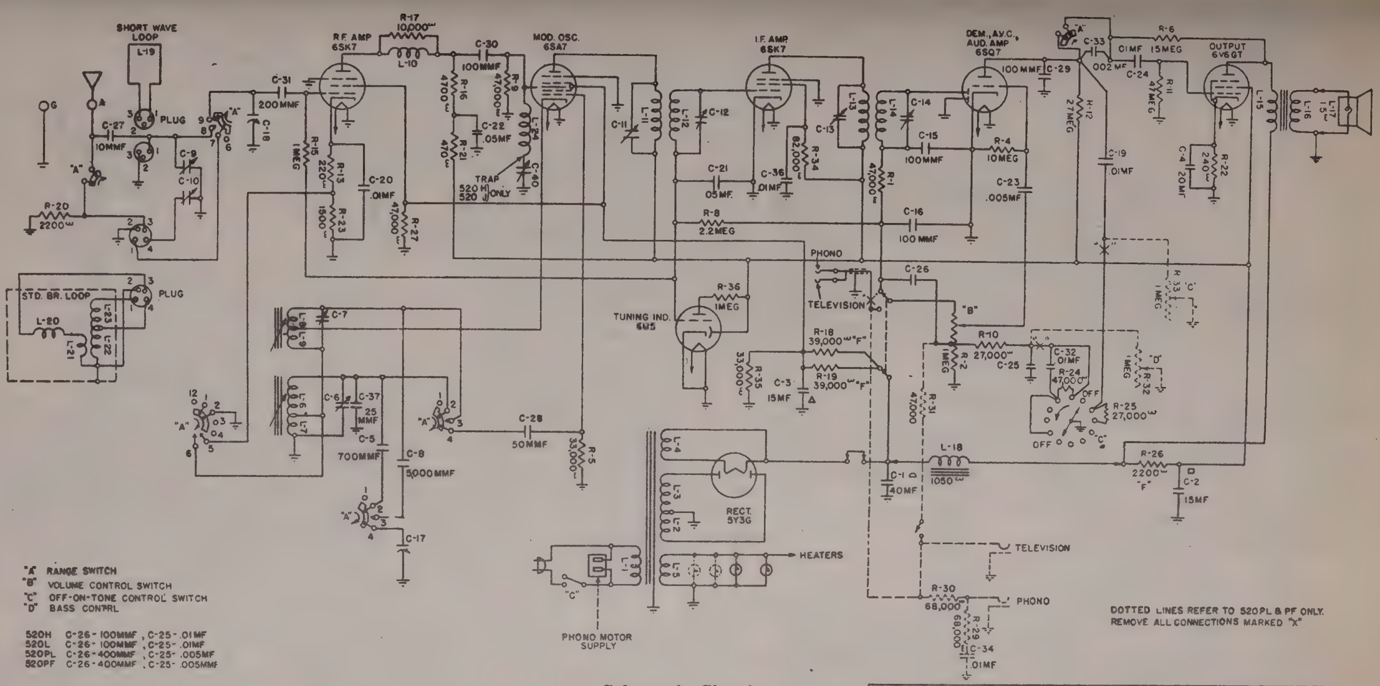
Push "Radio" button in	"Open"
Push "Phono" button in	1 Megohm

Test between terminals of A.C. plug:

"Off-On" switch in "Off" position	"Open"
"Off-On" switch in "On" position	5 Ohms
Terminals of A.C. plug to chassis base	"Open"

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 520

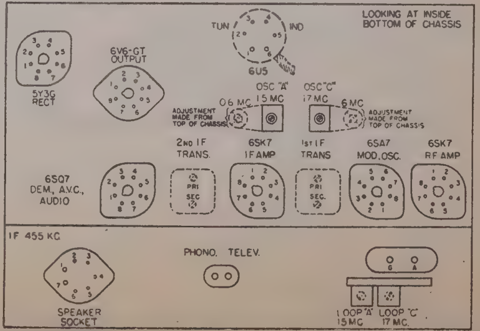


"A" RANGE SWITCH
"B" VOLUME CONTROL SWITCH
"C" OFF-ON-TONE CONTROL SWITCH
"D" BASS CONTRL

520H C-26-100MMF, C-25-.01MF
520L C-26-100MMF, C-25-.01MF
520PL C-26-400MMF, C-25-.005MF
520PF C-26-400MMF, C-25-.005MMF

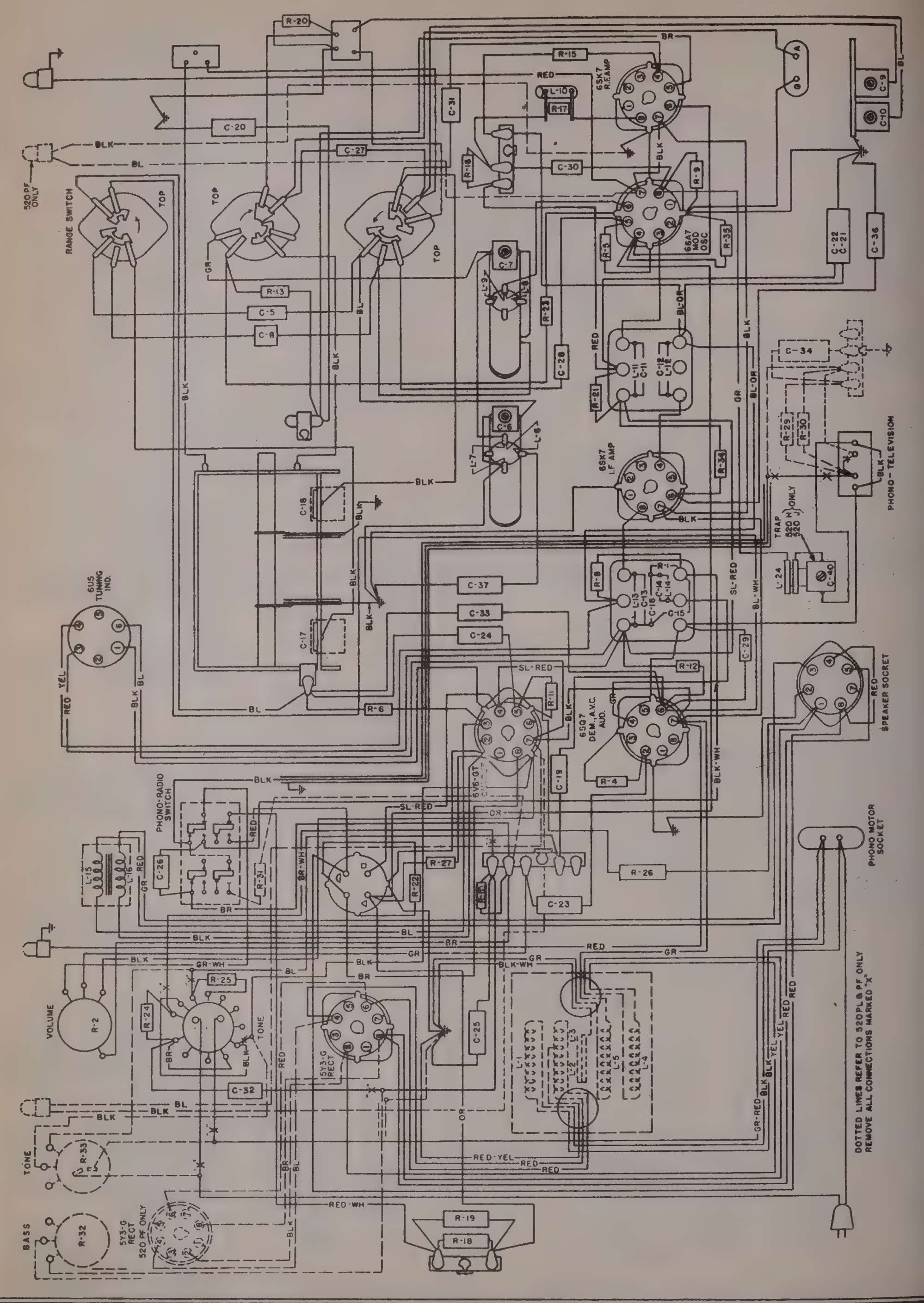
DOTTED LINES REFER TO 520PL & PF ONLY.
REMOVE ALL CONNECTIONS MARKED "X"

Schematic Circuit



Model	Input Power Frequency	Chassis	Cabinet	Speaker	Phonograph Equipment
520-H	50-60 Cycles	32832	32306	26171	Use No. 16 Record Player
520-HB	25-60 Cycles	32833	32306	26171	Use No. 16 Record Player
520-J	50-60 Cycles	32832	32098	26171	Use No. 16 Record Player
520-JB	25-60 Cycles	32833	32098	26171	Use No. 16 Record Player
520-L	50-60 Cycles	32043	32099	32166	Use No. 16 Record Player
520-LB	25-60 Cycles	32044	32099	32166	Use No. 16 Record Player
520-PF	60 Cycle	32178	32101	32166	32286
520-PFB	25 Cycle	32179	32101	32166	32287
520-PL	60 Cycle	32176	32102	32166	32283
520-PLB	25 Cycle	32177	32102	32166	32284
520-PG	60 Cycle	32986	32988	32989	32822
520-PGB	25 Cycle	32987	32988	32989	32823

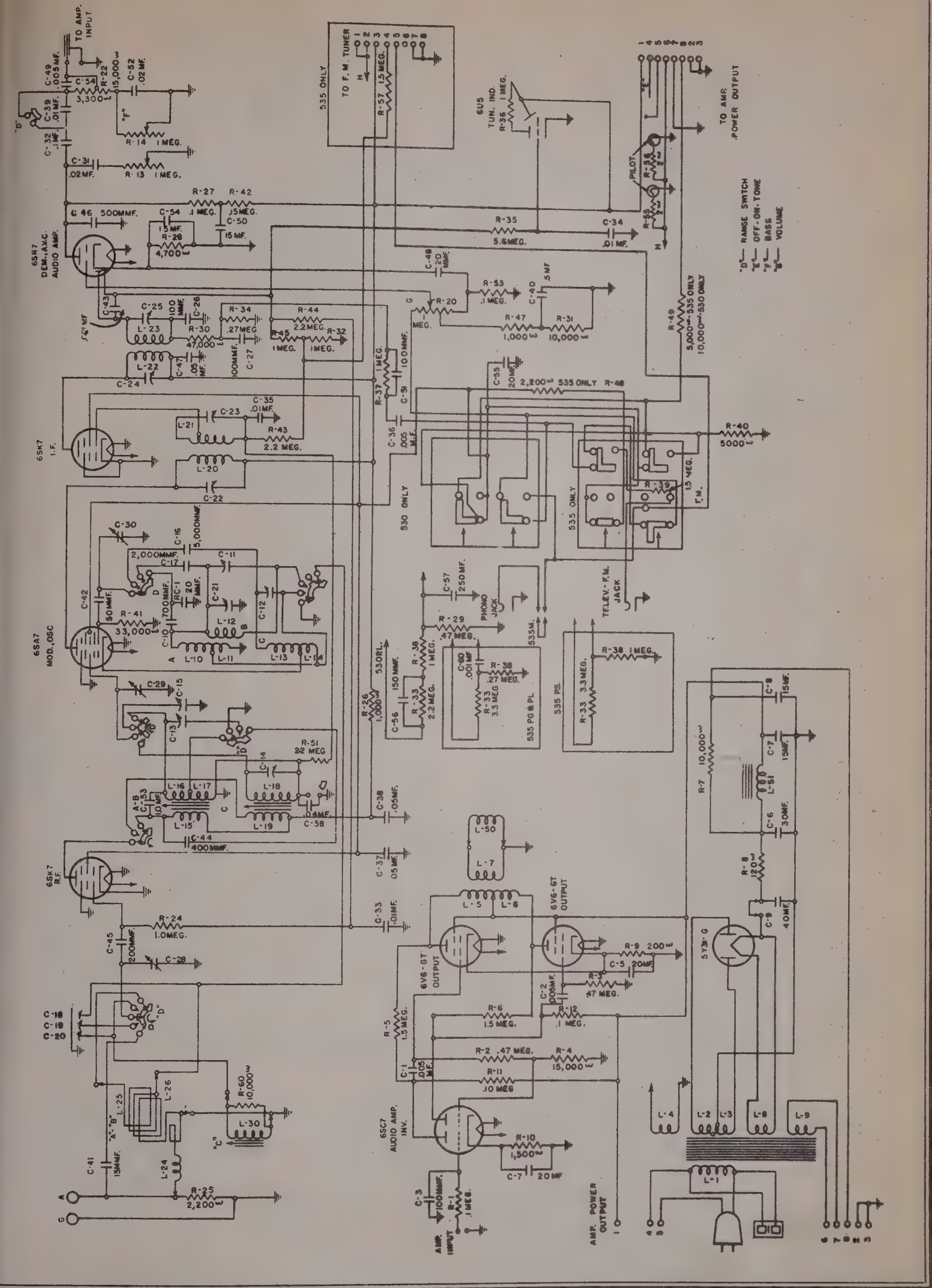
STROMBERG-CARLSON TEL. MFG. CO.



DOTTED LINES REFER TO 520PL & PF ONLY
REMOVE ALL CONNECTIONS MARKED "X"

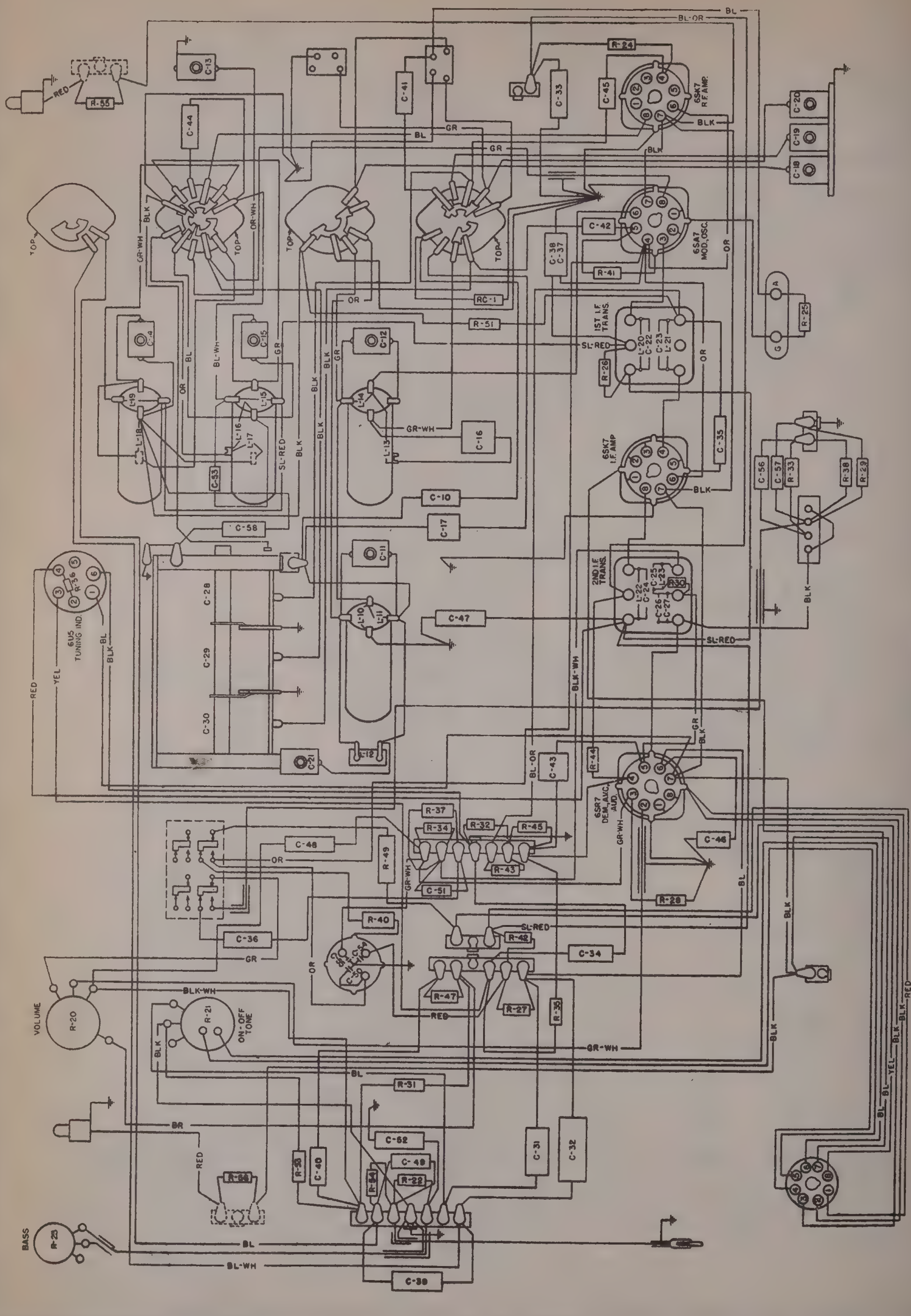
STROMBERG-CARLSON TEL. MFG. CO.

MODELS 530, 535

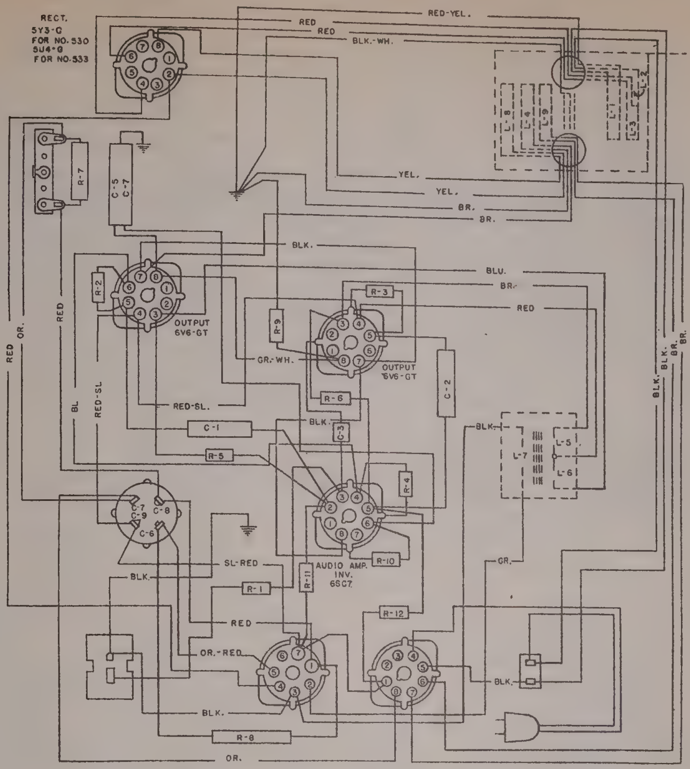


MODEL 530
Ampl. Mod.

STROMBERG-CARLSON TEL. MFG. CO.



Wiring Diagram (530 Ampl. Mod.)



Wiring Diagram Power Amplifier (Nos. 530 and 535 Receivers)

GENERAL. The No. 530 Receivers are nine tube, three gang, three range receivers, designed for the reception of Amplitude Modulated stations. The No. 535 Receivers are fifteen tube receivers of the very latest design, providing reception of both Amplitude and Frequency Modulated stations. The "Armstrong Wide-Swing Frequency Modulation System" used in this receiver is outstanding in that substantially static-free reception is obtained, plus a degree of high fidelity which has heretofore been unobtainable in any radio system.

Six button automatic tuning is provided in these receivers, so that six favorite stations may be set up.

Separate continuously variable bass and treble controls are provided in these chassis.

Provision is made for a record player to be used with all models not already equipped with phonograph mechanism without additional wiring.

The No. 530-PL Receiver is equipped with a record player using a crystal pick-up in conjunction with a specially equalized circuit. This record player shifts and plays the standard 10" or 12" records.

The No. 535-PG, PL and PS Receivers are equipped with record players using a one-ounce sapphire pick-up in conjunction with specially equalized circuits. This type of pick-up eliminates the frequent changing of needles and reduces record wear to a minimum. This record player shifts and plays the standard 10" or 12" records. The records may be intermixed on the No. 535-PG and PS Receivers.

A loop antenna is provided in these receivers so that no antenna and ground connection whatsoever is required. However, antenna and ground terminals are provided on the chassis so that an external antenna may be used for improved reception if desired.

PHONOGRAPH OPERATION. A jack is provided on the back of the chassis of all receivers not already equipped with a phonograph mechanism, into which a record player may be plugged, and a push button is provided on the front of the receiver for switching from "Radio" to "Phonograph".

ACCESSORIES

ANTENNA. The built-in loop antenna provided in these receivers will give satisfactory operation in most locations. However, for improved reception, a Stromberg-Carlson All-Wave Antenna is recommended. These antenna are supplied in kits containing all the necessary parts for mounting and installation, and are designed especially for use with all Stromberg-Carlson receivers.

HEADSET ATTACHMENT. Headphones can be very simply attached to this receiver. Ask for Pc-28303 Headset Package Assembly, which comes complete with headphones and installation instructions.

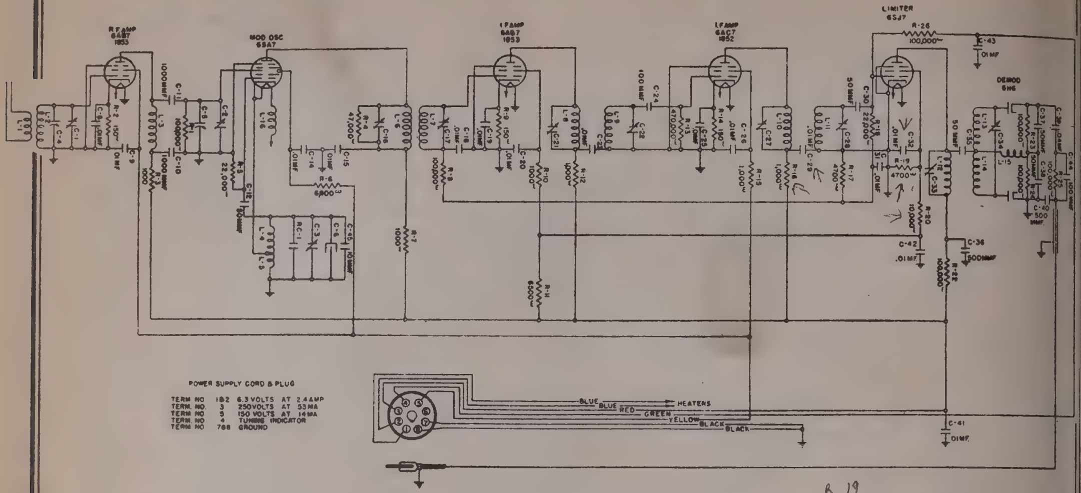
CARE OF THE CABINET. The finish of Stromberg-Carlson cabinets should be protected by using Stromberg-Carlson cabinet polish regularly. It is available in pint cans designated as Pc-28601.

Nicks and scratches of most kinds can be repaired quickly and easily by proper use of the Pc-26962 Touch-up Kit. Complete instructions are provided with each kit.

ADJUSTING THE DIAL LAMP. To obtain the proper illumination of the dial, slide the two dial lamp sockets on their mounting brackets to the position where maximum illumination of the dial is obtained.

MODEL 535
Freq. Mod.

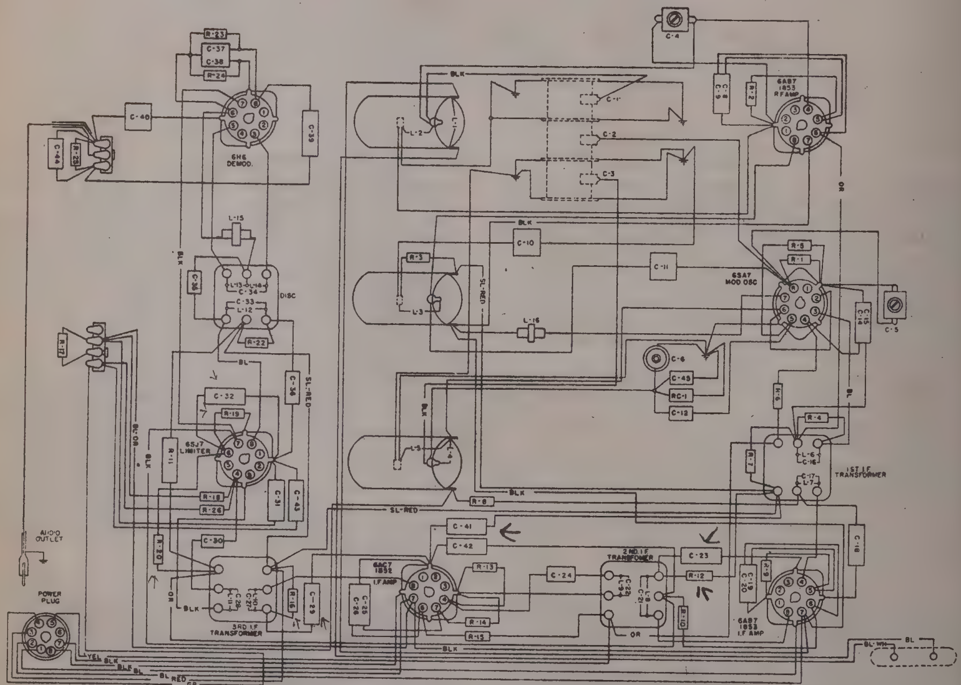
STROMBERG-CARLSON TEL. MFG. CO.



POWER SUPPLY CORD & PLUG

TERM NO	1&2	6.3 VOLTS AT 2.4 AMP
TERM. NO.	3	250 VOLTS AT 53 MA
TERM NO.	5	150 VOLTS AT 14 MA
TERM. NO	4	TUNING INDICATOR
TERM NO	7&8	GROUND

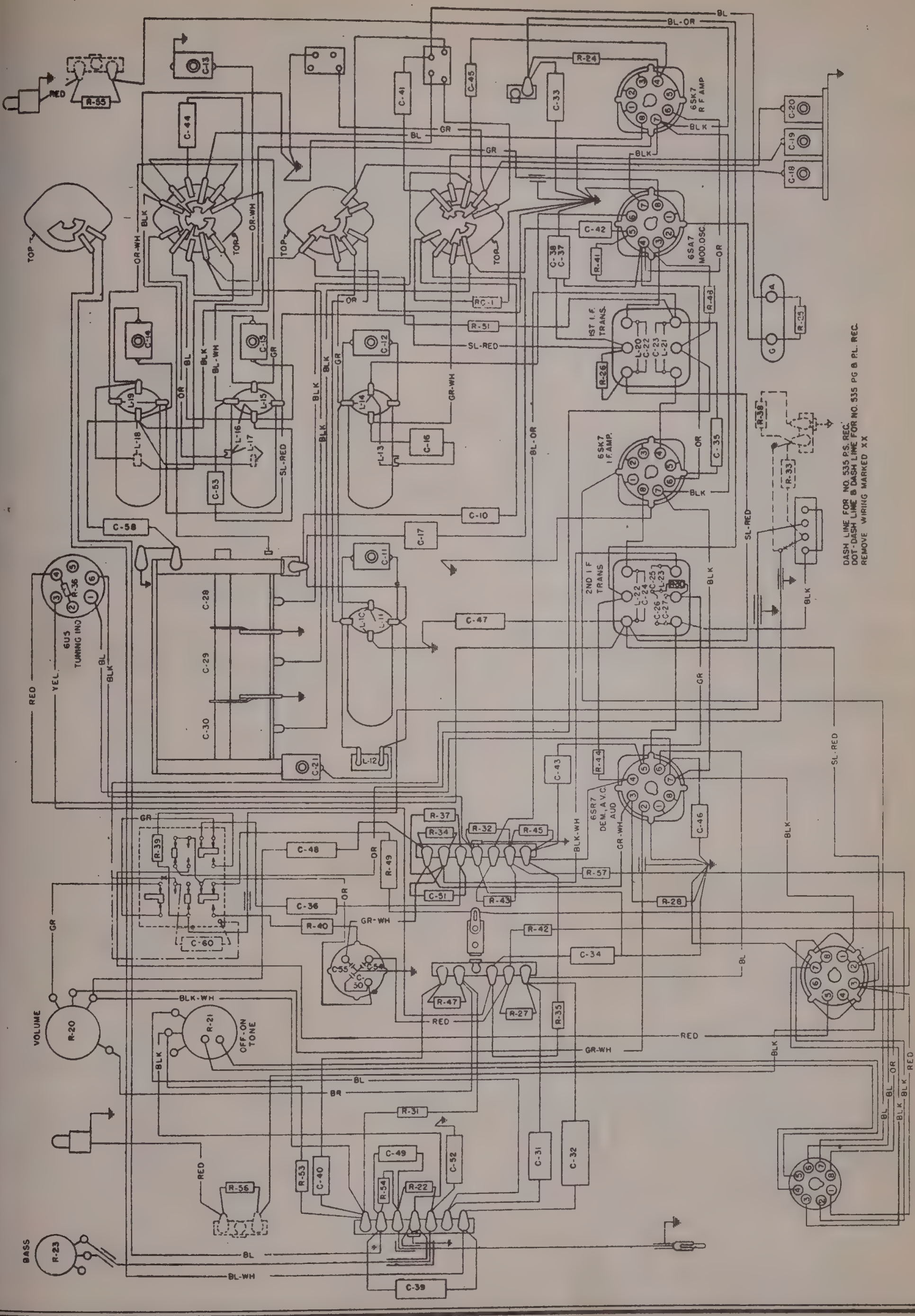
R 19
5 WATT BLEEDER
or
10 WATT



Schematic Circuit and Wiring Diagram (535 Freq. Mod.)

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 535
Ampl. Mod.



DASH LINE FOR NO. 535 P.S. REC.
DOT-DASH LINE & DASH LINE FOR NO. 535 PG & PL. REC.
REMOVE WIRING MARKED XX

Wiring Diagram (535 Ampl. Mod.)

INSTRUCTIONS FOR SETTING UP PUSH BUTTONS

IMPORTANT: The stations selected should be the local or favorite stations which give good reception at all times. If a Frequency Modulation station is available, it may be set up on one of the push buttons on the No. 535 Receivers.

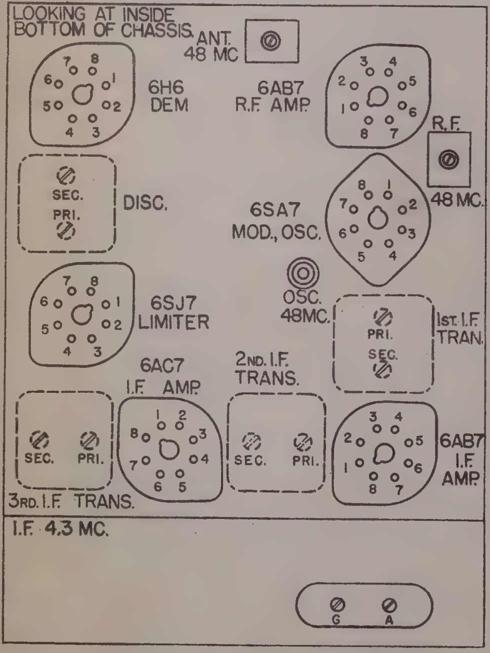
Set up stations in the daytime to avoid unnecessary interference. Allow the set to run for about twenty minutes before setting up stations.

Always use the tuning indicator unit when setting up stations, in order to determine when the station is exactly in tune.

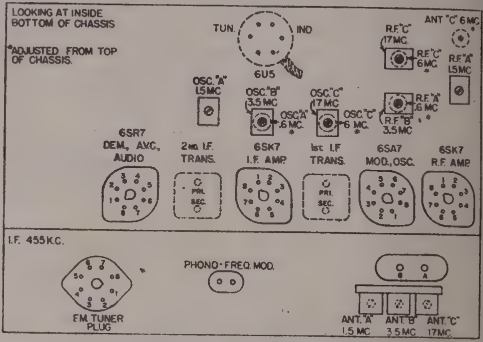
1. Turn the receiver "On".
2. On the No. 530 Receivers, push in the "Radio" button. On the No. 535 Receivers, be sure the "Phono" and "F. M." buttons are in the proper position to receive the desired stations.
3. Set the range switch to the "BC" position.
4. Turn volume control about three-quarters of the way on (in a clockwise direction).
5. Pull the six station push buttons off their levers.
6. Remove the call letters of the six selected stations from the call letter sheets, which are in an envelope stapled to the cabinet. Insert the station call letters part way in the slots at the sides of the buttons. Next, insert a transparent tab in each slot in front of the station letters. Then push both the transparent tabs and the call letters all the way into the slot. (A pencil eraser may be helpful.)
7. Loosen the set screw of the lever to be set up.
8. Push in the lever and manually tune in the desired station, observing the tuning indicator in order to obtain exact resonance.

IMPORTANT: For accurate set-up, be sure that the lever is pushed in, in the same manner and with the same amount of pressure as will be used when operating the push buttons.

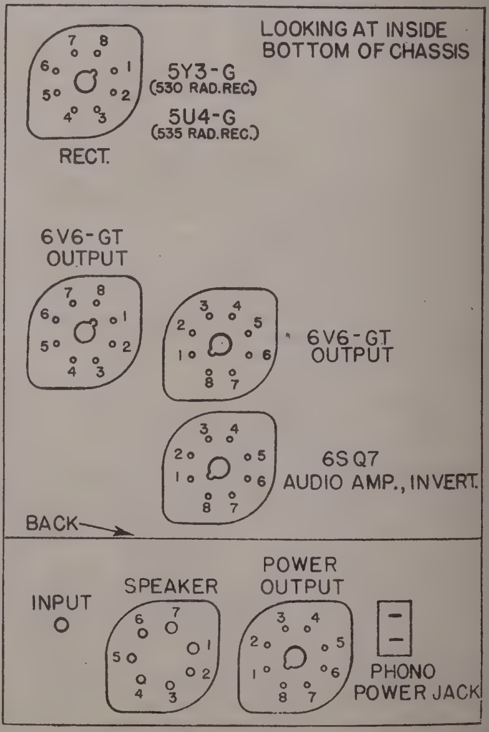
9. Tighten the set screw. Be sure not to disturb the adjustment in any way while tightening the screw.
10. Place the proper button on the lever.
11. Check the accuracy of the adjustment by detuning the station and retuning with the button several times, pushing the button with an even pressure. Readjust if necessary.
12. Set up the other five stations in the same manner.



Location Chart (Freq. Mod.)



Location Chart (Ampl. Mod.)



Location Chart (Power Ampl.)

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned manually to 1000 kc. or 47 megacycles—no signal.

Use a line voltage of 120 volts or make allowance for the variation.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all D. C. readings on the 500 volt scale, except when an asterisk appears.

Read from indicated terminals to chassis base.

See location chart on Page 2 for position of terminals.

A. C. voltages are indicated by italics.

AMPLITUDE MODULATION AND POWER AMPLIFIER CHASSIS, 530 AND 535 RECEIVERS

Tube	Circuit	Receiver No.	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	530	0	0	0	0	0	+100	*6.3*	+260
		535	0	0	0	0	0	+100	*6.3*	0
6SA7	Modulator and Oscillator	530	0	0	+260	+100	−20*	0	*6.3*	0
		535	0	0	+260	+100	−20*	0	*6.3*	0
6SK7	I. F. Amplifier	530	0	0	0	0	0	+100	*6.3*	+260
		535	0	0	0	0	0	+100	*6.3*	0
6SR7	Demod., A. V. C., Audio Amp.	530	0	0	+3	0	0	+[illegible]	*6.3*	0
		535	0	0	+3	0	0	+54	*6.3*	0
6AC7	Audio Inverter	530	0	+165	0	0	+165	+[illegible]	0	*6.3*
		535	0	+165	0	0	+165	+2	0	*6.3*
6V6GT	Output	530	0	0	+260	+263	0	—	*6.3*	+14
		535	0	0	+260	+263	0	—	*6.3*	+14
6V6GT	Output	530	0	0	+260	+263	0	—	*6.3*	+14
		535	0	0	+260	+263	0	—	*6.3*	+14
5Y3G	Rectifier	530	—	+400	—	*390*	—	*390*	—	+400
5U4G	Rectifier	535	—	+370	—	*355*	—	*355*	—	+370
—	Speaker Socket	530	+[illegible]	0	0	+400	+400	—	+262	—
		535	+360	[illegible]	0	+370	+370	—	+265	—
—	Power Socket	530	+263	0	0	*50*	*50*	*6.3*	0	+240
		535	+263	0	0	*50*	*50*	*6.3*	0	+200

FREQUENCY MODULATION CHASSIS, 535 RECEIVER

Tube	Circuit	Receiver No.	1	2	3	4	5	6	7	8
6AB7	R. F. Amplifier	535	0	0	0	0	+1.8	+150	*6.3*	+265
6SA7	Modulator and Oscillator	535	0	0	+265	+100	−2*	0	*6.3*	0
6AB7	I. F. Amplifier	535	0	0	0	0	+2.2	+150	*6.3*	+265
6AC7	I. F. Amplifier	535	0	0	0	0	+2.2	+150	*6.3*	+265
6SJ7	Limiter	535	0	0	0	0	0	+42	*6.3*	+10
6H6	Demodulator	535	0	0	0	0	0	—	*6.3*	0

* Read on 1000 volt scale of voltmeter.
Between terminals 2 and 8 of rectifier socket—5 volts A. C.

CONTINUITY TEST

Remove all tubes and disconnect all plugs from the chassis before checking continuity.

Use a good meter capable of measuring accurately up to several megohms.

The resistances given are often approximate, owing to electrolytic capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals to chassis base unless otherwise specified.

See location chart on Page 2 for position and numbering of terminals.

IMPORTANT: The continuity of each chassis may be checked as a separate unit; however, the power supply of the chassis to be checked should be shorted as follows:

1. A. M. chassis 530 and 535 Receivers: Short terminals 1, 2 and 8 of power supply plug together.
2. Power Amplifier chassis 530 and 535 Receivers: Short terminals 2 and 8 of power socket together.
3. F. M. chassis 535 Receivers: Short terminals 3, 4, 5, 7 and 8 of power supply plug together.

Be sure to remove the shorting wires when continuity is completed.

AMPLITUDE MODULATION CHASSIS, 530 AND 535 RECEIVERS

Tube	Circuit	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	S	S	S	4.5M	S	A	S	1000¶
6SA7	Mod. and Osc.	S	S	11¶	A	33000¶	S	S	B
6SK7	I. F. Amplifier	S	S	S	3.2M	S	A	S	13¶
6SR7	Demod., A. V. C., Audio Amp.	S	C	4700¶	2M	320000¶	250000¶	S	S
6U5	Tuning Indicator	S	1M	6.7M	S	S	S	—	—
—	*Power Supply Plug	250000¶	S	S	O	O	S	S	250000¶
—	Power Supply Socket	S	S	S	2.5M	S	O	S	S

POWER AMPLIFIER CHASSIS, 530 AND 535 RECEIVERS

Tube	Circuit	1	2	3	4	5	6	7	8
6AC7	Audio Inv.	S	150000¶	O	12000¶	150000¶	1500¶	S	S
6V6GT	Output	S	S	50000¶	50000¶	500000¶	12000¶	S	S
6V6GT	Output	S	S	50000¶	50000¶	500000¶	O	S	S
5Y3G or 5U4G	Rectifier	O	O	O	60¶	O	60¶	O	O
—	*Power Output Socket	50000¶	S	S	O	O	O	O	50000¶
—	Speaker Socket	10000¶	S	S	O	10000¶	O	50000¶	—

FREQUENCY MODULATION CHASSIS, 535 RECEIVERS

Tube	Circuit	1	2	3	4	5	6	7	8
6AB7	R. F. Amplifier	S	S	S	S	150¶	S	O	1000¶
6SA7	Mod. and Osc.	S	S	1000¶	6800¶	22000¶	S	O	O
6AB7	I. F. Amplifier	S	S	S	100000¶	150¶	5700¶	O	1000¶
6AC7	I. F. Amplifier	S	S	S	470000¶	150¶	1000¶	O	1000¶
6SJ7	Limiter	S	S	S	270000¶	S	4700¶	O	100000¶
6H6	Demodulator	S	S	100000¶	S	100000¶	100000¶	O	200000¶
—	*Power Plug	O	O	17000¶	130000¶	O	O	S	S

Symbols shown on chart are as follows: ¶—ohms; M—megohms; S—short; O—open.

A. Push Buttons in normal position --- 7200 Ohms
Phono Button pushed in ---------- 5 Megohms
Radio or F. M. button pushed in --- "Open"

B. Range Switch in "A" band ------ 3.2 Megohms
Range Switch in "B" band -------- "Short"
Range Switch in "C" band -------- "Short"

C. Operate volume control from most counterclockwise position to extreme clockwise position—should read 50,000 Ohms to 1 Megohm.

* Remove shorting wire before making continuity test of power circuits.

Other Tests Not Shown on Chart:

Amplitude Modulation Chassis:

Between terminals 4 and 5 of the Power Supply Plug should read "Open" with A. C. switch open; "Short" with A. C. switch closed.

Audio output plug: Prong 5 Megohms—Shield "Short".

F. M. Jack: "Open"—A, B and C Bands
Push in F. M. Button—1 Megohm.

Phono Jack: "Open"—A, B and C Bands
Push in F. M. Button—1 Megohm.

Power Amplifier Chassis

Audio Input Jack to Chassis Base ---- "Open"

Frequency Modulation Chassis

Audio Plug: Prong "Open", Shield "Short".

Antenna Terminal to Chassis Base ---- "Open"
Ground Terminal to Chassis Base ----- "Open"
Between Antenna and Ground Terminals ---------- "Short"

ALIGNING INFORMATION

NEVER REALIGN UNLESS ABSOLUTELY NECESSARY.

GENERAL. All aligning adjustments are carefully made at the factory with special equipment which is designed for aligning Frequency Modulation receivers. The limitations of commercial oscillographs and other ordinary test equipment are such that alignment should not be attempted in the field unless absolutely necessary.

If alignment is attempted, it will not be successful unless the instructions which follow are adhered to exactly.

The following equipment will be required:

1. Standard signal generator with sweep circuit.
2. Wide band sweep signal generator.
3. Oscillograph.
4. Microammeter—0 to 200 microamps.
5. Center "0" microammeter with 100 divisions either side of "0".

See location chart on Page 2 for location of all aligners.

ALIGNING PROCEDURE (AMP. MOD.)

I. Dial Pointer Adjustment. (A. M.)

With the plates of the gang tuning capacitor fully engaged, check to be sure that the dial pointer is in a vertical position directly on the calibration marks located at the low frequency end of the dial scale. Adjust if necessary.

II. Intermediate Frequency Adjustments. (A. M.)

1. Set the range switch to standard broadcast position.
2. Tune set to extreme low frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 kilocycles to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8), using a 0.1 mmf. capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. aligners for maximum output in the following order:
   a. Secondary of second I. F. transformer.
   b. Primary of second I. F. transformer.
   c. Secondary of first I. F. transformer.
   d. Primary of first I. F. transformer.

III. Radio Frequency Adjustments. (A. M.)

Standard Broadcast Range (A Band)

1. Replace the 0.1 mf. capacitor in series with the output lead of the signal generator with a 200 mmf. capacitor and connect it to the antenna terminal of the chassis.
2. Set the signal generator frequency and the receiver tuning dial to 600 kc.
3. Set the range switch to the Standard Broadcast range (A Band).
4. Adjust the 600 kc. oscillator and R. F. aligners (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 1500 kc.
6. Adjust the 1500 kc. oscillator, R. F. and antenna aligning capacitors for maximum signal.
7. Repeat operations three and four.
8. Repeat operations five and six.

Medium Wave Range (B Band)

1. Replace the 0.1 mf. capacitor in series with the output lead from the signal generator with a 400 ohm carbon type resistor and connect it to the antenna terminal of the chassis.
2. Set the range switch to the Medium Wave range (B Band).
3. Set the signal generator frequency and the receiver tuning dial to 3.5 megacycles.
4. Adjust the oscillator R. F. and antenna aligning capacitors for maximum signal.

Short Wave Range (C Band)

1. Leave the signal generator connected in the same manner as when adjusting the Medium Wave Range (B Band).
2. Set the range switch to the Short Wave Range (C Band).
3. Set the signal generator frequency and the receiver tuning dial to 6 megacycles.
4. Adjust the 6 megacycle oscillator, R. F. and antenna aligners (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 17 megacycles.
6. Adjust the 17 megacycle oscillator, R. F. and antenna aligning capacitors for maximum signal.
7. Repeat operations three and four.
8. Repeat operations five and six

Note: After the receiver has been placed in the cabinet, plug the loops into their respective sockets and readjust the Standard Broadcast, Medium Wave and Short Wave antenna high frequency shunt aligners for maximum signal.

ALIGNING PROCEDURE (FREQ. MOD.)

I. Dial Pointer Adjustment.

Before alignment is attempted, be sure that the variable capacitor plates of the F. M. tuner are fully meshed with the variable capacitor plates of the A. M. tuner when turned all the way in.

II. Intermediate Frequency Adjustments (F. M.)

Note: All I. F. adjustments are made using a wide band sweep signal generator with a sweep circuit of plus or minus 300 kilocycles.

1. Push in the F. M. button.
2. Tune the set to the extreme high frequency end of the dial (50 megacycles).
3. Connect the 0-200 microammeter across the R-17 4700-ohm resistor. (This resistor is mounted on the terminal strip located on the side of the base.)
4. Connect the oscillograph between ground and the junction of C-43 .01-mf. capacitor and R-26 100,000-ohm resistor located on the same terminal strip with the R-17 resistor.
5. Connect the ground terminal of the wide band sweep signal generator to the ground terminal of the 6AC7 second I. F. tube socket.
6. Introduce a signal of 4.3 megacycles to the grid of the 6AC7 second I. F. tube socket (terminal No. 4), using a 0.1 capacitor in series with the output lead of the signal generator. Keep the 0 to 200 microammeter at approximately 100 microamps.
7. Adjust the secondary and primary of the third I. F. transformer for maximum reading on the 0 to 200 microammeter.
8. Connect the output lead of the wide band sweep signal generator and the 0.1 microfarad capacitor in series with it to the grid of the 6AB7 first I. F. tube socket (terminal No. 4).
9. Connect the ground lead of the signal generator to the ground terminal of the 6AB7 first I. F. tube socket.
10. Adjust the second I. F. transformer in the same manner.
11. Connect the output lead of the wide band sweep signal generator with the 0.1 microfarad capacitor in series with it to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8).
12. Connect the ground terminal of the signal generator to the ground terminal of the 6SA7 tube socket.
13. Adjust the first I. F. transformer in the same manner.

III. Discriminator Adjustment (F. M.)

1. Connect the ground terminal of the standard unmodulated signal generator to the ground terminal of the 6AB7 first I. F. tube socket.
2. Connect the output lead of the unmodulated standard signal generator to the grid of the 6AB7 first I. F. tube (terminal No. 4), using a 0.1 microfarad capacitor in series with the output lead of the standard signal generator, leaving the wide band sweep signal generator connected to the grid of the 6SA7 Modulator and Oscillator tube socket.
3. Adjust the attenuator of the wide band sweep signal generator for a curve on the oscillograph.
4. Set the frequency of the unmodulated standard signal generator to approximately 4.3 megacycles and adjust the attenuator for interference patterns on the oscillograph. Adjust the unmodulated standard signal generator frequency until interference patterns on each trace come together. (This is done in order to assure that the frequency of the standard signal generator which is used to align the discriminator coincides with the mean frequency of the wide band sweep signal generator.)
5. Remove the wide band sweep signal generator.
6. Connect the center "0" microammeter with a .5 megohm resistor in series across one-half of the discriminator load. (From ground to the junction of the two .1 megohm resistors R-23 and R-24.)
7. Set the attenuator of the standard signal generator for maximum output.
8. Adjust the primary of the discriminator transformer for maximum reading on the center "0" microammeter.
9. Connect the center "0" microammeter and the .5 megohm resistor in series with it across the whole discriminator load. (From ground to the junction of R-23 .1 megohm resistor and C-29 .04 mf. capacitor.)
10. Adjust the secondary of the discriminator transformer for center "0" reading of the microammeter.
11. Vary the frequency of the standard signal generator, making sure that the voltage peaks, which should be of the same magnitude, are the same number of kilocycles off on either side of resonance. Any departure from these conditions may be corrected by a slight readjustment of the primary.

Note: Connect the wide band sweep signal generator to the grid of the 6SA7 Modulator and Oscillator tube socket and make slight readjustments of the I. F. transformers for proper curve, since there is some interaction between these stages and the discriminator.

IV. Radio Frequency Adjustments. (F. M.)

1. Set the signal generator frequency and the receiver tuning dial to 48.5 megacycles.
2. Replace the 0.1 microfarad capacitor in series with the output lead from the signal generator with a 100 ohm resistor and connect it to one of the F. M. terminals on the back of the chassis.
3. Connect the ground lead of the signal generator to the other F. M. terminal.
4. Adjust the oscillator aligner (air trimmer) for maximum signal.
5. Adjust the R. F. and antenna aligners for maximum signal on the 0 to 200 microammeter, maintaining the center "0" microammeter at "0" at all times by rotating the receiver dial slightly back and forth.

Model	Input Power Frequency	A. M. Chassis	F. M. Chassis	Power Amplifier Chassis	Cabinet	Speaker	Phonograph Equipment
530-PL	60 Cycles	32113	None	32123	32104	26170	32702
530-PLB	25 Cycles	32113	None	32124	32104	26170	32703
535-PG	60 Cycles	32114	32316	32125	32713	32427	32713
535-PGB	25 Cycles	32114	32316	32126	32714	32427	32714
535-PS	60 Cycles	32114	32316	32125	32103	32427	32822
535-PSB	25 Cycles	32114	32316	32126	32103	32427	32823
535-M	60 Cycles	32121	32317	32125	32107	32427	Use No. 16 Record Player
535-MB	25 Cycles	32121	32317	32126	32107	32427	Use No. 16 Record Player
535-PL	60 Cycles	32114	32316	32125	32106	32427	32713
535-PLB	25 Cycles	32114	32316	32126	32106	32427	32714

Tuning Ranges: Standard Broadcast 540 to 1600 kilocycles; Medium Wave 1.6 to 3.6 megacycles; Short Wave 5.7 to 18 megacycles; Frequency Modulation (535) 42 to 50 megacycles

Voltage Rating .... 105 to 125 Volts

Type of Circuit .... Superheterodyne with Automatic Tuning

Number of Tubes { No. 530—9; No. 535—15

- 1—6SK7 R. F. Amplifier
- 1—6SA7 Modulator and Oscillator
- 1—6SK7 I. F. Amplifier
- 1—6SR7 Demodulator, A. V. C. and Audio
- 1—6U5 Tuning Indicator
- 1—6AC7 Audio Amplifier and Inverter
- 2—6V6GT Output
- 1—5Y3G Rectifier (530 Receiver)
- 1—5U4G Rectifier (535 Receiver)
- 1—6AB7 R. F. Amplifier (F. M.)
- 1—6SA7 Modulator and Oscillator (F. M.)
- 1—6AB7 I. F. Amplifier (F. M.)
- 1—6AC7 I. F. Amplifier (F. M.)
- 1—6SJ7 Limiter (F. M.)
- 1—6H6 Demodulator (F. M.)

Input Power Rating:
530-PL .... 120 Watts
535-PL, PS, PG .... 155 Watts
535-M .... 130 Watts

Intermediate Frequency .... 455 Kilocycles (Amplitude Modulation); 4.3 Megacycles (Frequency Modulation)

Speaker Field Coil Resistance .... 530—1050 ohms; 535—610 ohms

—Speaker Voice Coil Impedance .... 530— 1.5 ohms; 535— 11 ohms

STROMBERG-CARLSON TEL. MFG. CO.

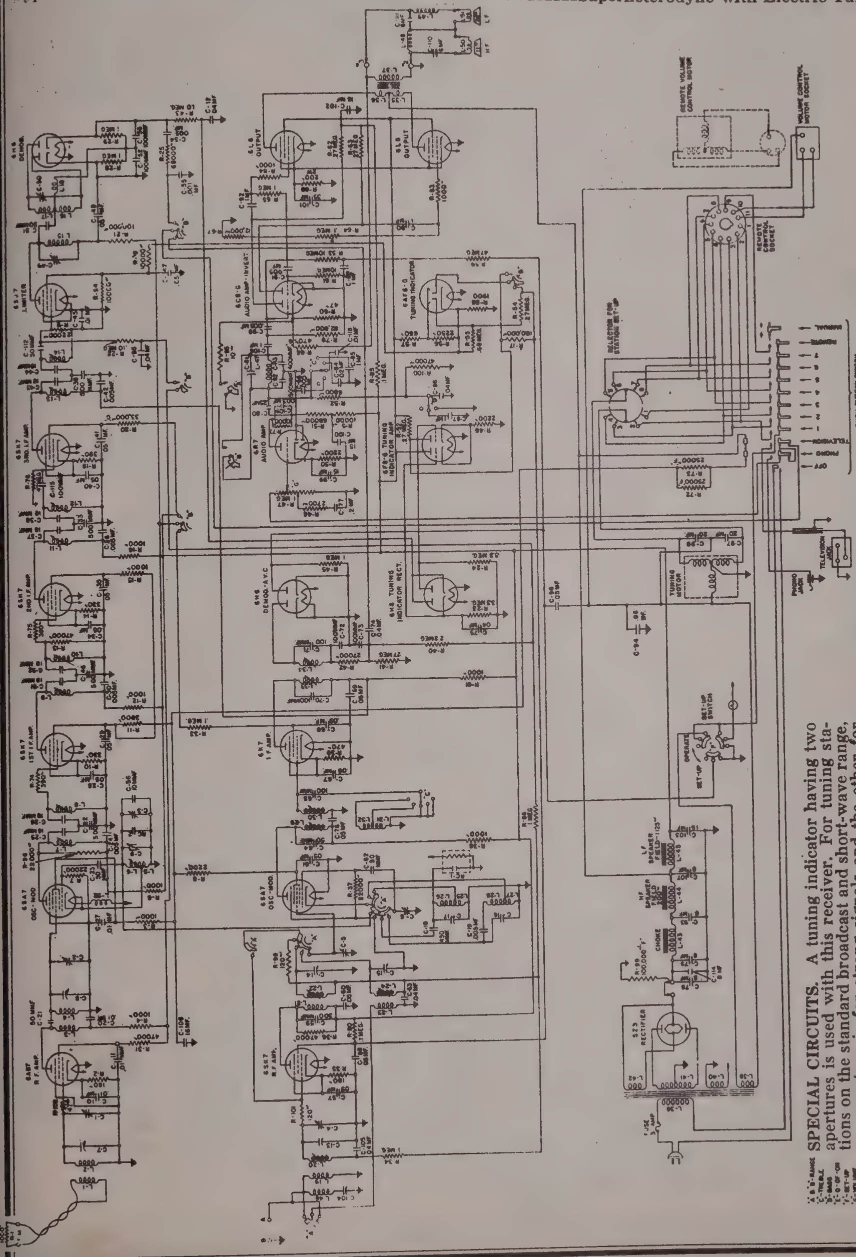
Model	Input Power Frequency	Chassis	Cabinet	Speaker
585-M	50-60 Cycles	32711	31088	31087 (Bass) 31126 (Treble)

SPECIFICATIONS

Tuning Ranges ---------- Frequency Modulation 42 to 50 Mc. (42,000 to 50,000 Kc.)
Shortwave 5.8 to 18 Mc. (5800 to 18,000 Kc.)
Standard Broadcast .54 to 1.7 Mc. (540 to 1700 Kc.)

Voltage Rating ---------- 105 to 125 Volts

Type of Circuit ---------- Superheterodyne with Electric Tuning



SPECIAL CIRCUITS. A tuning indicator having two apertures is used with this receiver. For tuning stations on the standard broadcast and short-wave range, one aperture is for strong signals and the other for weak signals. One aperture will close with a signal of approximately 100,000 microvolts and the other will not close even with a two volt signal. Stations on the frequency modulation range should be tuned for maximum closing of both apertures.

Iron core coils are used in the broadcast and short-wave ranges to provide greater accuracy of alignment. The audio system employs a special inverter push-pull circuit designed to provide excellent fidelity, and the chassis is thoroughly shielded throughout with an electro-statically shielded power transformer.

FREQUENCY MODULATION: The "Armstrong Wide-Swing Frequency Modulation System" used in this receiver is an outstanding development in radio. It makes possible:

1. Static-Free Reception;
   Both natural and man-made static is virtually eliminated.
2. Noise free reception;
   The tube and set noises present in ordinary amplitude modulation receivers are virtually eliminated.
3. Extreme high fidelity reception;
   Noise free reproduction of an audio range limited only by the capacity of the human ear or the audio system of the receiver is possible without interference.
4. Interference free reception;
   Two stations cannot be received at the same time.

STROMBERG-CARLSON TEL. MFG. CO.

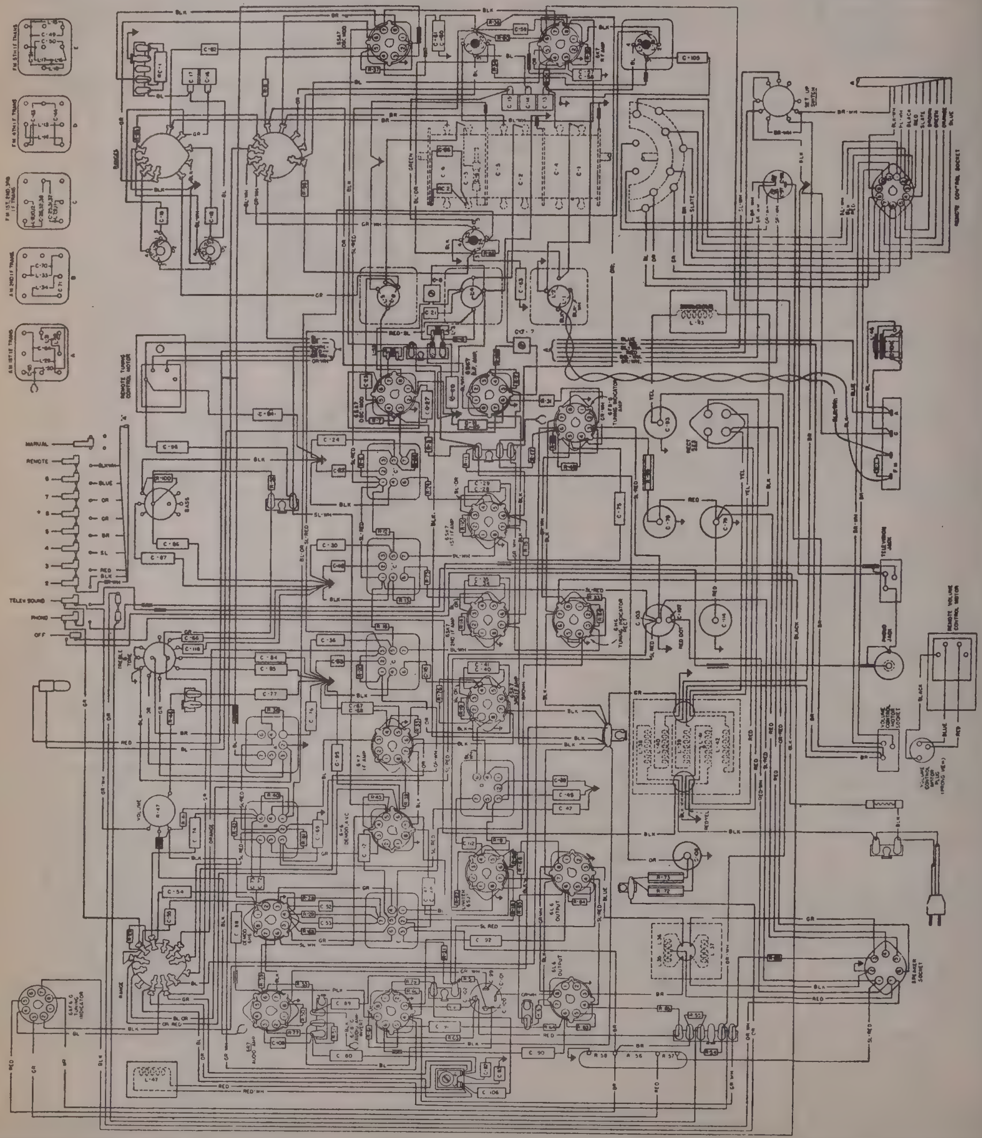
GENERAL. This is a nineteen-tube, three gang, three range receiver designed for the reception of both amplitude and frequency modulated stations and is equipped with a dual coaxial speaker system. It is capable of reproducing without distortion an audio frequency range of at least 10,000 cycles.

The chassis is of the fortified type with bails provided for ease in handling and servicing. Automatic tuning is accomplished by means of a motor drive controlled by a commutator and brush assembly and the dial is of the slide rule type, edge-lighted for clear visibility without glare. Separate treble and bass controls are provided to make accurate adjustment of the tone possible.

A remote control unit is provided with this receiver which enables the user to operate the receiver at a remote point.

The power output of this receiver is excellent and the tone quality and fidelity of reproduction is finer than anything produced commercially to date.

Input Power Rating	225 Watts
Intermediate Frequency	455 Kilocycles (Amplitude Modulation) 4.3 Megacycles (Frequency Modulation)
Speaker Field Coil Resistance—Approximately	1125 Ohms (Bass) 200 Ohms (Treble)
Speaker Voice Coil Impedance at 400 Cycles—Approximately	24 Ohms (Bass) 11 Ohms (Treble)



ADJUSTING DIAL LAMP

The dial on this receiver is edge-lighted, and for proper illumination it is very important that the dial light be adjusted so that the filament is exactly opposite the edge of the glass.

To make this adjustment simply slide the pilot light socket back and forth on its mounting bracket until maximum illumination is obtained.

NORMAL VOLTAGE READINGS

Take all voltage readings with chassis operating and tuned manually to 1000 kilocycles or 48 megacycles—no signal.

The upper figures shown in the table are with the range switch set to the standard broadcast range and tuned to approximately 1000 kilocycles—no signal.

The lower figures shown in the table are with the range switch set to the frequency modulation position and tuned to approximately 48 megacycles—no signal.

Use a line voltage of 125 volts or make allowance for any slight variation.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt. Take all D. C. readings on the 500 volt scale except when an asterisk appears. Read from indicated terminals to chassis base. See location chart on Page 3 for position of terminals.

A. C. voltages are indicated by italics.

				TERMINALS OF SOCKETS							
Tube	*Circuit*	*Range Switch Set To*	*Cap*	1	2	3	4	5	6	7	8
6AB7	R. F. Amp. (F. M.)	A. M. F. M.	— —	0 0	0 0	+1* +3*	— —	+1* +3*	+68 +135	*6.5* *6.5*	0 +265
6SA7	Mod. and Osc. (F. M.)	A. M. F. M.	— —	0 0	0 0	+290 +280	+70 +120	— —	0 0	*6.5* *6.5*	0 0
6SK7	1st I. F. Amp. (F. M.)	A. M. F. M.	— —	0 0	0 0	+2* +4*	— —	+2* +4*	+70 +110	*6.5* *6.5*	+290 +265
6SK7	2nd I. F. Amp. (F. M.)	A. M. F. M.	— —	0 0	0 0	+2* +3*	— —	+2* +3*	+55 +90	*6.5* *6.5*	+290 +270
6SK7	3rd I. F. Amp. (F. M.)	A. M. F. M.	— —	0 0	0 0	0 +6*	— —	0 +6*	0 +150	*6.5* *6.5*	+285 +260
6SJ7	Limiter (F. M.)	A. M. F. M.	— —	0 0	0 0	0 0	— —	0 0	+95 +90	*6.5* *6.5*	+95 +95
6H6	Demod. (F. M.)	A. M. F. M.	— —	0 0	0 0	— —	— —	— —	— —	*6.5* *6.5*	0 0
6H6	Tun. Ind. Rect. (F. M.)	A. M. F. M.	— —	0 0	0 0	— —	— —	— —	— —	*6.5* *6.5*	— —
6F8G	Tun. Ind. Amp. (F. M.)	A. M. F. M.	0 0	0 0	0 0	+295 +275	+11** +10**	— —	+200 +185	*6.5* *6.5*	+11** +10**
6SK7	R. F. Amp. (A. M.)	A. M. F. M.	— —	0 0	0 0	+2* +2*	— —	+2* +2*	+90 +80	*6.5* *6.5*	+290 +275
6SA7	Mod. and Osc. (A. M.)	A. M. F. M.	— —	0 0	0 0	+290 +275	+70 +135	— —	0 +100	*6.5* *6.5*	0 0
6K7	I. F. Amp. (A. M.)	A. M. F. M.	0 0	0 0	0 0	+285 +260	+115 0	+4* 0	+290 0	*6.5* *6.5*	+4* 0
6H6	Demod., A. V. C., "Q" (A. M.)	A. M. F. M.	— —	0 0	0 0	— —	0 0	— —	— —	*6.5* *6.5*	0 0
6R7	Audio Amp.	A. M. F. M.	0 0	0 0	0 0	+90 +85	0 0	0 0	— —	*6.5* *6.5*	+3* +3*
6C8G	Audio Inv.	A. M. F. M.	0 0	0 0	0 0	+35 +35	— —	— —	+35 +35	*6.5* *6.5*	0 0
6L6	Output	A. M. F. M.	— —	0 0	0 0	+415 +410	+290 +275	— —	— —	*6.5* *6.5*	+20** +20**
6L6	Output	A. M. F. M.	— —	0 0	0 0	+415 +410	+290 +275	— —	— —	*6.5* *6.5*	+20** +20**
5Z3	Rectifier	A. M. F. M.	— —	+495 +495	*480* *480*	*480* *480*	+495 +495	— —	— —	*5* *5*	— —
6AF6G	Tun. Ind.	A. M. F. M.	— —	— —	0 0	+65 +60	+90 +185	+250 +235	— —	*6.5* *6.5*	+95 +90
	Speaker Socket	A. M. F. M.	— —	+290 +275	0 0	0 0	+495 +495	+495 +495	+486 +486	+425 +420	— —

*Read on lowest possible scale of voltmeter.
**Read on 100 volt scale of voltmeter.

CONTINUITY TEST

Remove all tubes and disconnect the receiver from the power supply before making continuity test.

Test speaker socket with speaker left out.

Leave speaker plug in socket for all other tests. (If a speaker is not available when checking continuity the speaker socket may be shorted by using two pieces of bus wire and shorting together terminals 1, 6 and 7 and terminals 4 and 5 of the speaker socket. (See location chart on Page 3 for position and numbering of terminals.) Caution: Be sure to remove the two shorting wires when the continuity test is completed.

Use a good meter capable of measuring up to several megohms.

The resistances given are often approximate owing to electrolytic capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals to chassis base unless otherwise specified.

See location chart on Page 3 for position and numbering of terminals.

			TERMINALS OF SOCKETS							
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8
6AB7	R. F. Amp. (F. M.)	—	S	S	180¶	S	180¶	A	S	O
6SA7	Osc. and Mod. (F. M.)	—	S	S	6000¶	A	22000¶	S	S	S
6SK7	1st I. F. Amp. (F. M.)	—	S	S	330¶	390¶	330¶	B	S	6000¶
6SK7	2nd I. F. Amp. (F. M.)	—	S	S	330¶	390¶	330¶	C	S	6000¶
6SK7	3rd I. F. Amp. (F. M.)	—	S	S	390¶	470000¶	390¶	D	S	5000¶
6SJ7	Limiter (F. M.)	—	S	S	S	57000¶	S	1900¶	S	1900¶
6H6	Demod. (F. M.)	—	S	S	100000¶	200000¶	100000¶	1M	S	S
6H6	Tun. Ind. Rect. (F. M.)	—	S	S	1M	2.4M	2.4M	O	S	1M
6F8G	Tun. Ind. Amp. (F. M.)	1M	S	S	5000¶	2000¶	1M	150000¶	S	2200¶
6SK7	R. F. Amp. (A. M.)	—	S	S	180¶	F	180¶	90000¶	S	5000¶
6SA7	Osc. and Mod. (A. M.)	—	S	S	6000¶	G	22000¶	H	S	I
6K7	I. F. Amp. (A. M.)	7¶	S	S	5000¶	J	470¶	K	S	470¶
6H6	Demod., A. V. C., "Q" (A. M.)	—	S	S	300000¶	S	900000¶	500000¶	S	S
6R7	Audio Amp.	1M	S	S	100000¶	S	S	1.5M	S	2200¶
6C8G	Audio Inv.	1M	S	S	350000¶	47¶	10M	350000¶	S	S
6L6	Output	—	S	S	5000¶	5000¶	150000¶	150000¶	S	200¶
6L6	Output	—	S	S	5000¶	5000¶	150000¶	150000¶	S	200¶
5Z3	Rectifier	—	5000¶	30¶	30¶	5000¶	—	—	—	—
6AF6G	Tun. Ind.	—	O	S	200000¶	L	4200¶	O	S	1900¶
—	Speaker Socket	—	5000¶	S	S	O	90000¶	90000¶	300000¶	—

Symbols used on chart are as follows: ¶—ohms; M—megohms; S—short; O—open.

A. Push in any "Pre-set Station" Button .... 18,000 Ohms
Push in "Phono" Button .... 300,000 Ohms
Push in "Television" Button .... 300,000 Ohms

B. Push in any "Pre-set Station" Button .... 20,000 Ohms
Push in "Phono" Button .... 400,000 Ohms
Push in "Television" Button .... 400,000 Ohms

C. Push in any "Pre-set Station" Button .... 30,000 Ohms
Push in "Phono" Button .... 400,000 Ohms
Push in "Television" Button .... 400,000 Ohms

D. Range switch in standard broadcast position .... "Open"
Range switch in short-wave position .... "Open"
Range switch in frequency modulation position .... 38,000 Ohms

E. "Q" Switch "On"
Range switch in standard broadcast position .... "Open"
Range switch in short-wave position .... "Open"
Range switch in frequency modulation position .... 1 Megohm
"Q" Switch "Off"
Range switch in standard broadcast, short-wave and frequency modulation positions .... "Short"
Set up switch in "Set up" position .... "Short"
Set up switch in "Operate" position .... 1 Megohm

F. Range switch in standard broadcast position .... 3 Megohms
Range switch in short-wave position .... 3 Megohms
Range switch in frequency modulation position .... 550,000 Ohms

G.	Push in any "Pre-set Station" Button	20,000 Ohms
	Push in "Phono" Button	400,000 Ohms
	Push in "Television" Button	400,000 Ohms
H.	Range switch in standard broadcast position	"Short"
	Range switch in short-wave position	"Short"
	Range switch in frequency modulation position	"Open"
I.	Range switch in standard broadcast position	3.5 Megohms
	Range switch in short-wave position	3.5 Megohms
	Range switch in frequency modulation position	"Open"
J.	Range switch in standard broadcast position	100,000 Ohms
	Range switch in short-wave position	100,000 Ohms
	Range switch in frequency modulation position	"Open"
K.	Range switch in standard broadcast position	5,000 Ohms
	Range switch in short-wave position	5,000 Ohms
	Range switch in frequency modulation position	"Open"
L.	Range switch in standard broadcast position	900,000 Ohms
	Range switch in short-wave position	900,000 Ohms
	Range switch in frequency modulation position	1.5 Megohms

IMPORTANT: Do not go back and touch up any adjustments previously made. If the receiver is not in proper alignment after completing the adjustments outlined above, go back and start over again and follow the instructions through to the finish.

REMOTE CONTROL. Remote selection of stations is accomplished by simply plugging the remote control unit into the socket provided on the back of the chassis. This unit enables the user to select any one of eight favorite stations which have been previously set up on the electric tuning system of the receiver.

Other tests not shown on chart—

Phono jack to chassis base	
Push in "Phono" button	1 Megohm
Push in any "Pre-set" Station button	"Open"
Television jack to chassis base	
Terminal No. 1 (this is the terminal located nearest to the bottom of the chassis) Push in "Television" button	1 Megohm
Terminal Nos. 2 and 3	"Short"
Amplitude Modulation Antenna Terminal to chassis base	"Short"
Amplitude Modulation Ground Terminal to chassis base	"Short"
Frequency Modulation Terminals to chassis base	"Open"
Between Frequency Modulation Terminals	1,000 Ohms
Terminals of A. C. Plug to chassis base	"Open"
Between terminals of A. C. Plug—	
Push in "Off" button	"Open"
Push in any other button	1.5 Ohms

PHONOGRAPH OPERATION. A jack is provided on the back of the chassis into which a record player may be plugged and a push button is provided on the front of the chassis for switching from "Radio" to "Phonograph".

TELEVISION. A socket is provided on the back of the chassis into which a television receiver may be plugged and a push button is provided on the front of the chassis for switching to television so that the audio amplifier and speaker system employed in this receiver are available for use with television receivers designed for this type of sound reproduction.

ALIGNING INFORMATION

NEVER REALIGN UNLESS ABSOLUTELY NECESSARY

GENERAL. All aligning adjustments are carefully made at the factory with special equipment which is designed for aligning frequency modulation receivers. The limitations of commercial oscillographs and other ordinary test equipment are such that alignment should not be attempted in the field unless absolutely necessary.

If alignment is attempted, it will not be successful unless the instructions which follow are adhered to exactly.

The following equipment will be required:

1. Standard signal generator with sweep circuit.
2. Wide band sweep signal generator.
3. Oscillograph.
4. Microammeter "0" to 200 Microamps.
5. Center "0" Microammeter with 100 divisions each side of "0".

See location chart above for location of all aligning screws.

ALIGNING PROCEDURE (follow this order exactly)

I. **Dial pointer adjustment.** With the plates of the gang tuning capacitor fully engaged, set the dial pointer directly on the two vertical lines located at the extreme low frequency end of the dial scale.

II. **Intermediate frequency adjustments** (Frequency Modulation)

1. Set the range switch to Frequency Modulation position and the volume control to "off" position.
2. Tune the set to the extreme high frequency end of the dial (50 megacycles).
3. Disconnect the ground side of the 10000 ohm resistor R94 and connect the "0" to 200 microammeter in series with it and ground. (This resistor is connected between terminals No. 3 and 4 of the fourth I. F. transformer.)
4. Connect the oscillograph between high side of R94 resistor and ground.
5. Connect the ground terminal of the wide band sweep signal generator to the ground terminal of the 6SK7 third I. F. tube socket.
6. Introduce a signal of 4.3 megacycles to the grid of the 6SK7 third I. F. tube (Terminal No. 4), using a 0.1 microfarad capacitor in series with the output lead of the signal generator. Keep the "0" to 200 microammeter at approximately 100 microamps.
7. Align the secondary and primary of the fourth I. F. transformer for maximum reading on the "0" to 200 microammeter.
8. Slight adjustments of the aligners may be made if necessary to obtain a symmetrical curve on the oscillograph. Try for a good curve rather than the very last bit of output.
9. Connect the output lead and the 0.1 microfarad capacitor in series with it to the grid of the 6SK7 second I. F. tube (Terminal No. 4).
10. Align the third I. F. transformer in the same manner.
11. Connect the output lead and the 0.1 microfarad capacitor in series with it to the grid of the 6SK7 first I. F. tube (Terminal No. 4).
12. Connect the ground lead to the ground terminal of the 6SK7 first I. F. tube socket.
13. Align the second I. F. transformer in the same manner.
14. Connect the output lead and the 0.1 microfarad capacitor in series with it to the grid of the 6SA7 modulator tube (Terminal No. 8).
15. Connect the ground lead to the ground terminal of the 6SA7 modulator tube socket.
16. Align the first I. F. transformer in the same manner.
17. Remove the wide band sweep signal generator.

III. **Discriminator adjustment** (Frequency Modulation)

Note: Be sure the frequency of both signal generators are the same.

1. Connect the ground terminal of the standard signal generator to the ground terminal of the 6SK7 second I. F. tube socket.
2. Introduce an unmodulated signal of 4.3 megacycles to the grid of the 6SK7 second I. F. tube (Terminal No. 4) using a 0.1 microfarad capacitor in series with the output lead of the standard signal generator.
3. Connect the center "0" microammeter with a .5 megohm resistor in series across one-half of the discriminator load. (From ground to the junction of the two .1 megohm resistors R28 and R29).
4. Set the attenuator on the standard signal generator for maximum output.
5. Adjust the primary of the discriminator transformer for maximum reading on the center "0" microammeter.
6. Connect the center "0" microammeter and the .5 megohm resistor in series with it across the whole discriminator load. (Terminal No. 4 of the 6H6 Demodulator tube and ground).
7. Adjust the secondary of the discriminator transformer for center "0" reading of the microammeter.
8. Vary the frequency of the standard signal generator slightly and be sure that the center "0" microammeter reads the same on each side of resonance. If not, go back and realign both primary and secondary.

IV. **Radio frequency adjustments** (Frequency Modulation)

1. Set the signal generator frequency and the receiver tuning dial to 48.5 megacycles).
2. Replace the 0.1 microfarad capacitor in series with the output lead from the signal generator with a 100 ohm resistor and connect it to the F. M. antenna terminal nearest to the end of the antenna and ground terminal strip.
3. Connect the ground lead to the other F. M. terminal on the antenna and ground terminal strip.
4. Adjust the oscillator shunt aligner for maximum signal.
5. Adjust the R. F. and antenna aligners for maximum signal on the "0" to 200 microammeter maintaining the center "0" microammeter at "0" at all times by rotating the receiver dial slightly back and forth.
6. Remove both meters from the circuits and resolder the 10000 ohm resistor R94 in its original position to terminal No. 4 on the fourth I. F. transformer.

V. **Intermediate frequency adjustments** (Amplitude Modulation)

Adjustment of second I. F. transformer.

1. Set the range switch to standard broadcast position.
2. Set the fidelity control in the center or "sharp" position and turn the volume control "full on".
3. Connect the oscillograph to the high side of the volume control R47.
4. Replace the 100 ohm resistor in series with the output lead from the signal generator with a 0.1 microfarad capacitor and connect it to the grid cap of the 6K7 I. F. tube. (Do not remove the grid cap from this tube.)
5. Connect the ground terminal of the signal generator to the ground terminal of the receiver.
6. Introduce a modulated signal of 455 kilocycles to the grid of the 6K7 I. F. tube.
7. Adjust the second I. F. transformer aligners for a symmetrical curve on the oscillograph in the following order:
   a. Secondary of second I. F. transformer.
   b. Primary of second I. F. transformer.
8. Set the fidelity control to the high fidelity (expanded) position and readjust the primary of the second I. F. transformer for symmetrical curve.
9. Set the fidelity control back to the center or "sharp" position.

Adjustment of first I. F. transformer.

1. Connect the output lead from the signal generator with the 0.1 microfarad capacitor in series with it to the grid of the 6SA7 Modulator Tube. (Terminal No. 8.)
2. Adjust the first I. F. transformer aligners for a symmetrical curve on the oscillograph in the following order:
   a. Secondary of first I. F. transformer.
   b. Primary of first I. F. transformer.
3. After the Amplitude Modulation I. F. adjustments have been completed, the fidelity control should be turned to the high fidelity position and a check made on the shape of the curve which should show a slight double peak.
4. Turn the fidelity control back to middle or "sharp" position.
5. Remove the oscillograph from the circuit.

VI. **Radio frequency adjustments** (Amplitude Modulation)

Short Wave Range (C Band)

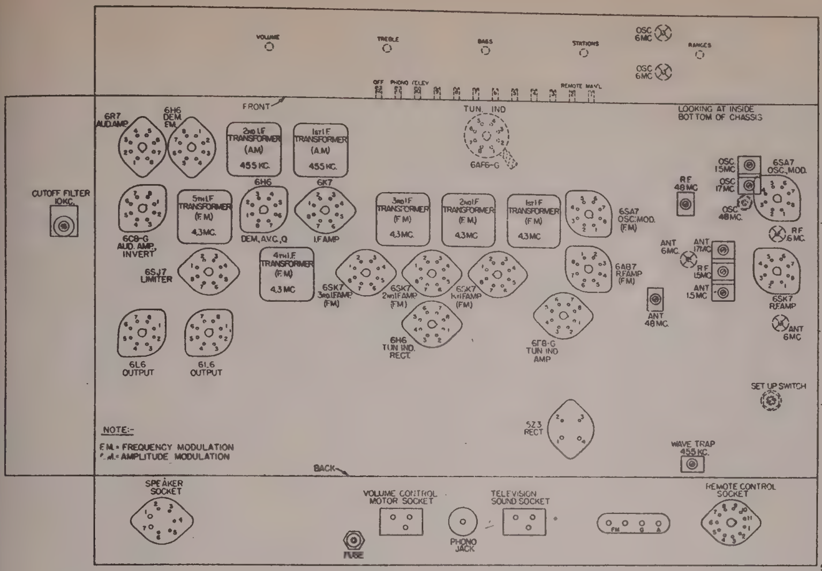
1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator with a 400 ohm resistor and connect it to the Amplitude Modulation antenna terminal on the back of the chassis.
2. Set the range switch to the short-wave range position (C Band).
3. Set the signal generator frequency and the receiver tuning dial to 6 megacycles.
4. Adjust the 6 megacycle "oscillator" and "antenna" iron cores for maximum signal.
5. Set the signal generator and the receiver tuning dial to 17 megacycles.
6. Adjust the 17 megacycles "oscillator" and "antenna" aligning capacitors for maximum signal.
7. Repeat operations 3 and 4.
8. Repeat operations 5 and 6.

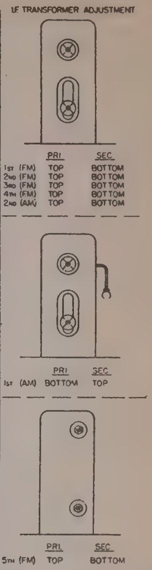
Standard Broadcast Range (A Band)

1. Replace the 400 ohm resistor in series with the output lead of the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the standard broadcast range (A Band).
3. Set the signal generator frequency and the receiver tuning dial to 600 kilocycles.
4. Adjust the 600 kilocycle "oscillator", "R. F." and "Antenna" iron cores for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 1500 kilocycles.
6. Adjust the 1500 kilocycle "oscillator", "R. F." and "Antenna" aligning capacitors for maximum signal.
7. Repeat operations 3 and 4.
8. Repeat operations 5 and 6.

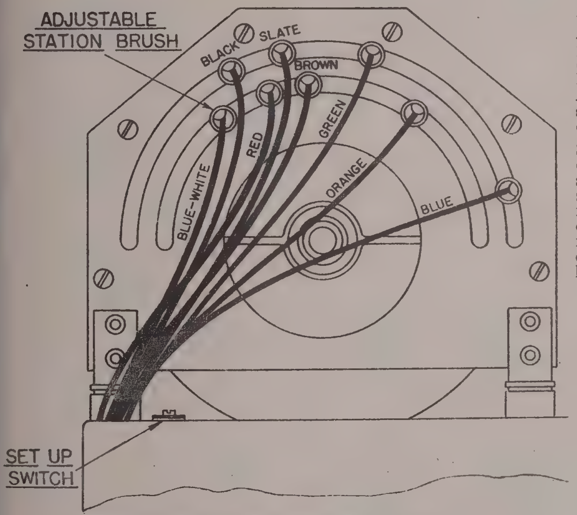
VII. **Wave trap adjustment.** (Leave the receiver connected in the same manner as when adjusting the standard broadcast range) (A Band).

1. Set the receiver's tuning dial to 1000 kilocycles.
2. Set the signal generator frequency to 455 kilocycles and introduce a fairly strong modulated signal to the receiver.
3. Adjust the wave trap aligner for minimum signal.





Location Chart



Adjustable Station Brushes and Set Up Switch

SETTING UP PUSH BUTTONS

Button No.	Purpose	Color of wire on brush
1	Manual	—
2	Remote	—
3	Highest frequency station	Blue
4	Next lower frequency station	Orange
5	Next lower frequency station	Green
6	Next lower frequency station	Brown
7	Next lower frequency station	Slate
8	Next lower frequency station	Red
9	Lowest frequency station on receiver	Black
10	Telev. button on receiver Lowest frequency button on remote control unit	Blue White
11	Phonograph	See diagram of adjustable brushes and set-up switch
12	Off	

IMPORTANT: The stations selected should be local or favorite stations which give good reception at all times. Frequency Modulated Stations, as well as Amplitude Modulation Stations, may be set up on the push buttons by simply using the appropriate button determined by the position of the Frequency Modulated Station on the dial.

Always use the tuning indicator unit when setting up stations in order to determine when the station is exactly in tune.

Seven stations may be set up for push buttons located on the front of the receiver and eight stations may be set up on the remote control unit. The same seven stations which were set up for the buttons on the front of the receiver must also be used on the remote control unit and the eighth station which is chosen for the remote control unit must be of a lower frequency than any of the other stations which have been set up.

Put the call letters of the selected stations in place above the push buttons. **The stations should be arranged according to frequency with the highest frequency at the right and the lowest frequency at the left, just as on the dial.** (The call letters will be found inside the envelope stapled inside or underneath the cabinet).

Set the "Treble" control in normal position.

Turn the set-up switch (located on the base just back of the brush and commutator assembly) to the set-up position. (The slot in the screw should point toward "set-up").

Push the button of the highest frequency station to be set up (button No. 3) and then tune in that station manually. Be sure the station is exactly "in tune" by tuning carefully and watching the cathode ray indicator.

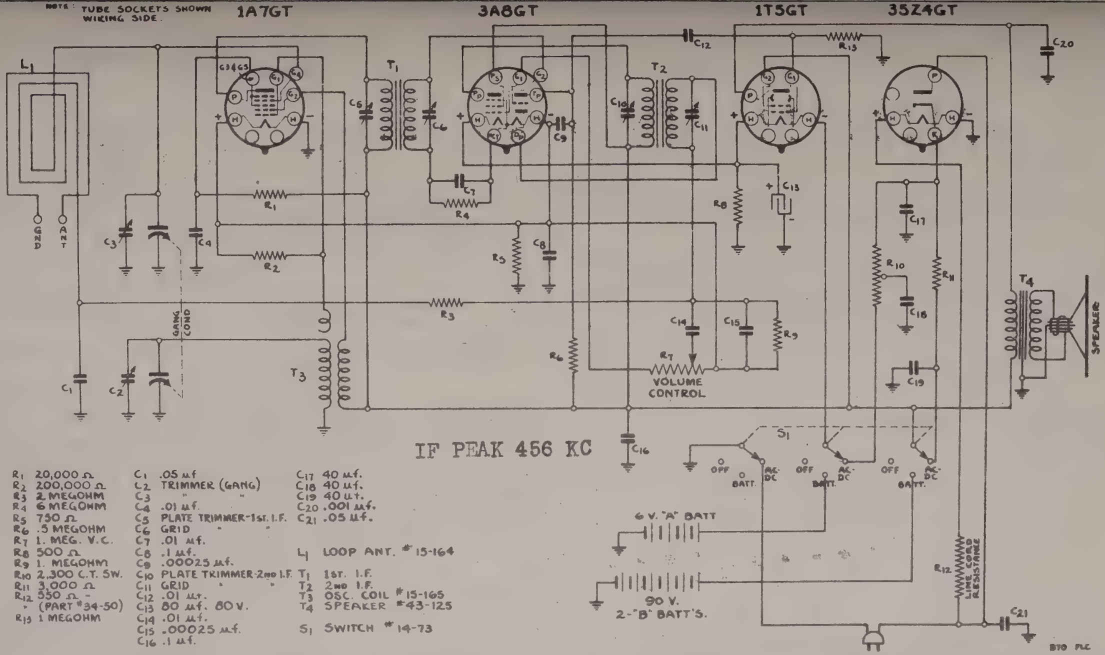
Slide the brush to which the blue wire is connected until it is over the slot in the commutator. Then adjust it very carefully until the pilot light goes out. This indicates exact adjustment.

Repeat operations 4 and 5 for each station. Work from right to left or from the higher to the lower frequencies in accordance with the table below:

Turn the set-up switch back to the "Operate" position.

Check the operation of all the push buttons to be sure that each has been accurately set up. If it is necessary to readjust any of the buttons, follow the procedure given above.

TRAV-LER RADIO & TELEV. CORP. MODELS B70, B71, B712

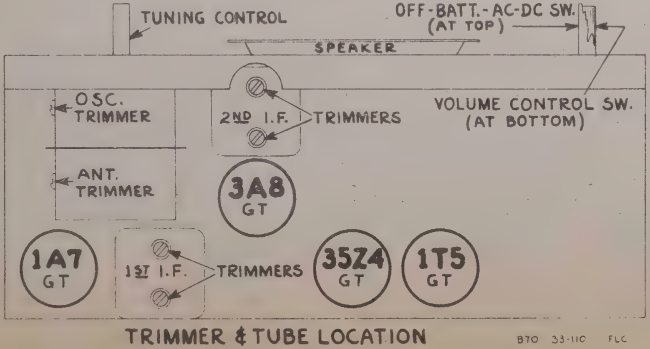


IF PEAK 456 KC

R1	20,000 Ω
R2	200,000 Ω
R3	2 MEGOHM
R4	6 MEGOHM
R5	750 Ω
R6	.5 MEGOHM
R7	1. MEG. V.C.
R8	500 Ω
R9	1. MEGOHM
R10	2,300 C.T. SW.
R11	3,000 Ω
R12	550 Ω - " (PART #34-50)
R13	1 MEGOHM

C1	.05 μf
C2	TRIMMER (GANG)
C3	" "
C4	.01 μf.
C5	PLATE TRIMMER-1st. I.F.
C6	GRID " "
C7	.01 μf.
C8	.1 μf.
C9	.00025 μf.
C10	PLATE TRIMMER-2nd I.F.
C11	GRID " "
C12	.01 μf.
C13	80 μf. 80 V.
C14	.01 μf.
C15	.00025 μf.
C16	.1 μf.
C17	40 μf.
C18	40 μf.
C19	40 μf.
C20	.001 μf.
C21	.05 μf.

L1	LOOP ANT. #15-164
T1	1st. I.F.
T2	2nd I.F.
T3	OSC. COIL #15-165
T4	SPEAKER #43-125
S1	SWITCH #14-73



TRIMMER & TUBE LOCATION

B70 33-11C FLC

FOR ALIGNMENT. SEE NEXT PAGE

INSTRUCTIONS FOR REMOVAL OF CHASSIS. (Model B70 only)

1. Remove batteries after taking off bottom panel.

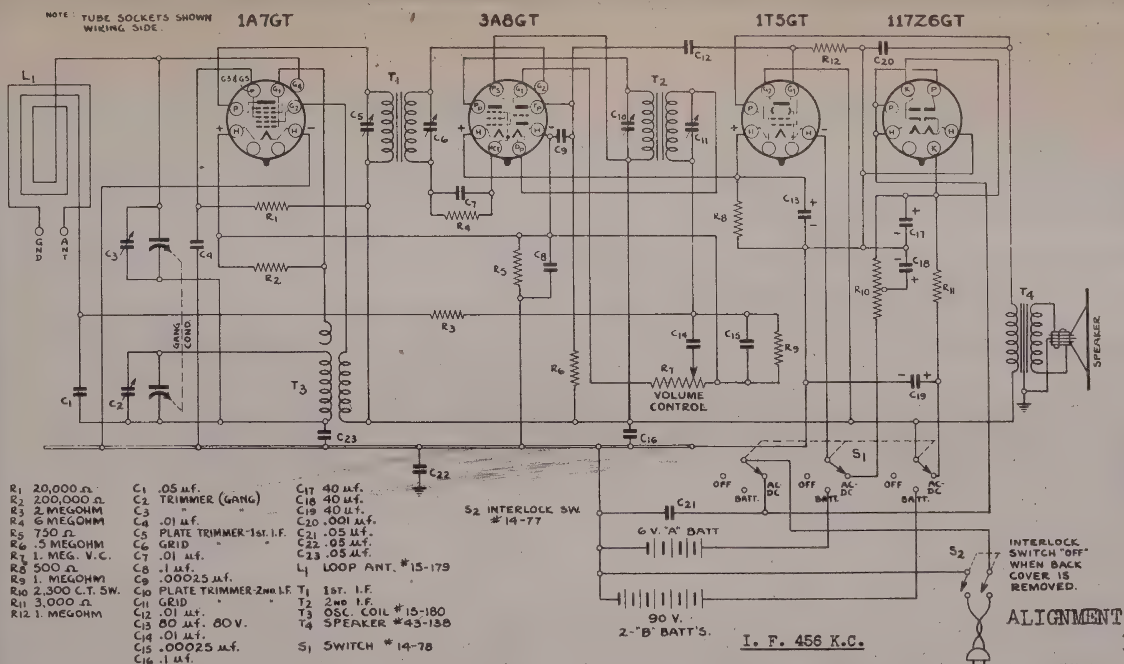
2. Remove two wood screws from loop antenna panel in cover. If loop panel does not come out easily, loosen antenna or ground screws a few turns, and lift one end out by gently pulling on screw with pliers until panel can be removed.

3. Remove two screws in rear on cabinet and one screw in front of cabinet. The chassis can now be removed by pushing it from behind and sliding it out of the cabinet.

4. If the loop antenna is disconnected for any reason, be sure that the lead coming from the gang condenser is connected to the inside turn of the loop antenna coil.

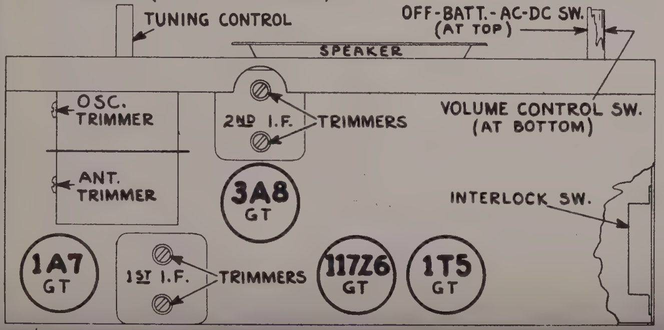
MODEL FB-73
MODELS B70, B71, B712

TRAV-LER RADIO & TELEV. CORP.



R1	20,000 Ω	C1	.05 µf.	C17	40 µf.
R2	200,000 Ω	C2	TRIMMER (GANG)	C18	40 µf.
R3	2 MEGOHM	C3	" "	C19	40 µf.
R4	6 MEGOHM	C4	.01 µf.	C20	.001 µf.
R5	750 Ω	C5	PLATE TRIMMER-1st. I.F.	C21	.05 µf.
R6	.5 MEGOHM	C6	GRID " "	C22	.05 µf.
R7	1. MEG. V.C.	C7	.01 µf.	C23	.05 µf.
R8	500 Ω	C8	.1 µf.	L1	LOOP ANT. #15-179
R9	1. MEGOHM	C9	.00025 µf.		
R10	2,300 C.T. SW.	C10	PLATE TRIMMER-2nd I.F.	T1	1st. I.F.
R11	3,000 Ω	C11	GRID " "	T2	2nd I.F.
R12	1. MEGOHM	C12	.01 µf.	T3	OSC. COIL #15-180
		C13	80 µf. 80 V.	T4	SPEAKER #43-138
		C14	.01 µf.		
		C15	.00025 µf.	S1	SWITCH #14-78
		C16	.1 µf.		

NOTE: POWER AUTOMATICALLY TURNED "OFF" WHEN CABINET BACK PANEL IS REMOVED. (INTERLOCK SWITCH).



ALIGNMENT --- MODELS B70, FB73 B71, B712

I. F. 456 K.C.

Set receiver dial at 1720 KC, or with tuning condenser open.

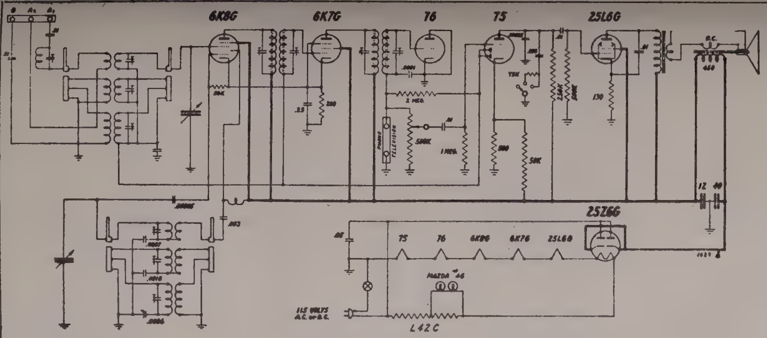
Set signal generator at 456 KC with generator coupled to receiver through a .1 mfd. condenser in each lead (ground side to chassis and other lead to 1A7GT grid cap). Allow just enough signal to produce a reading in an output indicating device such as a.c. meter connected to voice leads of speaker. Meter must be able to indicate as low as one or two volts a.c.

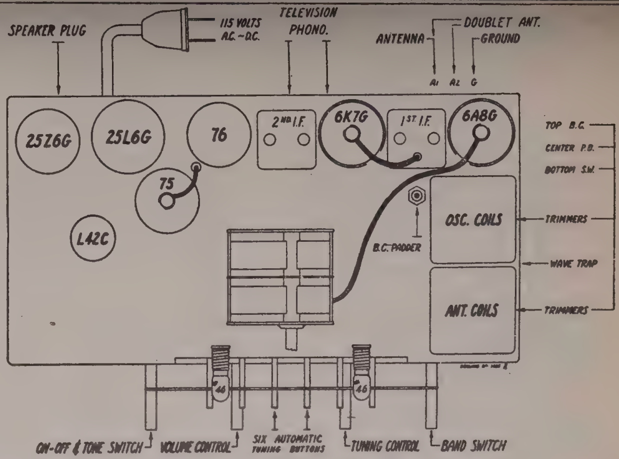
Adjust each I.F. trimmer to maximum output while reducing input signal to a minimum, thus avoiding a.v.c. effects and insuring perfect resonance.

B.C. BAND

Connect signal generator to a single turn loop of wire five or six inches in diameter facing receiver loop and spaced about eight inches away. This is to simulate actual receiving conditions.

Set receiver dial to 1500 KC and signal generator dial to 1500 KC. Adjust oscillator trimmer until signal is heard. Start this procedure with considerable signal from generator and reduce as previously instructed until signal is set at 1500 KC on receiver. Adjust antenna trimmer at same point and to the greatest output with minimum signal from generator.





IF PEAK 456 KC

I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the chassis (make sure polarity is the same first), and the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the tube's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the speaker. Adjust the I.F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

B. C. ALIGNMENT

1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.

2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. ANT. trimmer for maximum output.

3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together

Check the alignment again at 1400 K.C.

Adjust the wave trap at 456 K.C. for MINIMUM output.

INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the Antenna trimmer at 6 M.C.

Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust S.W. oscillator trimmer at 24.5 M.C., and the Antenna trimmer at 22 M.C.

Check for alignment at 8 M.C.

The ranges of the three wave bands are as follows.

Standard Broadcast Band	538	to	1,720 K.C.
Intermediate (Police) Band	1,950	to	6,500 K.C.
Short Wave (Foreign) Band	7,650	to	24,500 K.C.

Each push button may be adjusted to select any station in the broadcast band.

1.Tune in desired station with the Selector knob.

2.Twist the push button you are going to set up for this station one full turn to the left.

3.Push this button in all the way,holding the Selector knob so station will stay tuned in.

4.With button pressed in,twist it to the right until tight and then release it.

Follow this procedure with the remaining buttons,setting each for a different station.

Insert call-letter tabs.

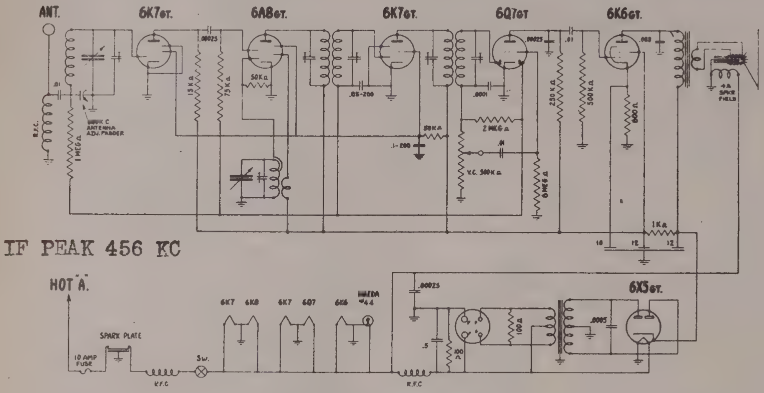
I. F. ALIGNMENT

Set the variable condenser at minimum capacity, (dial pointer at 1550 K.C.). Connect the two leads from a good, modulated signal generator, the ground lead to the radio chassis and the other lead through a .1 mfd. condenser, to the grid cap of the 6A8GT with the tube's grid lead still in place.

Connect the leads from a fully charged 6 volt storage battery to the receiver chassis and battery lead, the polarity being reversible.

With the set in operation and the volume control full on, set the signal generator to 456 K.C. and increase its output until the signal is heard in the set's speaker. Starting with the second I. F., adjust the I. F. trimmers for maximum output, decreasing the signal generator output as the receiver output increases.

The generator output in all the alignment adjustments should be adjusted so the meter will read approximately .4 volts continually.



R. F. ALIGNMENT

With the variable condenser still full open, set the generator to 1550 K.C. Connect the generator lead to the antenna lead through a .0001 mfd. condenser as dummy antenna. Adjust the oscillator trimmer for maximum output. Set the receiver dial and the generator to 1400 K.C. so the signal comes through, and adjust the antenna trimmer for maximum output.

Set the receiver dial and generator to 600 K.C. and adjust the oscillator padder for maximum output by rocking the variable condenser (with the tuning knob) as the padder is adjusted.

Return the dial and generator setting to 1400 K.C. and check for alignment.

PUSH BUTTON ADJUSTMENT

Six push button station selectors are incorporated in this receiver, and each may be set to select any frequency or station within the range of the set.

To adjust each button, follow these instructions.

1. With the set in operation, tune in any station the push button is to be set for, with the right hand tuning knob.

2. Keep a firm grip on the tuning knob so the station will not be detuned, and turn the push button about one turn to the left to loosen the mechanism. Press the button all the way in and turn it to the right until it is tight.

Repeat these operations with the other five buttons, setting each for a different station. Insert the correct call letter tab into the space provided in the panel just above the push buttons.

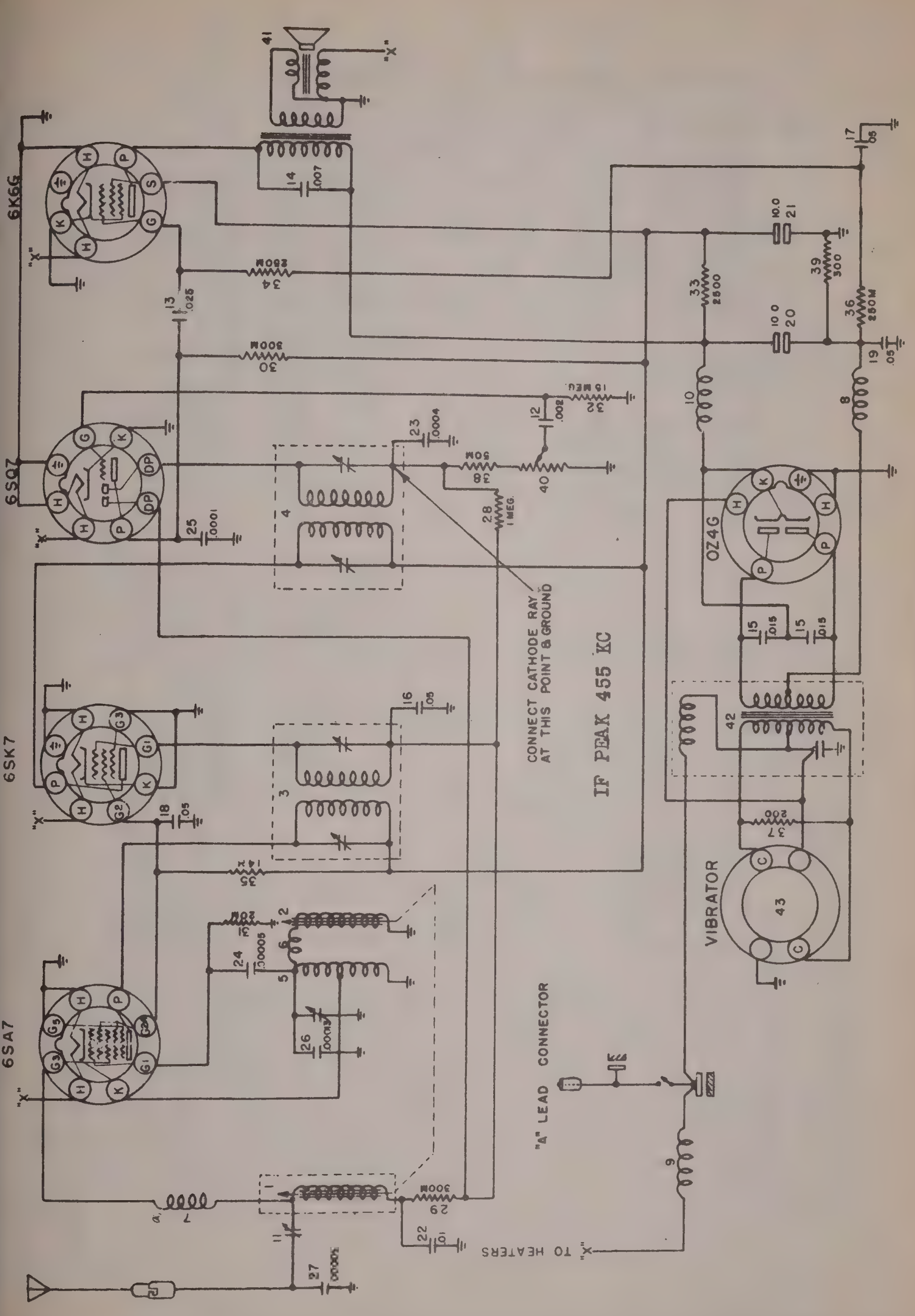


FIG. 2--DELCO MODEL R-675

4-25-39

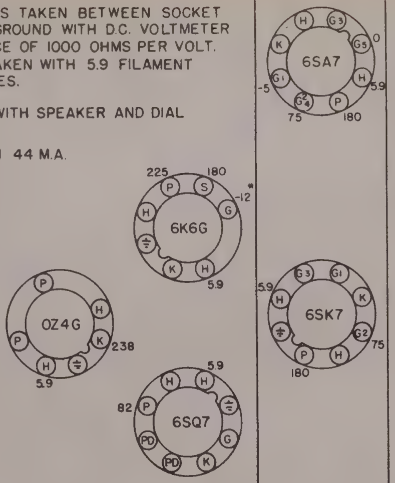
MODEL R675

UNITED MOTORS SERVICE

VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 5.9 FILAMENT VOLTAGE AT TUBES.

CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 6.1 AMPS.

"B" SUPPLY DRAIN 44 M.A.



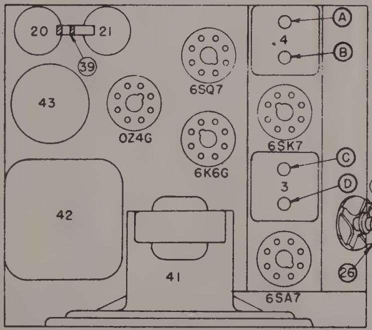
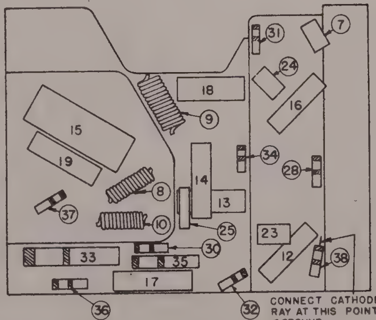


FIG. 3--PARTS LAYOUT--Top View



CONNECT CATHODE RAY AT THIS POINT & GROUND.

FIG. 4--PARTS LAYOUT--Bottom View

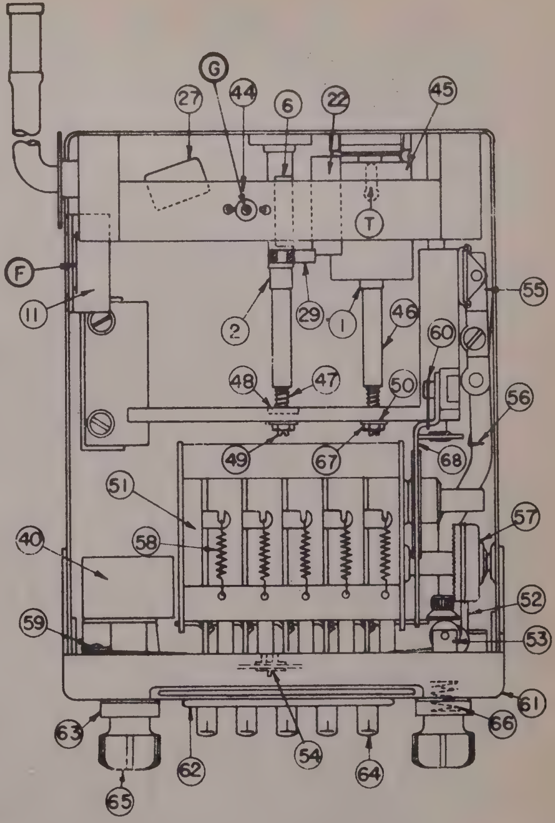


FIG. 5--PARTS LAYOUT--TUNER ASSEMBLY

Tuning is accomplished with the conventional manual tuning control or by means of five push buttons which mechanically adjust the position of the iron cores in the tuning coils, tuning the radio to preselected stations.

SETTING STATIONS ON PUSH BUTTONS
MODELS 675,677,678

1. Remove the push-button trim plate by prying gently with a small screwdriver or knife blade in the slots provided at the bottom of plate.

2. Press the manual station selector knob and tune across the dial. Select the five stations which will give the best all around reception.

3. Stations may be set up in any sequence desired; however, it is best from a speed-of-operation standpoint to set them up on the buttons in the order of their frequencies.

4. Press a button on which a station is to be set-up. Insert screwdriver supplied in receiver package in hole located to the right of the button and loosen set screw. BUTTON MUST BE HELD IN WHEN LOOSENING OR TIGHTENING SET SCREW.

5. Tune set manually (with station button held down FIRMLY) until station desired to be set up is tuned in. In order to secure an accurate set-up, rock manual tuning knob back and forth slightly until station is tuned in clearly and with maximum volume. DO NOT RELEASE PUSH BUTTON.

6. With push button still held down firmly and station accurately tuned in, tighten adjustment screw securely and remove screwdriver before releasing button.

7. Insert station call letter tab in slot provided at top of button.

8. Repeat this same procedure in setting up the remaining buttons and then replace the button snap-on plate.

CIRCUIT ALIGNMENT
MODEL 675

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated Test Oscillator or Signal Generator, and an output meter. Extreme care should be exercised in following the alignment instructions in order to obtain the best performance possible. IT WILL BE NECESSARY TO USE AN INSULATED SCREWDRIVER IN ALL ALIGNMENT ADJUSTMENTS.

In order to prevent the A.V.C. from affecting the alignment adjustment, the lowest signal generator output which will give a readable indication on the output meter should be used. Top and bottom covers must be removed in order to properly align the set, however, the chassis should not be removed from the case.

ALIGNMENT PROCEDURE

Two separate alignment procedures are included in these instructions. The first is to be considered the usual alignment procedure, and the second to be used only when a tuning coil has been changed, or when some major change has been made in the tuning apparatus.

CAPACITY ALIGNMENT

1. Aligning I.F. Stages at 455 Kilocycles

   (a) Connect the ground lead of the Signal Generator to chassis frame. Connect the signal lead through an 0.1 mfd. condenser to the terminal "T" (Fig. 5).

   (b) Connect output meter from the plate of the 6K6G tube to ground.

   (c) Set signal to exactly 455 kilocycles and turn volume control on full.

   (d) Tune the set by means of the manual tuning control knob to a position where no squeals or beat notes can be noticed, also so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output.

   (e) Adjust trimmers A-B-C-D (Fig. 3) in the order mentioned until maximum output is obtained.

   (f) Repeat adjustment of I.F. trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Alignment at 1560 Kilocycles

   (a) Tune the set by means of the tuning control knob to the extreme high frequency position against stop.

   (b) Connect the signal lead of the Signal Generator to the antenna terminal of the set through a .0001 mfd. condenser.

   (c) Set frequency of the Signal Generator to 1560 kilocycles and adjust the oscillator shunt trimmer "G" for maximum output (Fig. 5).

3. Alignment at 600 Kilocycles

   (a) Leave Signal Generator connected the same as for alignment at 1560 kilocycles.

   (b) Set the Signal Generator to 600 kilocycles.

   (c) Tune the set (manual tuning control) to this signal.

   (d) Adjust the antenna trimmer "F" (Fig. 5) for maximum output.

4. Checking I.F. Band Spread

   (a) A Cathode Ray Oscillograph should be used to check the I.F. band spread after completing the alignment procedure. Slight adjustment of the I.F. stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray Oscillograph as shown in Fig. 4.

CAPACITY AND INDUCTANCE ALIGNMENT

To be used ONLY when a major change such as changing a tuning coil has been made in the tuning apparatus and there is definite evidence of tuning coils not "tracking."

1. I.F. Alignment.

   Align the I.F. stages the same as outlined under the capacity Alignment Procedure.

2. Mechanical Alignment of R.F. Stage

   (a) Tune the set by means of the tuning control knob to extreme high frequency position, against mechanical stop (cores will be almost withdrawn from coil forms.)

   (b) Adjust the nut on the oscillator core (Illus. #2, Fig. 5) aligning the end of the core (inside coil form) to a position flush with the end of the oscillator coil winding. This may be done by laying a separate core (or an accurate 1-3/8" gauge) alongside the oscillator core making the stud ends flush and making the opposite ends just meet the winding of the oscillator coil.

   (c) Adjust the position of the core of the antenna coil assembly (Illus. #1, Fig. 5) until this core sticks out of its coil form (toward tuner) exactly the same amount that the oscillator core sticks out of its coil form. This should be measured carefully as it gives the antenna core the same mechanical relation to its coil as the oscillator core has to its coil.

3. Alignment at 1560 Kilocycles

   (a) Connect the signal lead of the Signal Generator to the antenna terminal of the set through a .0001 mfd. condenser.

   (b) Set the Signal Generator to 1560 kilocycles and adjust the oscillator shunt trimmer "G" (Fig. 5) for maximum output.

4. Alignment at 600 Kilocycles

   (a) Leave Signal Generator leads connected the same as for alignment at 1560 kilocycles.

   (b) Set the Signal Generator to 600 kilocycles.

   (c) Tune the set (manual tuning control) to this signal.

   (d) Adjust the antenna trimmer "F" (Fig. 5) for maximum output.

5. Alignment at 1400 Kilocycles

   (a) Leave Signal Generator leads connected the same as for alignment at 600 kilocycles.

   (b) Set the Signal Generator to 1400 kilocycles.

   (c) Tune the set to signal and using wrench, part #7238078, adjust the antenna coil (Illus. #1) iron core for maximum output. (Do not attempt to make this adjustment without this wrench.)

SERVICE HINTS

Removing Tuner Assembly

In order to make the parts located under the tuner assembly accessible for service tests, the tuner assembly can be lifted out of the way as follows.

1. Unsolder single "A" lead to switch.
2. Unsolder green lead connected to oscillator trimmer condenser at condenser (Illus. #44, Fig. 5).
3. Remove the four hex head slotted screws (two on each side of case) used for mounting tuner assembly to case.
4. Remove the two screws in antenna lead support bracket.
5. Lift front end of tuner out of case, pivoting at the back end, being careful not to break other leads connected to tuner.

Dial Cord Replacement.

1. Loosen shaft (Illus. #57, Fig. 5) in cord drive gear assembly.
2. Pull spring clip from shaft and disassemble cord drive gear assembly.
3. Thread doubled end of cord through cord drive pulley until the spring lies inside the pulley.
4. Looking in the end of the drive pulley, take the spring counter-clockwise around the shaft from the dial cord hole, placing the hook end in the hole provided in the side of the pulley.
5. Wrap one half the cord clockwise approximately one turn around the outside of the drum and the other half counter-clockwise and hold the cord in place with a piece of scotch tape on the side of the pulley opposite the cord hole.
6. Fasten cord drive gear assembly back into place lightly, not meshing gears until cord is threaded into place.
7. Thread cord around the two pulleys at the manual tuning control end of the dial and across the front and over the single pulley at the volume control end of the dial.
8. Mesh gears carefully by tightening cord drive gear shaft. Too tight a mesh will result in hard push button operation or rough or tight manual tuning drive.
9. Tune set to a station of known frequency or to Signal Generator. Set to a good calibration point (700 K.C.). Set pointer to that frequency on dial and crimp pointer tabs over dial cord.

Lubrication

The mechanical parts of the push button tuner should be carefully lubricated as a part of every service job, using a special lubricant supplied under part #7236515. NOTE: Do not use ordinary oils and greases on the automatic tuner.

Grease the following points:

(a) Dial pulleys and pins
(b) Plunger Guides
(c) All gears
(d) Core bracket guides
(e) Ratchet

Do not allow brake surface to become greasy.

Volume Control Replacement

1. Unsolder all volume control leads at the volume control.
2. Remove volume control nut from front end of chassis.
3. Remove volume control by lifting switch end of volume control up and back.
4. To replace reverse the procedure.

Oscillator Series Coil Replacement

1. This coil (Illus. #6, Fig. 5) is glued to terminal strip in the original assembly. Replacement coils will be furnished with a piece of tape to hold them to the terminal strip.

Oscillator Trimmer Condenser Replacement (Illus. #44, Fig. 5)

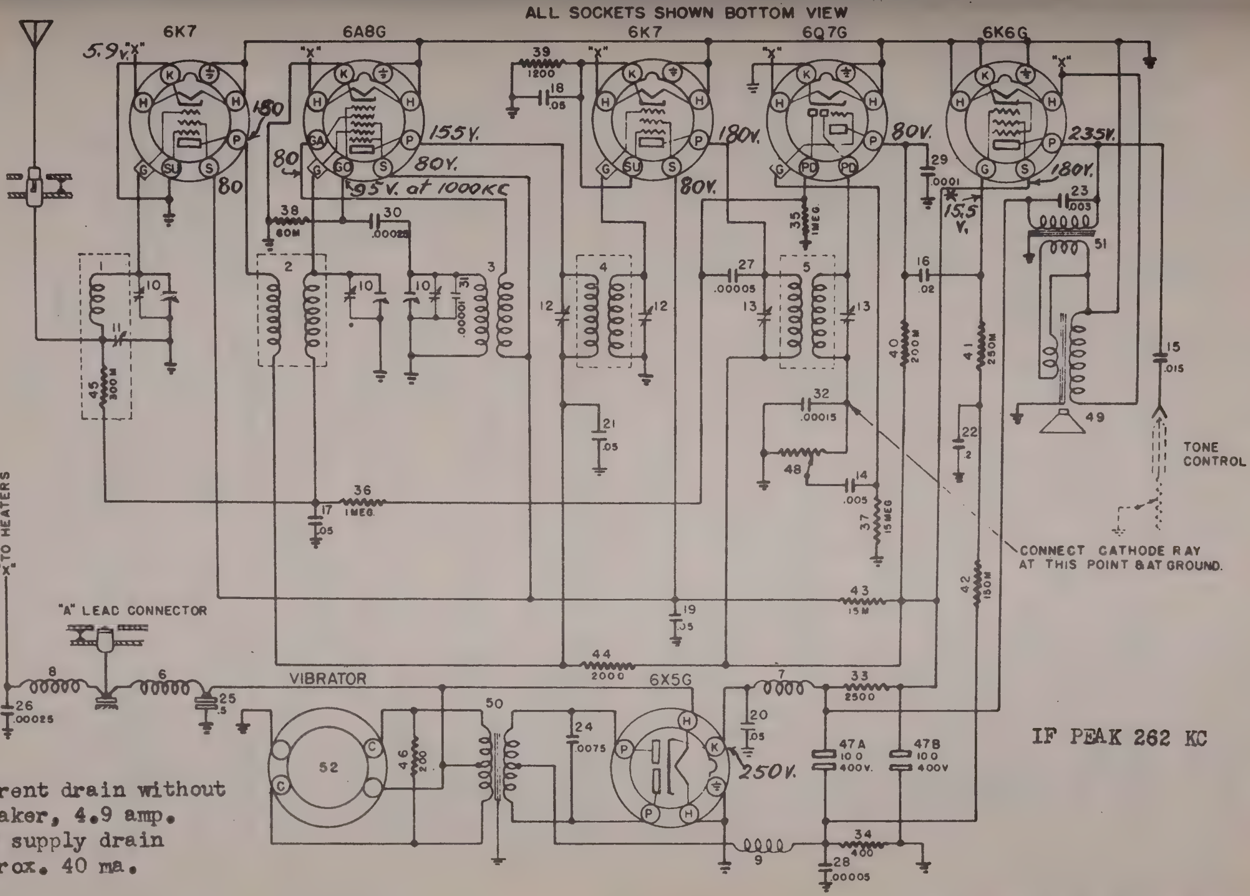
1. Unsolder leads from trimmer condenser.
2. Unsolder trimmer ground connection from chassis.
3. Straighten tangs through terminal strip and remove trimmer.
4. To replace reverse the procedure.

Antenna Coil Replacement.

1. Unsolder leads from antenna coil terminals located on terminal strip at rear of tuner.
2. Remove iron core by removing nut, Illus. #67, and washers, Illus. #48 and 50, (Fig. 5). Pull out of coil toward tuner unit. NOTE: Extreme care should be used in handling the iron cores as they are brittle and very easily broken.
3. To remove shield, Illus. #45 (Fig. 5), unsolder from chassis and straighten the three ears.
4. To remove coil, loosen the three screws holding its base to chassis.
5. To replace the antenna coil reverse this procedure.

Oscillator Coil Replacement (Tuning Coil)

1. Remove iron core in same manner as recommended under antenna coil replacement.
2. Remove three nuts holding coil to chassis and unsolder coil leads from terminal strip.
3. To replace reverse procedure.



Current drain without speaker, 4.9 amp. "B" supply drain approx. 40 ma.

IF PEAK 262 KC

FIG. 2--DELCO MODEL R-676 CIRCUIT DIAGRAM

* This reading is taken between negative side of 400-ohm resistor (No. 34) and ground.

4-14-39

1. Aligning I-F Stages at 262 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube through a .1 mfd. condenser, leaving the tubes grid clip in place.

   (c) Connect the output meter from the plate of the 6K6G tube to ground.

   (d) Set the Signal Generator to exactly 262 kilocycles and turn the volume control on full.

   (e) Turn the condenser gang to a position where no squeals or beat notes are heard and so that when the tuning condenser is rotated within narrow limits, there is no appreciable change in output.

   (f) Adjust trimmers A-B-C-D through the cutouts on the side of the chassis opposite the antenna and "A" receptacles (Illus. 12 & 13, Figure 4) for maximum output. Repeat with lowest possible output from the signal generator for more accurate alignment.

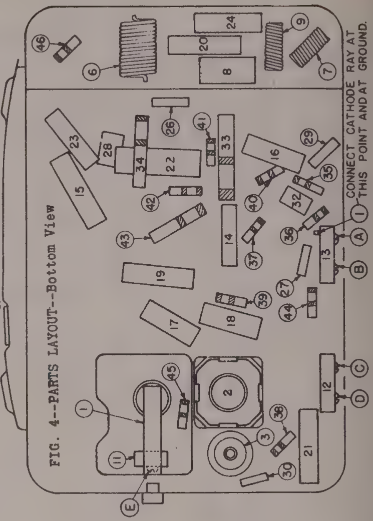


FIG. 4--PARTS LAYOUT--Bottom View

CONNECT CATHODE RAY AT THIS POINT AND AT GROUND.

2. Aligning at 1530 Kilocycles

   (a) Leave Signal Generator leads connected the same as for I-F adjustments.

   (b) Turn the rotor plates of the gang condenser all the way out of mesh and against the high frequency stop.

   (c) Set the Signal Generator to exactly 1530 Kilocycles.

   (d) Adjust the oscillator parallel trimmer "G" on the center section of the gang condenser carefully for maximum output (Figure 3).

3. Aligning at 1400 Kilocycles

   (a) Remove the signal lead of the Signal Generator from the grid cap of the 6A8G and connect to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

   (b) Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

   (c) Adjust the parallel trimmers "F" and "H" (Figure 3) on the condenser gang carefully for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the Signal Generator to approximately 600 kilocycles.

   (b) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

   (c) Adjust trimmer "E" (Illus. #11, Figure 4) while rocking the rotor plates of the gang condenser back and forth through the signal until maximum output is obtained.

   It will be necessary to readjust this condenser to the car antenna upon installation of the set.

   (d) Repeat adjustments made under "Alignment at 1400 Kilocycles".

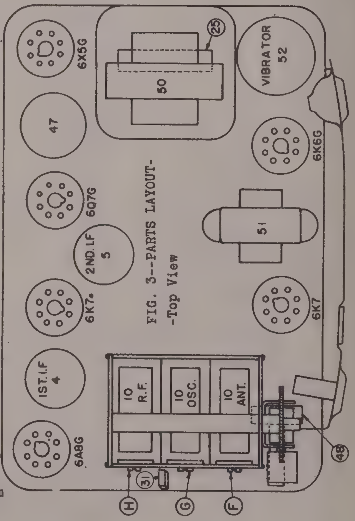
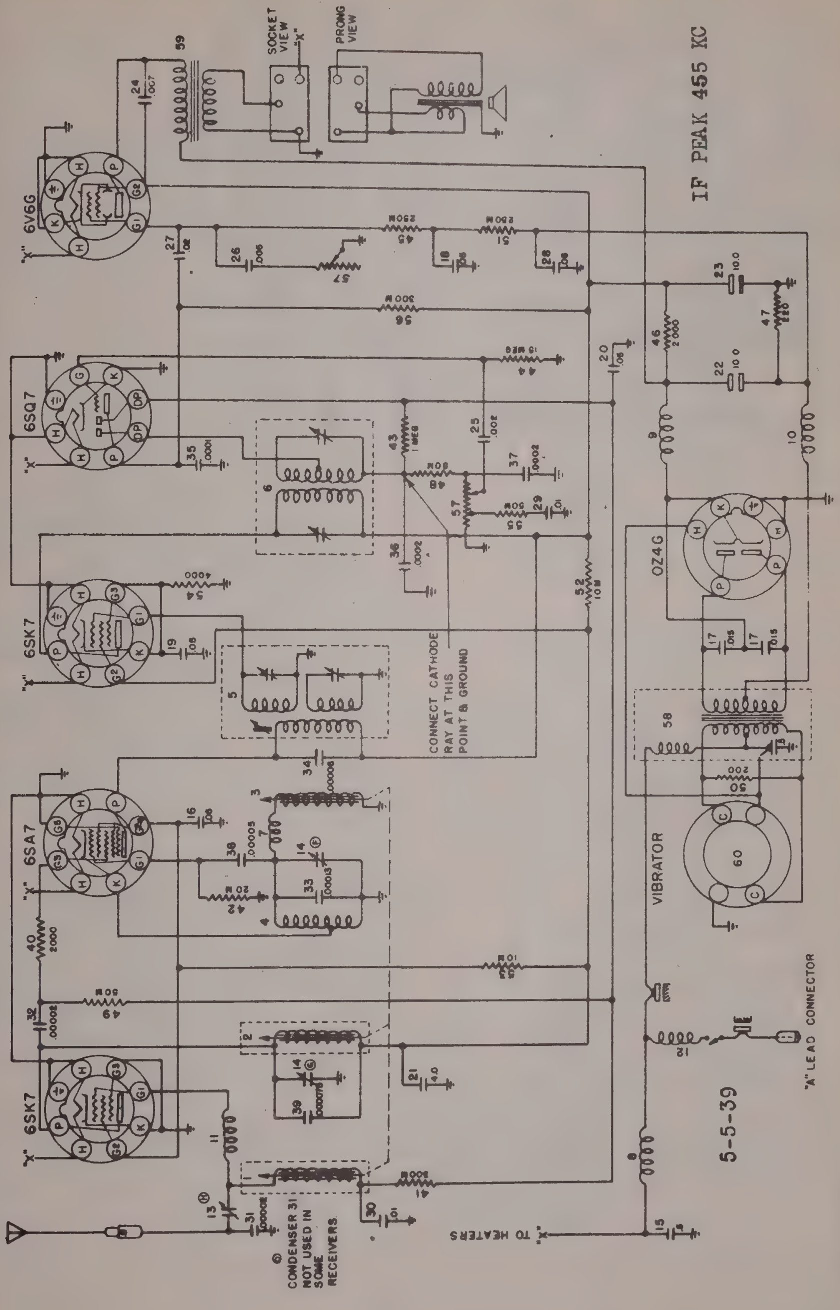


FIG. 3--PARTS LAYOUT- -Top View

5. Checking I-F Band Spread

   A Cathode Ray Oscillograph should be used to check the I-F band spread after completing the alignment procedure. Connect the oscillograph from connection "I" (Figure 4) to ground.



IF PEAK 455 KC

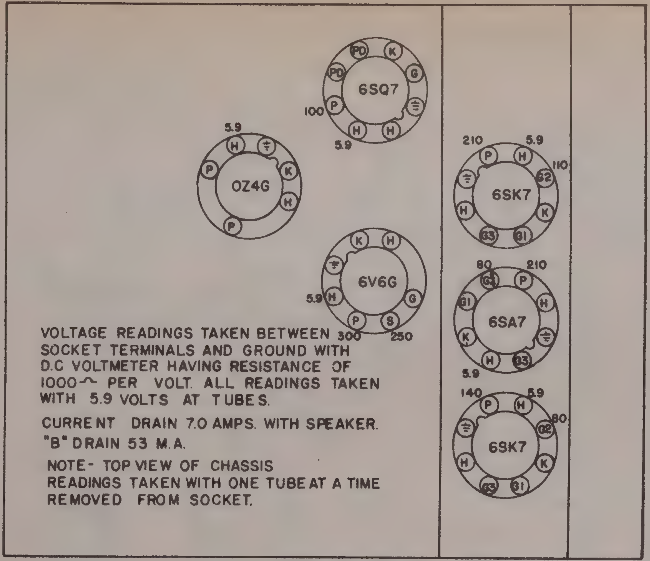
5-5-39

FIG. 2--DELCO MODEL R-677 CIRCUIT DIAGRAM

FOR TUNER
SEE INDEX

MODEL R677

UNITED MOTORS SERVICE

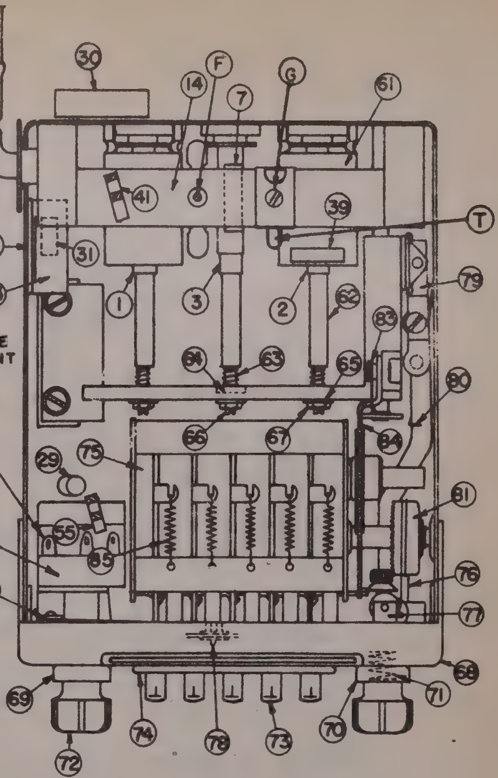


VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C VOLTMETER HAVING RESISTANCE OF 1000-~ PER VOLT. ALL READINGS TAKEN WITH 5.9 VOLTS AT TUBES.

CURRENT DRAIN 7.0 AMPS. WITH SPEAKER.
"B" DRAIN 53 M.A.

NOTE- TOP VIEW OF CHASSIS READINGS TAKEN WITH ONE TUBE AT A TIME REMOVED FROM SOCKET.

FIG. 1--TUBE SOCKET VOLTAGES



CONNECT CATHODE RAY AT THIS POINT AND GROUND.

FIG. 5--PARTS LAYOUT--TUNER ASSEMBLY

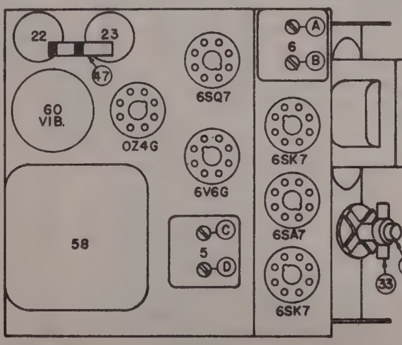


FIG. 3--PARTS LAYOUT--Top View

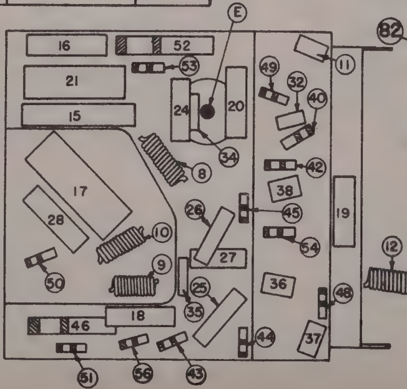


FIG. 4--PARTS LAYOUT--Bottom View

In order to prevent the A.V.C. from affecting the alignment adjustment, the lowest signal generator output which will give a readable indication on the output meter should be used. Top and bottom covers must be removed in order to properly align the set, however, the chassis should not be removed from the case.

ALIGNMENT PROCEDURE

Two separate alignment procedures are included in these instructions. The first is to be considered the usual alignment procedure, and the second to be used only when a tuning coil has been changed, or when some major change has been made in the tuning apparatus.

CAPACITY ALIGNMENT

1. Aligning I.F. Stages at 455 Kilocycles

   (a) Connect the ground lead of the Signal Generator to chassis frame. Connect the signal lead through an 0.1 mfd. condenser to the terminal "T" (Fig. 5).

   (b) Connect output meter from the plate of the 6V6G tube to ground.

   (c) Set signal to exactly 455 kilocycles and turn volume control on full.

   (d) Tune the set by means of the manual tuning control knob to a position where no squeals or beat notes can be noticed, also so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output.

   (e) Adjust trimmers A-B-C-D (Fig. 3) and I.F. core adjustment "E", (Fig. 4) in the sequence named, until maximum output is obtained.

   (f) Repeat adjustments with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Alignment at 1560 Kilocycles

   (a) Tune the set by means of the manual tuning control knob to the extreme high frequency position against stop.

   (b) Connect the signal lead of the Signal Generator to the antenna terminal of the set through a .0001 mfd. condenser.

   (c) Set frequency of the Signal Generator to 1560 kilocycles and adjust the oscillator shunt trimmer condenser "F" (Fig. 5) for maximum output.

3. Alignment at 600 Kilocycles

   (a) Leave Signal Generator connected the same as for alignment at 1560 kilocycles.

   (b) Set the Signal Generator to 600 kilocycles.

   (c) Tune the set (manual tuning control) to this signal.

   (d) Adjust the R.F. trimmer condenser "G" (Fig. 5) for maximum output.

   (e) Adjust the antenna trimmer condenser "H" (Fig. 5) for maximum output. (This trimmer is readjusted at 1400 kilocycles when set is installed in car.)

4. Checking I.F. Band Spread

   (a) A Cathode Ray Oscillograph should be used to check the I.F. band spread after completing the alignment procedure. Slight adjustment of the I.F. stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray Oscillograph as shown in Fig. 5.

CAPACITY AND INDUCTANCE ALIGNMENT

To be used ONLY when a major change such as changing a tuning coil has been made in the tuning apparatus and there is definite evidence of tuning coils not "tracking."

1. I.F. Alignment.

   Align the I.F. stages the same as outlined under the capacity Alignment Procedure.

2. Mechanical Alignment of R.F Stages

   (a) Tune the set by means of the tuning control knob to extreme high frequency position, against stop (cores will be almost withdrawn from coil forms.)

   (b) Adjust the nut on the oscillator core stud aligning the end of the core (inside coil form) to a position flush with the end of the oscillator coil winding. This may be done by laying a separate core Part #7237714 (or an accurate 1-3/8" gauge) alongside the oscillator core making the stud ends flush and making the opposite ends just meet the winding of the oscillator coil.

   (c) Adjust the position of the antenna and R. F. coil cores to a position flush with the end of the coil windings, using the separate core for a gauge in the same manner as for the oscillator coil.

3. Alignment at 1560 Kilocycles

   (a) Connect the signal lead of the Signal Generator to the antenna terminal of the set through a .0001 mfd. condenser.

   (b) Set frequency of the Signal Generator to exactly 1560 kilocycles and adjust the oscillator shunt trimmer condenser "F" (Fig. 5) for maximum output indication on the output meter.

4. Alignment at 600 Kilocycles

   (a) Leave the Signal Generator connected the same as for alignment at 1560 kilocycles.

   (b) Set the Signal Generator to 600 kilocycles.

   (c) Tune the set (manual tuning control) to this signal.

   (d) Adjust the R.F. trimmer condenser "G" for maximum output.

   (e) Adjust the antenna trimmer condenser "H" for maximum output.

5. Alignment at 1400 Kilocycles

   (a) Leave Signal Generator connected the same as for alignment at 600 kilocycles.

   (b) Set the Signal Generator to 1400 kilocycles.

   (c) Tune the set to signal and using wrench, part #7238078, adjust the position of the iron core in the R. F. coil (Illus. #2, Fig. 5) for maximum output meter indication.

   (d) Adjust the position of the iron core in the antenna coil (Illus. #1, Fig. 5) for maximum output. DO NOT TOUCH THE ADJUSTMENT OF THE OSCILLATOR COIL IRON CORE.

   (e) Repeat adjustments with a lower output from the signal Generator for more accurate alignment.

SERVICE HINTS

It is to be noted that the voltage chart is given for the tube sockets with the tubes pulled out of the socket. This is because the bases of several tube sockets are not readily accessible.

1. To remove the tuner assembly for servicing parts mounted on the 6SK7 or 6SA7 tube sockets, proceed as follows:

   (a) Unsolder single yellow "A" lead at switch.

   (b) Unsolder blue lead and black lead from either end of trimmer "G" (Fig. 5).

   (c) Unsolder green lead from high side of trimmer "F" (Fig. 5).

   (d) Remove screws holding tuner assembly in case and screws on antenna lead.

   (e) Fold tuning unit back being careful not to break other leads connected to it.

2. The position of the R.F. coil shunt condenser (Illus. 39, Fig. 5) should not be changed. Changing its position causes this stage of the radio to be detuned.

3. Coil cores (Part #7237714) should not have to be replaced except when broken by mishandling. Since these cores are matched at the factory into sets of matched characteristics, it is recommended that all three cores be replaced at the same time. All Branch stock on #7237714 is matched and may be ordered in the required quantity for service.

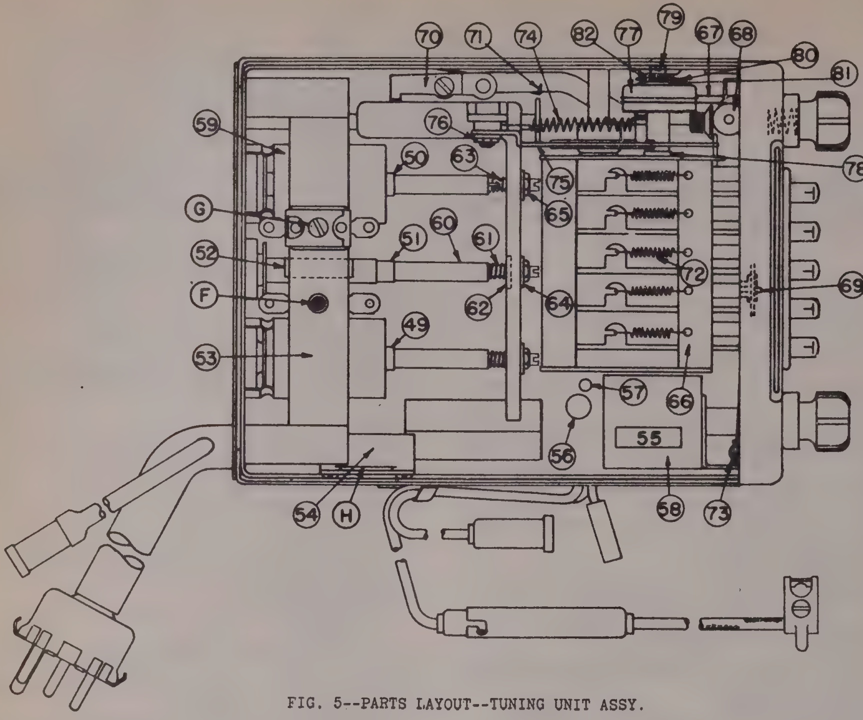


FIG. 5--PARTS LAYOUT--TUNING UNIT ASSY.

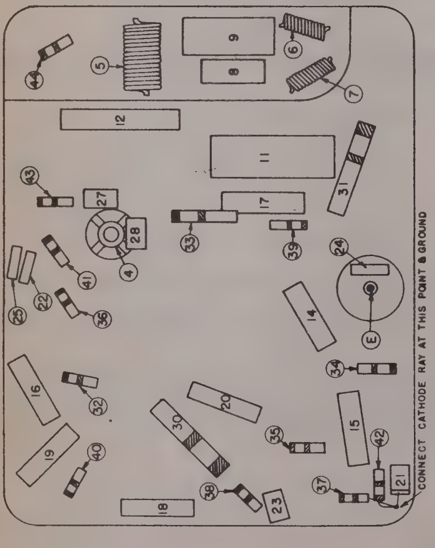


FIG. 4--PARTS LAYOUT--DASH UNIT--Bottom View

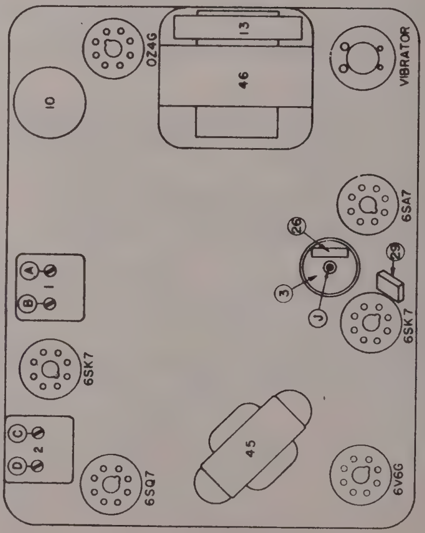
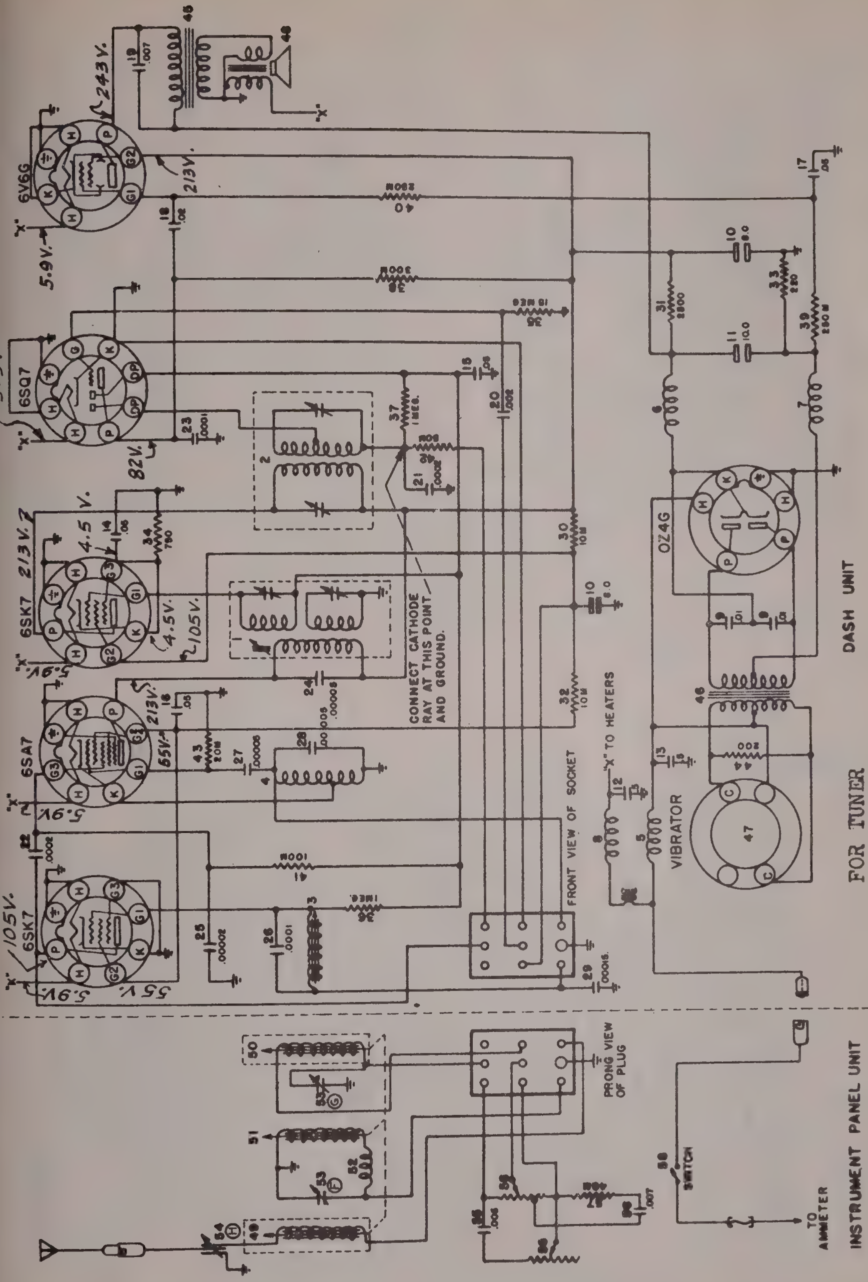


FIG. 3--PARTS LAYOUT--DASH UNIT--Top View



IF PEAK 455 KC

FOR TUNER
SEE INDEX

FIG. 2--DELCO MODEL R-678 CIRCUIT DIAGRAM

5-9-39

CAPACITY ALIGNMENT

1. Aligning I.F. Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis. Connect the signal lead through a 0.1 mfd. condenser to the bottom right hand connections of the tuner socket as shown in Fig. 2.

(b) Connect output meter from the plate of the 6V6G tube to ground.

(c) Set signal generator to exactly 455 kilocycles and turn volume control on full.

(d) Tune the set by means of the manual tuning control knob to a position where no squeals or beat notes can be noticed; also, so that when the tuning knob is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A-B-C-D (Fig. 3) and I.F. core adjustment "E" (Fig. 4) in the sequence named, until maximum output is obtained.

(f) Repeat adjustments with as low an output from the signal generator as possible, for more accurate alignment.

(g) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .1 mfd. condenser.

(h) Adjust the I.F. Trap adjustment "J" for MINIMUM output.

2. Alignmment at 1560 Kilocycles

(a) Tune the set by means of the manual tuning control knob to the extreme high frequency position, against stop.

(b) Connect the signal lead of the signal generator to the antenna terminal of the set through a .0001 mfd. condenser.

(c) Set frequency of the signal generator to exactly 1560 kilocycles and adjust the oscillator shunt trimmer condenser "F" (Fig. 5) for a maximum output.

3. Alignment at 600 Kilocycles

(a) Leave the signal generator connected the same as for alignment at 1560 kilocycles.

(b) Set the signal generator to 600 kilocycles.

(c) Tune the set (manual tuning control) to this signal.

(d) Adjust the R.F. trimmer condenser "G" (Fig. 5) for maximum output.

(e) Adjust the antenna trimmer condenser "H" (Fig. 5) for maximum output.

4. Checking I.F. Band Spread

A Cathode Ray Oscillograph should be used to check the I.F. band spread after completing the alignment procedure. Slight adjustment of the I.F. stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray Oscillograph as shown in Fig. 4.

CAPACITY AND INDUCTANCE ALIGNMENT

To be used ONLY when a major change such as changing a tuning coil has been made in the tuning apparatus and there is definite evidence of the coils not "tracking."

1. I.F. Alignment

Align the I.F. stages in the same manner as outlined under the Capacity Alignment Procedure.

2. Mechanical Alignment of R.F. Stages

(a) Tune the set by means of the tuning control knob to extreme high frequency position against stop. (Cores will be almost withdrawn from coil forms.)

(b) Adjust the nut on the oscillator (center coil) core stud, aligning the end of the core (inside coil form) to a position flush with the end of the oscillator coil winding. This may be done by laying a separate core, Part #7237714, (or an accurate 1-3/8" gauge) alongside the oscillator core making the stud ends flush and making the opposite ends just meet the winding of the oscillator coil.

(c) Adjust the position of the antenna and R.F. coil cores (Illus. #49 and 50, Fig. 5) to a position flush with the end of the coil windings, using the separate core for a gauge in the same manner as for the oscillator coil.

3. Alignment at 1560 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the set through a .0001 mfd. condenser.

(b) Set frequency of the signal generator to exactly 1560 kilocycles and adjust the oscillator shunt trimmer condenser "F" (Fig. 5) for a maximum output indication on the output meter.

4. Alignment at 600 Kilocycles

(a) Leave the signal generator connected the same as for alignment at 1560 kilocycles.

(b) Set the signal generator to 600 kilocycles.

(c) Tune the set (manual tuning control) to this signal.

(d) Adjust the R.F. trimmer condenser "G" (Fig. 5) for maximum output.

(e) Adjust the antenna trimmer condenser "H" (Fig. 5) for maximum output.

5. Alignment at 1400 Kilocycles

(a) Leave signal generator connected the same as for alignment at 600 kilocycles.

(b) Set the signal generator to 1400 kilocycles.

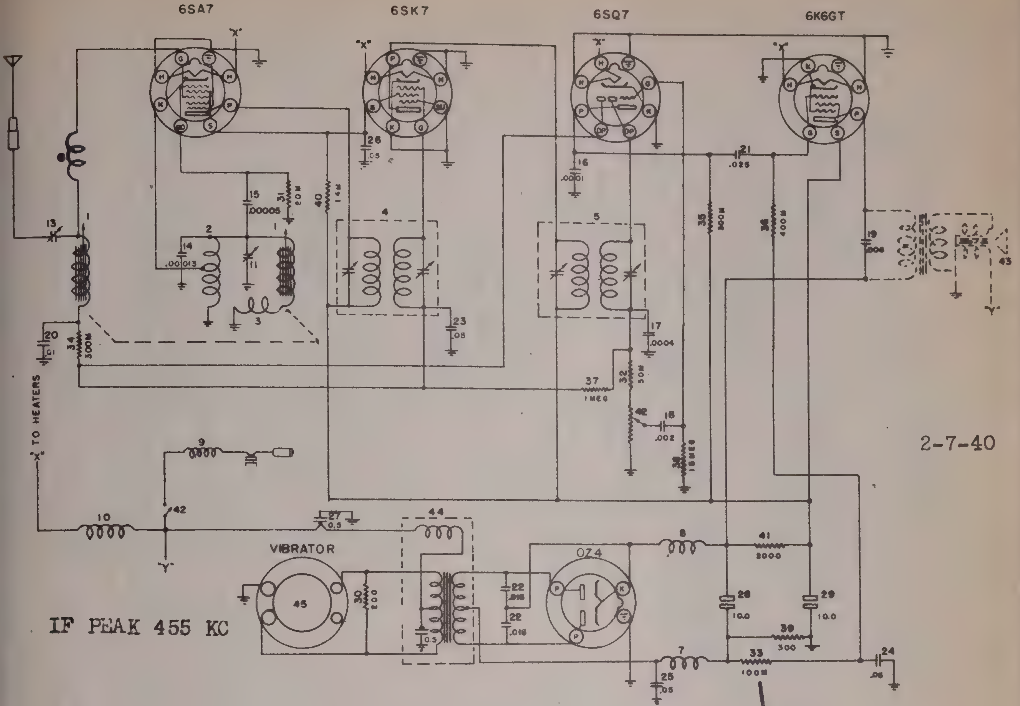
(c) Tune radio set to the signal and using wrench, Part No. 7238078, adjust the position of the iron core in the R.F. coil (Illus. #50, Fig. 5) for maximum output meter indication.

(d) Adjust the position of the iron core in the antenna coil (Illus. #49, Fig. 5) for maximum output. DO NOT TOUCH THE ADJUSTMENT OF THE OSCILLATOR COIL IRON CORE.

(e) Repeat adjustments with a lower output from the signal generator for more accurate alignment.

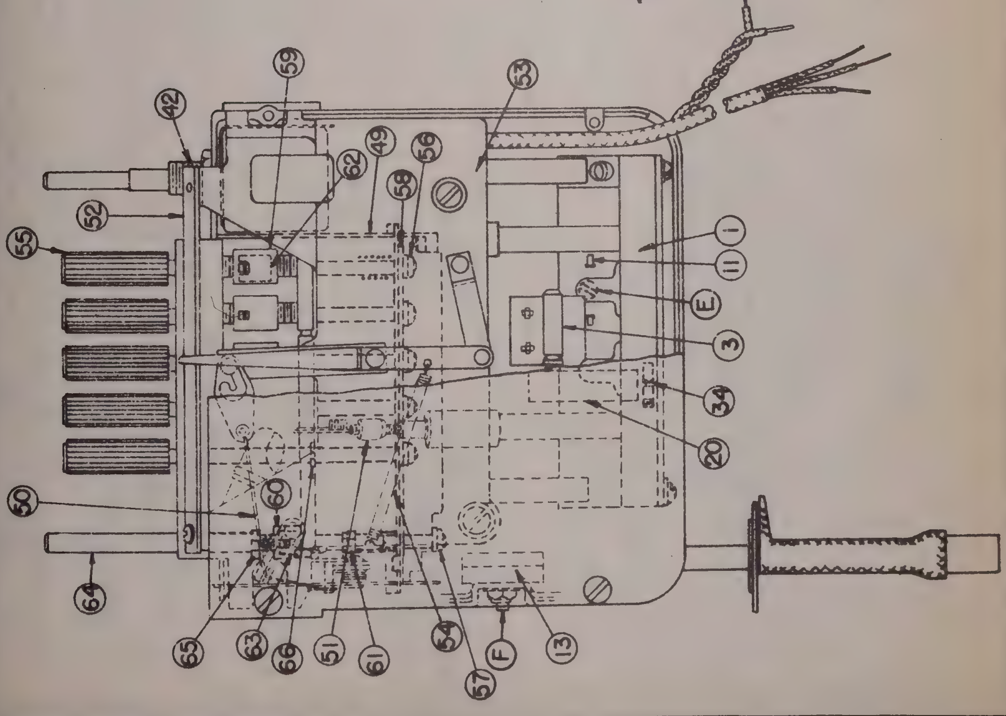
UNITED MOTORS SERVICE

MODEL R685

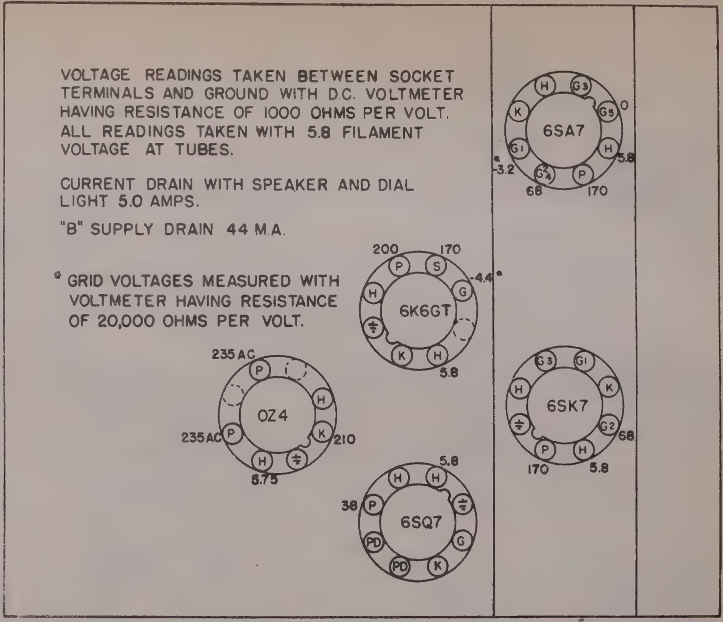


IF PEAK 455 KC

2-7-40



UNITED MOTORS SERVICE



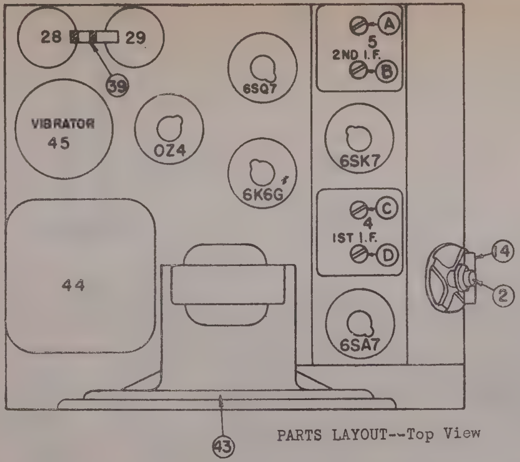
VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 5.8 FILAMENT VOLTAGE AT TUBES.

CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 5.0 AMPS.

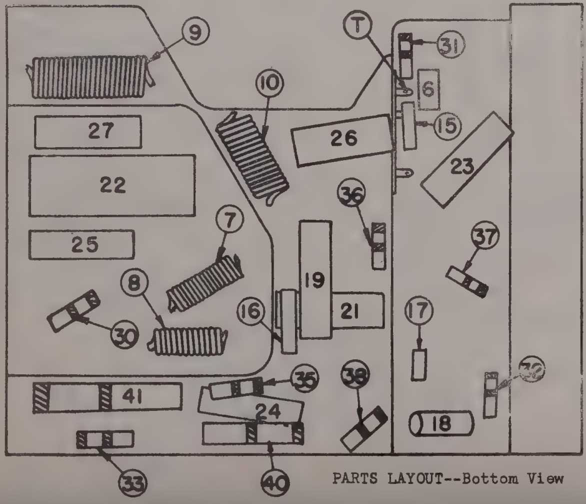
"B" SUPPLY DRAIN 44 M.A.

* GRID VOLTAGES MEASURED WITH VOLTMETER HAVING RESISTANCE OF 20,000 OHMS PER VOLT.

FIG. 1--TUBE SOCKET VOLTAGES



PARTS LAYOUT--Top View



PARTS LAYOUT--Bottom View

GENERAL: The Delco Model R-685 is a five tube, single unit superhetrodyne receiver with a 5" dynamic speaker, designed for universal mounting on all cars.

TUNING CONTROLS: Tuning is accomplished by means of a manual tuning control or by means of five push-buttons each of which drives the permeability tuning cores to preselected frequencies.

Setting up the push-buttons for any desired station is accomplished by pressing the button into its latched position and rotating it in the manner of a manual tuning control until the desired station is tuned in. No locking device is required to retain this setting.

Note: Do not hold the button in beyond its normal latching position when setting up stations.

The manual tuning control operates by pressing the tuning knob into its latched position and tuning in the conventional manner.

CAPACITY ALIGNMENT

Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the terminal "T" (Fig. 4) through a .1 mfd. condenser.

(c) Connect the output meter from the plate of the 6K6GT tube to ground.

(d) Set the signal generator to exactly 455 K.C.

(e) Turn the volume control on full and tune the set to a position where no squeals or beat notes are noticed, also so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output.

(f) Adjust the I-F trimmers A, B, C, D (Fig. 3) in the order mentioned until maximum output is obtained.

(g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.

2. Aligning at 1560 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. mica condenser.

(b) Tune the set to the extreme high frequency position against the stop.

(c) Set the signal generator to exactly 1560 K.C.

(d) Adjust the oscillator shunt trimmer "E" (Fig. 5) for maximum output.

3. Aligning at 600 Kilocycles

(a) Leave the signal generator connected the same as before.

(b) Set the signal generator to 600 K.C.

(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.

(d) Adjust the antenna trimmer "F" (Fig. 5) for maximum output.

CAPACITY AND INDUCTANCE ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

Align the I-F stages as outlined under paragraph 1 under CAPACITY ALIGNMENT.

2. Mechanical Alignment of Cores

(a) Tune the set by means of the manual tuning control to the extreme high frequency end of the dial and against stop. (Cores will be almost withdrawn from coil forms.)

(b) Remove the pointer plate (note insulating washers under left hand screw) without disturbing the tuning mechanism.

(c) Using a spare core (part #7240022) as a gauge, adjust the oscillator core so that with the front surfaces of the spare core and the oscillator core exactly flush, the rear surface of the test core is flush with the front end of the oscillator coil winding. This adjustment may be made using adjustment tool #7240160 inserted through the hole at the rear of the coil mounting bracket. The tool should be fitted into the hole at the rear of the core and rotated without applying any thrust to the core which would move it out of its normal resting position.

(d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fibre mounting bushing.

(e) Adjust the antenna coil core position so that the front surface of the core is flush with the front end of the antenna coil fibre mounting bushing.

(f) Replace the pointer plate assembly.

3. Aligning at 1560 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. mica condenser.

(b) Tune the set by means of the manual tuning control to the extreme high frequency end of the dial and against stop.

(c) Set the signal generator to exactly 1560 K.C.

(d) Adjust the oscillator shunt trimmer "E" (Fig. 5) for maximum output.

4. Aligning at 600 Kilocycles

(a) Leave the signal generator connected the same as before.

(b) Set the signal generator to 600 K.C.

(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.

(d) Adjust the antenna trimmer "F" (Fig. 5) for maximum output.

5. Aligning at 1400 Kilocycles

(a) Set the signal generator to 1400 K.C.

(b) Tune the set manually until this signal is tuned in with maximum output.

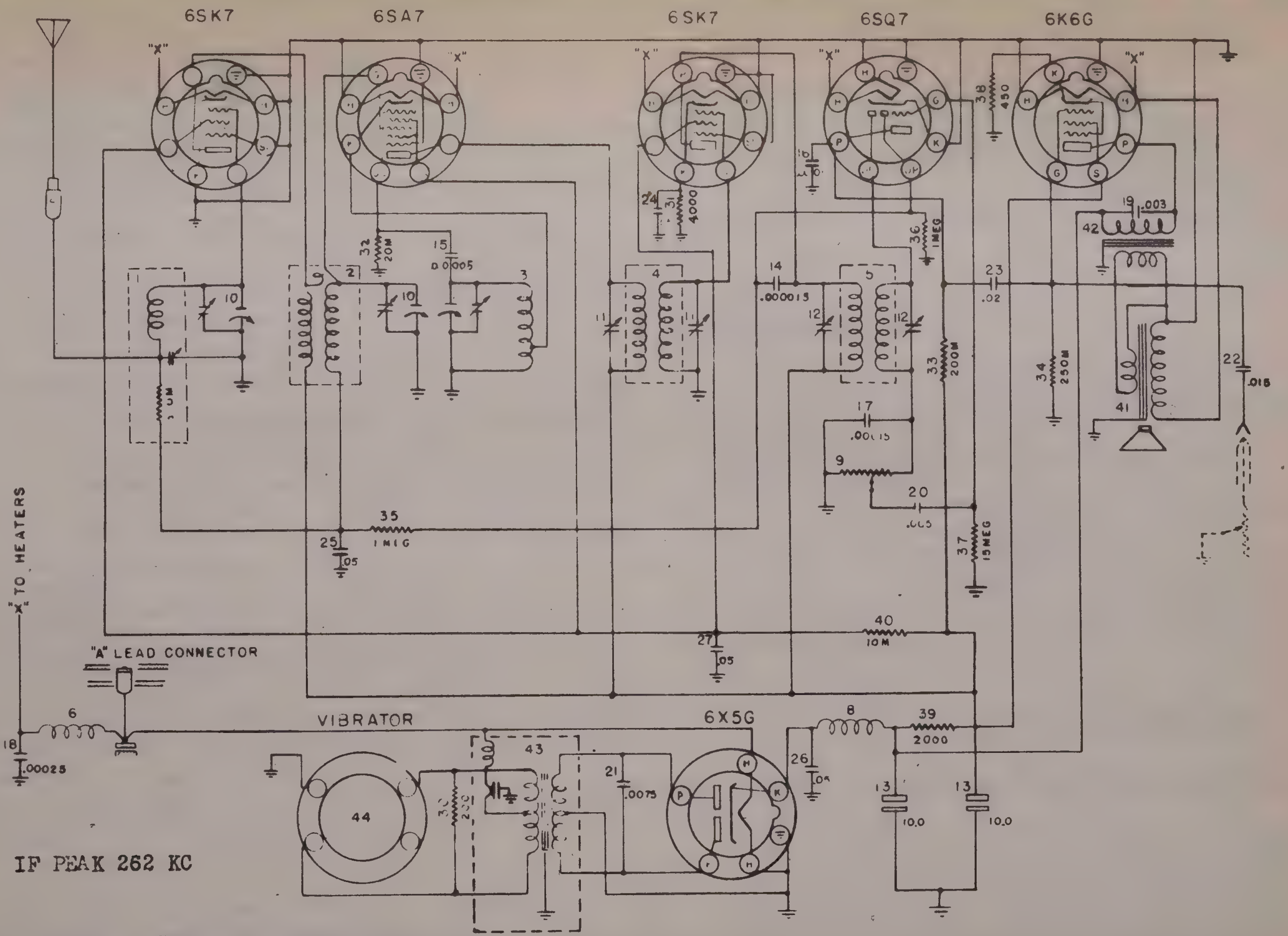
(c) Adjust the core of the antenna coil (using tool #7240160) for maximum output.

(d) Repeat the alignment with as low an output from the signal generator as possible for more accurate alignment.

(e) Apply cement to the core screws to prevent their changing adjustments.

6. Adjusting Receiver to Car Antenna

After the receiver is reinstalled in the car, it will be necessary to readjust the antenna trimmer on a weak station at about 600 K.C.



Note: Condenser #22 was changed from plate to grid of the 6K6G tube starting with serial #865000.

4-12-40

FIG. 2--DELCO MODEL R-686 CIRCUIT DIAGRAM

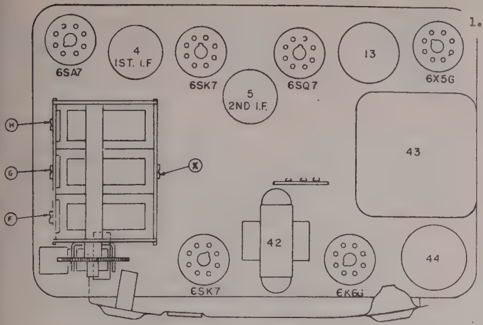


FIG. 3--PARTS LAYOUT--Top View

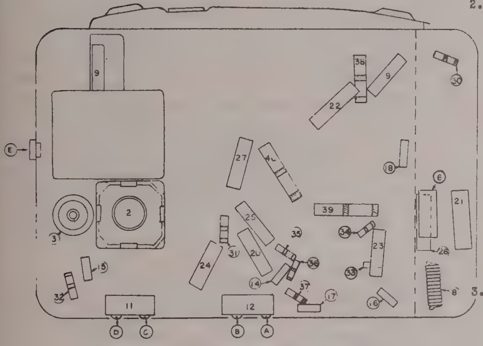
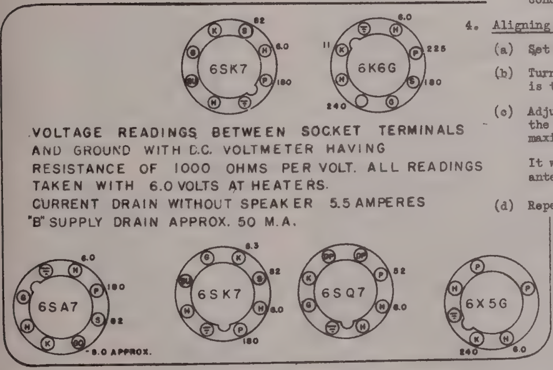


FIG. 4--PARTS LAYOUT--Bottom View



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT HEATERS.

CURRENT DRAIN WITHOUT SPEAKER 5.5 AMPERES

"B" SUPPLY DRAIN APPROX. 50 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the end section (RF) of the gang condenser (adjacent to trimmer "H", Fig. 3) through a .1 mfd. condenser.

(c) Connect the output meter from the plate of the 6K6G tube to ground.

(d) Set the signal generator to exactly 262 kilocycles and turn the volume control on full.

(e) Turn the condenser gang to a position where no squeals or beat notes are heard and so that when the tuning condenser is rotated within narrow limits, there is no appreciable change in output.

(f) Adjust trimmers A-B-C-D through the cut-outs on the side of the chassis opposite the antenna and "A" receptacles (Illus. 11 and 12, Fig. 4) for maximum output. Repeat with lowest possible output from the signal generator for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Leave signal generator leads connected the same as for I-F adjustments.

(b) Turn the rotor plates of the gang condenser all the way out of mesh and against the high frequency stop.

(c) Set the signal generator to exactly 1530 Kilocycles.

(d) Adjust the oscillator parallel trimmer "G" on the center section of the gang condenser carefully for maximum output (Fig. 3).

(e) Trimmer "X" (Fig. 3) is adjusted and sealed at the factory and should require no further adjustment.

In the event that its setting has been changed, back out trimmers "G" and "X" to minimum capacity and readjust simultaneously until maximum output is obtained.

3. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the signal generator and connect to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

(b) Set the signal generator to 1400 Kilocycles and tune the receiver to this signal.

(c) Adjust the parallel trimmers "F" and "H" (Fig. 3) on the condenser gang carefully for maximum output.

4. Aligning at 600 Kilocycles

(a) Set the signal generator to approximately 600 Kilocycles.

(b) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

(c) Adjust trimmer "E" (Fig. 4) while rocking the rotor plates of the gang condenser back and forth through the signal until maximum output is obtained.

It will be necessary to readjust this condenser to the car antenna upon installation of the set.

(d) Repeat adjustments made under "Alignment at 1400 Kilocycles".

UNITED MOTORS SERVICE

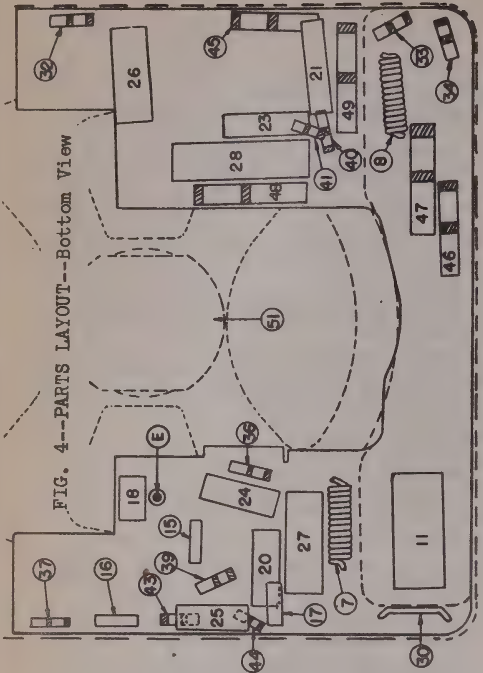
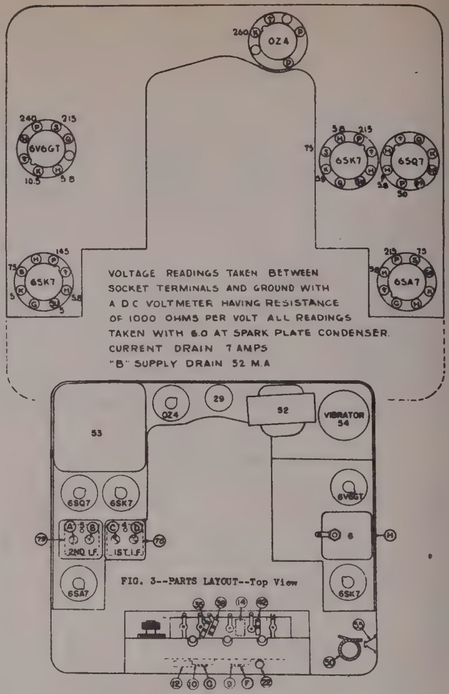


FIG. 4--PARTS LAYOUT--Bottom View



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH A D C VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT ALL READINGS TAKEN WITH 6.0 AT SPARK PLATE CONDENSER.
CURRENT DRAIN 7 AMPS
"B" SUPPLY DRAIN 52 M.A

FIG. 3--PARTS LAYOUT--Top View

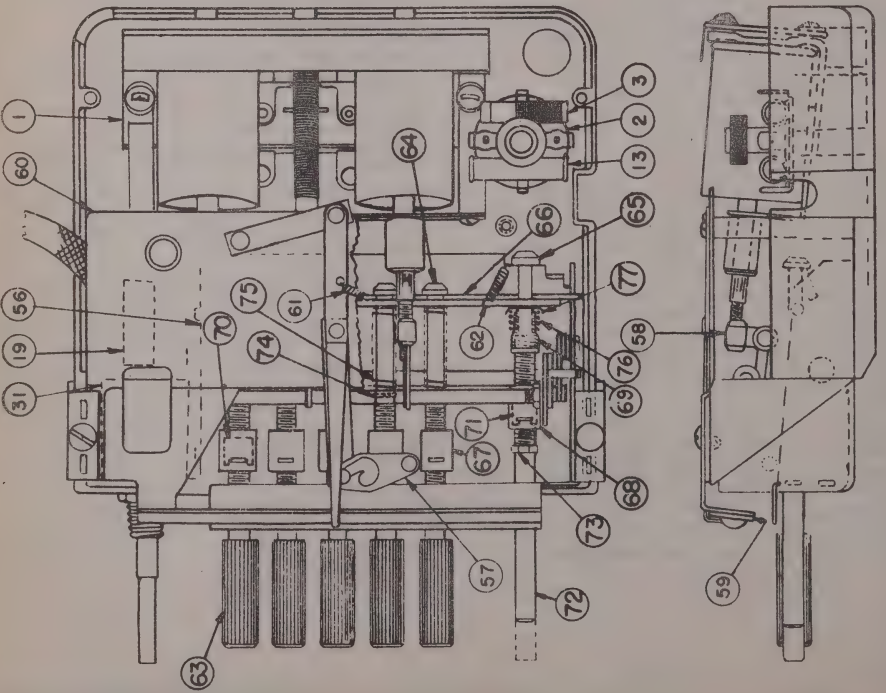
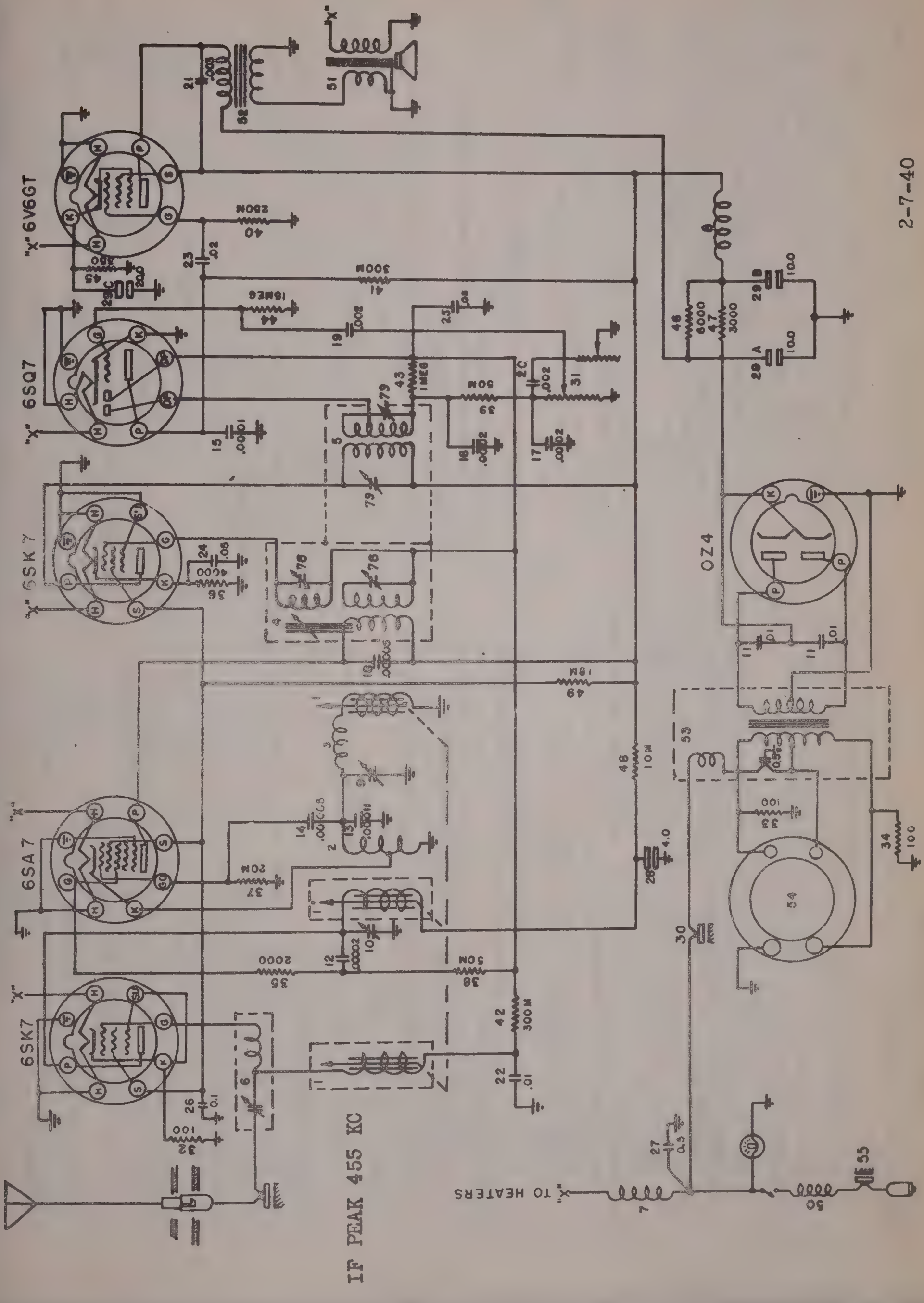


FIG. 5--PARTS LAYOUT--TUNER UNIT

UNITED MOTORS SERVICE

MODEL R687



2-7-40

IF PEAK 455 KC

CAPACITY ALIGNMENT

MODELS R687, R688

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the bottom right hand connection of the tuner socket (Fig. 2) through a .1 mfd. condenser.

   (c) Connect the output meter from the plate of the 6V6GT tube to ground.

   (d) Set the signal generator to exactly 455 K.C.

   (e) Turn the volume control on full and tune the set to a point where no squeals or beat notes are noticed, also so that when the tuning control knob is rotated within narrow limits, there is no appreciable change in output.

   (f) Adjust the I-F trimmers "A, B, C, D" (Fig. 3) and the I-F core adjustment "E" (Fig. 4) until maximum output is obtained.

   (g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.

   (h) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .1 mfd. condenser.

   (i) Adjust the I-F wave trap "J" (Fig. 3) for minimum output.

   *** Disregard items (h) and (i) for Model R687**

2. Aligning at 1560 Kilocycles

   (a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. mica condenser.

   (b) Tune the set to the extreme high frequency position against the stop.

   (c) Set the signal generator to exactly 1560 K.C.

   (d) Adjust the oscillator shunt trimmer "F" (Fig. 5) for maximum output.

3. Aligning at 600 Kilocycles

   (a) Leave the signal generator connected the same as before.

   (b) Set the signal generator to 600 K.C.

   (c) Tune the set by means of the manual tuning control until this signal is tuned in with maximum output.

   (d) Adjust the R. F. trimmer "G" (Fig. 3) for maximum output.

   (e) Adjust the antenna trimmer "H" (Fig. 3) for maximum output.

   **** Disregard item (d) for Model R688**

CAPACITY AND INDUCTANCE ALIGNMENT

1. Aligning I. F. Stages at 455 Kilocycles

   Align the I. F. stages as outlined under paragraph 1 under CAPACITY ALIGNMENT.

2. Mechanical Alignment of Cores

   (a) Tune the set by means of the manual tuning control to the extreme high frequency end of the dial and against stop. (Coils will be almost withdrawn from coil forms.)

   (b) Remove the pointer plate (note insulating washers under left hand screw) without disturbing the tuning mechanism.

   (c) Using a spare core (Part #7240022) as a gauge adjust the oscillator core (middle core) so that with the front surfaces of the spare core and the oscillator core exactly flush, the rear surface of the test core is exactly flush with the front end of the oscillator coil winding. This adjustment may be made using adjustment tool #7240160 inserted through the hole at the rear of the coil mounting bracket.

   The tool should be fitted into the hole at the rear of the core and rotated without applying any thrust to the core which would move it out of its normal resting position.

   (d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fibre mounting bushing.

   (e) Adjust the antenna and R. F. cores so that the front surfaces of the cores are flush with the front ends of the coil fibre mounting bushing.

   (f) Replace the pointer plate assembly.

3. Aligning at 1560 Kilocycles

   Follow procedure No.2 under "Capacity Alignment".

4. Aligning at 600 Kilocycles

   (a) Leave the signal generator connected the same as before.

   (b) Set the signal generator to 600 K.C.

   (c) Tune the set by means of the manual control until this signal is tuned in with maximum output.

   (d) Adjust the R. F. trimmer "G" (Fig. 3) for maximum output.

   (e) Adjust the antenna trimmer "H" (Fig. 3) for maximum output.

5. Aligning at 1400 Kilocycles

   (a) Set the signal generator to 1400 K.C.

   (b) Tune the set manually until this signal is tuned in with maximum output.

   (c) Adjust the antenna and R. F. cores for maximum output.

   (d) Repeat the alignment with as low an output from the signal generator as possible for more accurate alignment.

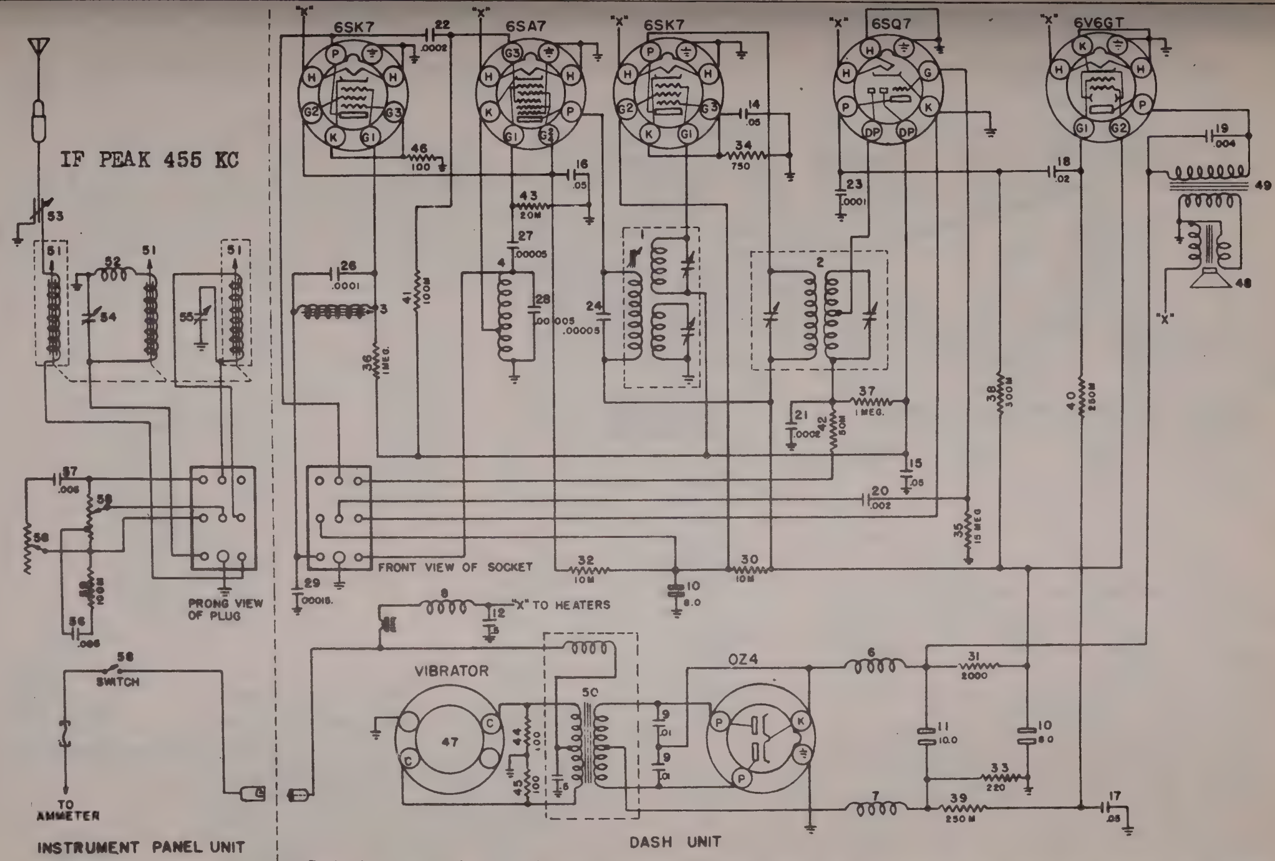
   (e) Apply cement to the core screws to prevent their changing alignment.

6. Adjusting Receiver to Car Antenna

   After the receiver is reinstalled in the car, it will be necessary to readjust the antenna trimmer on a weak station at about 600 K.C.

UNITED MOTORS SERVICE

MODEL R688



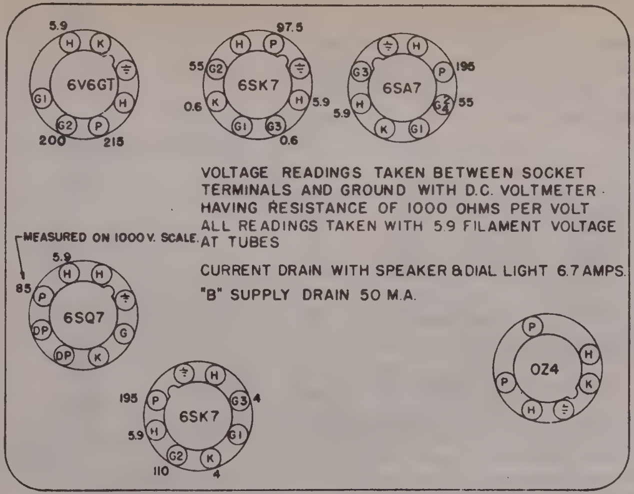
Setting up the push-buttons for any desired station is accomplished by pressing the button into its latched position and rotating it in the manner of a manual tuning control until the desired station is tuned in. No locking device is required to retain this setting.

Note: Do not hold the button in beyond its normal latched position when setting up stations.

2-7-40

MODEL R688

UNITED MOTORS SERVICE



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT ALL READINGS TAKEN WITH 5.9 FILAMENT VOLTAGE AT TUBES

CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 6.7 AMPS.

"B" SUPPLY DRAIN 50 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

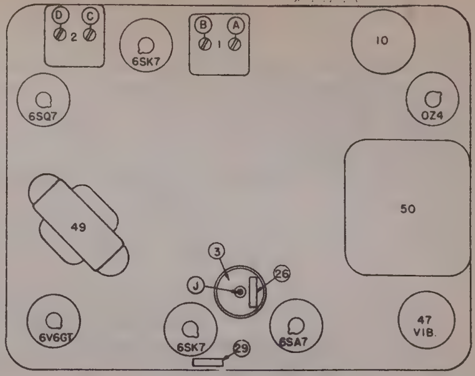


FIG. 3--PARTS LAYOUT--DASH UNIT--Top View

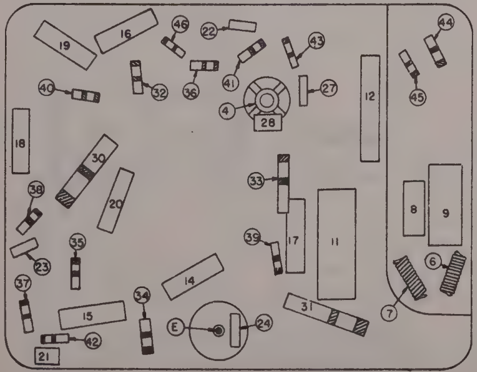
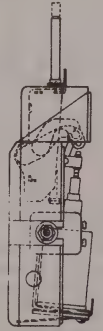


FIG. 4--PARTS LAYOUT--DASH UNIT--Bottom View



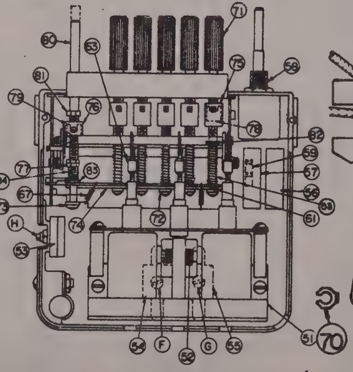


FIG. 5--PARTS LAYOUT--I. P. UNIT

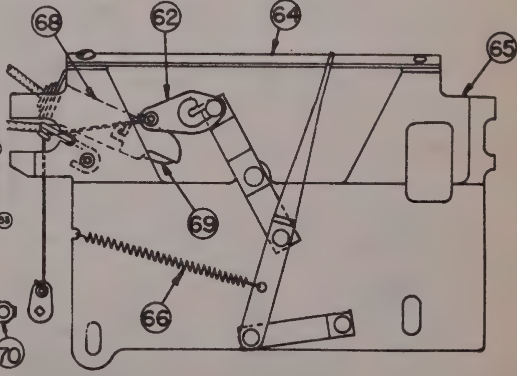
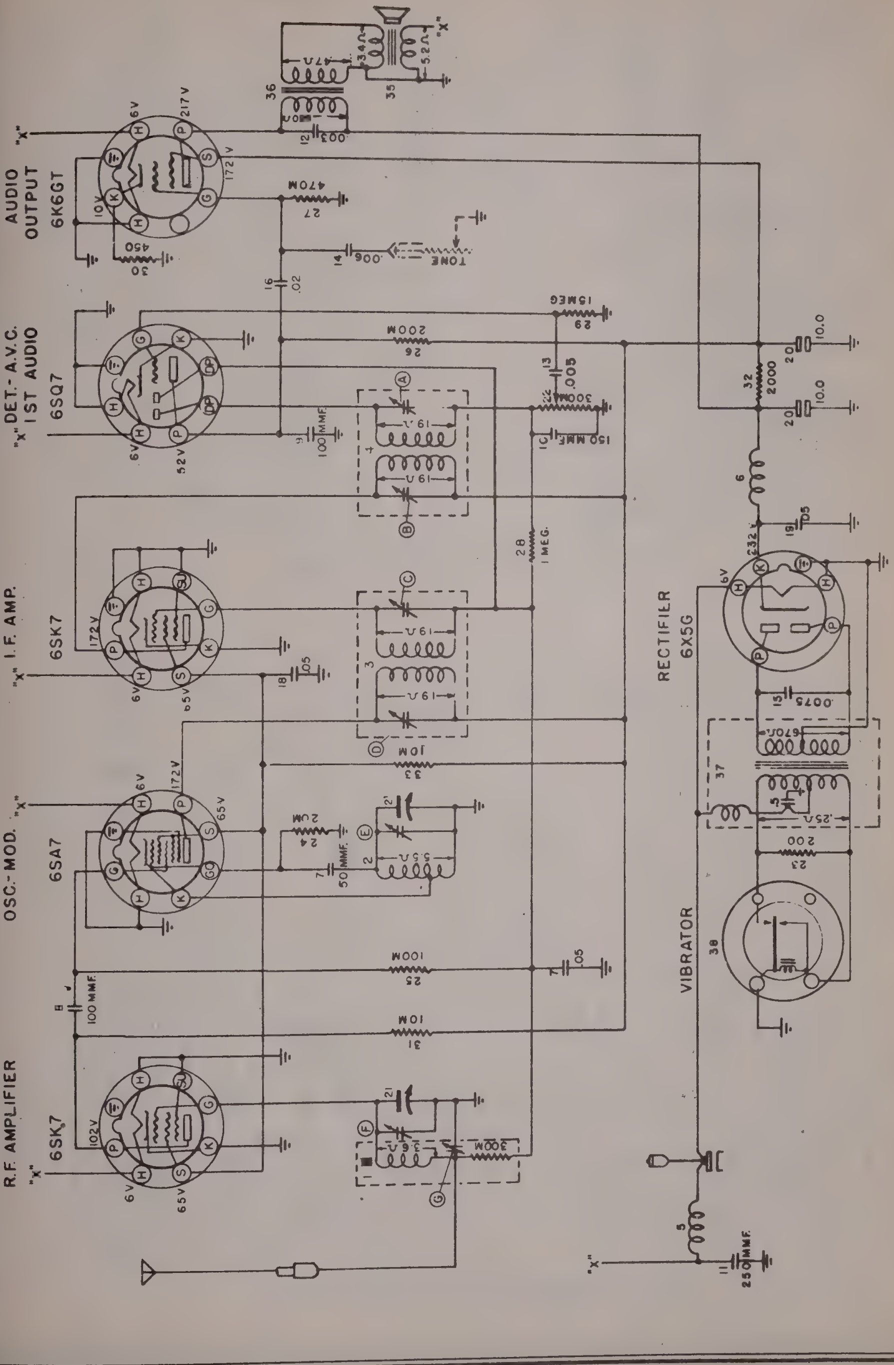


FIG. 6--PARTS LAYOUT POINTEL PLATE ASSEMBLY



IF PEAK 455 KC

FIG. 2--DELCO MODEL R-695 CIRCUIT DIAGRAM

Date: 1-16-41

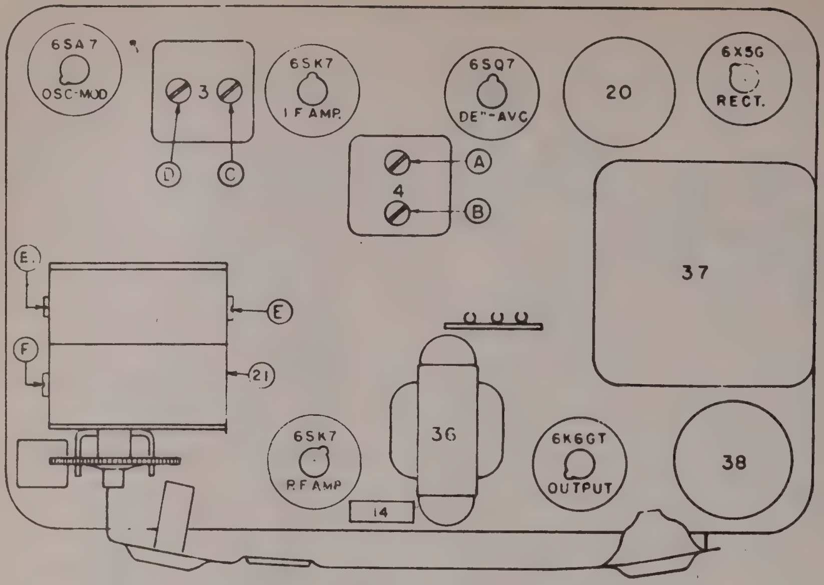


FIG. 3--PARTS LAYOUT--Top View

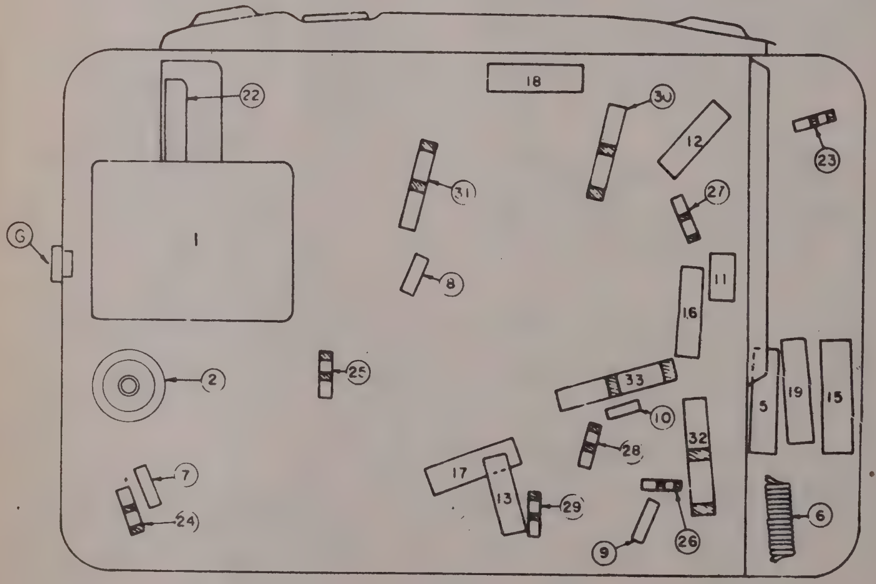


FIG. 4--PARTS LAYOUT--Bottom View

SUBJECT--SERVICE INSTRUCTIONS--DELCO MODEL R-695 AUTO RADIO

GENERAL: The Delco Model R-695 is a six tube, single unit, superheterodyne receiver with a 5" dynamic speaker, designed for universal mounting on all cars.

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated test oscillator or signal generator and an output meter.

1. Aligning I-F Stages at 455 Kilocycles

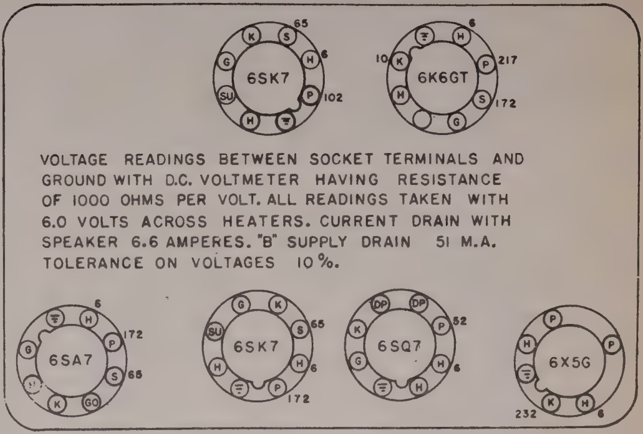
(a) Connect the ground lead of the signal generator to the chassis frame.
(b) Connect the signal lead of the signal generator to the grid end of condenser (Illus. 8, Fig. 4) through a .1 mfd. condenser.
(c) Connect the output meter from the plate of the 6K6GT tube to ground through a .1 mfd. condenser.
(d) Set the signal generator to exactly 455 Kilocycles.
(e) Turn the volume control on full and tune the set to a position where no squeals or beat notes are noticed, also so that when the tuning control knob is rotated within narrow limits, there is no appreciable change in output.
(f) Adjust the I-F trimmers (Illus. A, B, C, D, Fig. 3) in the order mentioned until maximum output is obtained.
(g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .000070 mfd. mica condenser.
(b) Tune the set to the extreme high frequency position against the stop.
(c) Set the signal generator to exactly 1530 Kilocycles.
(d) Adjust the oscillator shunt trimmer (Illus. E, Fig. 3) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Leave the signal lead of the signal generator connected the same as before.
(b) Set the signal generator to 1400 Kilocycles.
(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.
(d) Adjust the trimmer (Illus. F, Fig. 3) for maximum output.



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER 6.6 AMPERES. "B" SUPPLY DRAIN 51 M.A. TOLERANCE ON VOLTAGES 10%.

FIG. 1--TUBE SOCKET VOLTAGES

4. Aligning at 600 Kilocycles

(a) Leave the signal lead of the signal generator connected the same as before.
(b) Set the signal generator to 600 Kilocycles.
(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.
(d) Adjust the trimmer (Illus. G, Fig. 4) for maximum output.
(e) Repeat adjustment made under 3 and 4.

5. Adjustment of Radio to Car Antenna

The radio should be adjusted to the car antenna after mounting in the car. The following adjustment should be made:

(a) Tune in a weak station near the low frequency end of the dial (approximately 600 Kilocycles.).
(b) Adjust the antenna trimmer (Illus. G, Fig. 4) for maximum volume.

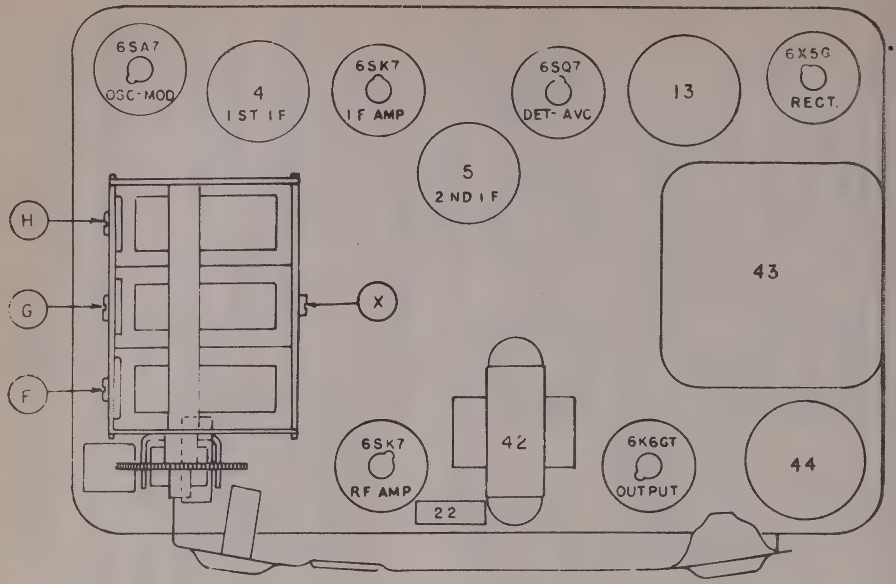


FIG. 3--PARTS LAYOUT--Top View

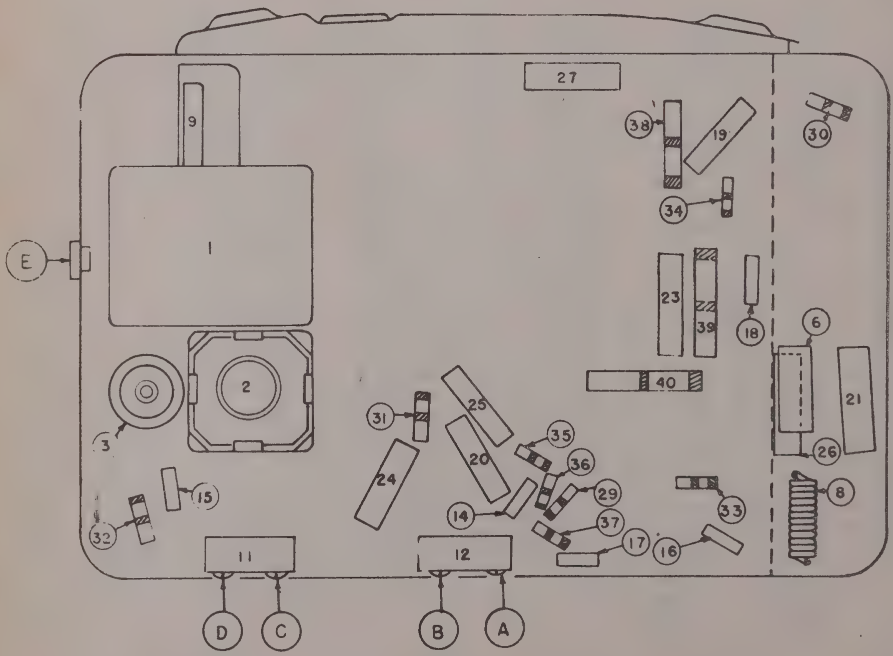
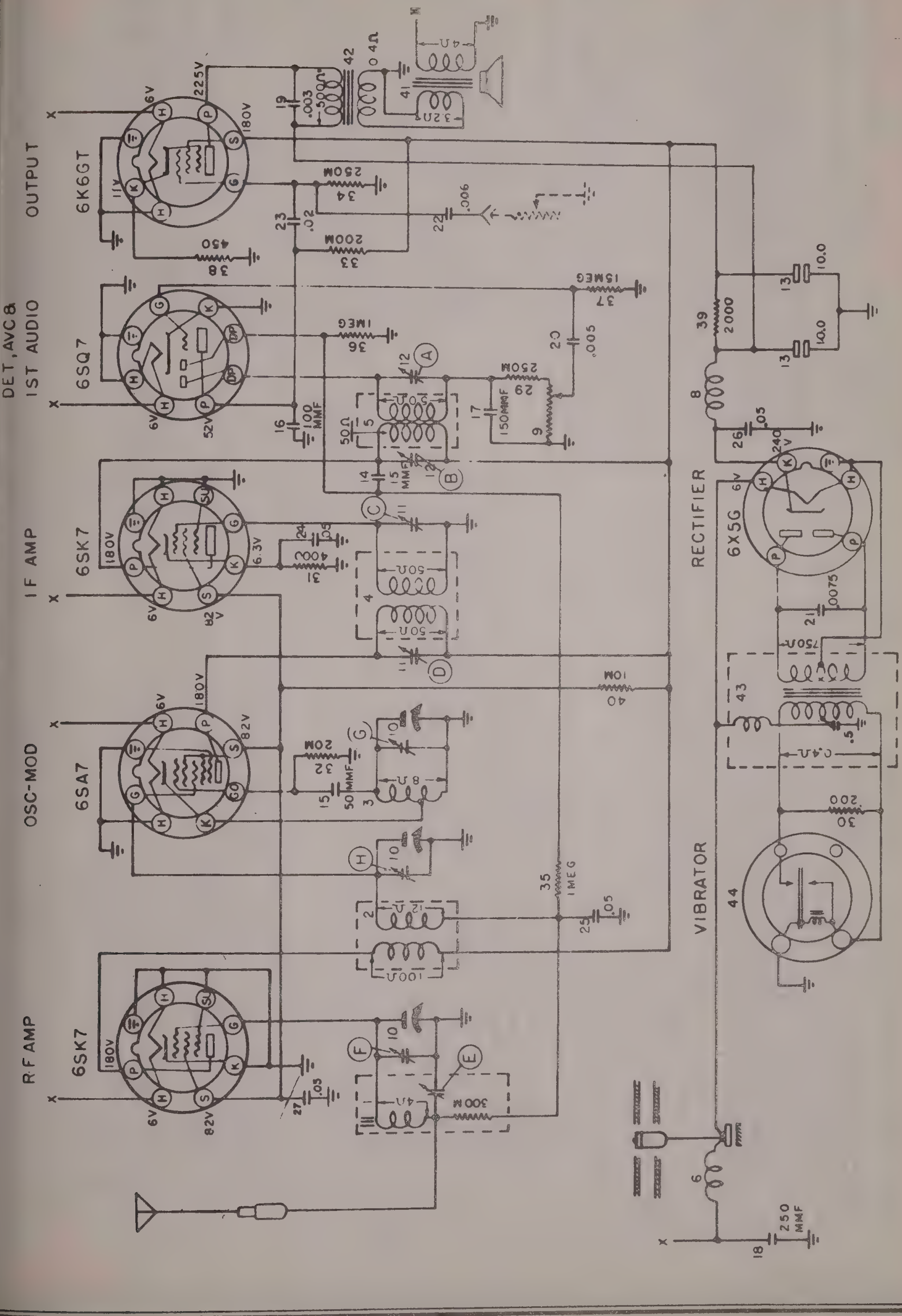


FIG. 4--PARTS LAYOUT--Bottom View



IF PEAK 260 KC

FIG. 2--DELCO MODEL R-696 CIRCUIT DIAGRAM

Date: 1-15-41

SUBJECT--SERVICE INSTRUCTIONS--DELCO MODEL R-696 AUTO RADIO

GENERAL: The Delco Model R-696 is a six tube, single unit Auto Radio with a 6" dynamic speaker, variable tone control, non-synchronous vibrator and type 6K6GT power tube.

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated test oscillator or signal generator and an output meter.

In order to prevent the A.V.C. circuit from affecting the alignment adjustment, the lowest signal generator output should be used, which will give a readable indication on the output meter. Do not remove the bottom half of the case during alignment.

1. Aligning I-F Stages at 260 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.
(b) Connect the signal lead of the signal generator to the grid terminal of trimmer (Illus. H, Fig. 3) through a .1 mfd. condenser.
(c) Connect the output meter from the plate of the 6K6GT tube to ground through a .1 mfd. condenser.
(d) Set the signal generator to 260 Kilocycles.
(e) Turn the volume control on full and turn the gang condenser to a position where no squeals or beat notes are heard and so that when the tuning condenser is rotated within narrow limits, there is no appreciable change in output.
(f) Adjust the trimmers (Illus. A,B,C,D, Fig. 4) for maximum output. Repeat with lowest possible output from the signal generator for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .00007 mfd. mica condenser.
(b) Tune the set to the extreme high frequency position against the stop.
(c) Set the signal generator to 1530 Kilocycles.
(d) Adjust the oscillator shunt trimmer (Illus. G, Fig. 3) for maximum output.

3. Aligning at 1400 Kilocycles

(a) Leave the signal generator connected the same as before.
(b) Set the signal generator to 1400 Kilocycles.

3. Aligning at 1400 Kilocycles--

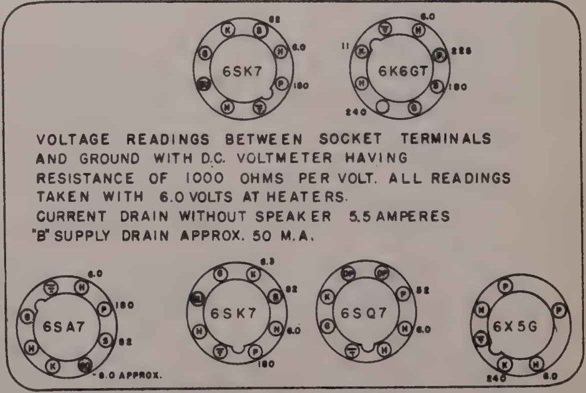
(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.
(d) Adjust the trimmers (Illus. F, H, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

(a) Leave the signal generator connected the same as before.
(b) Set the signal generator to 600 kilocycles.
(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.
(d) Adjust the trimmer (Illus. E, Fig. 4) for maximum output.
(e) Repeat alignment under 3.

5. Adjustment of Radio to Car Antenna

The radio should be adjusted to the car antenna after mounting in the car. The following adjustment should be made:
(a) Tune in a weak station near the low frequency end of the dial (approximately 600 kilocycles.)
(b) Adjust the trimmer (Illus. E, Fig. 4) for maximum volume.

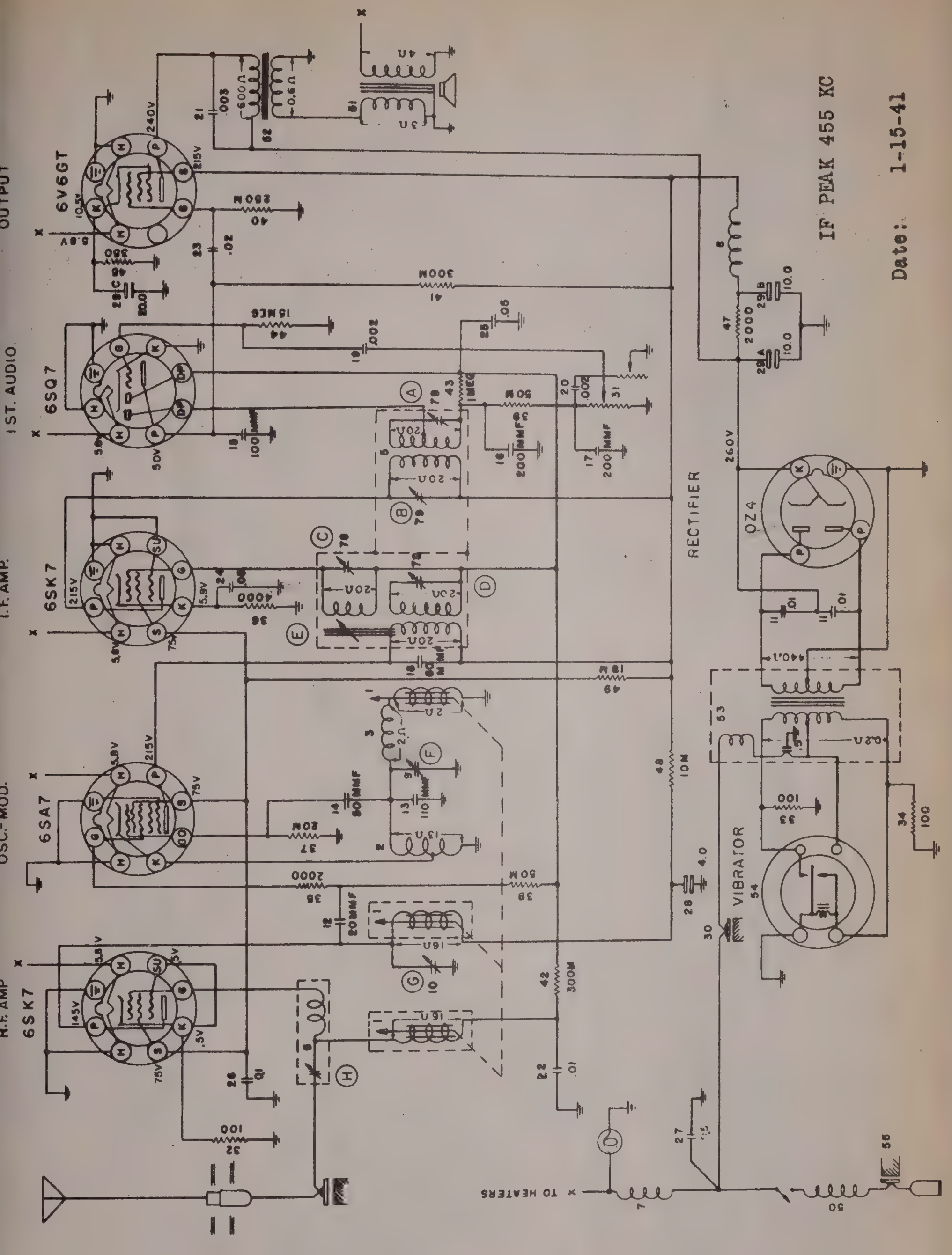


VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT HEATERS.
CURRENT DRAIN WITHOUT SPEAKER 5.5 AMPERES
"B" SUPPLY DRAIN APPROX. 50 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

UNITED MOTORS SERVICE

MODEL R697



IF PEAK 455 KC

Date: 1-15-41

FIG. 2--DELCO MODEL R-697 CIRCUIT DIAGRAM

©John F. Rider, Publisher

MODEL R697

UNITED MOTORS SERVICE

GENERAL: The Delco Model R-697 is a six tube single unit Superheterodyne receiver with an 7'' dynamic speaker and is designed specifically for instrument panel mounting on 1941-1940 General Motors cars.

TUNING CONTROLS : Tuning is accomplished by means of a manual tuning control or by means of five push buttons each of which drives the permeability tuning cores to preselected frequencies.

SETTING UP THE PUSH BUTTONS for any desired station is accomplished by pressing the button into its latched position and rotating in the manner of a manual tuning control until the desired station is tuned in.

No looking device is required to obtain this setting.

NOTE : Do not hold the button in beyond its normal latching position when setting up stations.

The manual tuning control operates by pressing the tuning knob into its latched position and tuning in the conventional manner.

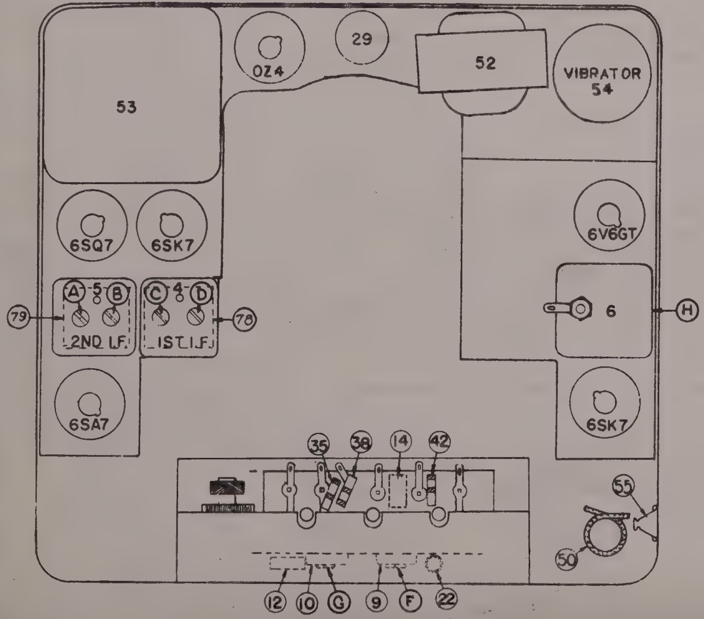


FIG. 3--PARTS LAYOUT--Top View

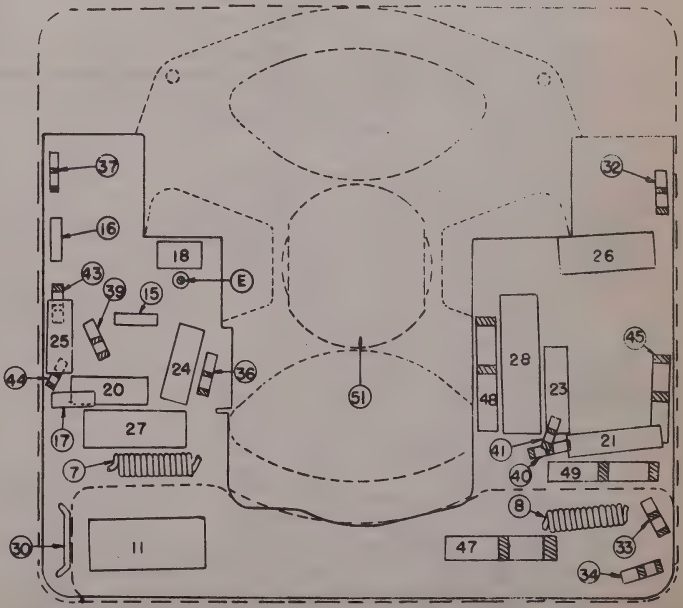


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODEL R697

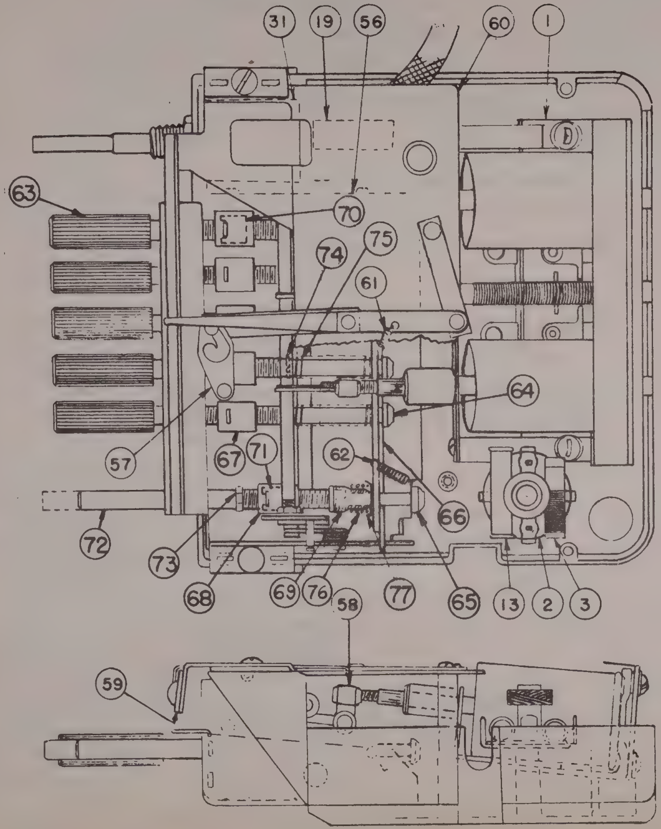
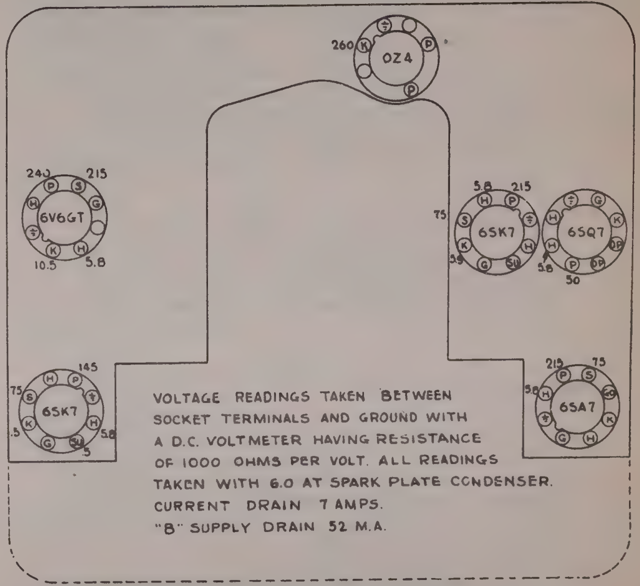


FIG. 5--PARTS LAYOUT--TUNER



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH A D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 AT SPARK PLATE CONDENSER.
CURRENT DRAIN 7 AMPS.
"B" SUPPLY DRAIN 52 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

UNITED MOTORS SERVICE

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly aligned only with the use of a calibrated test oscillator or signal generator and an output meter. Extreme care should be exercised in following the alignment instructions in order to obtain the best performance possible. It will be necessary to use an insulated screw driver in making alignment adjustments.

ALIGNMENT PROCEDURE

Two seaprate alignment procedures are included in these instructions. The first, or CAPACITY ALIGNMENT, is to be considered as the usual alignment procedure and the second OR CAPACITY AND INDUCTANCE ALIGNMENT is to be used only when a tuning coil has been replaced or a major change has been made in the tuning circuits.

CAPACITY ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.
(b) Connect the signal lead of the signal generator to the grid of the 6SA7 tube (grid side of resistor #35, Fig. 3) through a .1 mfd. condenser.
(c) Connect the output meter from the plate of the 6V6GT tube to ground through a .1 mfd. condenser.

1. Aligning I-F Stages at 455 Kilocycles-

(d) Set the signal generator to 455 kilocycles.
(e) Turn the volume control on full and tune the set to a point where no squeals or beat notes are noticed, also so that when the tuning control knob is rotated within narrow limits there is no appreciable change in output.
(f) Adjust the I-F trimmers (Illus. A,B,C,D, Fig. 3) and the I.F. core adjustment (Illus. E, Fig. 4) until maximum output is obtained.
(g) Repeat these adjustments with as low an output from the signal generator as possible for more accurate alignment.

2. Aligning at 1560 kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .00007 mfd. mica condenser.
(b) Tune the set to the extreme high frequency position against the stop.
(c) Set the signal generator to 1560 kilocycles.
(d) Adjust the oscillator shunt trimmer (Illus. F, Fig. 3) for maximum output.

3. Aligning at 600 kilocycles

(a) Leave the signal generator connected the same as before.
(b) Set the signal generator to 600 kilocycles.
(c) Tune the set by means of the manual tuning control until this signal is tuned in with maximum output.
(d) Adjust the trimmers (Illus. G, H, Fig. 3) for maximum output.

CAPACITY AND INDUCTANCE ALIGNMENT

1. Aligning I-F stages at 455 kilocycles

Align the I-F stages as outlined under paragraph 1, under CAPACITY ALIGNMENT.

2. Mechanical Alignment of Cores

(a) Tune the set by means of the manual tuning control to the extreme high frequency end of the dial and against stop. (Coils will be almost withdrawn from coil forms.)
(b) Remove the pointer plate (note insulating washers under left hand screw) without disturbing the tuning mechanism.
(c) Using a spare core (Part #7240022) as a gauge, adjust the oscillator core (middle core) so that with the front surfaces of the spare core and the oscillator core exactly flush, the rear surface of the test core is exactly flush with the front end of the oscillator coil winding. This adjustment may be made using adjustment tool (part #7240160) inserted through the hole at the rear of the coil mounting bracket.

2. Mechanical Alignment of Cores

The tool should be fitted into the hole at the rear of the core and rotated without applying any thrust to the core which would move it out of its normal resting position.

(d) Manually tune the set to a point where the front surface of the oscillator core is flush with the front end of the oscillator coil fibre mounting bushing.
(e) Adjust the antenna and R.F. cores so that the front surfaces of the cores are flush with the front ends of the coil fibre mounting bushing.
(f) Replace the pointer plate assembly.

3. Aligning at 1560 kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver through a .000070 mfd. mica condenser.
(b) tune the set by means of the manual tuning control to the extreme high frequency end of the dial and against the stop.
(c) Set the signal generator to 1560 kilocycles.
(d) Adjust the oscillator shunt trimmer (Illus. F, Fig. 3) for maximum output.

4. Aligning at 600 kilocycles

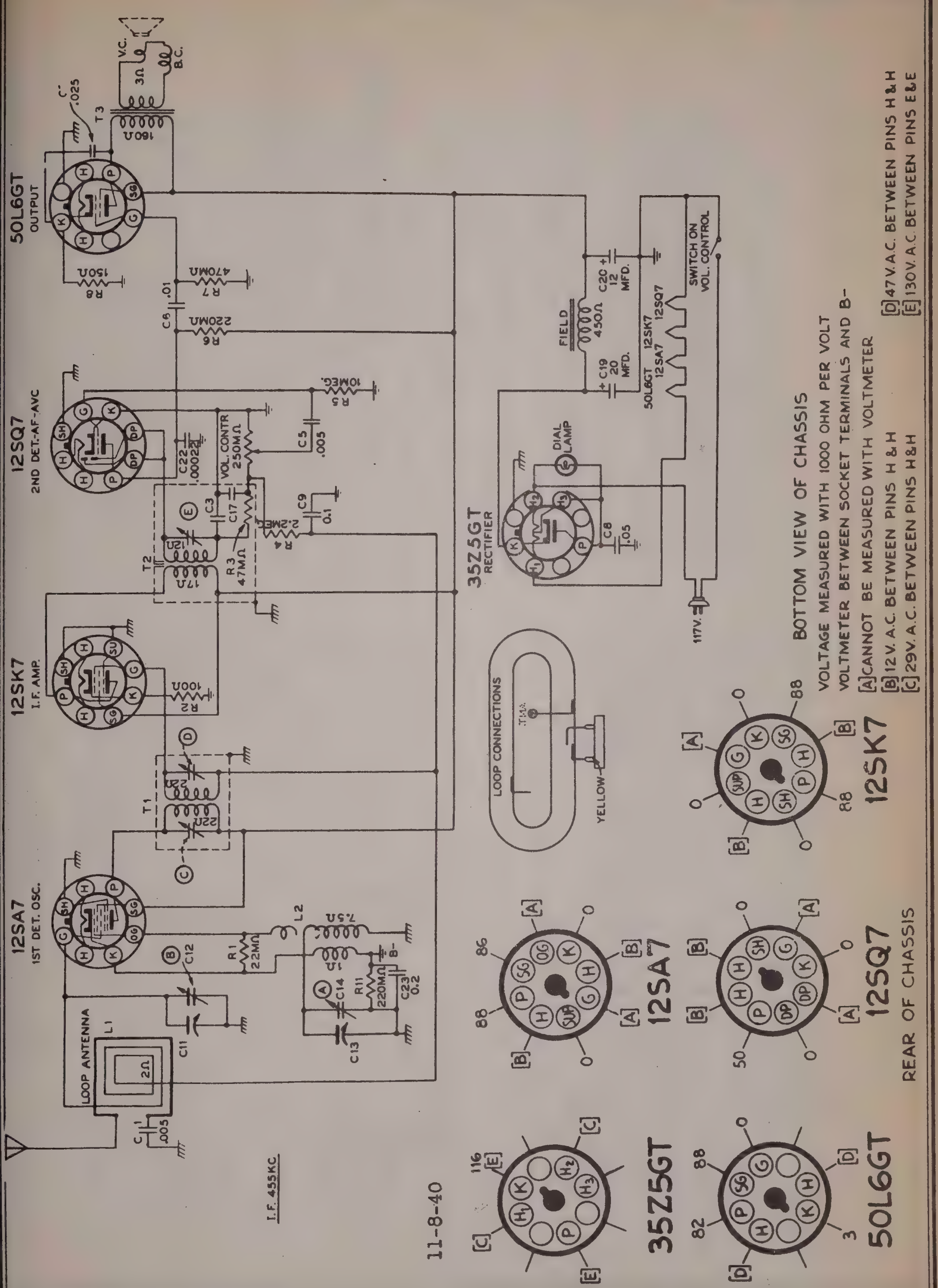
(a) Leave the signal generator connected the same as before.
(b) Set the signal generator to 600 kilocycles.
(c) Tune the set by means of the manual control until this signal is tuned in with maximum output.
(d) Adjust the trimmers (Illus. F,H, Fig. 3) for maximum output.

5. Aligning at 1400 kilocycles

(a) Set the signal generator to 1400 kilocycles.
(b) Tune the set manually until this signal is tuned in with maximum output.
(c) Adjust the antenna and R.F. cores for maximum output.
(d) Repeat the alignment with as low an output from the signal generator as possible for more accurate alignment.
(c) Apply cement to the core screws to prevent their changing alignment.

6. Adjusting receiver to car antenna

After the receiver is reinstalled in the car, it will be necessary to readjust the antenna trimmer (Illus. H, Fig. 3), on a weak station at or near 600 kilocycles. for maximum output.



BOTTOM VIEW OF CHASSIS

VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-

[A] CANNOT BE MEASURED WITH VOLTMETER

[B] 12 V. A.C. BETWEEN PINS H & H

[C] 29V. A.C. BETWEEN PINS H&H

[D] 47 V.A.C. BETWEEN PINS H&H

[E] 130V. A.C. BETWEEN PINS E&E

MODEL R1170 Delco

UNITED MOTORS SERVICE

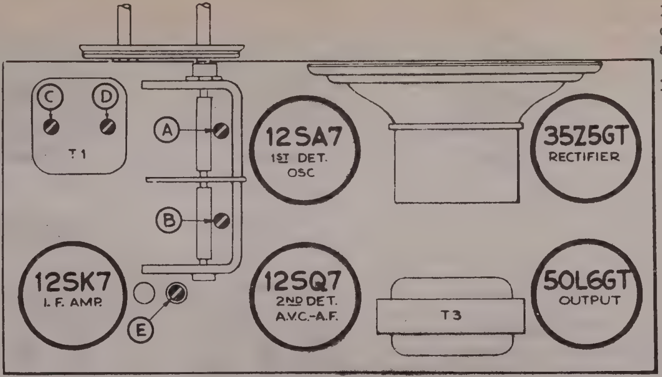


FIG. 3--PARTS LAYOUT--Top View

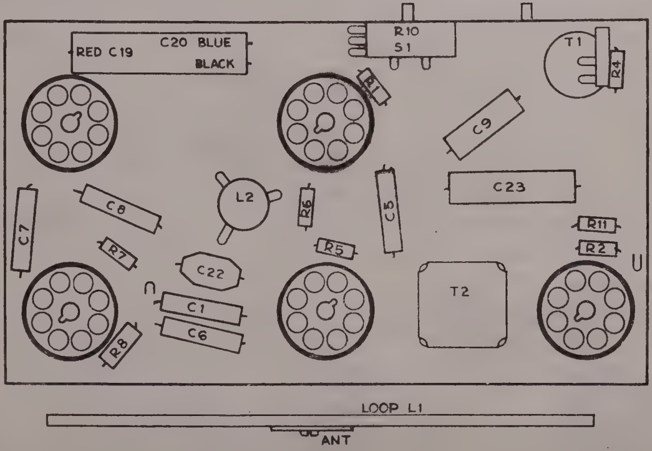


FIG. 4--PARTS LAYOUT--Bottom View

If realignment if found necessary, the circuits can be properly adjusted only with the use of a calibrator test oscillated or signal generator and an output meter.

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. condenser.

   (b) Connect the signal lead of the signal generator to the grid terminal of the 12SK7 tube through a .01 mfd. condenser.

   (c) Connect the output meter across the primary of the output transformer.

   (d) Set the signal generator to exactly 455 K.C.

   (e) Tune the receiver to quiet point at 1600 K.C. end of dial, set Volume Control full on, adjust the trimmer on the second I-F transformer (Illus. E, Fig. 3) for maximum output.

   (f) Connect the signal lead of the signal generator to the grid of the 12SA7 tube.

   (g) Adjust the trimmers on the first I-F transformer (Illus. C, D, Fig. 3) for maximum output.

2. Aligning at 1720 Kilocycles

   (a) Connect the signal lead of the signal generator to the antenna terminal of the loop through .0001 mfd. condenser.

   (b) Set signal generator to exactly 1720 K.C.

   (c) Tune receiver to 1720 K.C., condenser plates full clockwise (out of mesh).

   (d) Adjust oscillator trimmer condenser (Illus. A, Fig. 3) for maximum output.

3. Aligning at 1500 Kilocycles

   (a) Leave the signal lead of the signal generator connected as above.

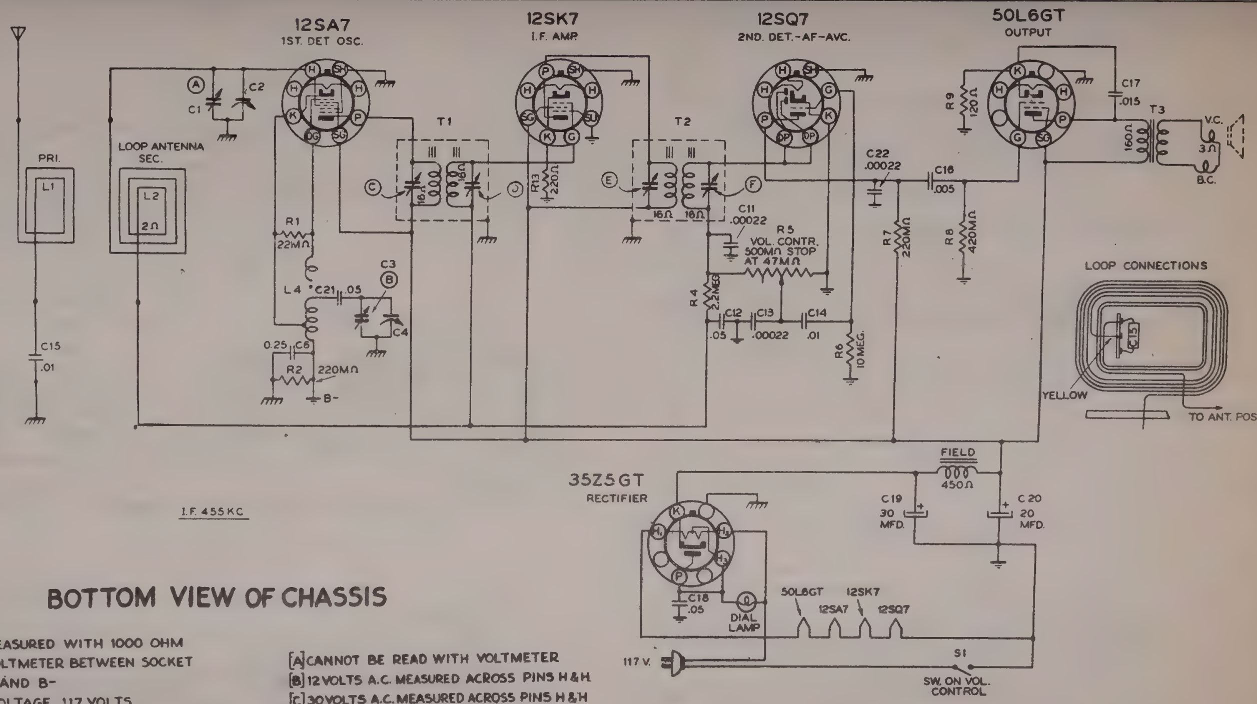
   (b) Set the signal generator to 1500 K.C.

   (c) Rotate the tuning control knob until this signal is tuned in with maximum output.

   (d) Adjust the antenna trimmer (Illus. B. Fig. 3) for maximum output.

UNITED MOTORS SERVICE

MODELS R1171,R1172
R1173 Delco



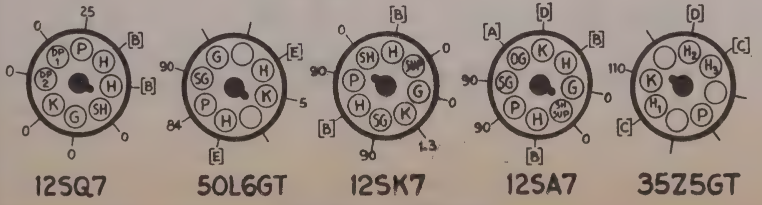
11-29-40

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-
A.C LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 30 WATTS
VOLUME CONTROL AT MINIMUM VOLUME.

[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. MEASURED ACROSS PINS H & H
[C] 30 VOLTS A.C. MEASURED ACROSS PINS H & H
[D] 117 VOLTS A.C. MEASURED ACROSS PINS D & D
[E] 45 VOLTS A.C. MEASURED ACROSS PINS H & H

FIG. 2--DELCO MODELS R-1171, R-1172, R-1173



REAR OF CHASSIS

©John F. Rider, Publisher

**MODELS R1171,R1172
R1173 Deloo**

UNITED MOTORS SERVICE

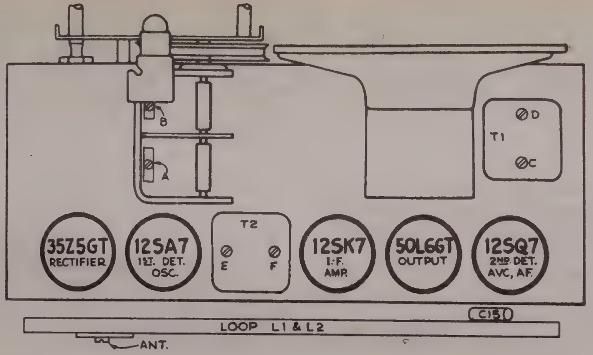


FIG. 3--PARTS LAYOUT--Top View

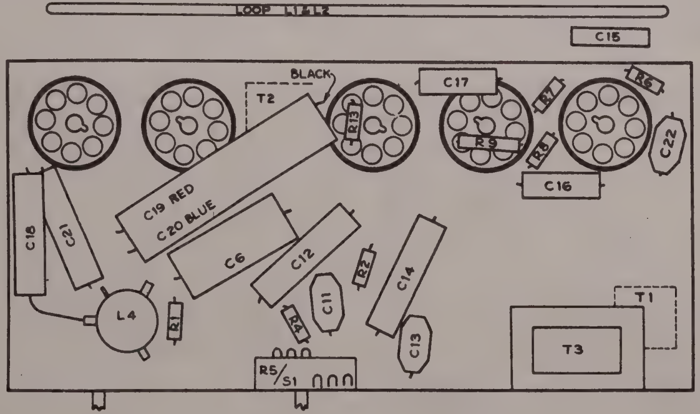


FIG. 4--PARTS LAYOUT--Bottom View

1. Aligning I-F Stages at 455 Kilocycles
   - (a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. capacitor.
   - (b) Connect the signal lead of the signal generator to the grid terminal of the 12SK7 tube through a .01 mfd. condenser.
   - (c) Connect the output meter across the primary of the output transformer.
   - (d) Set the signal generator to exactly 455 KC.
   - (e) Tune receiver to quiet point at 1,600 KC end of dial, set volume control full on, adjust the trimmers on the second I-F transformer (Illus. E & F Fig. 3) for maxinum output.
   - (f) Connect the signal lead of the signal generator to the grid of the 12SA7 tube.
   - (g) Adjust the trimmers on the first I-F transformer (Illus. C & D Fig. 3) for maximum output.
2. Aligning at 1600 Kilocycles
   - (a) Connect the signal lead of the signal generator to the antenna terminal of the loop through 100 mmfd. capacitor.
   - (b) Set signal generator to exactly 1600 KC.
   - (c) Tune receiver to 1600 KC., condenser plates full clockwise (out of mesh).
   - (d) Adjust oscillator trimmer condenser (Illus. B, Fig. #3) for maximum output.
3. Aligning at 1400 Kilocycles
   - (a) Leave the signal lead of the signal generator connected as above.
   - (b) Set the signal generator to 1400 KC.
   - (c) Rotate the tuning control knob until this signal is tuned in with maximum output.
   - (d) Adjust the antenna trimmer (Illus. A, Fig. #3) for maximum output.

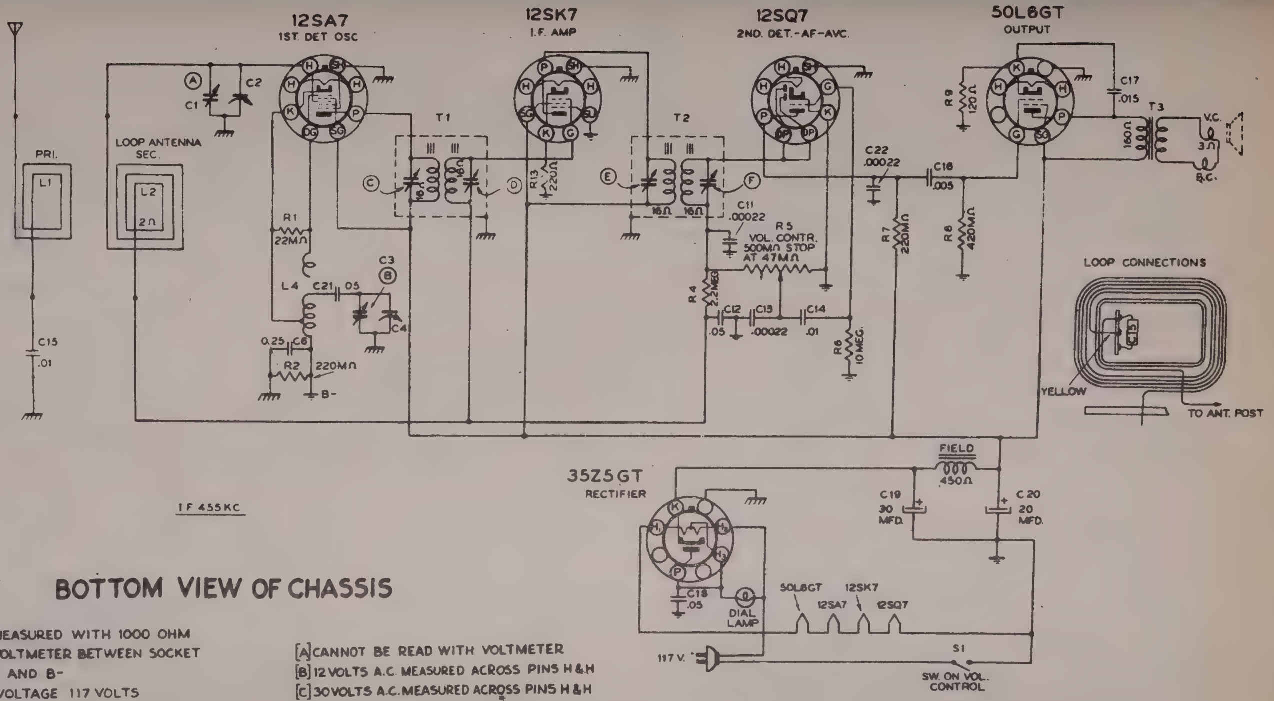


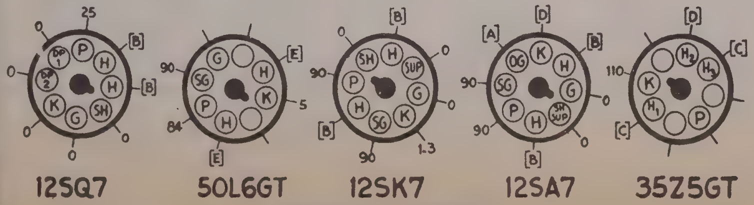
FIG. 2--DELCO MODEL R-1174

12-17-40

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM
PER VOLT VOLTMETER BETWEEN SOCKET
TERMINALS AND B-
A.C LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 30 WATTS
VOLUME CONTROL AT MINIMUM VOLUME.

[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. MEASURED ACROSS PINS H & H
[C] 30 VOLTS A.C. MEASURED ACROSS PINS H & H
[D] 117 VOLTS A.C. MEASURED ACROSS PINS D & D
[E] 45 VOLTS A.C. MEASURED ACROSS PINS H & H



REAR OF CHASSIS

MODEL R1174 Delco

UNITED MOTORS SERVICE

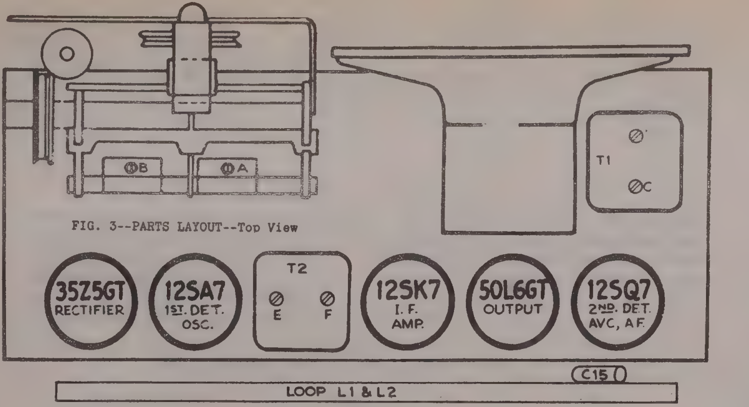


FIG. 3--PARTS LAYOUT--Top View

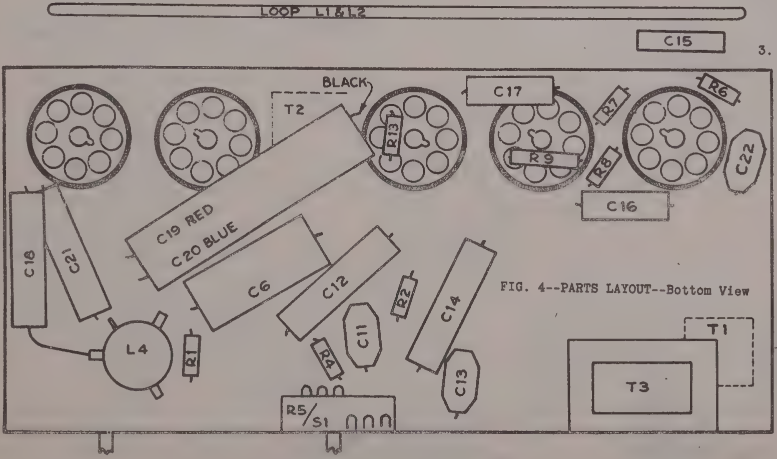


FIG. 4--PARTS LAYOUT--Bottom View

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. capacitor.
   (b) Connect the signal lead of the signal generator to the grid terminal of the 12SK7 tube through a .01 mfd. condenser.
   (c) Connect the output meter across the primary of the output transformer.
   (d) Set the signal generator to exactly 455 KC.
   (e) Tune receiver to quiet point at 1,600 KC end of dial, set volume control full on, adjust the trimmers on the second I-F transformer (Illus. E & F, Fig. 3) for maximum output.
   (f) Connect the signal lead of the signal generator to the grid of the 12SA7 tube.
   (g) Adjust the trimmers on the first I.F. transformer (Illus. C & D., Fig. 3) for maximum output.

2. Aligning at 1600 Kilocycles

   (a) Connect the signal lead of the signal generator to the antenna terminal of the loop through 100 mmfd. capacitor.
   (b) Set signal generator to exactly 1600 KC.
   (c) Tune receiver to 1600 KC, condenser plates full clockwise (out of mesh).
   (d) Adjust oscillator trimmer condenser (Illus. B, Fig. #3) for maximum output.

3. Aligning at 1400 Kilocycles

   (a) Leave the signal lead of the signal generator connected as above.
   (b) Set the signal generator to 1400 KC.
   (c) Rotate the tuning control knob until this signal is tuned in with maximum output.
   (d) Adjust the antenna trimmer (Illus. A, Fig. #3) for maximum output.

GENERAL: The Delco Model R-1174 is a five-tube, AC-DC superheterodyne receiver with 5" electrodynamic speaker.

ANTENNA: A loop antenna is built inside the back cover of this radio and attached to the chassis. This type of antenna is somewhat directional therefore, the radio should be tried in different positions to determine the position which will produce the best reception. An antenna terminal is provided for coupling an outside antenna to the receiver.

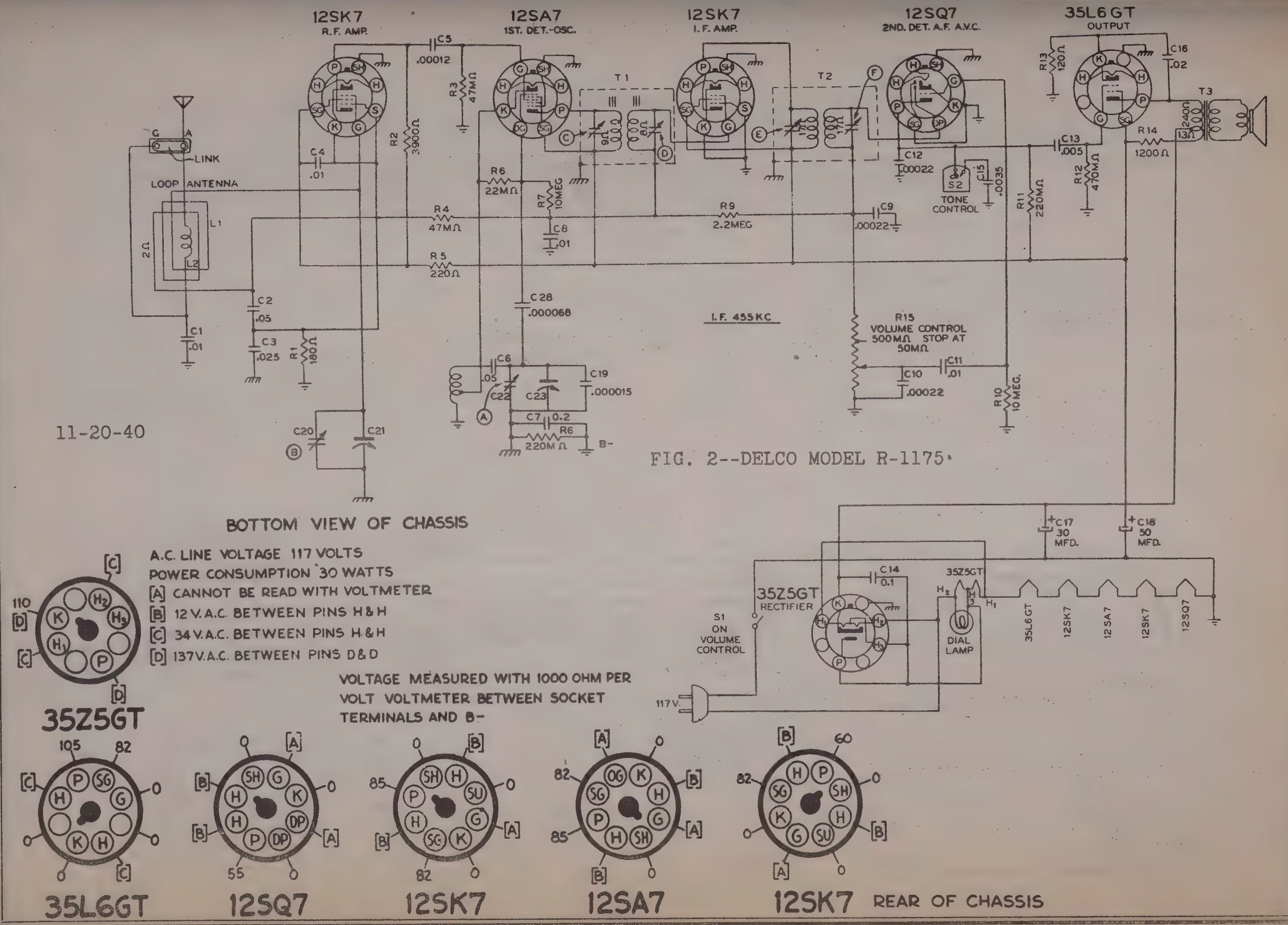


FIG. 2--DELCO MODEL R-1175.

BOTTOM VIEW OF CHASSIS

A.C. LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 30 WATTS
[A] CANNOT BE READ WITH VOLTMETER
[B] 12 V.A.C. BETWEEN PINS H & H
[C] 34 V.A.C. BETWEEN PINS H & H
[D] 137 V.A.C. BETWEEN PINS D & D

VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-

UNITED MOTORS SERVICE

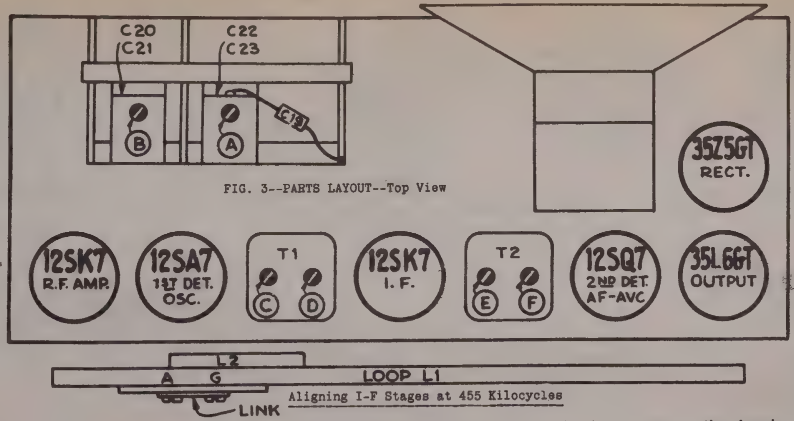


FIG. 3--PARTS LAYOUT--Top View

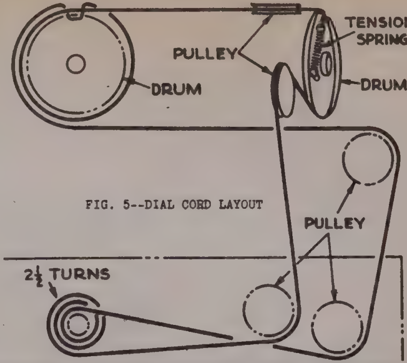


FIG. 5--DIAL CORD LAYOUT

Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. condenser.

(b) Connect the signal lead of the signal generator to the grid terminal of the 12SK7 tube through a .01 mfd. condenser.

(c) Connect the output meter across the primary of the output transformer.

(d) Set the signal generator to exactly 455 KC.

(e) Tune the receiver to quiet point at 1600 KC end of dial, set Volume Control full on, adjust the trimmers on the second I-F transformer (Illus. E, F, Fig. #3) for maximum output.

(f) Connect the signal lead of the signal generator to the grid of the 12SA7 tube.

(g) Adjust the trimmer on the first I-F transformer (Illus. C, D, Fig. #3) for maximum output.

Aligning at 1600 Kilocycles

(a) Connect the signal lead of the signal generator to the antenna terminal of the loop through .0001 mfd. condenser.

(b) Set the signal generator to exactly 1600 KC.

(c) Tune receiver to 1600 KC. condenser plates full clockwise (out of mesh)

(d) Adjust oscillator trimmer condenser (Illus. A, Fig. 3) for maximum output.

Aligning at 1400 Kilocycles

(a) Leave the signal lead of the signal generator connected as above.

(b) Set the signal generator to 1400 KC.

(c) Rotate the tuning control knob until this signal is tuned in with maximum output.

(d) Adjust the antenna trimmer (Illus. B, Fig.3) for maximum output.

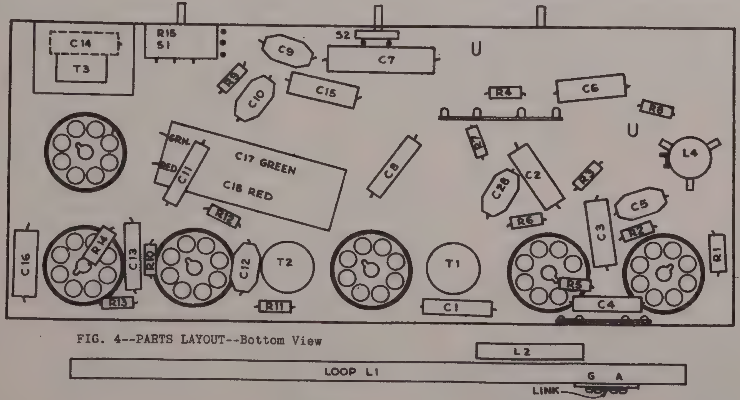


FIG. 4--PARTS LAYOUT--Bottom View

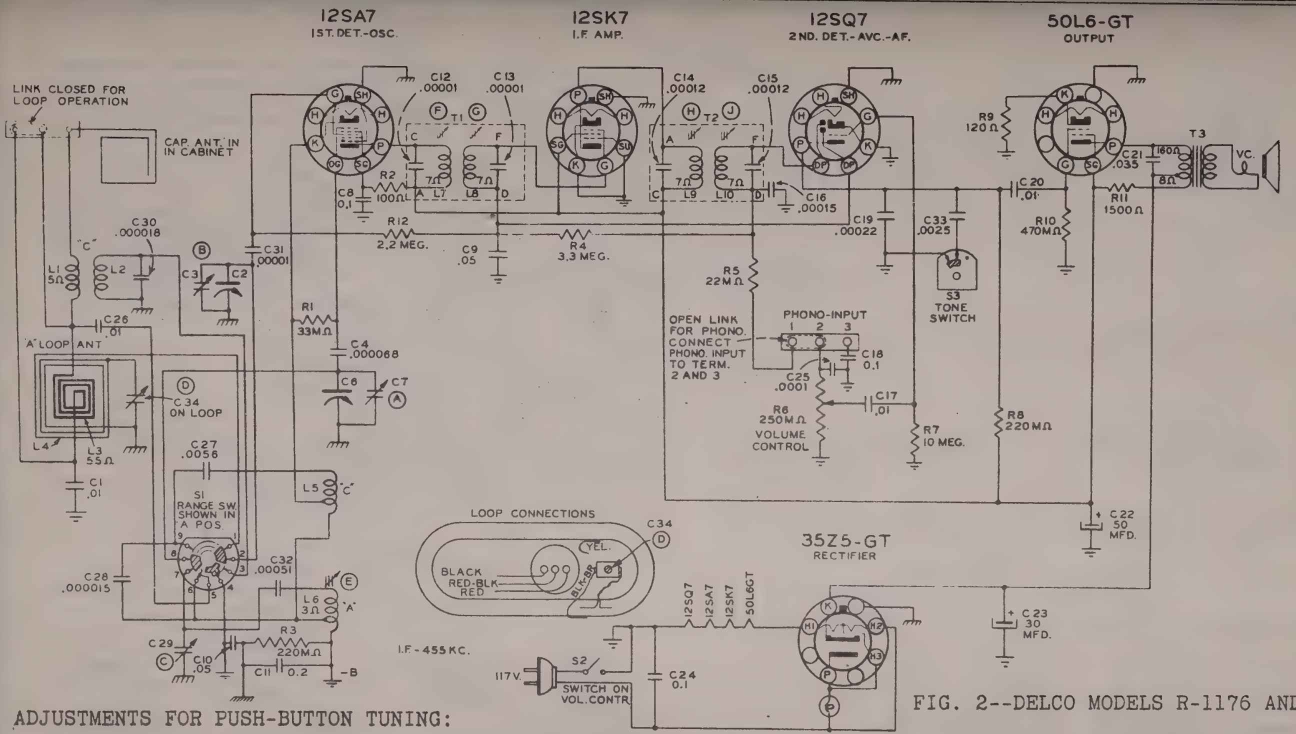


FIG. 2--DELCO MODELS R-1176 AND R-1181

ADJUSTMENTS FOR PUSH-BUTTON TUNING:

TUNER DATA ALSO FOR MODEL R1177

1. Press down on the first push button and hold it down. The screw in back of the push button is now accessible and should be loosened one or two turns with a screwdriver.
2. While still holding down the push button, tune in the station with the tuning knob. When the station is heard at its best, tighten up the screw in back of the push button. Now let go of the push button, turn the tuning knob in order to detune and again press down the button and let go. To check, repeat action.
3. Proceed to set up the other five push buttons in a similar manner.

11-29-40

MODELS R1176,R1181
Delco

UNITED MOTORS SERVICE

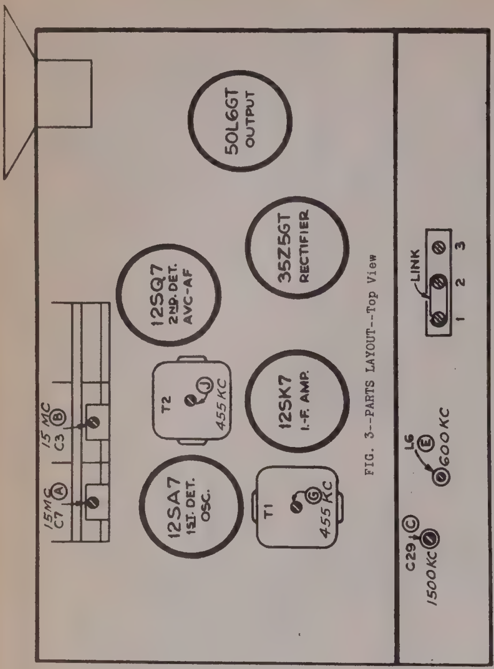


FIG. 3--PARTS LAYOUT--Top View

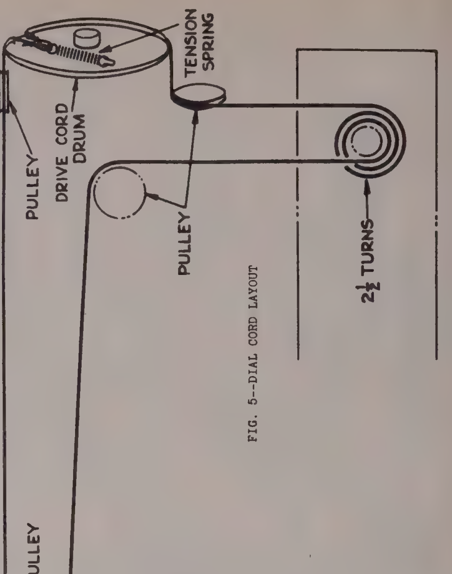


FIG. 5--DIAL CORD LAYOUT

BOTTOM VIEW OF CHASSIS

A.C. LINE VOLTAGE 117 VOLTS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-
VOLUME CONTROL AT MINIMUM VOLUME

POWER CONSUMPTION 30 WATTS
[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. MEASURED ACROSS PINS H&H
[C] 33 VOLTS A.C. MEASURED ACROSS PINS H&H
[D] 117 VOLTS A.C. MEASURED ACROSS PINS D&D
[E] 47 VOLTS A.C. MEASURED ACROSS PINS H&H

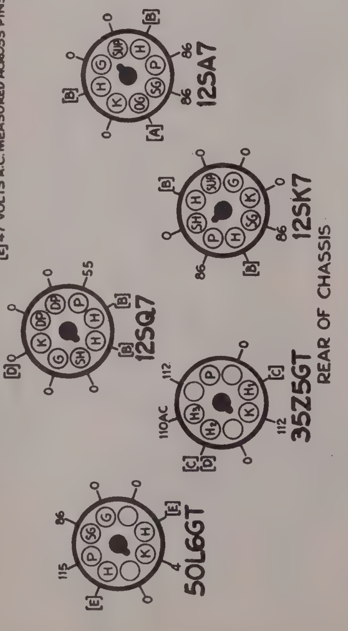


FIG. 1--TUBE SOCKET VOLTAGES

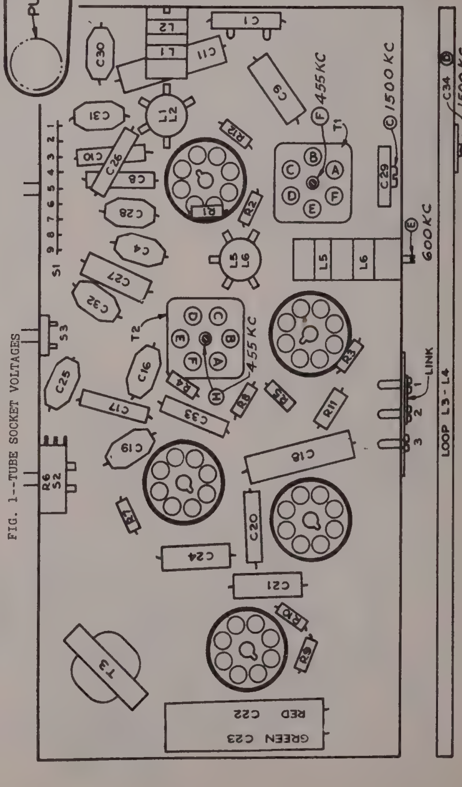


FIG. 4--PARTS LAYOUT--Bottom View

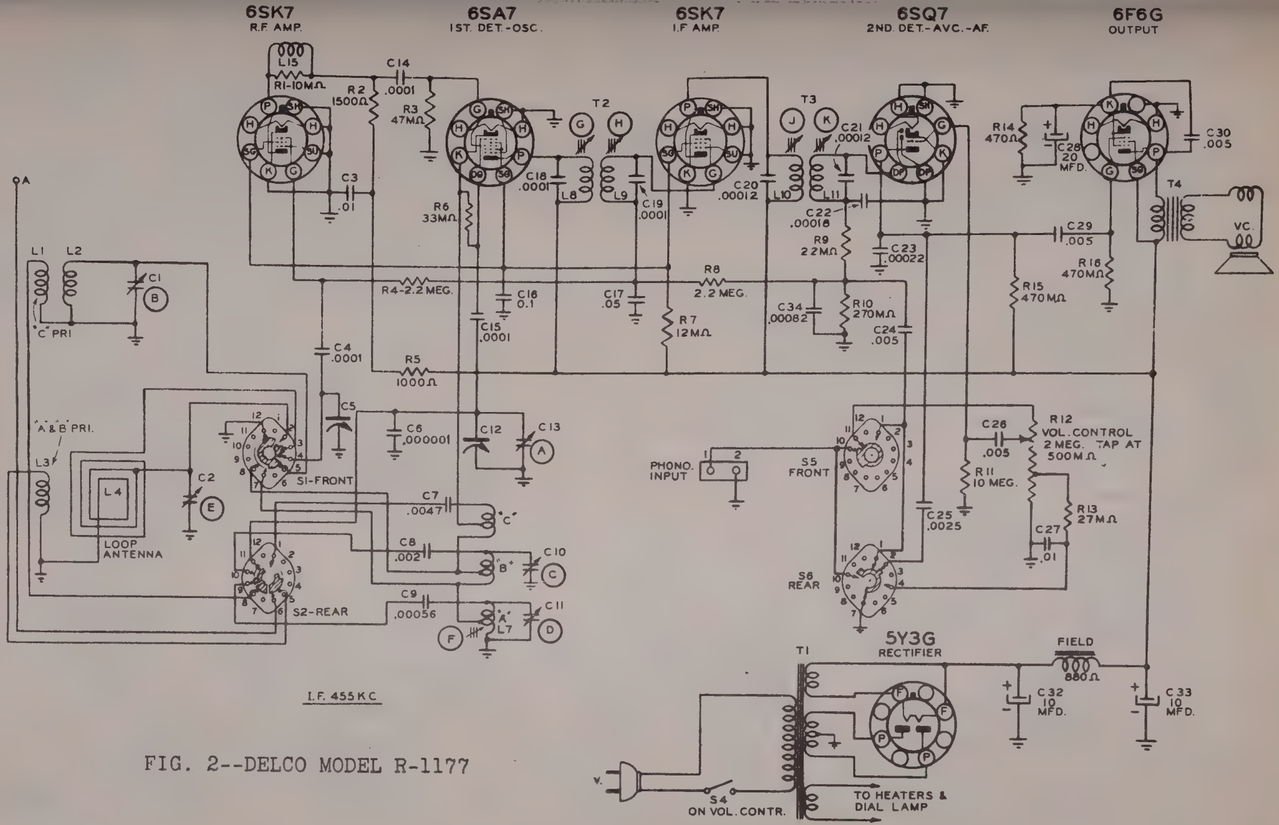


FIG. 2--DELCO MODEL R-1177

ANTENNA: A loop antenna is built inside the back of the radio. This type of antenna is somewhat directional, therefore, the radio should be tried in different positions to determine the position which will produce the best reception.

Terminals are provided for connecting an outside antenna and ground where required.

FOR TUNER
SEE INDEX

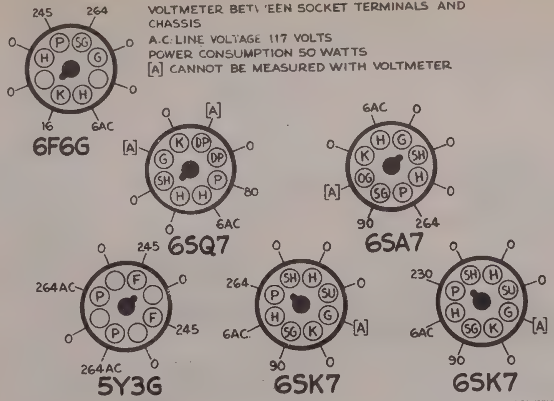
12-16-40

MODEL R1177 Delco

UNITED MOTORS SERVICE

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 50 WATTS
[A] CANNOT BE MEASURED WITH VOLTMETER



REAR OF CHASSIS

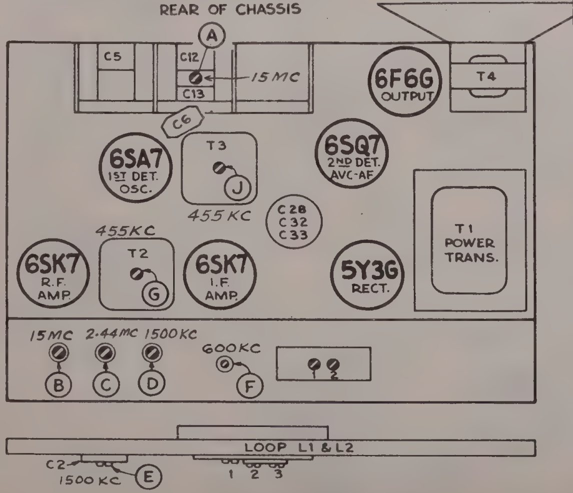


FIG. 3--PARTS LAYOUT--Top View

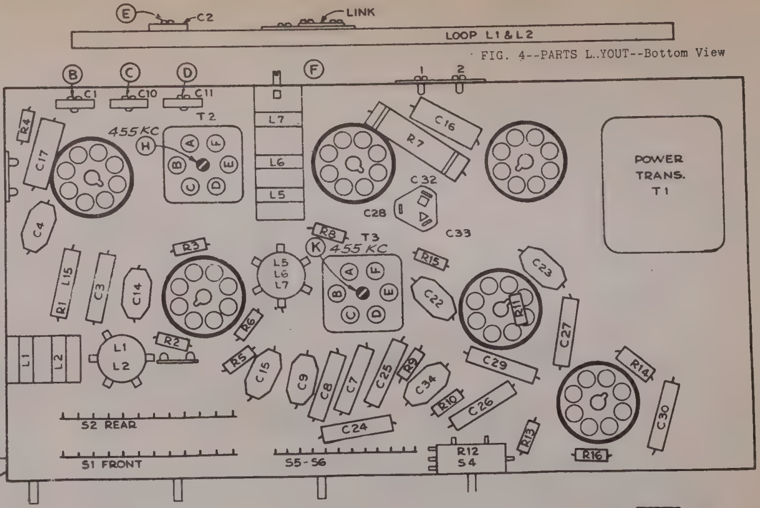


FIG. 4--PARTS LAYOUT--Bottom View

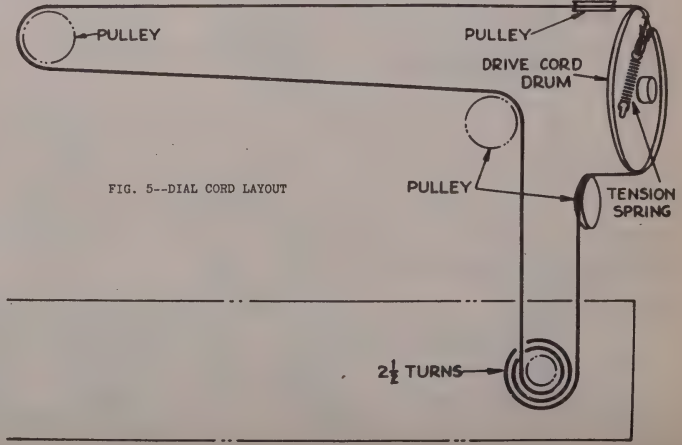


FIG. 5--DIAL CORD LAYOUT

©John F. Rider, Publisher

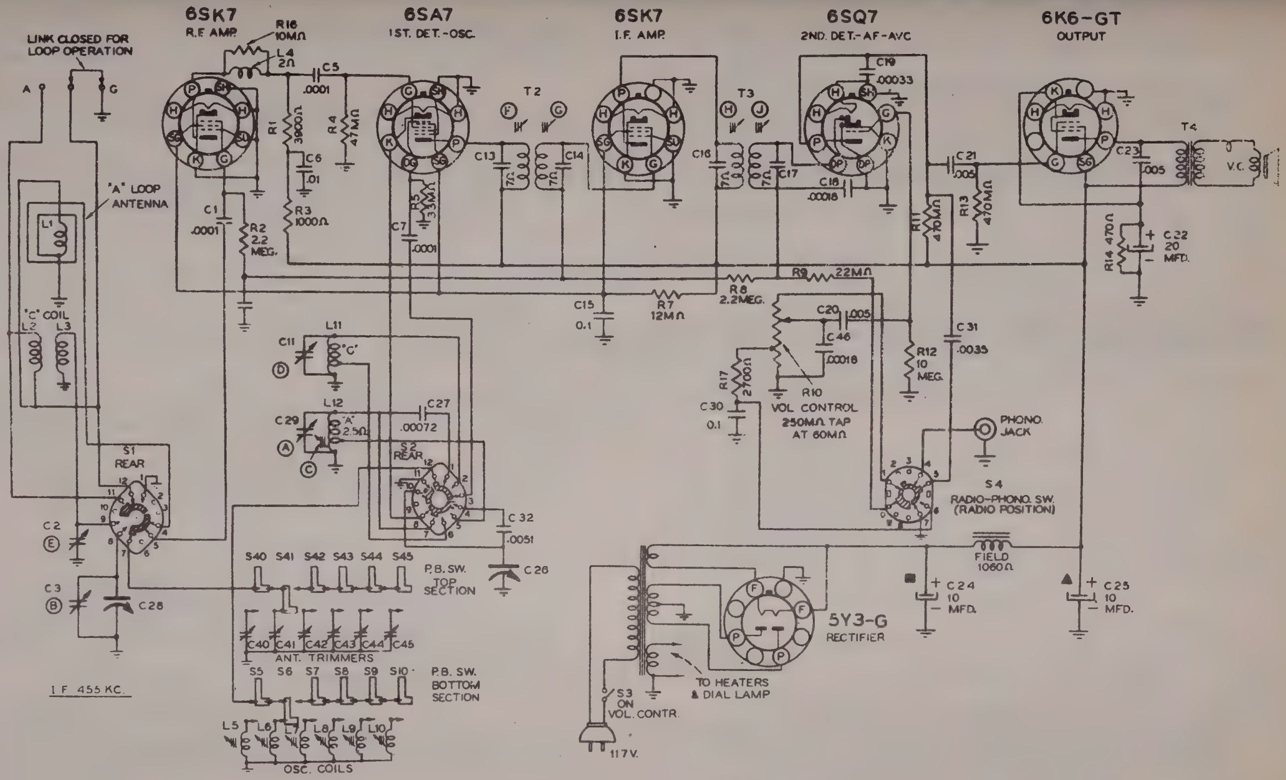


FIG. 2--DELCO MODEL R-1178 CIRCUIT DIAGRAM

PRECAUTIONARY LEAD DRESS

1. Dress 2nd I.F. leads close to chassis.
2. Dress leads from volume control and tone switch away from filaments, diode and power leads.

12-9-40

TUNING CONTROLS: Tuning is accomplished by means of a manual control or by means of six push buttons for electric tuning. The buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments. The procedure is as follows:

1. Turn Range Control knob to "A" position, and manually tune in the station. Turn the Loop Antenna to give minimum pickup of signal, no outside antenna should be used and link on antenna board should be closed.

2. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.

3. Adjust No. 1 antenna trimmer for maximum output on this station. Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particluar station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

4. Adjust for each station in the same manner.

5. After all six stations are tunedin on the buttons, turn the loop Antenna to a position giving the best signal pickup and make a final careful adjustment of all core rods until best reception is obtained for each Outdoor antenna should now be reconnected if used.

During alignment the chassis must be removed from the cabinet along with the loop antenna. Keep the signal generator and signal generator leads as far from the loop as possible, also keep the output as low as possible to avoid a.v.c. action.

CALIBRATION SCALE ON INDICATOR-DRIVE-CORD DRUM: The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in Fig. 5.

As the first step in R-F alignment, check the position of the drum. The "90°" mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

POINTER FOR CALIBRATION SCALE: Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

DIAL-INDICATOR ADJUSTMENT: After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 KC mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis.
   (b) Connect the signal lead of the signal generator to the grid terminal of the 6SK7 tube through a .01 mfd. condenser.
   (c) Connect the output meter across the primary of the output transformer.
   (d) Set the signal generator to exactly 455 KC.
   (e) Tune receiver to quiet point at 1500 KC end of dial, set volume control full on, range switch to broadcast position, and adjust the trimmers on the second I.F. transformer (Illus. H. J., Fig. 3 & 4) for maximum output.
   (f) Connect the signal lead of the signal generator to the grid of the 6SA7 tube.
   (g) Adjust the trimmers, on the first I-F transformer (Illus. F. G., Fig. 3 & 4) for maximum output.

2. Aligning Broadcast Band at 1500 Kilocycles

   (a) Connect signal lead of signal generator to antenna "A" terminal on loop, link open, through .0002 condenser. Connect a 25,000 ohm load resister across secondary of 1st I-F transformer.
   (b) Set signal generator to 1500 KC.
   (c) Rotate the tuning condenser to 150° on drum calibration scale.
   (d) Adjust the broadcast oscillator trimmer (Illus. A., Fig. 4) to maximum output.
   (e) Adjust the broadcast antenna trimmer (Illus. B., Fig. 3) to maximum output

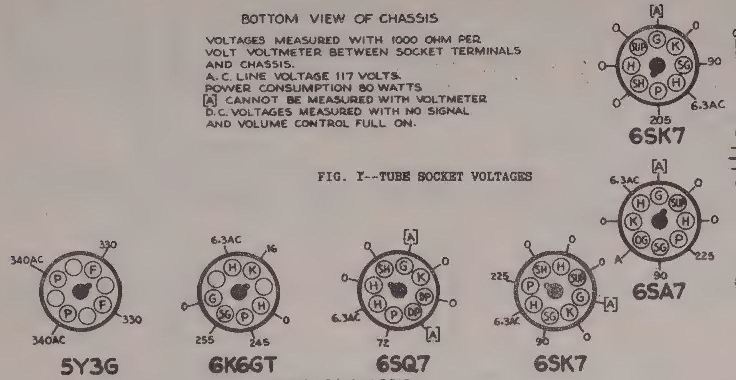
3. Aligning Broadcast Band at 600 Kilocycles

   (a) Set signal generator to 600.
   (b) Rotate the tuning condenser to 30.5° on drum calibration scale.
   (c) Adjust the broadcast oscillator trimmer (Illus. C., Fig. 3) while rocking the condenser-gang back and forth until maximum output is obtained.

4. Repeat steps 2 and 3 above for maximum output.

5. Aligning Shortwave Band at 15 M.C.

   (a) Connect signal lead of signal generator to antenna "A" terminal on loop, link open, through .00005 mfd. condenser.
   (b) Remove 25,000 ohm load resistor.
   (c) Set signal generator to 15 M.C.
   (d) Rotate tuning condenser to 147° on drum calibration scale.
   (e) Adjust the short wave oscillator trimmer (Illus. D., Fig. 4) for maximum output. Use MINIMUM capacity peak if two peaks can be obtained.
   (f) Adjust the short wave antenna trimmer (Illus. E., Fig. 4) for maximum output.



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A. C. LINE VOLTAGE 117 VOLTS.
POWER CONSUMPTION 80 WATTS
[A] CANNOT BE MEASURED WITH VOLTMETER
D. C. VOLTAGES MEASURED WITH NO SIGNAL AND VOLUME CONTROL FULL ON.

FIG. 1--TUBE SOCKET VOLTAGES

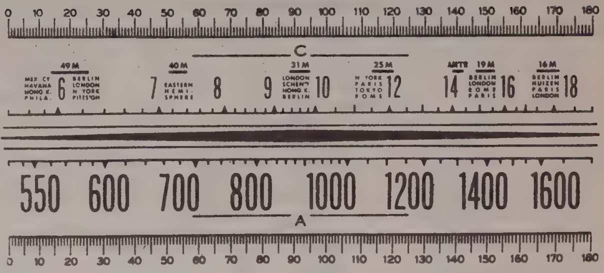


FIG. 5--DIAL CALIBRATION

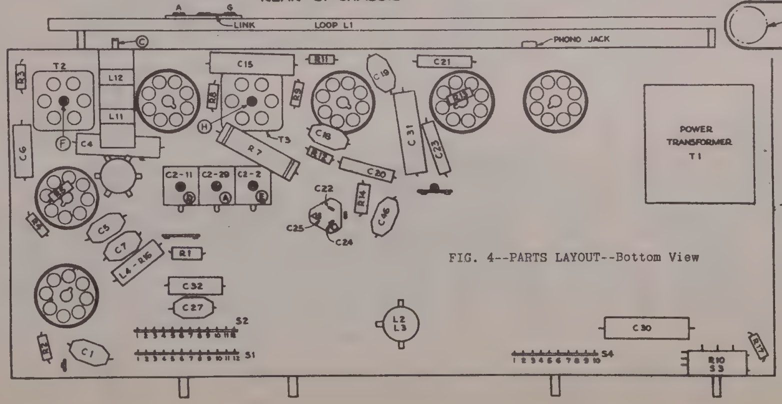


FIG. 4--PARTS LAYOUT--Bottom View

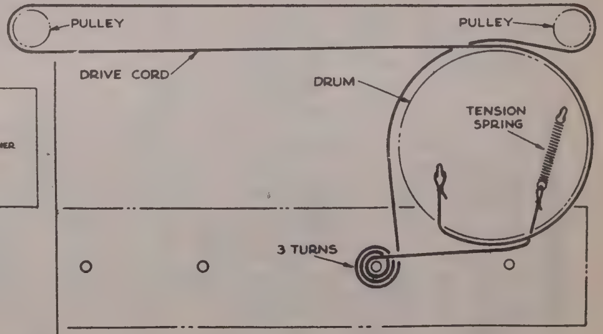


FIG. 6--DIAL CORD LAYOUT

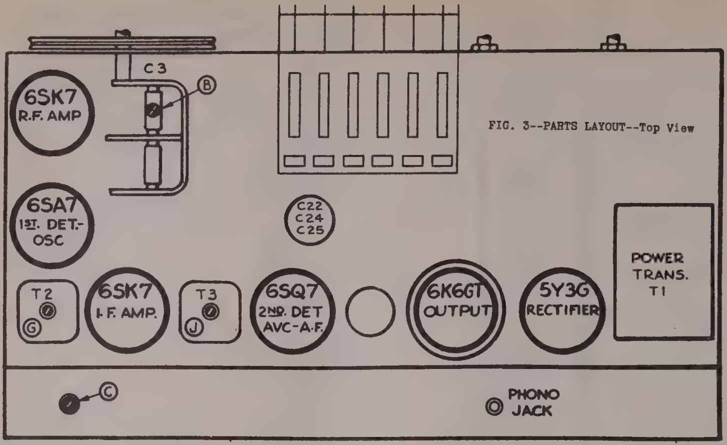


FIG. 3--PARTS LAYOUT--Top View

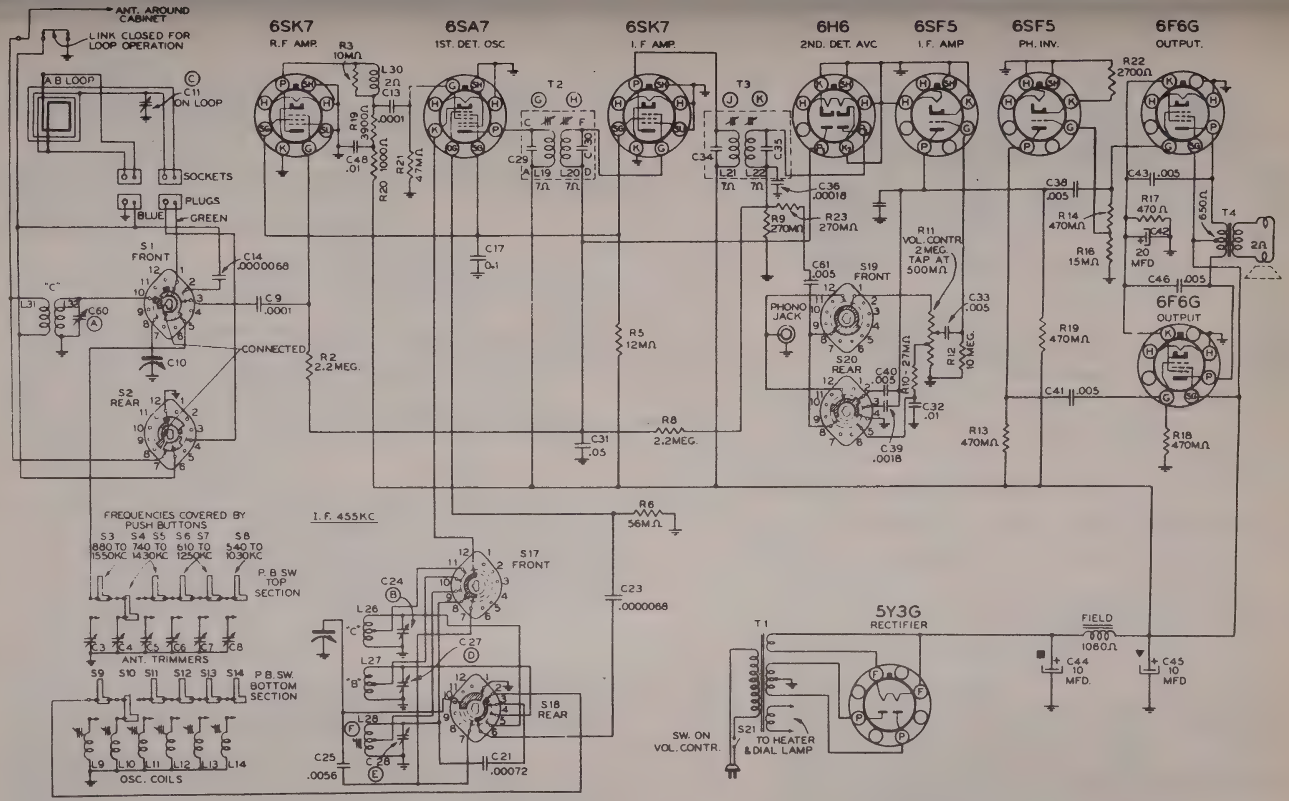
Illus. No.	Service Part No.	Description	
L1	1214671	Antenna loop	
L2	1214662	Antenna "C" band	
L3	"	Antenna "C" band	
L4	Incl. in R16		
L5	1214673	Oscillator "PB"	
L6	"	Oscillator "PB"	
L7	"	Oscillator "PB"	
L8	"	Oscillator "PB"	
L9	"	Oscillator "PB"	
L10	1214785	Oscillator "PB" low frequency	
L11	1214670	Oscillator	
L12	"	Oscillator	
C1	1210275	.0001 mfd. molded	
C2	1214670	Trimmer	
C11	"	Trimmer	
C29	"	Trimmer	
C3	1214677	Variable tuning	
C26	"	Variable tuning	
C28	"	Variable tuning	
C4	7230592	.05 mfd. 600 V. tubular	
C5	1210275	.0001 mfd. molded	
C6	1208600	.01 mfd. 600 V. tubular	
C7	1210275	.0001 mfd. molded	
C13	Incl. in T2	.0001 mfd. molded	
C14	Incl. in T2	.0001 mfd. molded	
C15	1207908	.1 mfd. 400 V. tubular	
C16	Incl. in T3	.00012 mfd. molded	
C17	Incl. in T3	.00012 mfd. molded	
C18	1215294	.00018 mfd. molded	
C19	7232957	.00033 mfd. molded	
C20	7230912	.005 mfd. 800 V. tubular	
C21	7230912	.005 mfd. 800 V. tubular	
C22	1214676	20 mfd. 25 V. elect.	
C24	"	10 mfd. 450 V. elect.	
C25	"	10 mfd. 450 V. elect.	
C23	7230912	.005 mfd. 800 V. tubular	
C27	1215297	.00072 mfd. silvered mica	
C30	1207908	.1 mfd. 400 V. tubular	
C31	7232954	.0035 mfd. 700 V. tubular	
C32	1215298	.0051 500 V. tubular	
C40	1214674	Trimmer	
C41	"	Trimmer	
C42	"	Trimmer	
C43	"	Trimmer	
C44	"	Trimmer	
C45	"	Trimmer	
C46	1215294	.00018 mfd. moldea	
R1	1214546	3,900 ohms 1/2 watt ins.	
R2	1211164	2 megohms 1/2 watt ins.	
R3	1211035	1,000 ohms 1/2 watt ins.	
R4	1210116	50,000 ohms 1/2 watt ins.	
R5	1213845	33,000 ohms 1/2 watt ins.	
R7	1214659	12,000 ohms 3 watt ins.	
R8	1211164	2 megohms 1/2 watt ins.	
R9	1210882	20,000 ohms 1/2 watt ins.	
R10	1214667	Volume	
S3	"	110 V. power	
R11	1210470	500,000 ohms 1/2 watt ins.	
R12	1214761	10 megohm 1/2 watt ins.	
R13	1210470	500,000 ohms 1/2 watt ins.	
R14	1211021	500 ohms 1 watt ins.	
R16	1214660	10,00 ohms 1/2 watt ins. (incl. L4)	
R17	1211049	2700 ohms 1/2 watt ins.	
S1	1214669	Switch	Band change
S2	"	Switch	Band change
S4	1214668	Switch	Tone control
S5	1214675	Switch	Push button
S6	"	Switch	Push button
S7	"	Switch	Push button
S8	"	Switch	Push button
S9	"	Switch	Push button
S10	"	Switch	Push button
S40	1214675	Switch	Push button
S41	"	Switch	Push button
S42	"	Switch	Push button
S43	"	Switch	Push button
S44	"	Switch	Push button
S45	"	Switch	Push button
T1	1214786	Transformer	25 cycle 110 V. power
T1	1214666	Transformer	50-60 cycle 110 V. power
T2	1214629	Coil assy.	1st I.F.
T3	1214630	Coil assy.	2nd I.F.
T4	1214678	Transformer	Output
	1214514	Speaker	12" dynamic

CHASSIS MISCELLANEOUS PARTS

7241702	Cord	Dial drive (60" length)
1214672	Core	Adjustable core and stud for P.B. oscillator coils
1214663	Core	Adjustable core and stud for oscillator coil
1214664	Drum	Dial drive
1214683	Indicator	Dial pointer
51	Lamp	6-8 volt (Mazda #51)

UNITED MOTORS SERVICE

MODEL R1179 Delco



IF PEAK 455 KC

PRECAUTIONARY LEAD DRESS

1. Dress 2nd I. F. leads close to chassis.
2. Dress leads from volume control and tone switch away from filaments, diode and power leads.
3. Dress .005 mfd. (C33) volume control condenser away from electrolytic.

12-16-40

As the first step in R-F alignment, check the position of the drum. The "90°" mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

POINTER FOR CALIBRATION SCALE: Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

DIAL-INDICATOR ADJUSTMENT: After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 KC mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis.
   (b) Connect the output meter from plate to plate of the 6F6G output tubes.
   (c) Connect the signal lead of the signal generator to the control grid of the 6SA7 tube through a .01 mfd. condenser.
   (d) Turn the band switch to the broadcast position, the tone control on high and the volume control on full.
   (e) Set the signal generator to exactly 455 kilocycles.
   (f) Adjust the trimmers on the I-F coils (Illus. G,H,J,K, Figs. 3 & 4) for maximum output.

2. Aligning short wave band at 16 M.C.

   (a) Connect signal lead of signal generator to antenna terminal "A" on rear of chassis through a .00005 mfd. condenser. Leave ground lead connected to receiver chassis.
   (b) Change the band switch to the short wave (C) position.
   (c) Set the signal generator to 16 M.C.
   (d) Rotate the tuning condenser plates to 155° on drum calibration scale.
   (e) Adjust the short wave oscillator trimmer (Illus. B., Fig. 4) for maximum output.
   (f) Adjust the short wave antenna trimmer (Illus. A, Fig. 4) for maximum output. Use minimum capacity peak if two peaks can be obtained.

3. Aligning Middle wave Band at 2.44 Megacycles

   (a) Connect signal lead of signal generator to antenna section of gang condenser through 300 ohm resistor. Leave ground lead connected to receiver chassis.
   (b) Change the band switch to the middle wave position (B).
   (c) Set the signal generator to 2.44 megacycles.
   (d) Rotate the tuning condenser plate to 97° on drum calibration scale.
   (e) Adjust the middle wave oscillator trimmer (Illus. D, Fig. 4) for maximum output. Use minimum capacity peak if two peaks can be obtained.

4. Aligning Broadcast Band at 1,500 Kilocycles

   (a) Set Band switch to the broadcast position.
   (b) Rotate the tuning condenser plates to 160° on drum calibration scale.
   (c) Adjust the broadcast oscillator trimmer (Illus. E., Fig. 4) for maximum output. Use minimum capacity peak if two peaks can be obtained.

5. Aligning Broadcast Band at 600 Kilocycles

   (a) Set signal generator to 600 kilocycles.
   (b) Rotate the tuning condenser plates to 30° on drum calibration scale.
   (c) Adjust the broadcast oscillator trimmer (Illus. F, Fig. 3) (rocking gang) until maximum output is obtained.

Note: Fasten chassis in cabinet. Connect loop, see that link is closed on the antenna board, attach dial indicator to drive cord, with indicator at 540 KC mark and gang at maximum capacity.

6. Aligning Broadcast Band at 1,500 Kilocycles

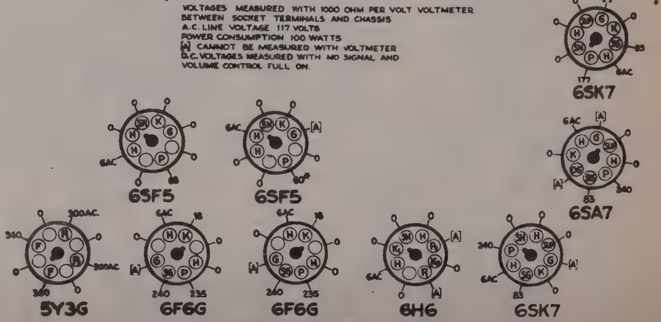
   (a) Connect a radiation loop to signal generator consisting of two turns of wire 18 inches in diameter and locate the generator and loop 4 to 6 ft. from receiver.
   (b) Set signal generator to 1,500 KC.
   (c) Rotate the tuning condenser plates to 160° on drum calibration scale.
   (d) Adjust the broadcast antenna trimmer on loop to maximum output.

7. Aligning Broadcast Band at 600 Kilocycles

   (a) Set signal generator to 600 KC.
   (b) Rotate the tuning condenser plates to 30° on drum calibration scale.
   (c) Adjust the broadcast oscillator trimmer (Illus. F. Fig. 3) to maximum output.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 100 WATTS
[A] CANNOT BE MEASURED WITH VOLTMETER
D.C. VOLTAGES MEASURED WITH NO SIGNAL AND VOLUME CONTROL FULL ON.



REAR OF CHASSIS

UNITED MOTORS SERVICE

MODEL R1179 Delco

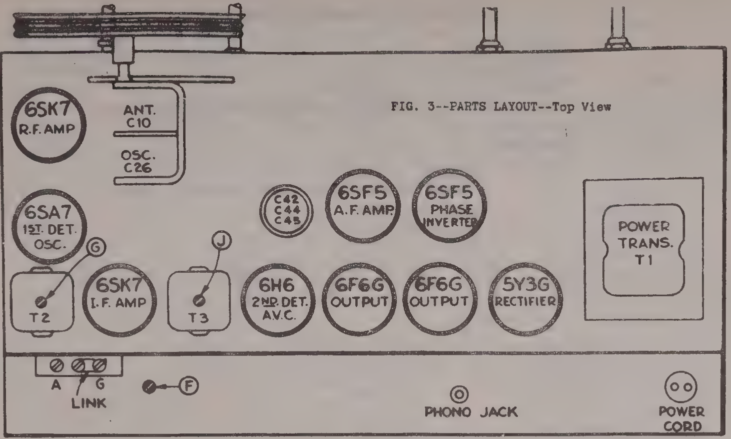


FIG. 3--PARTS LAYOUT--Top View

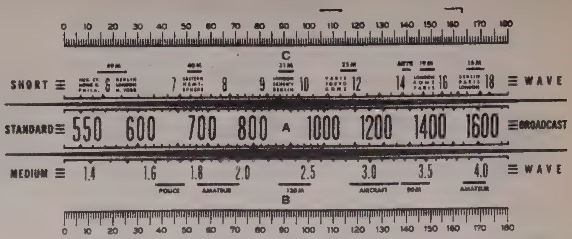


FIG. 5--DIAL CALIBRATION

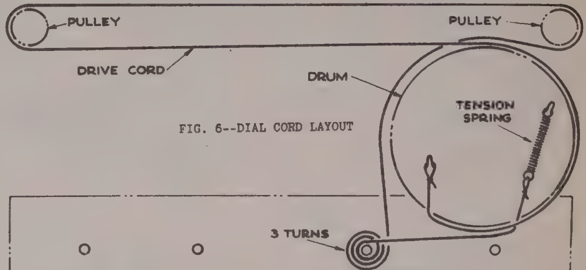


FIG. 6--DIAL CORD LAYOUT

CALIBRATION SCALE ON INDICATOR-DRIVE-CORD DRUM: The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in Fig. 5.

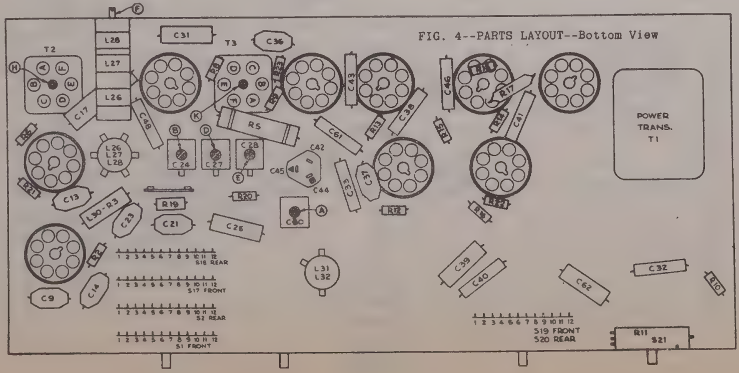


FIG. 4--PARTS LAYOUT--Bottom View

1. Turn Range Control knob to "A" position, and manually tune in the station. Turn the Loop Antenna to give minimum pickup of signal, no outside antenna should be used and link on antenna board should be closed.

2. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.

3. Adjust No. 1 antenna trimmer for maximum output on this station. Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particular station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

4. Adjust for each station in the same manner.

5. After all six stations are tuned-in on the buttons, turn the Loop Antenna to a position giving the best signal pickup and make a final careful adjustment of all core rods until best reception is obtained for each. Outdoor antenna should now be reconnected if used.

MODEL R1180 Delco

UNITED MOTORS SERVICE

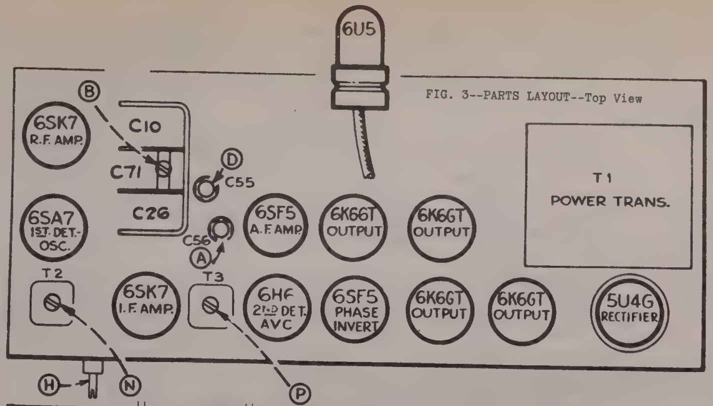


FIG. 3--PARTS LAYOUT--Top View

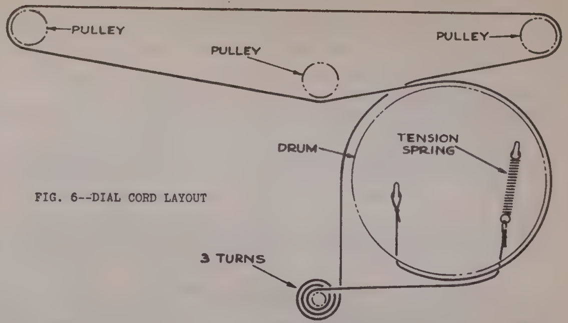


FIG. 6--DIAL CORD LAYOUT

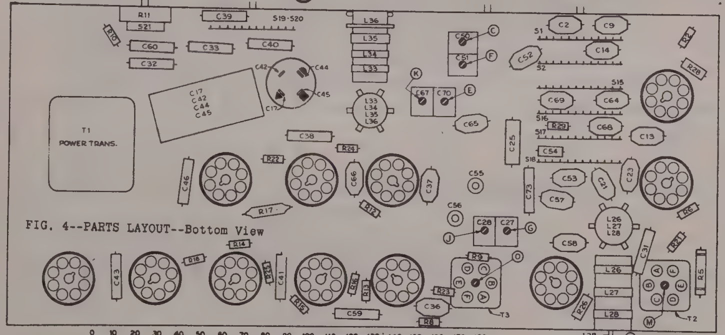


FIG. 4--PARTS LAYOUT--Bottom View

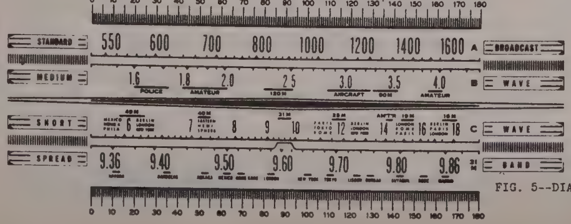
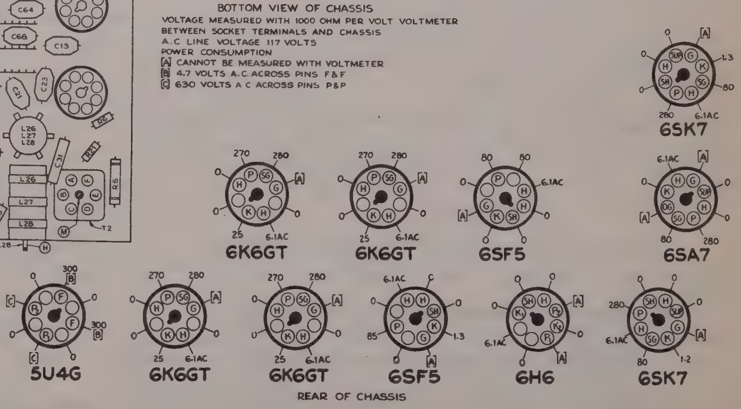


FIG. 5--DIAL CALIBRATION



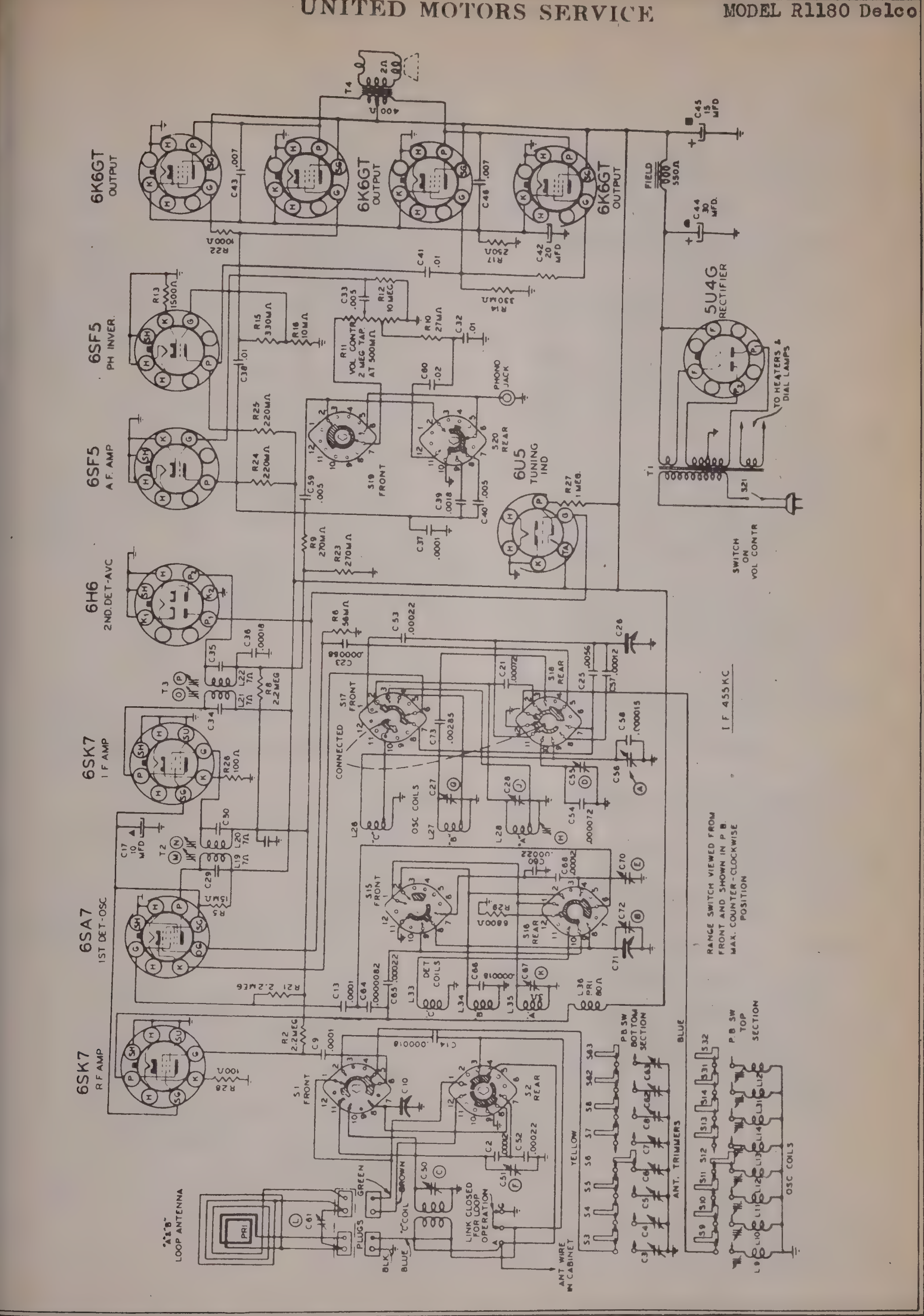
BOTTOM VIEW OF CHASSIS
VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER
BETWEEN SOCKET TERMINALS AND CHASSIS
A.C LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] 4.7 VOLTS A.C. ACROSS PINS F&F
[C] 630 VOLTS A C ACROSS PINS P&P

REAR OF CHASSIS

FIG. 1--TUBE SOCKET VOLTAGES

UNITED MOTORS SERVICE

MODEL R1180 Delco



TUNING CONTROLS: Tuning is accomplished by means of a manual control or by means of six push buttons for electric tuning. The buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments. The procedure is as follows:

1. Turn Range Control knob to "A" position, and manually tune in the station. Turn the Loop Antenna to give minimum pickup of signal, no outside antenna should be used and link on antenna board should be closed.

2. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.

3. Adjust No. 1 antenna trimmer for maximum output on this station. Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particular station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

4. Adjust for each station in the same manner.

5. After all six stations are tuned-in on the buttons, turn the Loop Antenna to a position giving the best signal pickup and make a final careful adjustment of all core rods until best reception is obtained for each. Outdoor antenna should now be reconnected if used.

During alignment the chassis must be removed from the cabinet but the loop may be left in cabinet and must be connected to the receiver. Keep the signal generator and signal generator leads as far from the loop as possible, also keep the output as low as possible to avoid A.V.C. action.

CALIBRATION SCALE ON DRIVE-CORD DRUM: The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore, a calibration scale is attached to the drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment procedure.

As the first step in R-F alignment check the position of the drive drum. The "90°" mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to Fig. 5 which shows the dial with 0-180° calibration scales drawn at top and bottom.

POINTER FOR CALIBRATION SCALE: Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

DIAL-INDICATOR ADJUSTMENT: After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 KC mark, and the gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

SPREAD-BAND ALIGNMENT: Make final adjustment of "D", "E" and "F" "31-meter" trimmers during actual reception of a station of known frequency near 9.5 megacycles.

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis.
(b) Connect the output meter across the primary of the output transformer.
(c) Connect the signal lead of the signal generator to the grid of the 6SK7 I-F tube through a 0.1 mfd. condenser.
(d) Set the signal generator to exactly 455 KC.
(e) With the band switch in the "C" band position, the volume control on full and the radio tuned to a quiet point at 18 M.C. end of dial, adjust the trimmers on the second I-F coils (Illus. O, P Fig. 3 & 4) for maximum output.
(f) Connect the signal lead of the signal generator to the grid of the 6SA7 tube.
(g) Adjust the trimmers on first I-F coil (Illus. M, N Fig. 3 & 4) for maximum output.

2. Aligning at 15 M.C.

(a) Connect the signal lead of the signal generator to the antenna terminal of the receiver (link on terminal closed) in series with a .00005 mfd. condenser.
(b) Connect the ground lead of the signal generator to the ground terminal of the receiver.
(c) Set the signal generator to 15 M.C.
(d) With the band switch in the "C" position, rotate the tuning condenser plates to 145° on drum calibration scale.
(e) Adjust "C" band oscillator trimmer (Illus. A, Fig. 3) for maximum output. Use MINIMUM capacity peak if two peaks can be obtained.
(f) Adjust "C" band detector trimmer (Illus. B, Fig. 3) for MAXIMUM output. Use MAXIMUM capacity peak if two peaks can be obtained.
(g) Adjust "C" band antenna trimmer (Illus. C, Fig. 4) for maximum output. Use MAXIMUM capacity peak if two peaks can be obtained.

3. Aligning "31" Meter Band at 9.5 M.C.

(a) Connect signal lead of signal generator as above.
(b) Change the band switch to "31" meter band position.
(c) Set generator to 9.5 M.C.
(d) Rotate the tuning condenser plates to 64° on drum calibration scale.
(e) Adjust "31-meter" oscillator trimmer (Illus. D, Fig. 3) to maximum output. Use MINIMUM capacity peak if two peaks can be obtained.
(f) Adjust "31-meter" detector trimmer (Illus. E, Fig. 4) to maximum output.
(g) Adjust "31-meter" Antenna trimmer (Illus. F, Fig. 4) to maximum output. Rock in trimmers E and F.

4. Aligning at 2.44 M.C.

(a) Conect signal lead of signal generator to GREEN lead of loop antenna plug in series with 300 ohm resistor.
(b) Change Band switch to "B" position.
(c) Set signal generator to 2.44 M.C.
(d) Rotate the tuning condenser plates to 90° on drum calibration scale.
(e) Adjust "B" band oscillator trimmer (Illus. G, Fig. 4) to maximum output.

5. Aligning at 600 KC.

(a) Connect signal lead of signal generator as above.
(b) Change band switch to broadcast "A" position.
(c) Set signal generator to 600 KC.
(d) Rotate the tuning condenser plates to 30° on drum calibration scale.
(e) Adjust the broadcast oscillator trimmer (Illus. H, Fig. 3 & 4) while rocking the condenser gang back and forth until maximum output is obtained.

6. Aligning at 1500 KC.

(a) Connect signal lead of signal generator as above.
(b) Set signal generator to 1500 KC.
(c) Rotate the tuning condenser plates to 159° on drum calibration scale.
(d) Adjust broadcast oscillator trimmer (Illus. J, Fig 4) to maximum output.
(e) Adjust broadcast detector trimmer (Illus. K, Fig 4) to maximum output.

7. Repeat Operations 4 and 5

NOTE: Fasten chassis in cabinet, close antenna link, adjust indicator to dial scale.

8. Aligning at 1500 KC.

(a) Connect a radiation loop to signal generator consisting of two turns of wire 18 inches in diameter and locate the generator and loop 4 to 6 feet from receiver.
(b) Set signal generator to 1500 KC.
(c) Rotate the tuning condenser plates to 159° on drum calibration scale.
(d) Adjust the broadcast antenna trimmer "L" (on loop) to maximum output.

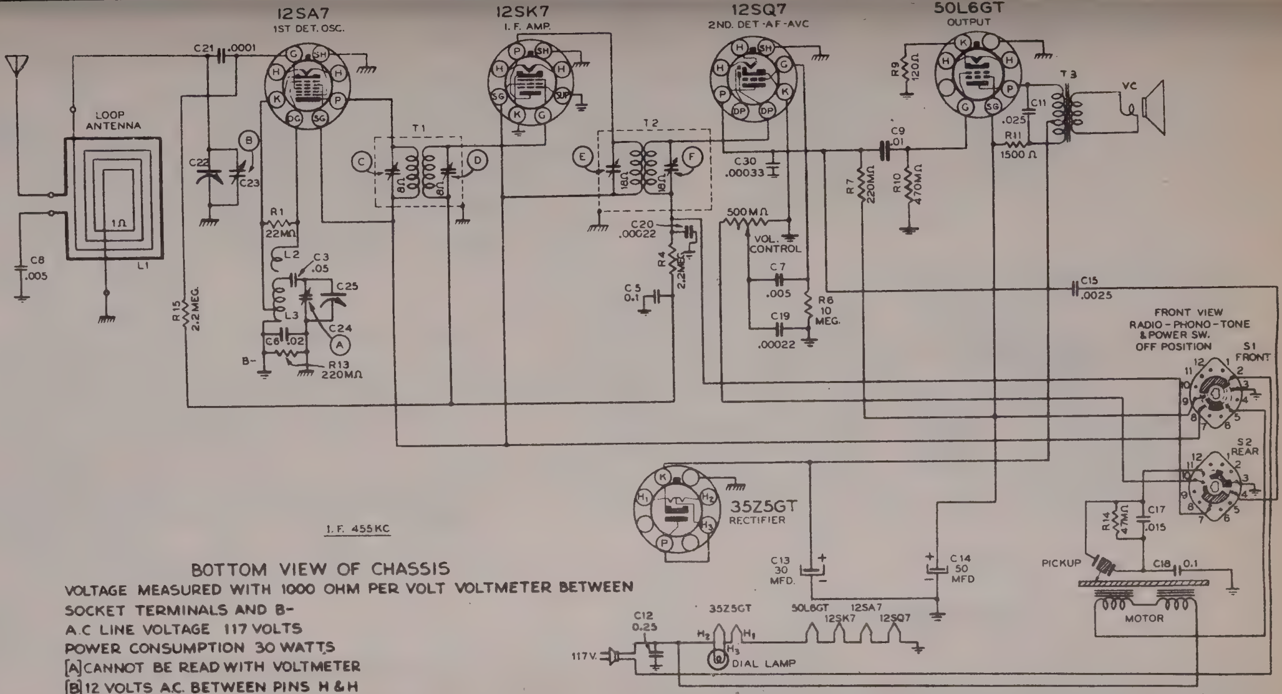
9. Aligning at 600 KC.

(a) Set signal generator to 600 KC. connection as above.
(b) Rotate the tuning condenser plates to 30° on drum calibration scale.
(c) Adjust the broadcast oscillator trimmer (Illus. H, Fig. 3 & 4) to maximum output.

10. Repeat operations 8 and 9

UNITED MOTORS SERVICE

MODEL R1185 Delco



BOTTOM VIEW OF CHASSIS

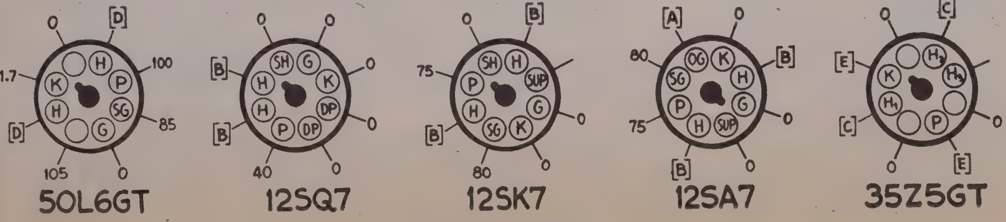
VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-

A.C LINE VOLTAGE 117 VOLTS

POWER CONSUMPTION 30 WATTS

[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. BETWEEN PINS H & H
[C] 29 VOLTS A.C. BETWEEN PINS H & H
[D] 45 VOLTS A.C. BETWEEN PINS H & H
[E] 125 VOLTS A.C. BETWEEN PINS E & E

12-5-40



REAR OF CHASSIS

©John F. Rider, Publisher

PHONOGRAPH MOTOR: The phonograph motor is of the self starting synchronous type and operates the turntable through friction drive between the motor drive spindle and the rubber tired idler on the rim of the turntable.

The motor should be lubricated once or twice a year by placing a few drops of S.A.E. 20 oil on the turntable spindle and saturating the felt oil retaining pads on the motor shaft.

CAUTION: The motor drive spindle and the rubber tire on the idler must be kept clean and entirely free from oil and grease at all times.

POWER SUPPLY: Although this model employs an AC-DC chassis, it is not suitable for use on DC., as this would damage the motor.

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly adjusted only with the use of a test oscillator or signal generator and an output meter.

1. Aligning I-F Stages at 455 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. condenser, and keep the output as low as possible.
   (b) Connect the signal lead of the signal generator to the grid terminal of the 12SK7 tube through a .01 mfd. condenser.
   (c) Connect the output meter across the primary of the output transformer.

   (d) Set the signal generator to exactly 455 KC.
   (e) Tune the receiver to quiet point at 1600 KC end of dial, set Volume Control full on, adjust the trimmers on the second I-F transformer (Illus. E, F, Fig. 3) for maximum output.
   (f) Connect the signal lead of the signal generator to the grid of the 12SA7 tube.
   (g) Adjust the trimmers on the first I-F transformer (Illus. C, D, Fig. 3) for maximum output.

2. Aligning at 1560 Kilocycles

   (a) Connect the signal lead of the signal generator to the antenna terminal of the loop through .0001 mfd. condenser.
   (b) Set signal generator to exactly 1560 KC.
   (c) Tune receiver to 1560 KC., adjust oscillator trimmer condenser (Illus. A, Fig. 3) for maximum output.

3. Aligning at 1300 Kilocycles

   (a) Leave the signal lead of the signal generator connected as above.
   (b) Set the signal generator to 1300 KC.
   (c) Rotate the tuning control knob until this signal is tuned in with maximum output.
   (d) Adjust the antenna trimmer (Illus. B, Fig. 3) for maximum output.

4. Repeat Operations 2 and 3 for maximum output.

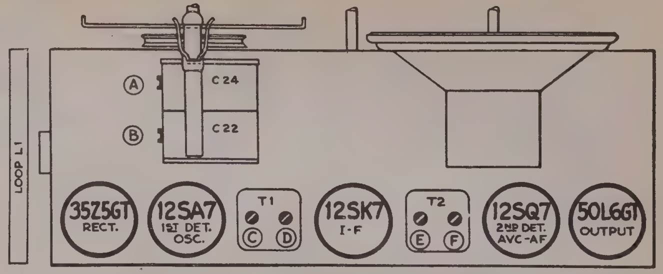


FIG. 3--PARTS LAYOUT--Top View

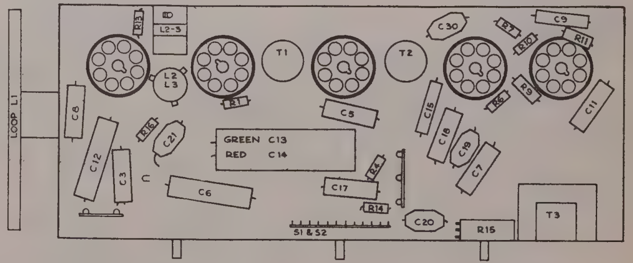
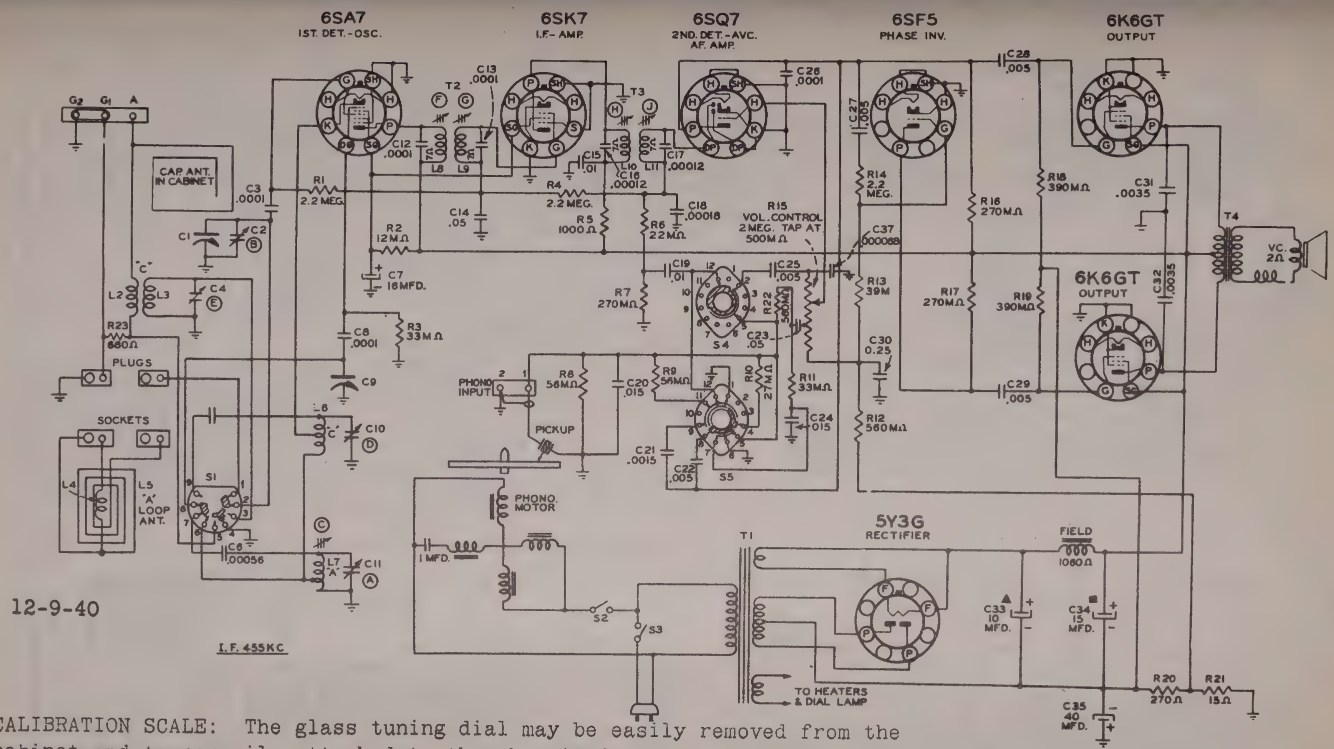


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

MODELS R1186,R1188
Delco



12-9-40

CALIBRATION SCALE: The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment.

CIRCUIT ALIGNMENT: If realignment is found necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

During alignment the chassis may be removed from the cabinet along with the loop antenna. Keep the signal generator and signal generator leads as far from the loop as possible, also keep the output as low as possible to avoid a.v.c. action.

MODELS R1186,R1188
Delco

UNITED MOTORS SERVICE

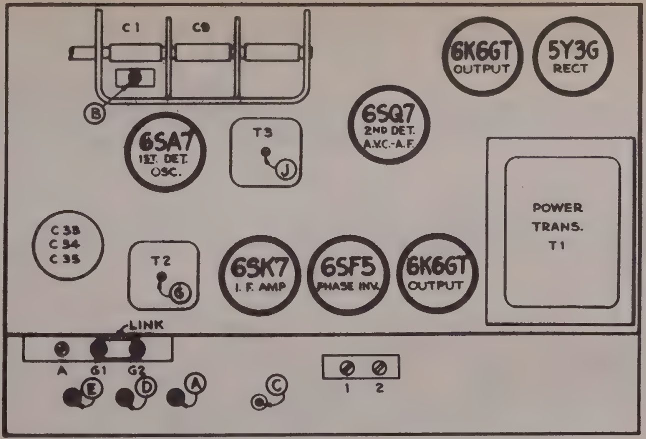
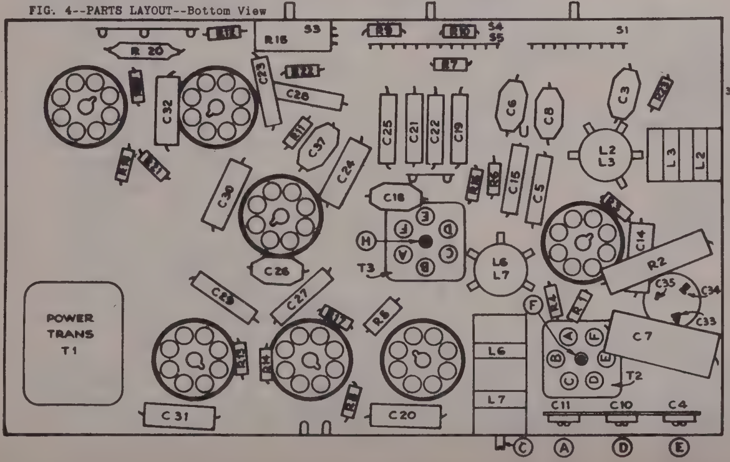


FIG. 3--PARTS LAYOUT--Top View

FIG. 4--PARTS LAYOUT--Bottom View



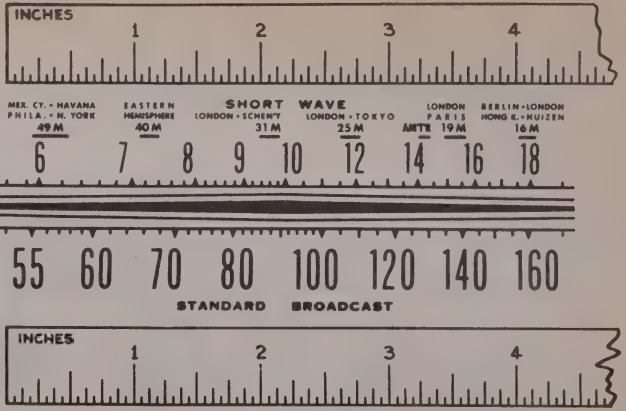
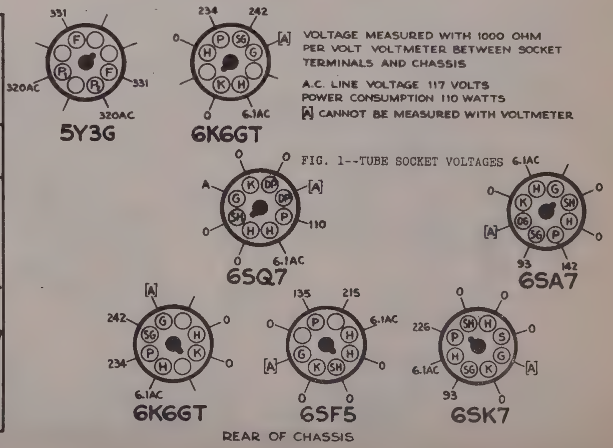


FIG. 5--DIAL CALIBRATION

BOTTOM VIEW OF CHASSIS



VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS

A.C. LINE VOLTAGE 117 VOLTS
POWER CONSUMPTION 110 WATTS
[A] CANNOT BE MEASURED WITH VOLTMETER

FIG. 1--TUBE SOCKET VOLTAGES

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis.
(b) Connect the signal lead of the signal generator to the grid terminal of the 6SK7 tube through a .01 mfd. condenser.
(c) Connect the output meter across the primary of the output transformer.
(d) Set the signal generator to exactly 455 KC.
(e) Tune receiver to quiet point at 1500 KC end of dial, set volume control full on, range switch to broadcast position, and adjust the trimmers on the second I-F transformer (Illus. H. J., Fig. 3 & 4) for maximum output.
(f) Connect the signal lead of the signal generator to the grid of the 6SA7 tube.
(g) Adjust the trimmers, on the first I-F transformer (Illus. F. G., Fig. 3 & 4) for maximum output.

2. Aligning Broadcast Band at 1500 Kilocycles

(a) Connect signal lead of signal generator to antenna "A" terminal on the chassis, link open, through .0002 condenser.
(b) Connect the ground lead of the signal generator to the "G2" terminal of the chassis.
(c) Set signal generator to 1500 KC.
(d) With band switch in broadcast position, tune receiver to the 1500 KC position.
(e) Adjust Broadcast Oscillator Trimmer (Illus. A, Fig. 3 & 4) for maximum output.
(f) Adjust Broadcast Antenna Trimmer (Illus. B, Fig. 3) for maximum output.

3. Aligning Broadcast Band at 600 Kilocycles

(a) Set signal generator to 600 KC.
(b) Tune radio to 600 KC position.
(c) Adjust Broadcast Oscillator Trimmer (Illus. C., Fig. 3 & 4) while rocking gang condenser back and forth through the signal until maximum output is obtained.

4. Repeat operations 2 and 3 for maximum output

5. Aligning Shortwave Band at 15 M.C.

(a) Connect the signal lead of the signal generator to the "A" terminal in series with .00005 mfd. condenser.
(b) Set the signal generator to exactly 15 M.C.
(c) With the band switch in the short wave position, tune the receiver to the 15 M.C. position.
(d) Adjust the short wave oscillator trimmer (Illus. D., Fig. 3 & 4) for maximum output. If two peaks are obtained use high frequency (minimum capacity) peak.
(e) Adjust short wave antenna trimmer (Illus. E., Fig. 3 & 4) while rocking gang condenser back and forth through the signal until maximum output is obtained. If two peaks can be obtained use low frequency (maximum capacity) peak.

MODEL R1186X
Record Changer

UNITED MOTORS SERVICE

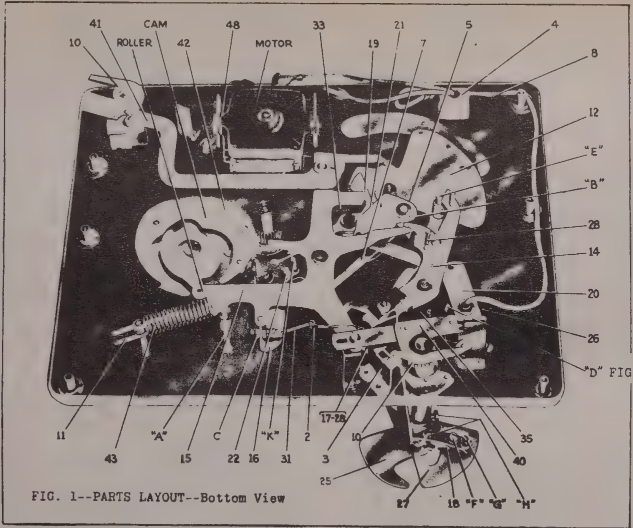


FIG. 1--PARTS LAYOUT--Bottom View

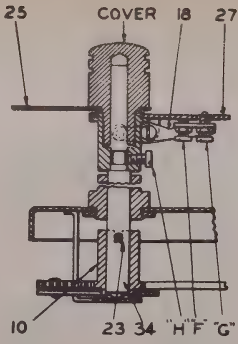


FIG. 2--SEPARATING KNIFE, SUPPORT SHELF AND POST

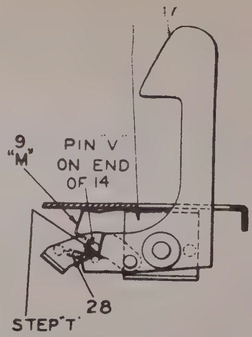


FIG. 3--RECORD DISCRIMINATOR

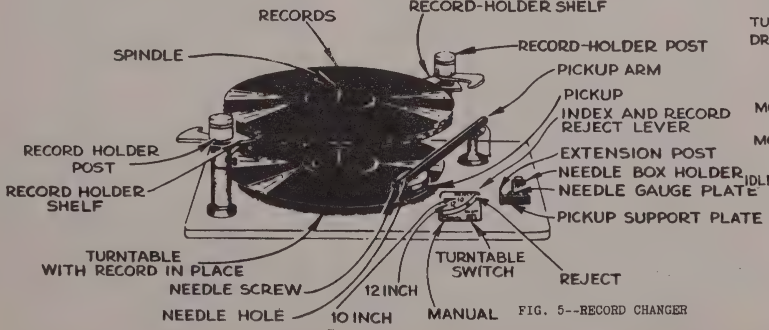


FIG. 5--RECORD CHANGER

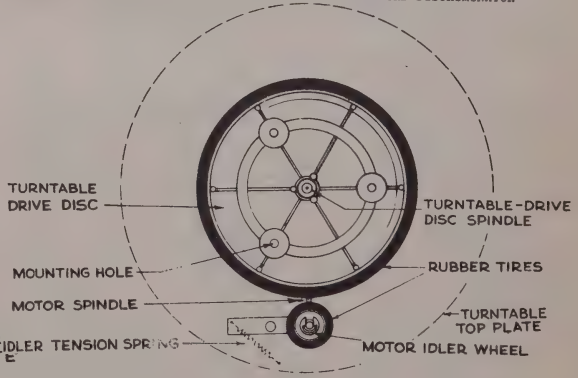


FIG. 4--TURN TABLE DRIVE--Top View

UNITED MOTORS SERVICE

MODEL R1186X
Record Changer

SUBJECT--SERVICE INSTRUCTIONS--DELCO AUTOMATIC RECORD CHANGER

GENERAL: The R-1186X Record Changer is a mechanical device for playing Victrola records in sequence. It has a capacity of seven 12 in. records or eight 10 in. records. If the mechanism is set for 10" records, it will play both 10" and 12" records in mixed sequence, BUT it is strongly recommended that only one size be used at a loading.

The motor employed is self starting sychronous available only in 50 or 60 cycles 110 V. AC.

SERVICE: It is important that the drive motor spindle, and rubber tires on main driving disc and idler pulley be kept clean and free from oil, grease, dirt, or any foreign matter at all times. Any quick-drying naphtha is satisfactory for cleaning these parts. The drive motor bearing is lubricated from an oil well filled and sealed at the factory. It should not require lubrication in the field.

The rubber-tired drive disc is not removable from the spindle. The turntable is fastened to the driving disc by three bolts. If necessary to remove these parts the spindle drive gear set screw should first be removed. The driving disc, turntable and spindle assembly can now be lifted upward from the motorboard. If this is done, great care should be taken not to bend the spindle.

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

When a record has been played the pickup moves out, another record is dropped down, and the needle is fed automatically into the starting groove of this record. If the needle fails to enter the starting groove, raise the right-hand side of the cabinet by inserting thin spacers under the feet on that side. If the needle slides over a few grooves, raise the left-hand side of the cabinet in a similar manner.

The 10" and 12" records must be absolutely flat for smooth operation.

A pickup shorting switch, located under the motorboard, operates when the pickup is moved outward to the pickup rest.

MISCELLANEOUS SERVICE HINTS: Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records--make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch--effect adjustment "E".
4. Failure to trip at end of record--increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable--adjust lift cable per adjustment "C".
6. Needle does not track after landing--friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete--record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction--record is defective; or instrument is not being operated at normal room temperature; oil, grease, dirt, or other foreign matter on motor spindle, main driving disc or idler pulley rubber tire. Clean with any quick drying naphtha.
9. Record knives strike edge of records--records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly--adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. When playing both types of records mixed and needle either lands in 10 inch position on 12 inch record or misses record entirely--increase tension of mixed record discriminating lever spring "M".

ADJUSTMENTS

A. MAIN LEVER--This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. Rotate the turntable until the changer is out-of-cycle; and check rubber bumper bracket (A). The roller should clear the nose of the cam plate by approximately 1-16 inch.

B. FRICTION CLUTCH--The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5". If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B". If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. PICKUP LIFT CABLE SCREW--During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D&E. NEEDLE LANDING ON RECORD--The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that record discriminating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17". The correct point of landing is 4 5/8 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5 5/8 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motorboard, otherwise incorrect landing may occur with 10 inch records.

F&G. RECORD SEPARATING KNIFE--The upper plate (knife) "25" on each of the record posts serves to separate the lower record from stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055--.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F", adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072--.078 inch.

H. RECORD SUPPORT SHELF--The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant.
To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where both separating knives have turned clockwise as far as the mechanism will turn them; lift record upward until it is in contact with both separating knives. Then loosen screws "H" and shift record shelves "27" so that the curved inner edges of the shelves are uniformly spaced approximately 1/16 inch from the record edge. Some backlash will be present in the rotation of these shelves. They should be adjusted so that the backlash permits them to move away from the record but not closer than the approximate 1/16 inch specified above. Tighten the blunt tipped screw "H", run mechanism through cycle several times to check action, then tighten cone tipped screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. TONE ARM REST SUPPORT (NOT SHOWN)--When the changer is out-of cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motorboard. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. TRIP PAWL STOP PIN--The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

LUBRICATION--Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers and pulleys on underside of motorboard.

Do not allow oil or grease to come in contact with rubber bumper or rubber parts of the mechanism.

MOTOR SERVICE DATA

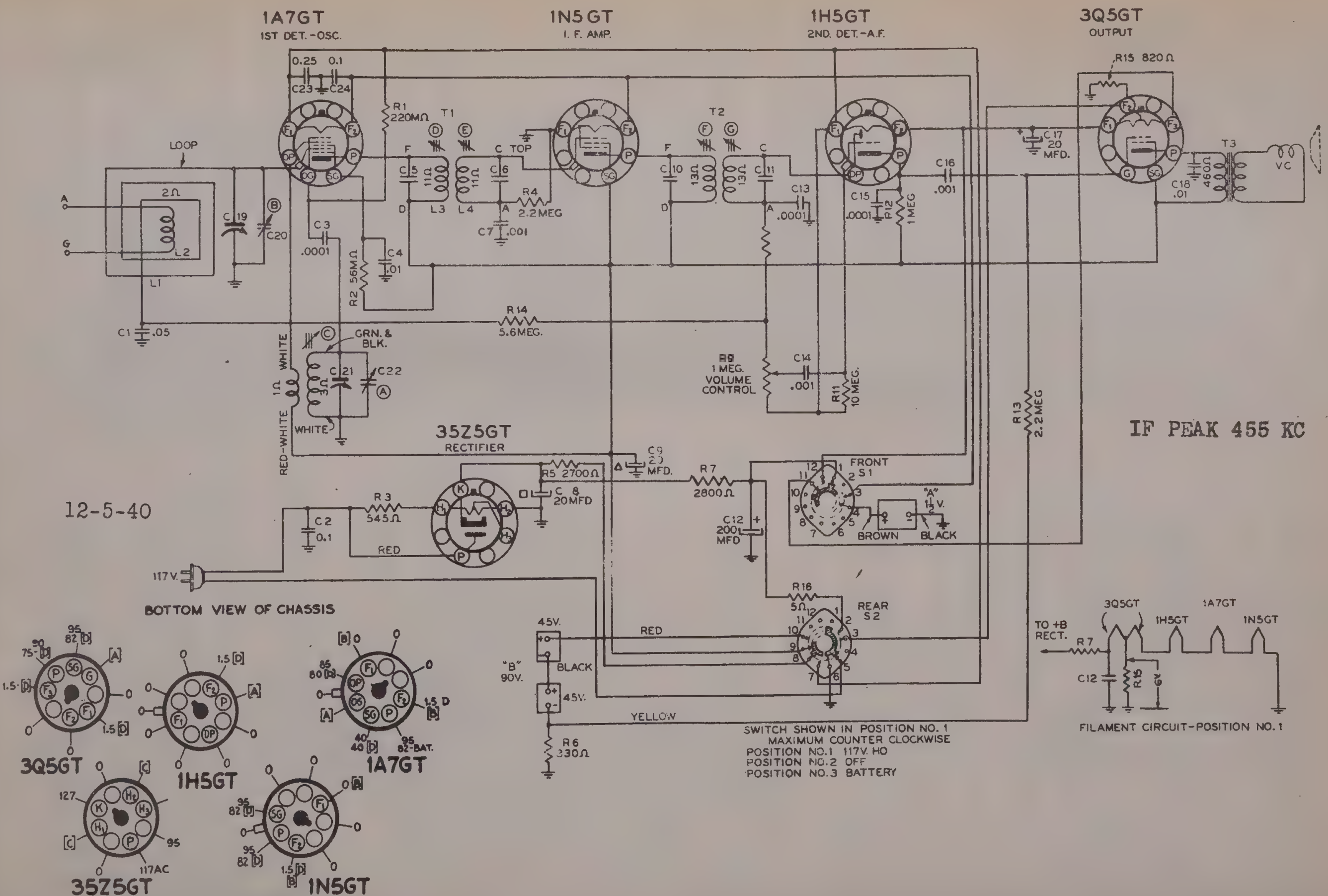
On the drive motor a 0.014 inch feeler gauge is recommended for centering the rotor in the field bore.

The field coils can be disassembled and reassembled if care is used in reassembling the field lamination block in a manner so that the dovetail joint will not be sprung.

When disassembling the rotor or rotor shaft bearing only, the field stacking should be held in a clamp to prevent the field springing when the bolts which hold the assembly together are loosened.

MODEL R1405 Delco

UNITED MOTORS SERVICE



IF PEAK 455 KC

12-5-40

REAR OF CHASSIS

VOLTAGE MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
[A] CANNOT BE READ WITH VOLTMETER
[B] 1.5V.A.C. BETWEEN PINS F_1 & F_2
[C] 35V.A.C. BETWEEN PINS H_1 & H_2
[D] D.C. VOLTAGE WITH RECEIVER IN BATTERY POSITION

FIG 1--TUBE SOCKET VOLTAGES

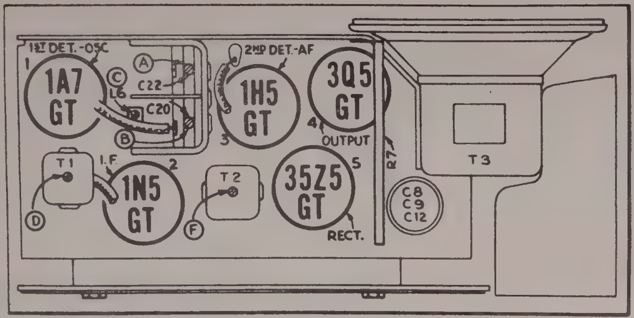


FIG. 3--PARTS LAYOUT--Top View

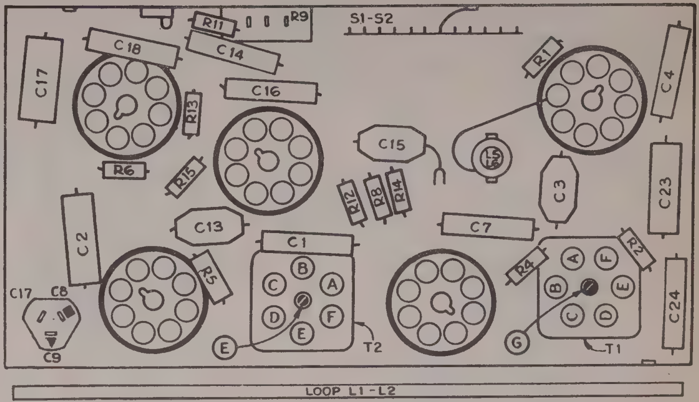


FIG. 4--PARTS LAYOUT--Bottom View

CIRCUIT ALIGNMENT

If realignment is found necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

1. Aligning I-F Stages at 455 Kilocycles
   - (a) Connect the ground lead of the signal generator to the chassis through a .01 mfd. condenser.
   - (b) Connect the signal lead of the signal generator to the grid cap of the 1N5GT tube through a .01 mfd. condenser.
   - (c) Connect the output meter across the primary of the output transformer.
   - (d) Set the signal generator to exactly 455 KC.
   - (e) Tune the receiver to quiet point at 1600 KC end of dial, set Volume Control full on, adjust the trimmers on the second I-F transformer (Illus. F, G, Fig. 3 & 4) for maximum output.
   - (f) Connect the signal lead of the signal generator to the grid cap of the 1A7GT tube.
   - (g) Adjust the trimmers on the first I-F transformer (Illus. D, E, Fig. 3 & 4) for maximum output.
2. Aligning at 1720 Kilocycles.
   - (a) Connect the signal lead of the signal generator to the antenna lead of the loop through a .0001 mfd. condenser.
   - (b) Set signal generator to exactly 1720 KC.
   - (c) Tune receiver to 1720 KC, condenser plates full clockwise (out of mesh).
   - (d) Abjust oscillator trimmer condenser (Illus. A, Fig. 3) for maximum output.
3. Aligning at 1400 Kilocycles
   - (a) Leave the signal lead of the signal generator connected as above.
   - (b) Set the signal generator to 1400 KC.
   - (c) Rotate the tuning control knob until this signal is tuned in with maximum output.
   - (d) Adjust the antenna trimmer (Illus. B, Fig. 3) for maximum output.
4. Aligning at 600 Kilocycles
   - (a) Set signal generator to 600 KC.
   - (b) Rotate the tuning control knob until this signal is tuned in with maximum output.
   - (c) Adjust oscillator trimmer (Illus. C, Fig. 3) while rocking group condenser back and forth through the signal until maximum output is obtained.

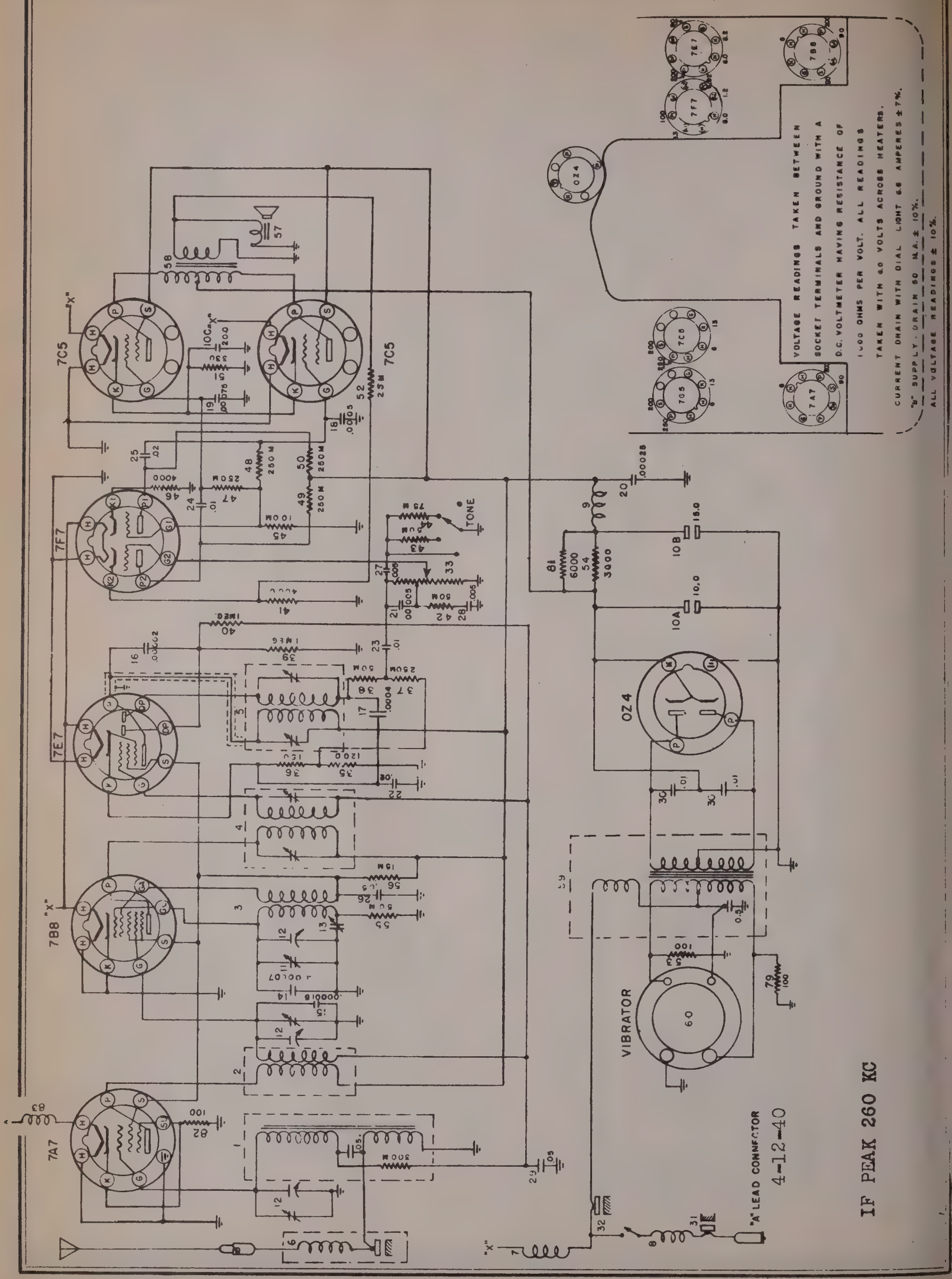
NOTE: Repeat operations 2, 3, and 4.

Current Consumption:

```
"A"  0.25 amperes     )                       105-125 volt 50-60 cycle )
                      ) Battery operation                              ) 35 Watts
"B" 11.5 milliamperes )                       105-125 volt D.C.        )
```

MODEL 983679
Pontiac

UNITED MOTORS SERVICE


VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH A D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS.
CURRENT DRAIN WITH DIAL LIGHT 6.6 AMPERES ±7%.
"B" SUPPLY DRAIN 50 MA. ± 10%.
ALL VOLTAGE READINGS ± 10%.

IF PEAK 260 KC

4-12-40

UNITED MOTORS SERVICE

MODEL 983679
Pontiac

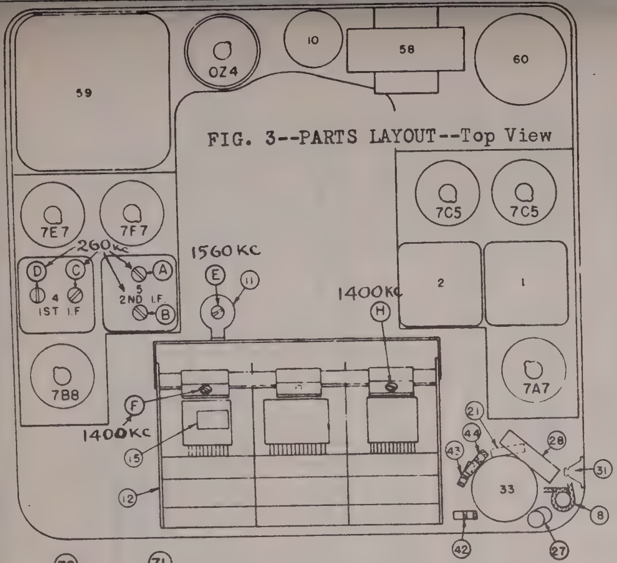


FIG. 3--PARTS LAYOUT--Top View

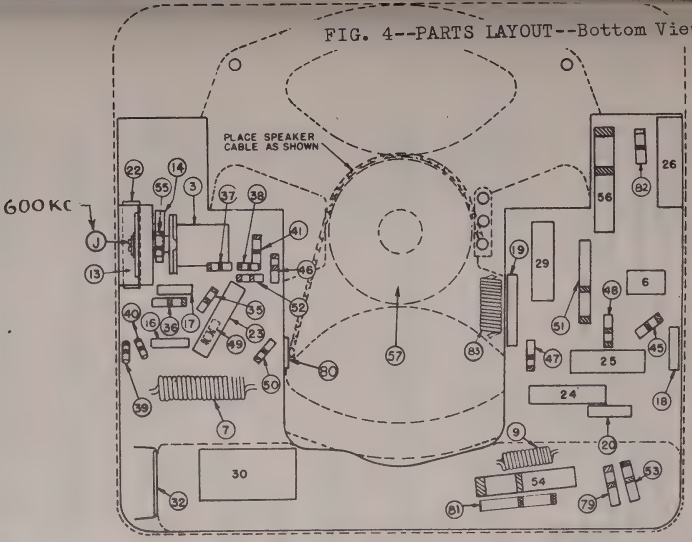


FIG. 4--PARTS LAYOUT--Bottom View

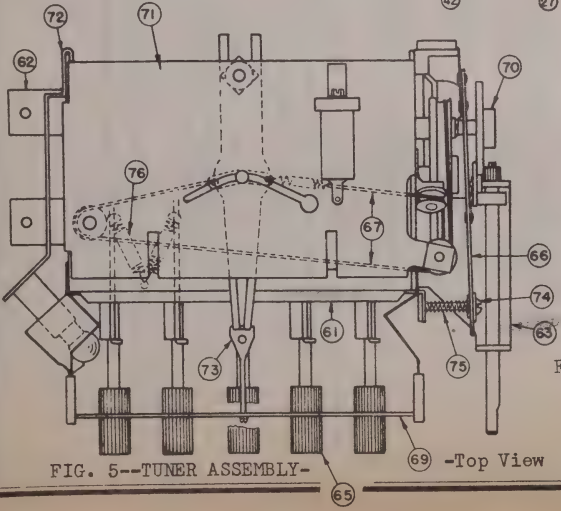


FIG. 5--TUNER ASSEMBLY- -Top View

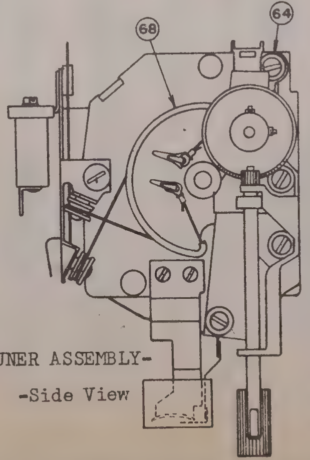


FIG. 6--TUNER ASSEMBLY- -Side View

TUNER:

Mechanical tuning is accomplished by five push buttons which rotate the tuning condenser to pre-selected frequencies.

1.Rotate the button to be set in a counter-clockwise direction until it turns freely.
2.Push the button in as far as it will go and hold it in this position while tuning in the desired station by means of the manual knob.
3.When the station has been carefully tuned in, release the button and turn it in a clockwise direction until it becomes tight. Tighten with the fingers, do NOT use any kind of tool.

Adjusting receiver to car antenna

When the receiver leaves the factory the antenna circuit is closely aligned to match the capacity of the car antenna. However, due to variations in antenna capacity it may be necessary to adjust the antenna trimmer to match the car antenna. This should be done as follows:

(a) Turn set on and tune in a very weak station between 120 and 150 (near 150) on the dial. Adjust the antenna trimmer (F) for maximum volume.

Do not disturb the oscillator or the R.F. trimmers in making this adjustment.

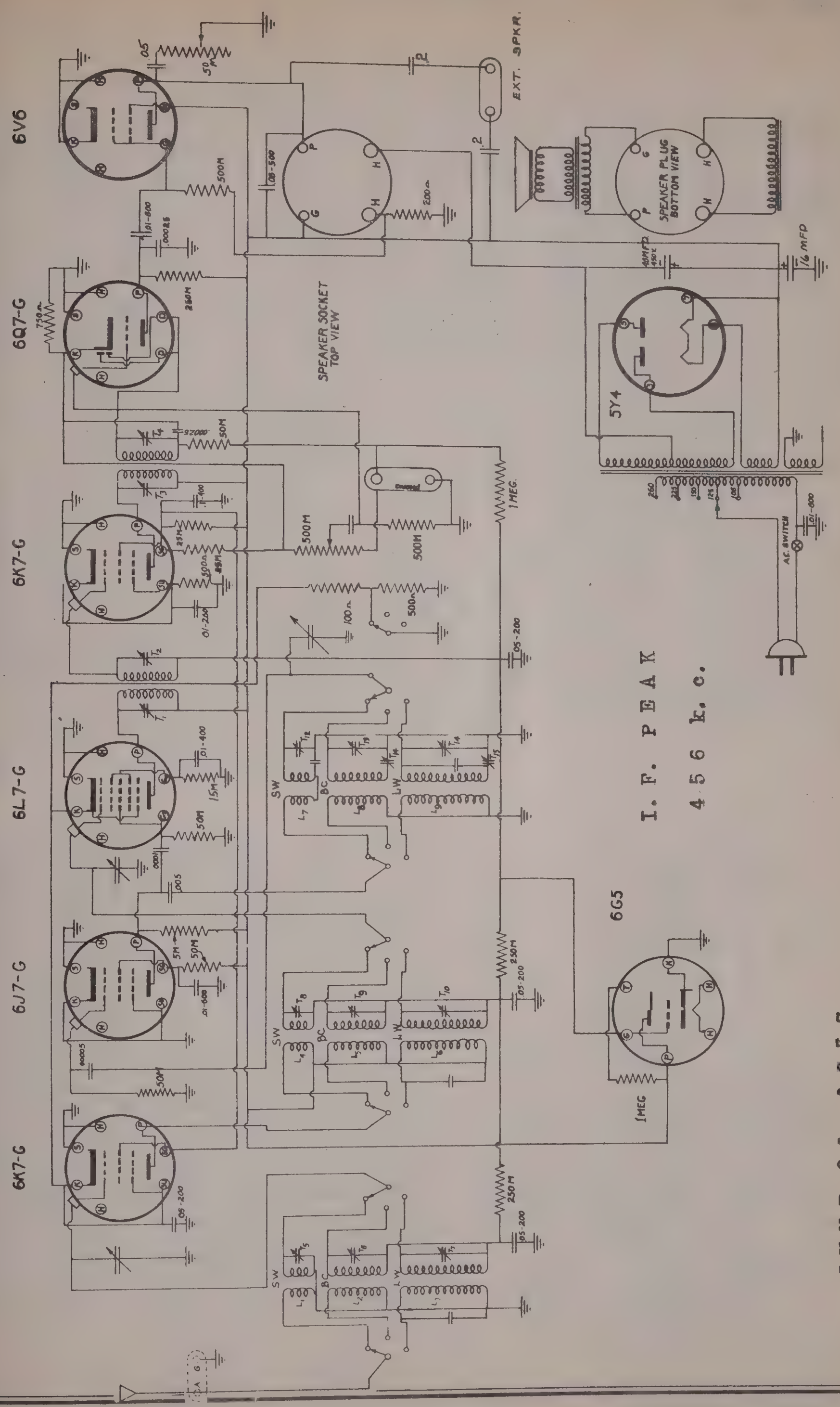
SERVICE HINTS

Dial cord (or pointer) replacement:

1. Unhook the cord eyelets from drive pulley.
2. Move pointer by hand toward the 150 end of the dial until the pointer pivot pin drops through the enlarged end of the pointer guide slot.
3. Lift the pointer and pointer cord out of the tuner from the dial side.
4. File off the lower tip of the pointer guide pin, releasing the retaining washer and the cord pivot arms.
5. With the pointer upside down and pointing away from the operator, put the longer cord pivot arm on the left. Cord side up.
6. Place the short pivot arm (spring assembly) on the right. Cord side up.
7. Replace the retaining washer and solder it to the guide pin.
8. Replace the pointer. Place pivot pin in the enlarged end of the guide slot and then slide the rear end of the pointer into the rear support bearing.
9. Place the long cord behind the pointer and over pulleys (Fig. 5 & 6). Hook the cord eyelet over the drive pulley hook nearest the back of the tuner and push the cord into position around the pulley rim.
10. Put the spring loaded cord over pulley and between the longer string and the tuner frame before hooking the cord eyelet to the drive pulley.

WALGREEN CO.

**MODELS 78RLS
C78RLS**



I. F. PEAK
456 k. c.

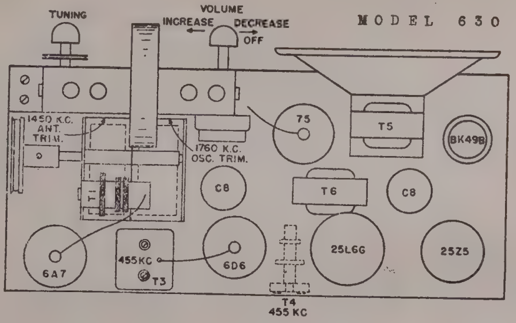
FOR OTHER DATA SEE INDEX

JUNE 21, 1937

WALGREEN CO.

ALIGNMENT FOR MODELS 78RLS C78RLS 99RLS C99RLS

LOCATION OF PARTS ON TOP OF CHASSIS



MODEL 630

Follow the procedure outlined below, in order to adjust the push-buttons properly:

1. By means of the Station Selector Knob tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position. PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.
in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Follow through with this same procedure, setting up the other 3 stations

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your **four** selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

Intermediate Alignment

Attach the output meter to the receiver. Set the signal generator to 456 KC and attach the output of the generator to the control grid cap of the 6K7G I.F. amplifier tube. Adjust the trimmers on the 2nd I.F. transformer for max. gain. Keep the volume control of the receiver at max. and the attenuator of the signal generator as low as possible.

Transfer the output connection of the signal generator from the 6K7G I.F. tube to the control grid of the 6L7 tube and adjust the trimmers on the 1st I.F. transformer. Now go back over the adjustments of both I.F. transformers.

Tuning Circuit Alignment

Long Wave---Set signal generator at 160KC. Attach output of generator to ant. of receiver using a 250 MMFD dummy. Throw band switch to the extreme left, counter clockwise, to band 3. Make sure dial pointer is set properly and then tune dial to approx. 160KC. Adjust long wave paddor for max. gain while "rocking" the gang back and forth with each adjustment. The long wave paddor is nearest the front edge of chassis.

Set signal generator to 350KC, tune dial to 350 KC and adjust osc. trimmer. Adjust ant. and R.F. stage trimmors for max. output.

Broadcast Band.-- Set signal generator to 600 KC, adjust band switch to broadcast position. Tune dial to 600 KC and adjust the other padder condenser for max. gain while "rocking" the gang back and forth with each adjustment.

Set signal generator to 1500 KC and tune dial to 1500 KC. Adjust osc. trimmer to bring in signal and adjust ant. and R.F. trimmers for max. gain.

Short Wave Band.--Change dummy ant. to 400 ohm resistor. Set signal generator to 15 M.C. Turn band switch to short wave band and tune dial to 15 M.C. Adjust osc. trimmer to bring in signal and adjust ant. and R.F. trimmers for max. gain.

Make the usual tests for image. Take care not to peak set on image when adjusting the short wave band.

The positions of the various trimmers are as follows:

On the trimmer strip nearest the front edge of the chassis are the three antenna trimmers. The one nearest the band switch is band 2 trimmer, the next trimmer is for band 1 and the trimmer out towards the side of chassis on this same strip is for band 3.

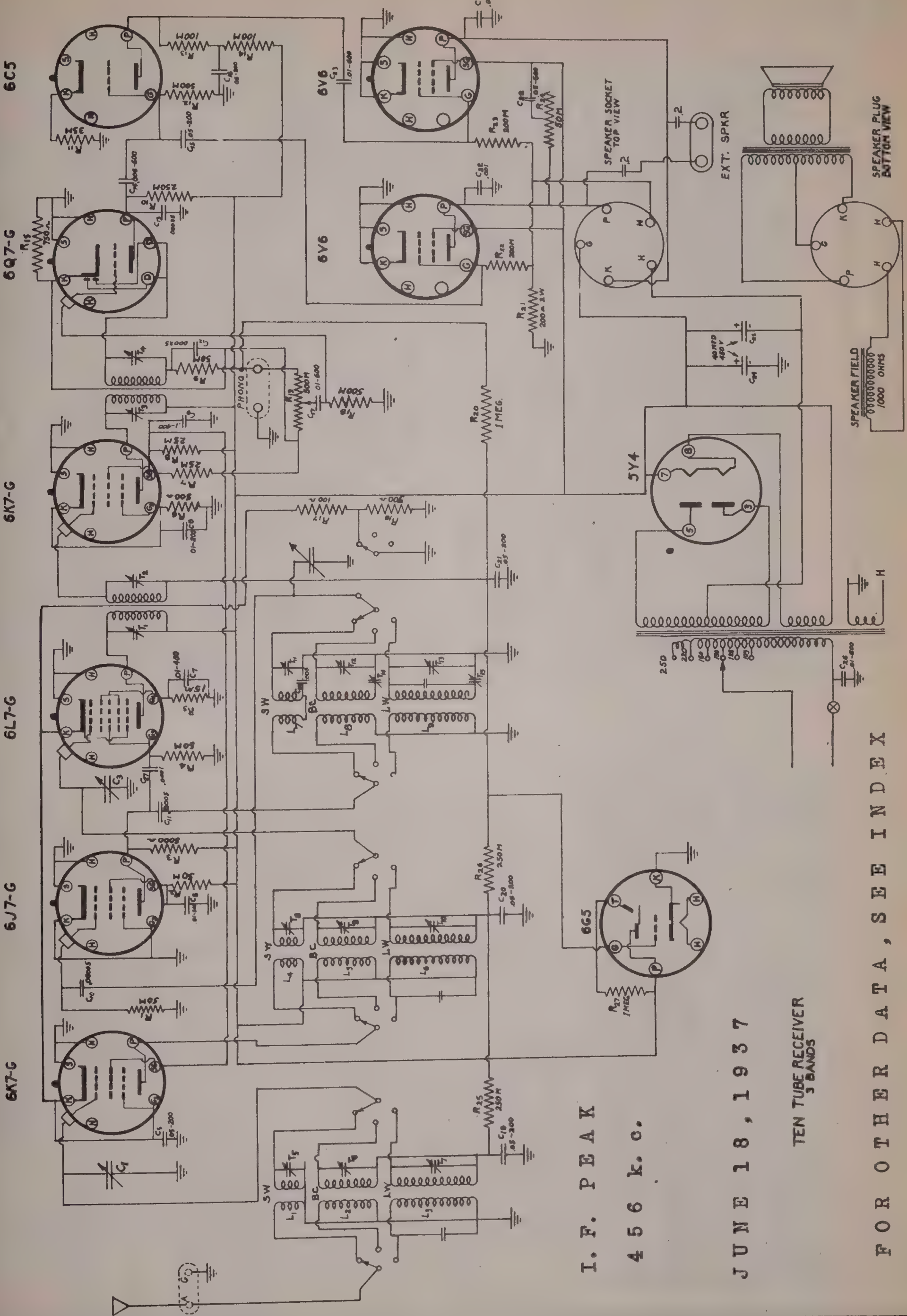
The center trimmer strip of 3 trimmers is for osc. adjustments.

The trimmer strip of 3 trimmers just back of the band switch is for R.F. interstage adjustments.

The trimmers for each band are in the same respective positions on all three trimmer strips.

WALGREEN CO.

MODELS 99RLS, C99RLS



I. F. PEAK

456 k. c.

JUNE 18, 1937

TEN TUBE RECEIVER
3 BANDS

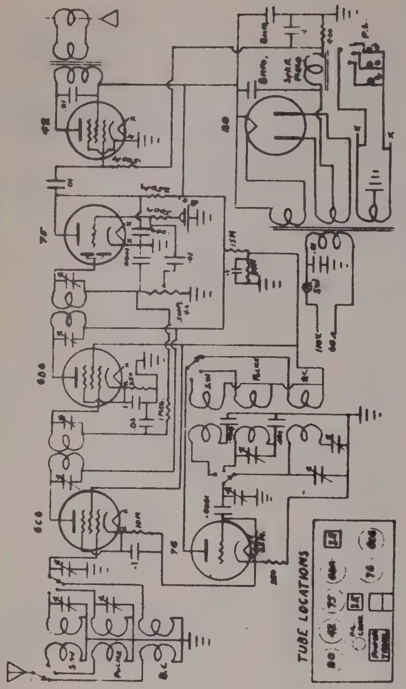
FOR OTHER DATA, SEE INDEX

MODEL 300CL
MODEL 300P
MODEL 204R
MODEL 253CL

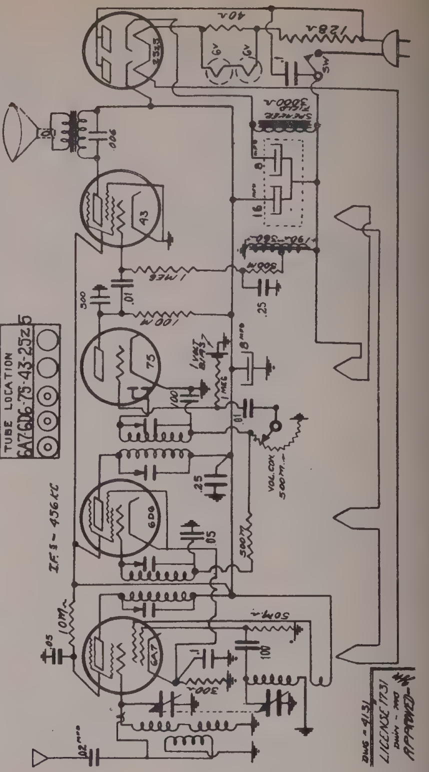
WALGREEN CO.

MODEL 300CL

6 TUBE 3 BAND A.C. SUPERHETERODYNE

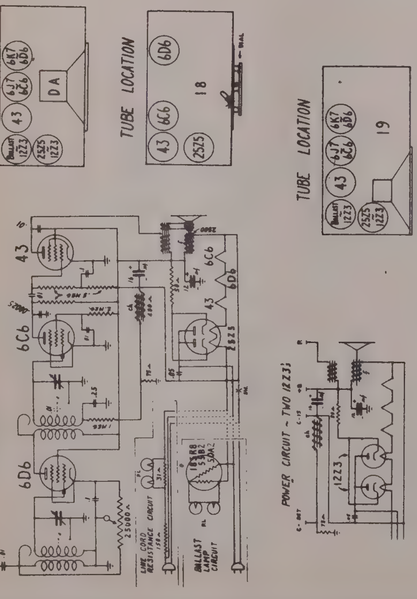


MODEL 300P (Late)

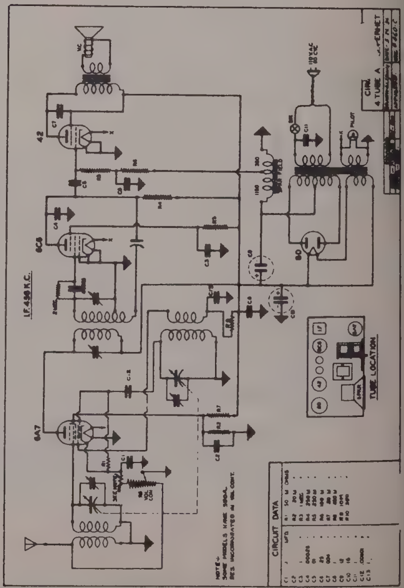


MODEL 253CL

4+5 TUBE A.C.-D.C. TRF

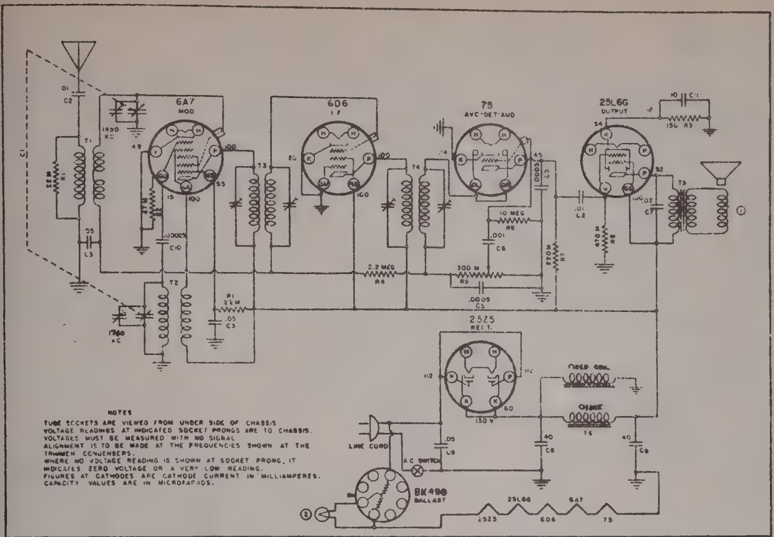


MODEL 204R



WALGREEN CO.

MODELS 604,606,653
MODEL 630



NOTES

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION MODEL 630
R1	60-185	22 M OHM RESISTOR	C1	19-132	VARIABLE CONDENSER	T1	10-239	ANTENNA TRANSFORMER
R2	60-177	47 M OHM RESISTOR	C2	16-121	.01 MFD 200 V CONDENSER	T2	10-240	OSCILLATOR "
R3	60-184	150 OHM " ±10%	C3	1822	.05 MFD " "	T3	10-241	1ST IF TRANSFORMER
R4	60-179	2.2 MEGOHM RESISTOR				T4	10-242	2ND IF "
R5	24-124	500 M OHM VOLUME CONTROL	C5	15-112	.0005 MF MICA CONDENSER	T5		OUTPUT "
R6	60-193	10 MEGOHM RESISTOR	C6	16-124	.001 MF 400 V CONDENSER			
R7	60-180	220 M OHM "	C7	1605	.02 MF " "	1	79-235	SPEAKER
R8	60-178	470 M OHM "	C8	16-232	40 MFD 150 WV ELECTROLYTIC	2	8901	PILOT LIGHT #40
			C9	1807	.05 MF 400 V CONDENSER			
			C10	1504	.00025 MF MICA CONDENSER	T6	33-214	CHOKE
			C11	16-235	5. MFD. 25 V CONDENSER			

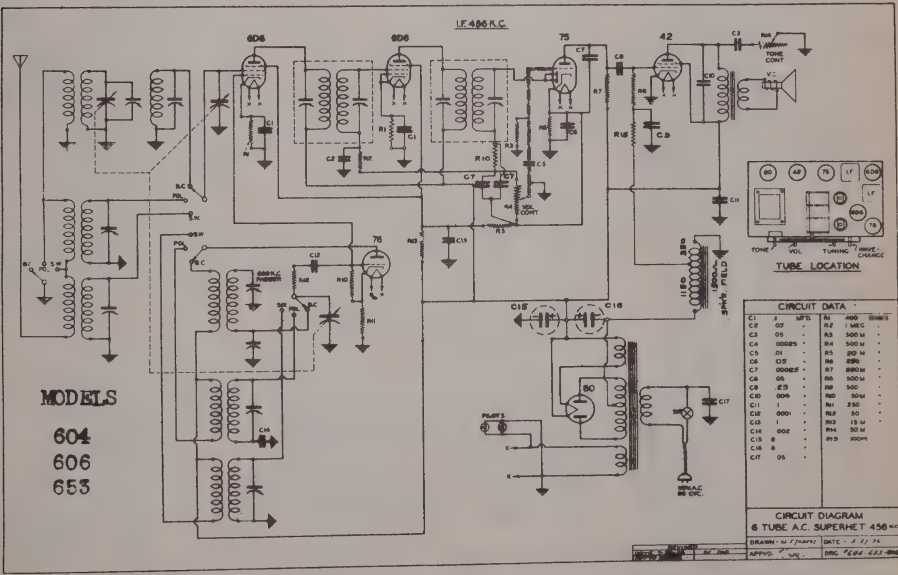
AETNA MODEL 630

I. F. PEAK 455 K.C.

FOR OTHER DATA SEE INDEX

This receiver is made to cover from 1750 KC. to 535 KC., which covers the standard broadcast band and the first police band.

The receiver will operate on either alternating or direct current, from a power supply of 105 to 125 volts. Do not connect it to any other source.



MODELS
604
606
653

CIRCUIT DATA

C1	.1	MFD.	R1	400	
C2	.05	"	R2	1 MEG	"
C3	.05	"	R3	500 M	"
C4	.00025	"	R4	500 M	"
C5	.01	"	R5	20 M	"
C6	.05	"	R6	250	"
C7	.00025	"	R7	800 M	"
C8	.05	"	R8	500 M	"
C9	.25	"	R9	500	"
C10	.004	"	R10	50 M	"
C11	1	"	R11	250	"
C12	.0001	"	R12	50	"
C13	1	"	R13	15 M	"
C14	.002	"	R14	50 M	
C15	8	"	R15	100 M	
C16	8	"			
C17	.05	"			

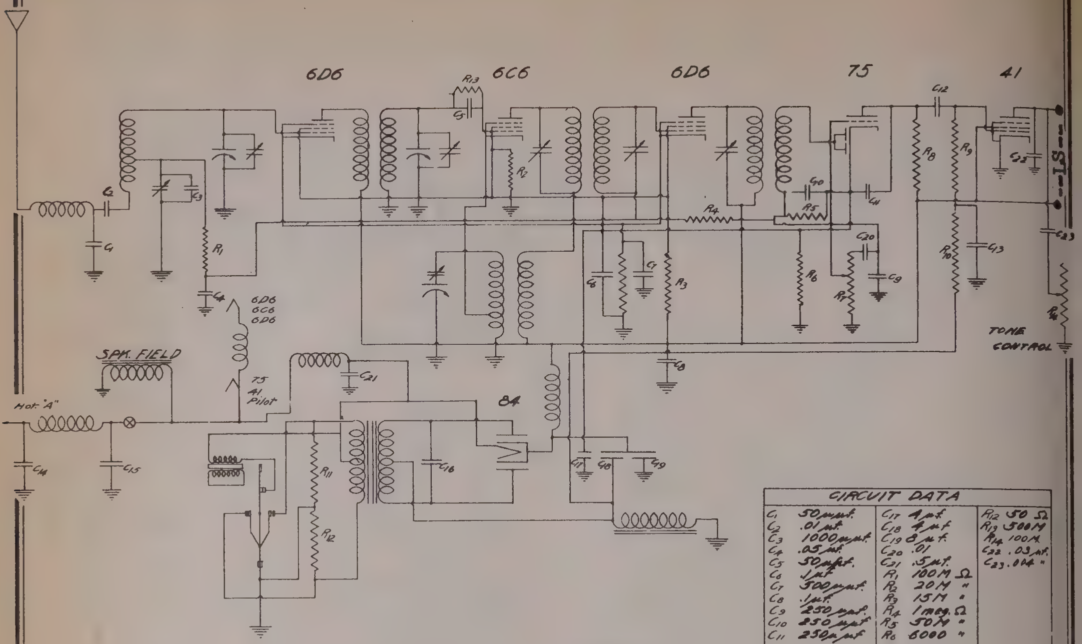
CIRCUIT DIAGRAM
6 TUBE A.C. SUPERHET 456 KC

DRAWN - W. J. Jeffery   DATE - 5 27 36
APPVD. [illegible]   DRG #604-653-[illegible]

©John F. Rider, Publisher

MODEL 660 (early)

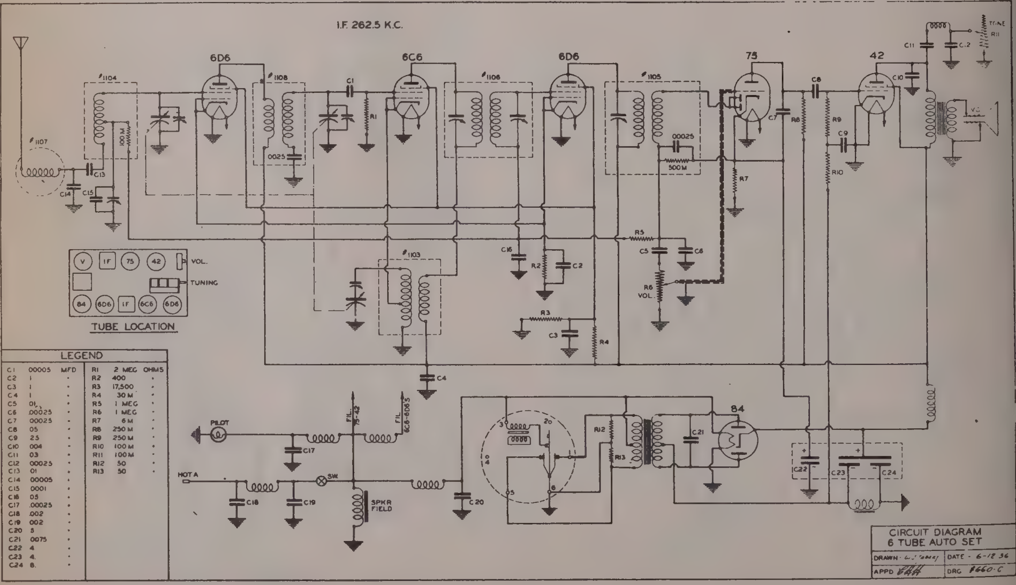
WALGREEN CO.



CIRCUIT DATA		
C_1 50μμf.	C_{17} 4μf.	R_{12} 50 Ω
C_2 .01μf.	C_{18} 4μf	R_{13} 500M
C_3 1000μμf.	C_{19} 8μf.	R_{14} 100M
C_4 .05μf.	C_{20} .01	C_{22} .03μf.
C_5 50μμf.	C_{21} .5μf.	C_{23} .004 "
C_6 .1μf.	R_1 100M Ω	
C_7 500μμf.	R_2 20M "	
C_8 .1μf.	R_3 15M "	
C_9 250μμf.	R_4 1meg. Ω	
C_{10} 250μμf.	R_5 50M "	
C_{11} 250μμf	R_6 6000 "	
C_{12} .01	R_7 500M	
C_{13} 25μμf.	R_8 250M "	
C_{14} .002μf.	R_9 200M "	
C_{15} .002μf.	R_{10} 100M "	
C_{16} .0075μf.	R_{11} 50 "	

6 TUBE AUTO RADIO
MODEL 660

BOTH ARE
EARLY TYPES
OF MODEL 660



LEGEND

C1	00005	MFD	R1	2 MEG	OHMS
C2	1	·	R2	400	·
C3	1	·	R3	17,500	·
C4	1	·	R4	30 M	·
C5	01	·	R5	1 MEG	·
C6	.00025	·	R6	1 MEG	·
C7	00025	·	R7	6 M	·
C8	05	·	R8	250 M	·
C9	25	·	R9	250 M	·
C10	004	·	R10	100 M	·
C11	03	·	R11	100 M	·
C12	00025	·	R12	50	·
C13	01	·	R13	50	·
C14	00005	·			
C15	0001	·			
C16	05	·			
C17	.00025	·			
C18	.002	·			
C19	002	·			
C20	5	·			
C21	0075	·			
C22	4.	·			
C23	4.	·			
C24	8.	·			

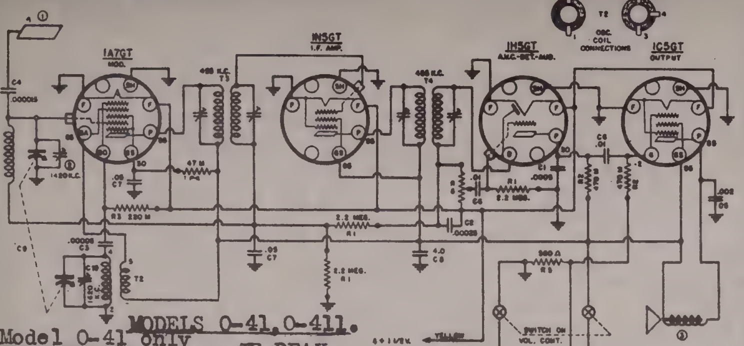
CIRCUIT DIAGRAM
6 TUBE AUTO SET

DRAWN · [illegible]	DATE - 6-12 36
APPD	DRG #660-C

MODELS 0-41, 0-411
MODELS 0-420 to 0-439
MODEL 0-46
MODEL 0-46
MODEL 0-42

WARWICK MFG. CORP.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY READINGS ARE IN MICROFARADS.

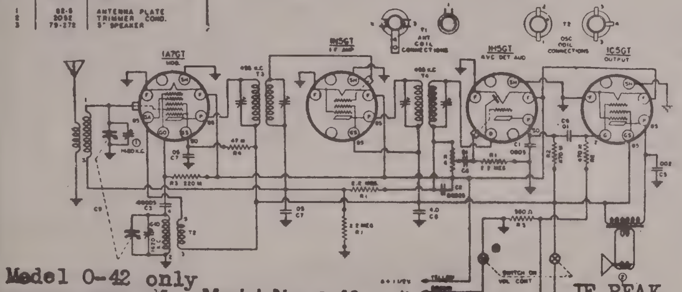


MODELS 0-41, 0-411.

IF PEAK
455 KC

Model 0-41 only

CODE	PART NO.	DESCRIPTION 0-41
T1	10-302	ANTENNA COIL
T2	10-294	OSCILLATOR COIL
T3	10-293	1 ST. I.F. TRANSFORMER
T4	10-295	2 ND. " "
1	82-8	ANTENNA PLATE
2	2082	TRIMMER COND.
3	79-272	5" SPEAKER



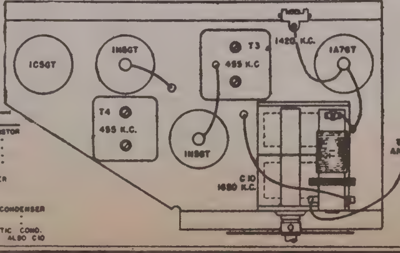
Model 0-42 only

CODE	PART NO	DESCRIPTION 0-41
T1	10-343	ANTENNA COIL
T2	10-294	OSCILLATOR COIL
T3	10-293	1 ST I.F. TRANSFORMER
T4	10-295	2 ND "
1	2082	TRIMMER COND
2	79-280	5" SPEAKER

Model No. 0-42

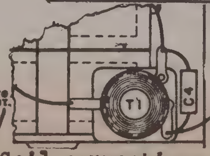
IF PEAK
455 KC

0-420 TO 0-429, INCLUSIVE

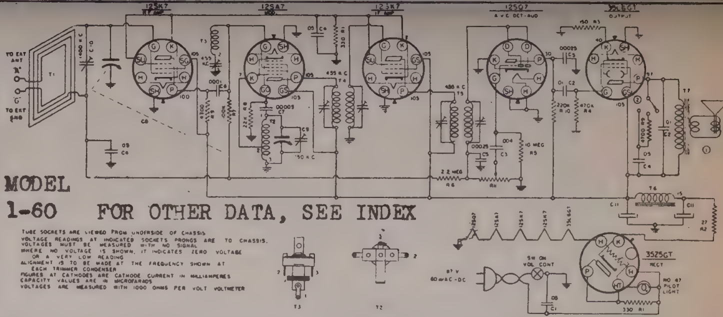


PARTS
Models 0-41, 0-42

CODE	PART NO.	DESCRIPTION
R1	60-179	2.2 MEGOHM 1/3 WATT RESISTOR
R2	60-178	470 M OHM " " "
R3	60-180	220 M " " " "
R4	60-177	47 M " " " "
R5	60-201	560 " " " "
R6	24-138	1 MEGOHM VOLUME CONTROL
C1	15-112	.0005 MFD. MICA CONDENSER
C2	1504	.00025 " " "
C3	1503	.00005 " " "
C4	15-117	.000015 " " "
C5	1609	.002 MFD. 400 V. TUBULAR CONDENSER
C6	16-121	.01 " 200 V " "
C7	1622	.05 " " " "
C8	18-250	4.0 " 150 W.V. ELECTROLYTIC COND.
C9	19-151	2 GANG VARIABLE CONDENSER ALSO C10



Coil connections
0-41 and 0-411.



MODEL 1-60 FOR OTHER DATA, SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKETS PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO	DESCRIPTION
R 1	60-262	330 OHM 1/4 WATT RESISTOR
R 2	60-220	27 " " " "
R 3	60-184	150 " " " "
R 4	60-178	470K " " " "
R 5	60-193	10 MEG " " " "
R 6	60-179	2.2 MEG " " " "
R 7	60-186	100 K " " " "
R 8	60-185	22 K " " " "
R 9	60-489	4700 " " "
R 10	60-180	220 K " " " "
R 11	24-153	500K " VOLUME CONTROL (WITH SWITCH)

CODE	PART NO	DESCRIPTION
C 1	1607	05 MFD 400 V TUBULAR CONDENSER
C 2	16-119	01 " 400 V " "
C 3	16-123	004 " 400 V " "
C 4	1622	05 " 200 V " "
C 5	1504	00025 MFD MICA "
C 6	1501	0 001
C 7	15-120	00005
C 8	95-14	2 GANG VARIABLE CONDENSER & TUNER (ALSO C9)
C 10	20-129	TRIMMER (ON LOOP)
C 11	18-266	30 & 30 MFD ELECTROLYTIC

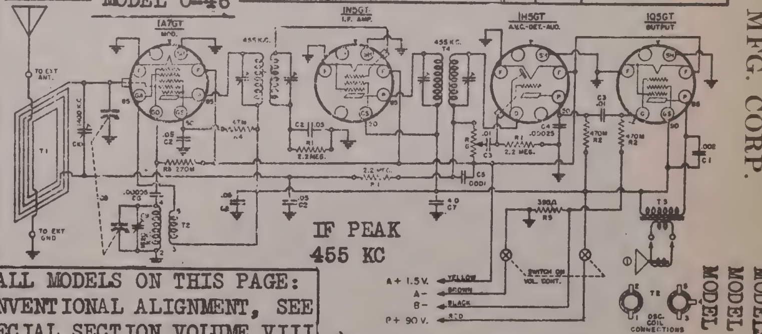
CODE	PART NO	1-60
T 1	82-21	LOOP ANTENNA
T 2	10-372	OSC COIL
T 3	10-373	WAVE TRAP
T 4	10-369	1 ST I F TRANS
T 5	10-370	2 ND I F TRANS
T 6	33-222	FILTER CHOKE
T 7	———	OUTPUT TRANS (ON SPEAKER)
1	79-300	SPEAKER
2	69-152	TONE CONTROL

CODE	PART NO	DESCRIPTION
R1	60-179	2.2 MEGOHM 1/4 W. RESISTOR
R2	60-178	470 M OHM " "
R3	60-180	270 M " " "
R4	60-177	47 M " " "
R5	60-221	390 " " "
R6	24-151	1 MEGOHM VOLUME CONT. (WITH SW.)

CODE	PART NO.	DESCRIPTION
C 1	16-138	.002 MFD. 400 V. TUBULAR COND.
C 2	1622	.05 " 200 V. " "
C 3	16-121	.01 " " " "
C 4	1504	.00025 MFD. MICA CONDENSER
C 5	1501	.0001 " " "
C 6	1503	.00005 " " "
C 7	18-250	4 MFD. 150 W. V. ELECTROLYTIC
C 8	19-168	2 GANG VARIABLE COND. ALSO C9
C 10	20-129	TRIMMER (ON LOOP)

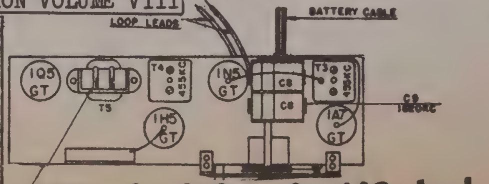
CODE	PART NO	DESCRIPTION 0-46
T 1	82-10	LOOP ANTENNA
T 2	10-356	OSCILLATOR COIL
T 3	10-355	1 ST. I.F. TRANSFORMER
T 4	10-343	2 ND. " "
T 5	80-200	OUTPUT TRANSFORMER
1	79-301	4" P.M. SPEAKER

MODEL 0-46



IF PEAK
455 KC

ALL MODELS ON THIS PAGE:
CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOLUME VIII

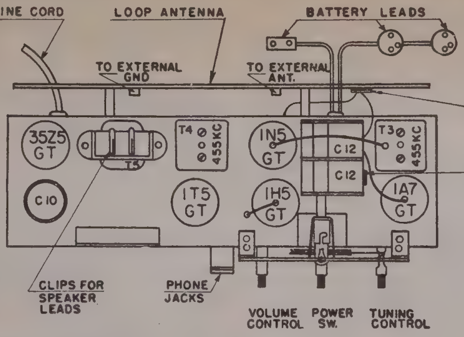


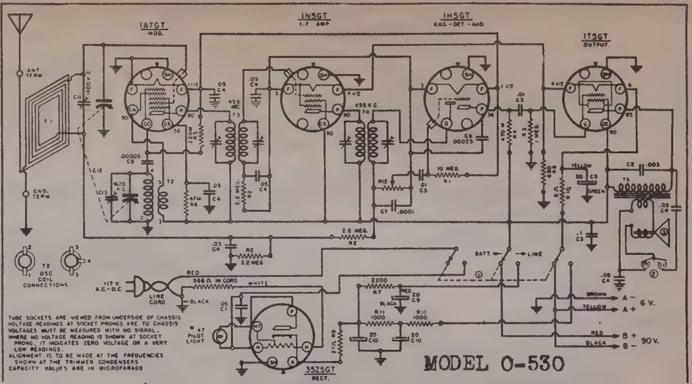
0-460 to 0-469, Incl

MODEL 0-84
MODEL 0-530

WARWICK MFG. CO.

MODEL 0-530





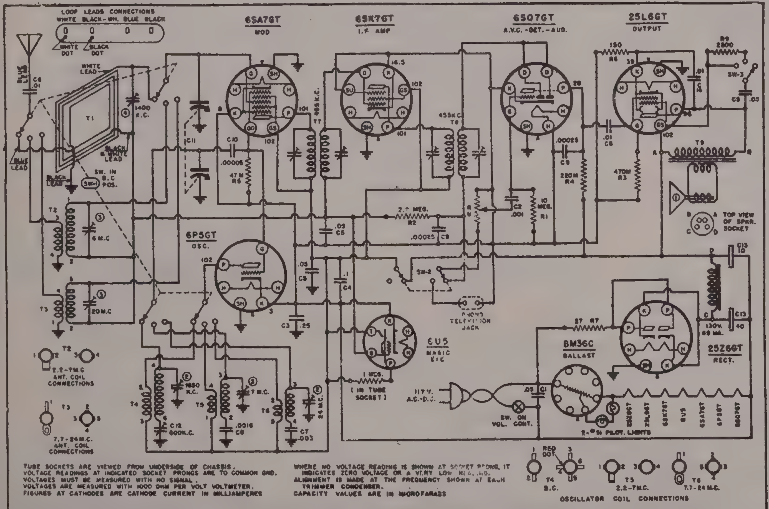
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READINGS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
CAPACITY VALUES ARE IN MICROFARADS

CODE	PART NO.	DESCRIPTION
C 1	1607	[illegible] MFD. 400 V. TUBULAR COND
C 2	16 139	003 " " " "
C 3	16 115	1 " 200 V. " "
C 4	1622	05 " " " "
C 5	16-121	01 " " " "
C 6	1504	.00025 MFD. MICA CONDENSER
C 7	1501	.0001 " " "
C 8	1503	.00005 " " "
C 9	18-263	20 X 20 " 150 W.V. ELECTROLYTIC
C 10	18 262	20 X 20 " 150 W V. "
C 11	20-129	TRIMMER ON LOOP
C 12	19-167	2 GANG VARIABLE COND. ALSO C 13

CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W. RESISTOR
R 2	60 179	2.2 " " "
R 3	60-195	1 " " "
R 4	60-178	470 M OHM " "
R 5	60-180	220 M " " "
R 6	60-177	47 M " " "
R 7	60-383	2200 " " "
R 8	60-379	680 " " "
R-9	60-220	27 " " "
R 10	60-128	8 " 1/2 W. "
R 11	60-644	1000 " 3 W. "
R 12	24-150	1 MEGOHM VOLUME CONTROL

CODE	PART NO.	DESCRIPTION 0-53
T 1	82-17	LOOP ANTENNA
T 2	10-310	OSCILLATOR COIL
T 3	10-355	1 ST. I.F. TRANSFORMER
T 4	10-343	2 ND. "
T 5	80-196	OUTPUT TRANSFORMER
1	69-151	POWER SWITCH
2	12-3	PHONE JACK
3	79-299	5" P.M. SPEAKER

MODEL 0-84



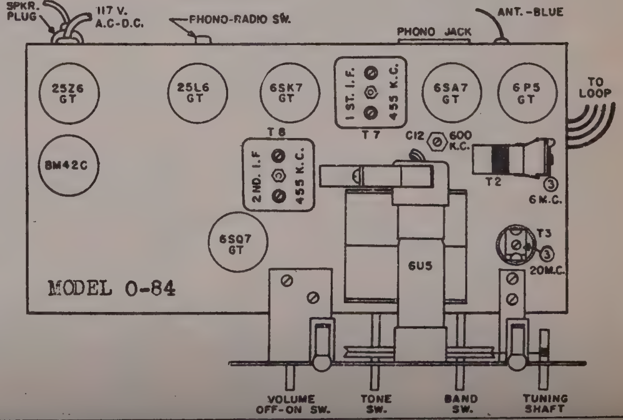
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS

CODE	PART NO.	DESCRIPTION
C 1	1607	05 MFD 400V. TUBULAR CONDENSER
C 2	16-124	.001 "
C 3	16-120	25 200 V
C 4	16-115	1 "
C 5	1622	.05
C 6	16-121	.01 "
C 7	19-118	.003 MFD MICA CONDENSER
C 8	19-119	.0016 " "
C 9	1504	.00025
C 10	1503	.00005 "
C 11	19-156	2 GANG VARIABLE CONDENSER
C 12	80-128	PADDING CONDENSER
C 13	18-255	40 X 10 MFD. 150 W.V. ELECTROLYTIC
C 14	16-119	.01 MFD. 400V. TUBULAR CONDENSER

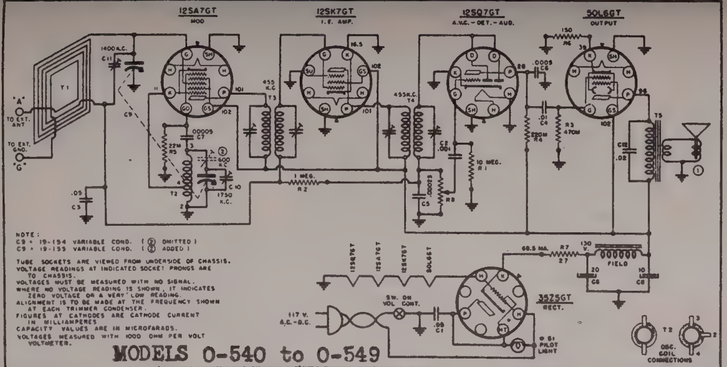
CODE	PART NO.	DESCRIPTION
R 1	60-153	10 MEGOHM 1/4 W. RESISTOR
R 2	60-179	2.2 "
R 3	60-176	470M OHM
R 4	60-180	220M
R 5	60-177	47M "
R 6	60-184	150 "
R 7	60-220	27 " "
R 8	24-144	500M VOLUME CONTROL
R 9	60-253	2200 1/4 W. RESISTOR
SW 1	69-142	BAND SWITCH
SW 2	69-140	PHONO "
SW 3	69-143	TONE

CODE	PART NO.	DESCRIPTION 0-84
T 1	82-13	LOOP ANTENNA
T 2	10-324	ANTENNA COIL (2.2-7 M.C.)
T 3	10-322	ANTENNA COIL (7.7-24 M.C.)
T 4	10-318	OSCILLATOR COIL (B.C.)
T 5	10-327	OSCILLATOR COIL (2.2-7 M.C.)
T 6	10-329	OSCILLATOR COIL (7.7-24 M.C.)
T 7	10-317	1ST. I.F. TRANSFORMER
T 8	10-312	2ND. "
T 9	------	OUTPUT TRANSFORMER (ON SPKR.)
1	79-277	6 1/2" DYNAMIC SPEAKER
2	20-121	TRIMMER BLOCK
3	2026	2 PLATE TRIMMER
4	20-129	TRIMMER (ON LOOP)



MODEL 0-84

WARWICK MFG. CO. MODELS 1-40, 1-400 to 1-409
MODEL 1-41
MODELS 0-540 to 0-549

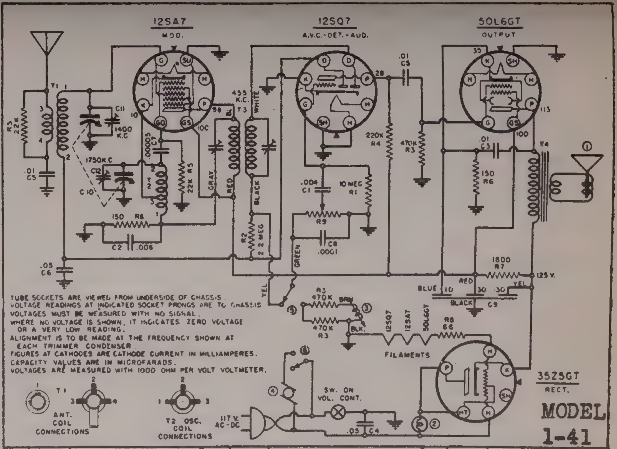


NOTE:
C9 = 19-154 VARIABLE COND. (⑧ OMITTED)
C9 = 19-155 VARIABLE COND. (⑧ ADDED)

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. CAPACITY VALUES ARE IN MICROFARADS. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

MODELS 0-540 to 0-549

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 0-54
R 1	60-193	10 MEGOHM 1/4 W. RESISTOR	C 1	1607	.05 MFD. 400V. TUBULAR COND.	T 1	82-8	LOOP ANTENNA
R 2	60-195	1 - - -	C 2	16-124	.001 - - - -	T 2	10-332	OSCILLATOR COIL
R 3	60-178	470M OHM - -	C 3	1622	.05 - 200V. - -	T 3	10-333	1 ST. I.F. TRANSFORMER
R 4	60-180	220M - - -	C 4	16-121	.01 - - - -	T 4	10-281	2 ND. -
R 5	60-185	22M - - -	C 5	1504	.00025 MFD. MICA CONDENSER	T 5	------	OUTPUT TRANSFORMER (ON SPKR.)
R 6	60-184	150 - - -	C 6	15-113	.0005 - - -			
R 7	60-220	27 - - -	C 7	1503	.00005 - - -			
R 8	24-142	500M - VOLUME CONTROL (WITH SW)	C 8	18-241	20 X 10 - 150 W.V. ELECTROLYTIC	1	79-283	5" DYNAMIC SPEAKER
			C 9	SEE NOTE	2 GANG VARIABLE COND. ALSO C10	2	20-130	PADDING COND. (SEE NOTE)
C 12	16-123	.02 MFD. 200V. TUBULAR COND.	C 11	20-129	TRIMMER (ON LOOP)			



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. CAPACITY VALUES ARE IN MICROFARADS. VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

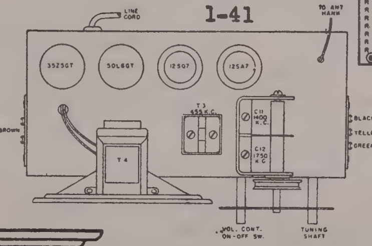
MODEL 1-41

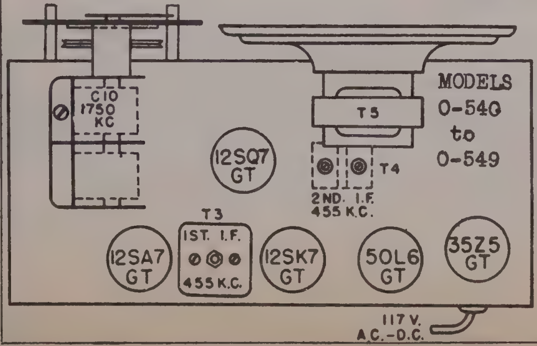
CODE	PART NO.	DESCRIPTION	CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION 1-41
R 1	60-193	10 MEGOHM 1/4 W RESISTOR	C 1	16-125	.004 MFD 400V TUBULAR COND	T 1	10-367	ANTENNA COIL
R 2	60-179	2.2 - - -	C 2	16-148	.006 - - - -	T 2	10-366	OSCILLATOR COIL
R 3	60-178	470K OHM - -	C 3	16-119	.01 - - - -	T 3	10-369	I F. TRANSFORMER
R 4	60-180	220K - - -	C 4	1607	.05 - - - -	T 4	80-205	OUTPUT TRANS (ON SPKR)
R 5	60-185	22K - - -	C 5	16-121	.01 - 200V. - -			
R 6	60-184	150 - - -	C 6	1622	.05 - - - -	①	79-305	5" P M SPEAKER
R 7	60-438	1800 - 1/2 W. -	C 7	1503	.00005 MFD. MICA COND	②	89-4	# 47 PILOT LIGHT
R 8	60-647	66 - 1 1/2 W -	C 8	1501	.0001 - - -	③	83-216	PICKUP
R 9	24-152	1 MEG. - VOL. CONT & SW.	C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.	④	59-4	PHONO MOTOR
⑥	69-153	S.P.S.T. SWITCH	C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12	⑤	69-154	S.P.D.T. SWITCH

ALL MODELS:
THESE RECEIVERS COVER A FREQUENCY RANGE FROM 540 KC TO 1750 KC.

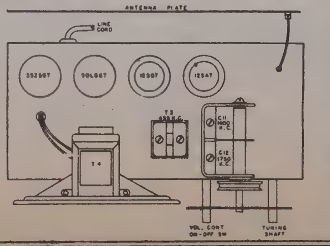
CONVENTIONAL ALIGNMENT

MODEL 1-41

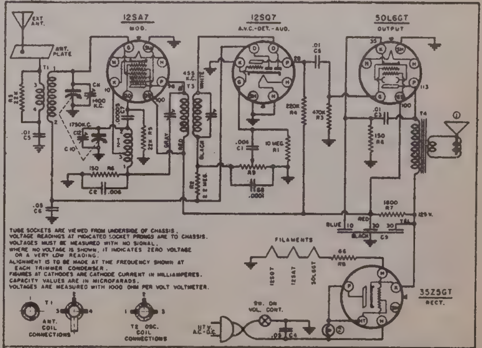




MODELS 1-40, 1-400 to 1-409



MODELS 1-40, 1-400 to 1-409



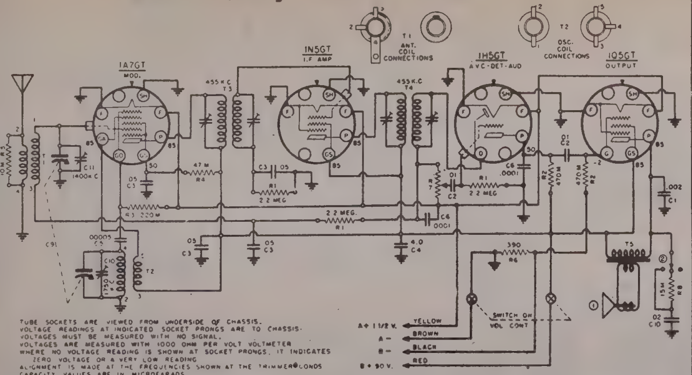
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. CAPACITY VALUES ARE IN MICROFARADS. VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 1-40
R 1	60-193	10 MEGOHM 1/4 W RESISTOR	C 1	16-125	.004 MFD. 400V TUBULAR COND.	T 1	10-367	ANTENNA COIL
R 2	60-179	2.2 - - -	C 2	16-148	.006 - - - -	T 2	10-366	OSCILLATOR COIL
R 3	60-178	470K OHM - -	C 3	16-119	.01 - - - -	T 3	10-368	I F. TRANSFORMER
R 4	60-180	220K - - -	C 4	1607	.05 - - - -	T 4	80-205	OUTPUT TRANS. (ON SPKR)
R 5	60-185	22K - - -	C 5	16-121	.01 - 200V. - -			
R 6	60-184	150 - - -	C 6	1622	.05 - - - -	①	79-305	5" P.M SPEAKER
R 7	60-438	1800 - 1/2 W. -	C 7	1503	.00005 MFD. MICA COND.	②	89-4	# 47 PILOT LIGHT
R 8	60-647	66 - 1 1/2 W. -	C 8	1501	.0001 - - -			
R 9	24-152	500K - VOL. CONT. & SW.	C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.			
			C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12			

MODELS 1-42, 1-420 to 1-429
MODELS 1-50, 1-500 to 1-509
MODEL 1-52

WARWICK MFG. CO.

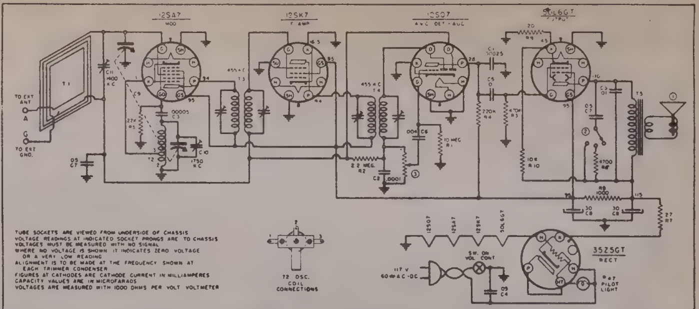
MODELS 1-42, 1-420 to 1-429



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES
ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS
CAPACITY VALUES ARE IN MICROFARADS

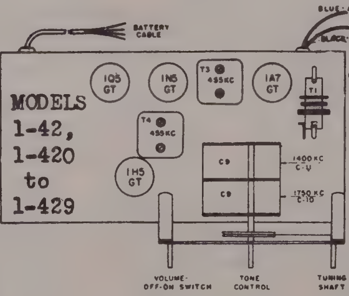
CODE	PART NO	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 1-42
R 1	60 179	2.2 MEGOHM 1/4 W RESISTOR	C 1	16 138	.002 MFD. 400V TUBULAR COND.	T 1	10-344	ANTENNA TRANSFORMER
R 2	60-178	470M OHM	C 2	16 121	.01 - 200V - -	T 2	10-341	OSCILLATOR -
R 3	60-180	220M -	C 3	1622	.05 - - - -	T 3	10-342	1ST I F -
R 4	60 177	47M	C 4	8 250	4.0 - 150 W V ELECTROLYTICS	T 4	10-343	2ND I F -
R 5	60-219	10M - -	C 5	15 120	.0005 MFD. MICA CONDENSER	T 5		OUTPUT TRANS' (ON SPKR)
R 6	60 221	390 - -	C 6	1501	.0001 - - -			
R 7	24 154	1 MEGOHM VOLUME CONTROL	C 9	19 165	2 GANG VAR COND ALSO C10 & C11	1	79-297	5" P M SPEAKER
R 8	60 202	18M OHM 1/4 W RESISTER	C 10	1605	.02 MFD 400V TUBULAR COND	2	69 152	TONE CONTROL SWITCH

MODELS 1-50, 1-500 to 1-509

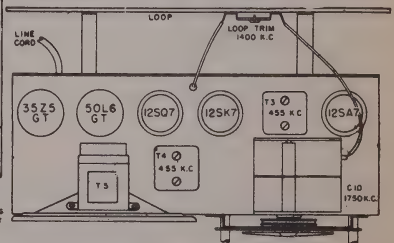


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

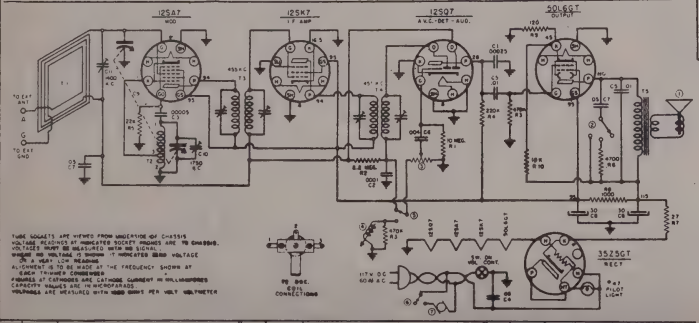
CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO	DESCRIPTION 1-50
R 1	60-193	10 MEGOHM 1/4 WATT RESISTOR	C 1	1504	.00025 MFD MICA CONDENSER	T 1	82-21	LOOP ANTENNA
R 2	60-179	2.2 - - -	C 2	1501	.0001 - - -	T 2	10-371	OSCILLATOR COIL
R 3	60-178	470K OHM - -	C 3	1503	.00005 - -	T 3	10-369	1ST I F TRANSFORMER
R 4	60-180	220K - - -	C 4	1607	.05 MFD. 400 V TUBULAR CONDENSER	T 4	10-370	2ND I F TRANSFORMER
R 5	60-185	22K - - -	C 5	16-119	.01 - - - -	T 5	80-805	OUTPUT TRANSFORMER (ON SPKR)
R 6	60-189	4700 - - -	C 6	16-125	.004 - - - -			
R 7	60-220	27 - - -	C 7	1622	.05 - 200 V. - -	1	79-306	5" P M SPEAKER
R 8	60-198	1000 - 1/2 WATT -	C 8	18-266	30 x 30 MFD. 150 W.V. ELECTROLYTIC	2	69-152	TONE SWITCH
R 9	60-648	120 - - -	C 9	19-171	2 GANG VARIABLE CONDENSER (ALSO C10)	3	24-153	500K OHM VOLUME CONTROL (WITH SW)
R 10	60-547	10R - 1 WATT	C 11	20-129	TRIMMER (ON LOOP)			



MODELS 1-50, 1-500 to 1-509



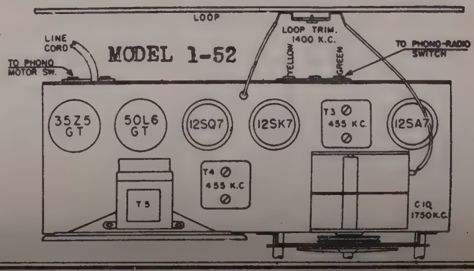
MODEL 1-52



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO	DESCRIPTION 1-52
R 1	60 193	10 MEGOHM 1/4 WATT RESISTOR	C 1	1504	.00025 MFD MICA CONDENSER	T 1	82-23	LOOP ANTENNA
R 2	60-179	2.2 - - -	C 2	1501	.0001 - - -	T 2	10-371	OSCILLATOR COIL
R 3	60-178	470K OHM -	C 3	1503	.00005 - - -	T 3	10-369	1ST I.F. TRANSFORMER
R 4	60 180	220K -	C 4	1607	.05 MFD. 400 V TUBULAR CONDENSER	T 4	10-370	2ND I F TRANSFORMER
R 5	60 85	22K -	C 5	16-119	.01 - - - -	T 5	80 205	OUTPUT TRANSFORMER (ON SPKR)
R 6	60-189	4700	C 6	16-125	.004 - - - -			
R 7	60 220	27 - - -	C 7	1622	.05 - 200 V. - -	1	79-30	5" P M SPEAKER
R 8	60 198	1000 1/2 WATT	C 8	18-266	30 x 30 MFD. 150 W V ELECTROLYTIC	2	69-152	TONE SWITCH
R 9	60-648	120 - -	C 9	19-171	2 GANG VARIABLE CONDENSER (ALSO C10)	3	24-153	500K OHM VOLUME CONTROL (WITH SW)
R 10	60 547	10R - 1 WATT -	C 11	20-129	TRIMMER (ON LOOP)	4	83 216	PICKUP
[illegible]	59 4	PHONO MOTOR	4	69-153	S P S T SWITCH	5	69 154	S P D T SWITCH

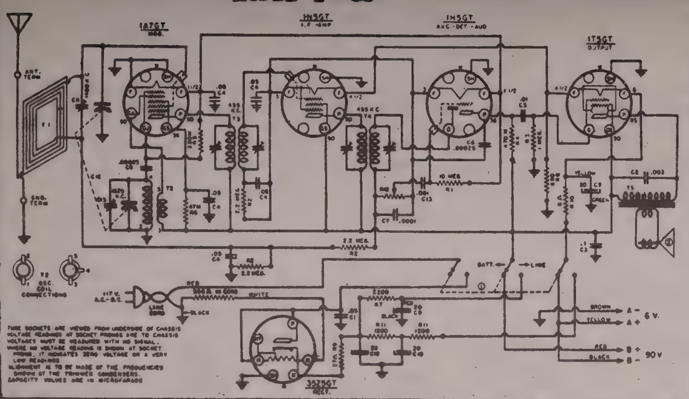
MODEL 1-52



WARWICK MFG. CO.

MODEL 1-53
MODEL 1-60
MODEL 1-61

MODEL 1-53



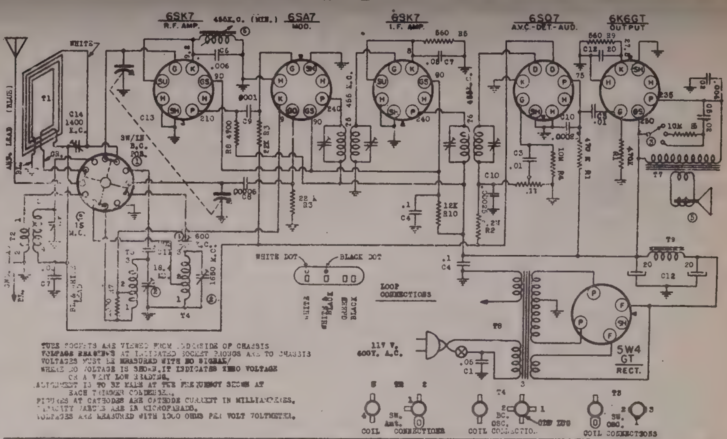
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
CAPACITY VALUES ARE IN MICROFARADS

CODE	PART NO.	DESCRIPTION
C1	1607	.05 MFD 400 V. TUBULAR COND.
C2	16-139	.003 " " " "
C3	16-113	.1 " 200 V " "
C4	1622	.05 " " " "
C5	16-101	.01 " " " "
C6	1504	.00025 MFD.. MICA CONDENSER
C7	1501	.0001 " " "
C8	1503	.00005 " " "
C9	18-263	30 x 20 " 150 W.V ELECTROLYTIC
C10	18-262	70 x 20 " 150 W.V "
C11	20-129	TRIMMER ON LOOP
C12	19-157	2 GANG VARIABLE COND. ALSO C13
C13	[illegible]	.001 MFD. 400 V. TUBULAR COND.

CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 W. RESISTOR
R2	60-179	2.2 " " "
R3	60-185	1 " " "
R4	60-178	470 M OHM " "
R5	60-180	220 M " " "
R6	60-177	47 M " " "
R7	60-303	2200 " " "
R8	60-375	680 " " "
R9	60-720	27 " " "
R10	60-176	8 " 1/2 W. "
R11	60-642	1200 " 3 W. "
R12	24-150	1 MEGOHM VOLUME CONTROL

CODE	PART NO.	DESCRIPTION 1-53
T1	82-25	LOOP ANTENNA
T2	10-310	OSCILLATOR COIL
T3	10-379	1 ST. I.F. TRANSFORMER
T4	10-343	2 ND. " "
T5	-------	OUTPUT TRANSFORMER
1	60-181	POWER SWITCH
2	79-314	5" P.M. SPEAKER

MODEL 1-61



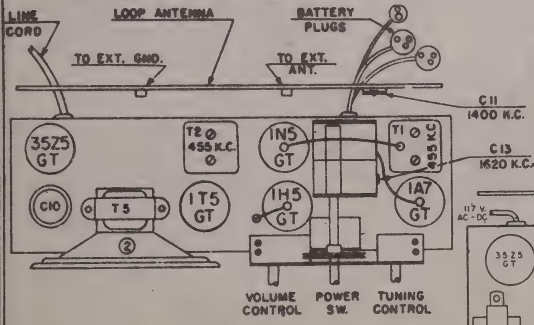
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL/
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE
OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER.

CODE.	PART NO.	DESCRIPTION
R1	60-178	470 K OHM 1/4 WATT RES.
R2	60-179	2.2 MEG OHM 1/4 WATT RES.
R3	60-185	22 K OHM 1/4 WATT RES.
R4	60-193	10 MEG. OHM 1/4 WATT RES.
R5	60-201	560 OHM 1/4 WATT RES.
R6	60-215	10 K OHM 1/4 WATT RES.
R7	60-217	1000 OHM 1/4 WATT RES.
R8	60-282	4700 OHM 1/2 WATT RES.
R9	60-535	560 OHM 1 WATT RES.
R10	60-646	12 K OHM 2 WATT RES.
R11	24-146	VOLUME CONTROL
5	10-374	WAVE TRAP

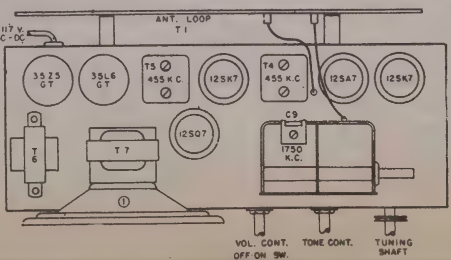
CODE.	PART NO.	DESCRIPTION
C1	1607	.05 MFD. 400 wv. TUB. COND.
C2	16-125	.004 " " " " "
C3	16-119	.01 " " " " "
C4	16-116	.1 " " " " "
C5	1606	.02 " " " " "
C6	16-148	.006 " " " " "
C7	1622	.05 " 200 " " "
C8	1603	.00006 MFD. MICA COND.
C9	1501	.0001 " " "
C10	1504	.00025 " " "
C11	16-118	.003 " " "
C12	18-267	ELEC. 20&20 AT 450 & 20 AT 25
C13	19-160	VARIABLE COND.
C14	20-129	TRIMMER (ON LOOP)

CODE.	PART NO.	DESCRIPTION 1-61
T1	82-19	LOOP ANTENNA
T2	10-357	S.W. ANTENNA COIL
T3	10-320	S.W. OSC. COIL
T4	10-326	B.C. OSC. COIL
T5	10-358	1 st. I.F. TRANS.
T6	10-312	2 nd. I.F. TRANS.
T7	-------	OUTPUT TRANS.
T8	80-195	POWER TRANS.
T9	-------	FIELD COIL
1	69-145	BAND SWITCH
2	20127	TRIMMER BLOCK
3	69-155	TONE CONTROL
4	20-130	PADDING CONDENSER
6	79-300	8" DYNAMIC SPEAKER

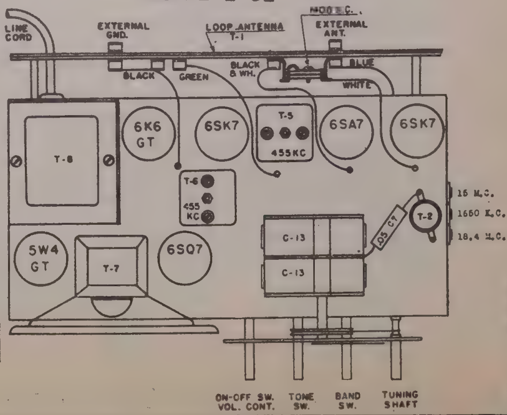
MODEL 1-53



MODEL 1-60

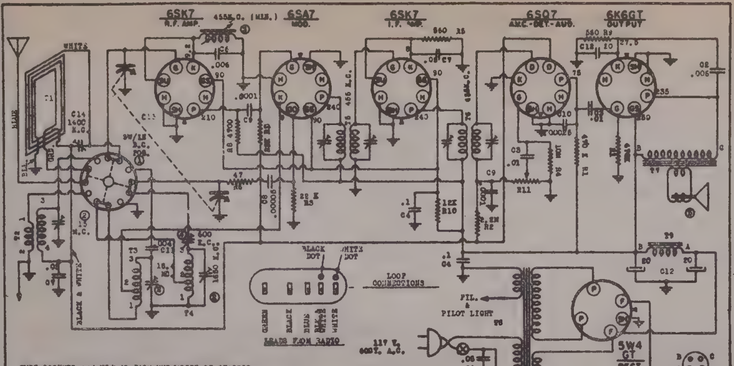


MODEL 1-61



MODELS 1-43, 1-430 to 1-439
MODELS 1-621, 1-622, 9-62, 910
WARWICK MFG. CO.

MODELS 1-621, 1-622, 9-62, 910



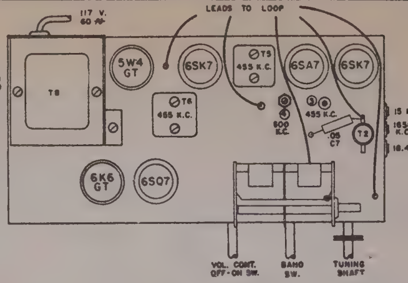
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION
R1	60-178	470 K OHM 1/4 WATT RES.
R2	60-179	2.2 MEG OHM 1/4 WATT RES.
R3	60-186	22 K OHM 1/4 WATT RES.
R4	60-193	10 MEG. OHM 1/4 WATT RES.
R5	60-201	560 OHM 1/4 WATT RES.
R6	60-256	47 OHM 1/4 WATT RES.
R7		
R8	60-282	4700 OHM 1/2 WATT RES.
R9	60-335	560 OHM 1 WATT RES.
R10	60-645	12 K OHM 2 WATT RES.
R11	24-156	VOLUME CONT.05

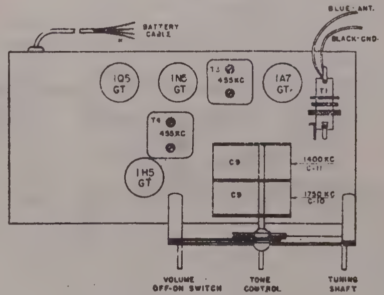
CODE	PART NO.	DESCRIPTION
C1	1607	.05 MFD. 400 WV. TUB. COND.
C2	16-1[illegible]	.006 " " " " "
C3	16-119	.02 " " " " "
C4	16-116	.1 " " " " "
C5		
C6	16-148	.006 " " " " "
C7	1622	.05 " 200 " " "
C8	1603	.00005 MFD. MICA COND.
C9	1601	.0001 " " "
C10	1604	.00025 " " "
C11	16-170	.004 " " "
C12	18-247	ELEC. 20-20 AT 450 & 20 AT 25
C13	95-15	VARIABLE COND.
C14	20-129	TRIMMER (ON LOOP)

CODE	PART NO.	DESCRIPTION 1-62
T1	82-24	LOOP ANTENNA
T2	10-387	S.W. ANTENNA COIL
T3	10-376	S.W. OSC. COIL
T4	10-375	B.C. OSC. COIL
T5	10-258	1 st. I.F. TRANS.
T6	10-312	2 nd. I.F. TRANS.
T7	------	OUTPUT TRANS.
T8	80-189	POWER TRANS.
T9	--- --	FIELD COIL
1	69-157	BAND SWITCH
2	20127	TRIMMER BLOCK
3	10-374	Wave Trap
4	20-130	PADDING CONDENSER
5	79-286	5" DYNAMIC SPEAKER

MODELS
1-621
1-622
9-62
910



MODELS
1-43
1-430
to
1-439



MODELS 1-621, 1-622, 9-62, 910

Follow the procedure outlined below in order to adjust the push buttons properly:

1. By means of the tuning knob, tune in as accurately as possible your first desired station.

2. Lift up the button for that station and with a small screw-driver loosen set screw about two turns (counter-clockwise).

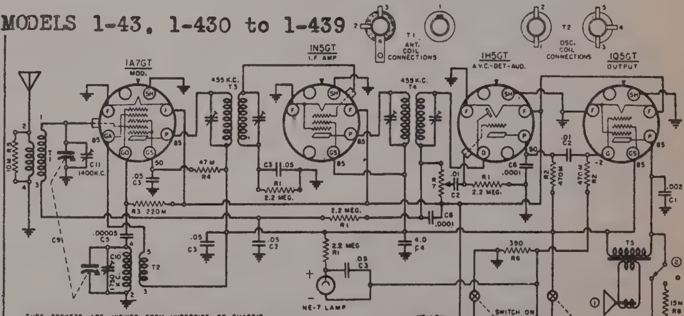
3. Push the set screw in as far as it can go with the screw-driver, and while holding the set screw in this position, make sure that your desired station is tuned in properly. It may be necessary to re-tune your station.

4. While holding set screw in as far as possible, and after your station is adjusted properly, tighten set screw firmly.

The push-button tuning system is now correctly set up for your first selected station.

Follow through with this same procedure in setting up the other three stations.

MODELS 1-43, 1-430 to 1-439



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.

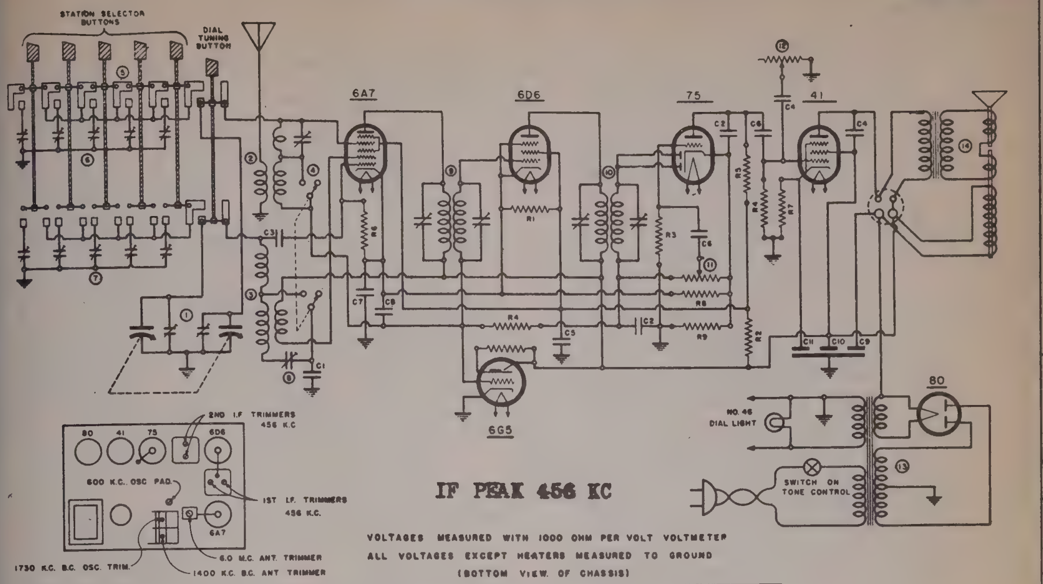
CODE	PART NO	DESCRIPTION
R 1	60-179	2.2 MEGOHM 1/4 W. RESISTOR
R 2	60-178	470M OHM " "
R 3	60-180	220M " " "
R 4	60-177	47M " " "
R 5	60-215	10M " " "
R 6	60-221	390 " " "
R 7	24-148	1 MEGOHM VOLUME CONTROL
R 8	60-202	15M OHM 1/4W RESISTOR

CODE	PART NO.	DESCRIPTION
C 1	16-138	.002 MFD. 400V TUBULAR COND.
C 2	16-121	.01 " 200V. " "
C 3	1622	.05 " " " "
C 4	18-250	4.0 " 150 W V. ELECTROLYTICS
C 5	15-120	.00005 MFD. MICA CONDENSER
C 6	1501	.0001 " " "
C 9	19-163	2 GANG VAR. COND. ALSO C10 & C11
C10	1605	.02 MFD 200 V TUBULAR COND

CODE	PART NO.	DESCRIPTION 1-43
T 1	10-344	ANTENNA TRANSFORMER
T 2	10-341	OSCILLATOR "
T 3	10-342	1 ST. I.F. "
T 4	10-343	2 ND. I.F. "
T 5	------	OUTPUT TRANS. (ON SPKR)
1	79-310	6" P.M. SPEAKER
2	69-156	TONE CONTROL SW

WARWICK MFG. CO.

MODEL WS-645



IF PEAK 456 KC

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER
ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND
(BOTTOM VIEW OF CHASSIS)

	PART NO.	DESCRIPTION					
R1	6117	25,000	OHM	1/2 W	CARBON	RES.	
R2	6105	10,000	"	"	"	"	
R3	6017	1 MEG.	"	1/3 W	"	"	
R4	6018	500,000	"	"	"	"	
R5	6056	200,000	"	"	"	"	
R6	6028	40,000	"	"	"	"	
R7	6052	800	"	"	"	"	
R8	60-151	160	"	"	"	"	±10%
R9	60-150	51	"	"	"	"	±10%

	PART NO.	DESCRIPTION				
C1	15-101	00148	MFD.	MICA	CONDENSER	±5%
C2	1504	00025	"	"	"	"
C3	1501	0001	"	"	"	"
C4	1651	004	"	600 V.	TUBULAR	COND.
C5	1607	05	"	400 V.	"	"
C6	1603	01	"	"	"	"
C7	1614	25	"	200 V.	"	"
C8	1622	05	"	"	"	"
C9	18-102	8	"	250 V.	WET	ELECTROLYTIC
C10	-	4	"	"	"	"
C11	-	4	"	25 V.	"	"

	PART NO.	DESCRIPTION 645
1	49-113	2 GANG CONDENSER
2	10-196	ANTENNA COIL
3	10-147	OSCILLATOR COIL
4	69-108	WAVE SWITCH
5	69-115	6 BUTTON PUSH-BUTTON SWITCH
6	20-106	ANT. TRIMMER STRIP
7	20-107	OSC. " "
8	20-100	B C OSC PADDING TRIMMER
9	10-194	1ST. I.F. TRANSFORMER
10	10-195	2 ND. I.F. " "
11	24-105	VOLUME CONTROL
12	26-106	TONE CONTROL WITH SWITCH
13	80-104	POWER TRANSFORMER
14		SPEAKER

FOR TUNER. SEE INDEX

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

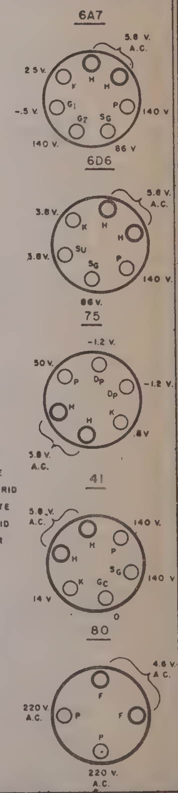
Connect the output meter, through a .5 M.F. condenser and a resistance, of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.

VOLTAGE DIAGRAM



F -FILAMENT
H -HEATER
P -PLATE
K -CATHODE
G1 -OSC. GRID
G2 -OSC. PLATE
Gc -CONTROL GRID
Dp -DIODE PLATE
Sg -SCREEN GRID
Su -SUPPRESSOR

INSTAMATIC TUNING

The purpose of **Instamatic** tuning is to give the user instant, automatic tuning of any one of a selection of favorite broadcast stations. The control buttons are conveniently located just below the tuning dial. Pushing in any button will release any other button which happens to be already in. After the **Instamatic** tuning feature has been properly adjusted, this will instantly and automatically tune in the station selected by this button.

Before attempting to adjust or use **Instamatic** tuning, the "Installation" and "Operation" instructions must be carefully followed. When the receiver is operating satisfactorily using the tuning dial with the "Dial Tuning" button pressed in, the **Instamatic** feature may be easily adjusted by carefully following these instructions.

Located on the back of the chassis is a row of five pair of small bakelite adjustment knobs. Each pair of these knobs controls the tuning of the station for the **Instamatic** button which is in the same relative position.

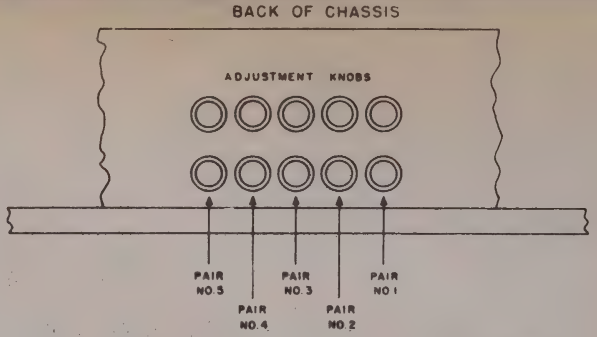
With the receiver operating with the "Dial Tuning" button in and the wave switch on broadcast position, turn the tuning knob to the left until the 540 KC end of the band has been reached. Then turn the tuning knob to the right until a station, for which it it desired to have **Instamatic** tuning, is heard. Press in the Button No. 1. This is the button at the left hand end of the row. Reach around to the back of the receiver and turn upper knob of the Pair No. 1 until the same program is heard. Unless the wrong knob is being turned, several different stations will be heard during this procedure. If necessary to check that the same program is now tuned in, the "Dial Tuning" button may again be pressed. In this way it can be determined that the same station is tuned in with the **Instamatic** button as when the "Dial Tuning" button is in. If it is not the same station the adjustment knob should be turned again and these operations repeated until the same program is heard when either of these two buttons is pressed.

The bottom adjustment knob of the first pair is now turned until the station is heard the best. Both top and bottom knobs may then be adjusted to exact tuning by watching the magic eye and adjusting until the two edges of the green section are as close together as it is possible to get them.

The first **Instamatic** button is now properly adjusted for the station which was tuned in on the dial and the station's call letters may be pushed out of the station list, moistened on the back, and pressed into the hollow end of the button.

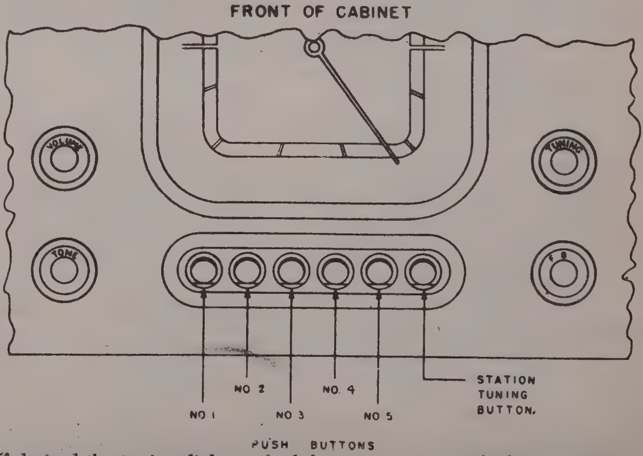
With the "Dial Tuning" button pressed in, the tuning knob is again turned to the right until the next station for which **Instamatic** tuning is wanted, is tuned in. The adjustment process for this station is the same as before, except that Button No. 2 and Pair No. 2 adjustment knobs are used. Proceeding in this way all five of the buttons may be properly adjusted for the stations desired.

It must be remembered that the "Dial Tuning" button must be pressed in whenever it is desired to tune in stations with the tuning knob, regardless of which wave band is in use. It must also be remembered that the wave switch must be in the broadcast position when **Instamatic** tuning is being used.



The approximate frequency coverage of each of the "**Instamatic**" control buttons is as follows:

1—	Stations between	540 and 1000 KC
2	Stations between	540 and 1000 KC
3	Stations between	750 and 1200 KC
4	Stations between	750 and 1200 KC
5	Stations between	1000 and 1500 KC

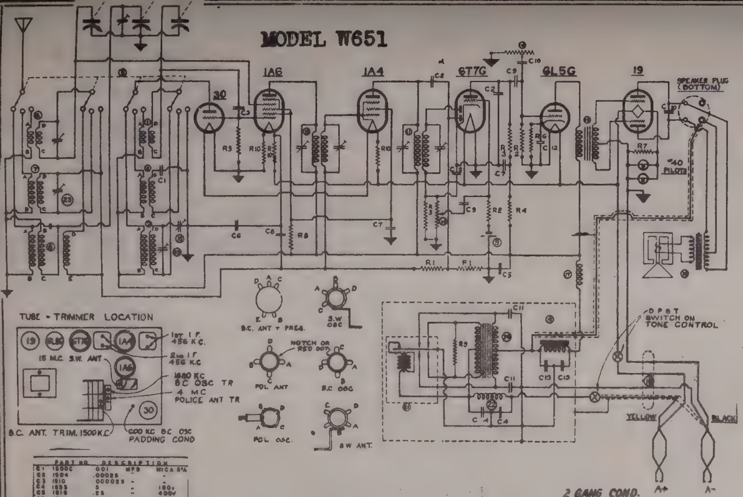


If desired the tuning dial may be left set to a station which is not set up on one of the buttons. The "Dial Tuning" button will then tune in this station when it is pressed. This will give an extra **Instamatic** tuned station, making a total of six different stations which can be instantly tuned in by simply pressing a button.

©John F. Rider, Publisher

WATTERSON RADIO MFG. CO.

MODEL 60B
MODEL 630
MODEL W651



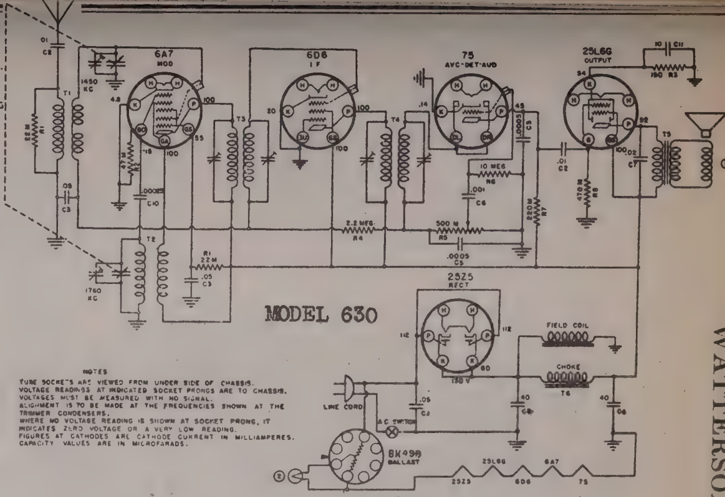
	PART NO.	DESCRIPTION		
C1	1500C	.001	MFD	MICA 5%
C2	1504	.00025	"	-
C3	1510	.000025	-	-
C4	1535	5	-	150v
C5	1515	.25	-	400v
C6	1514	.25	-	200v
C7	1501	.1	"	400v
C8	1500	.1	"	200V
C9	1503	.01	"	400V
C10	1511	.005	"	600 V
C11	1504	.01	"	600 V
C12	16-100	10 M.F.D. 25V. ELECTROLYTIC		
C13	1545	8 - 150V	"	

	PART NO.	DESCRIPTION		
R1	6017	1 MEG	OHM	1/3 W.
R2	6016	.5	"	"
R3	6024	.25 "	"	"
R4	6025	100,000	"	"
R5	6025	50,000	"	"
R6	6006	1500	"	"
R7	6007	500	"	"
R8	6117	25,000	"	1/2 W.
R9	6101	100	"	"
R10	60-102	33 1/3	"	WIRE WOUND

	PART NO.	DESCRIPTION
1	10-139	S.W. OSC COIL
2	10-138	POLICE OSC. COIL
3	10-134	BC OSC COIL
4	15-106	3 GANG CONDENSER
5	60-102	WAVE SWITCH
6	[illegible]-135	S.W. ANT. COIL
7	10-136	POLICE ANT COIL
8	10-137	B.C. ANT. & PRESEL. CL.
9	4500	BIAS CELL
10	1133	1ST. I.F TRANSFORMER
11	1134	2ND. I.F. TRANSFORMER
12	60-102	TONE CONTROL
13	[illegible]	PUSH-PULL AUDIO TRANS
14	24-101	VOLUME CONTROL
15	20-100	B.C. OSC. PADDER
16		SPEAKER
17	3303	RF "B" CHOKE
18	3307	FILTER
19	55-105	BATTERY CABLE
20	8041	POWER TRANFORMER
21	3407	VIBRATOR
22	3313	R.F. "A" CHOKE
23	25-102	TRIMMER STRIP

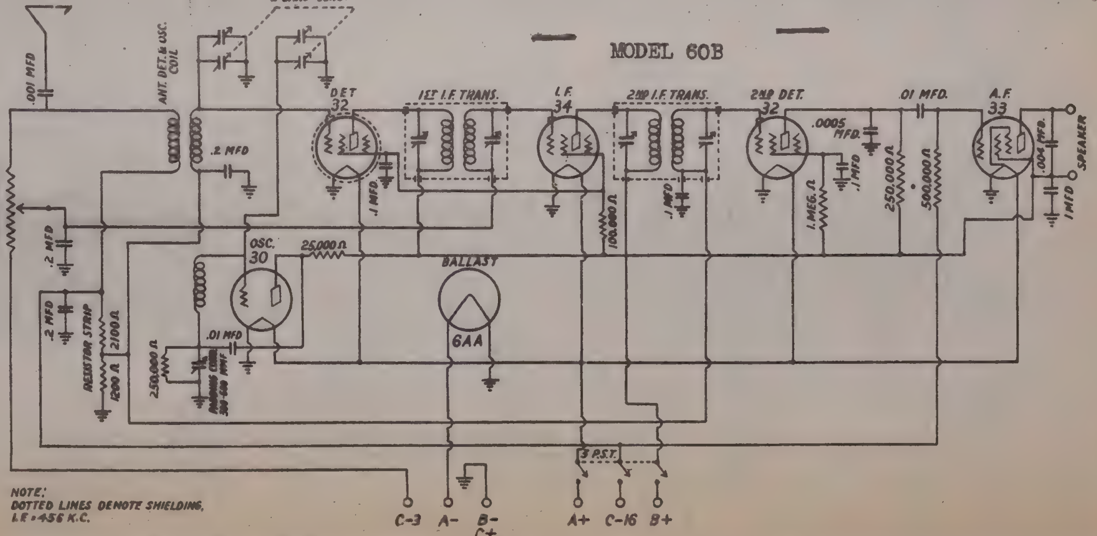
ALL MODELS
CONVENTIONAL
ALIGNMENT

SEE SPECIAL
SECTION
VOL.VIII



NOTES

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.

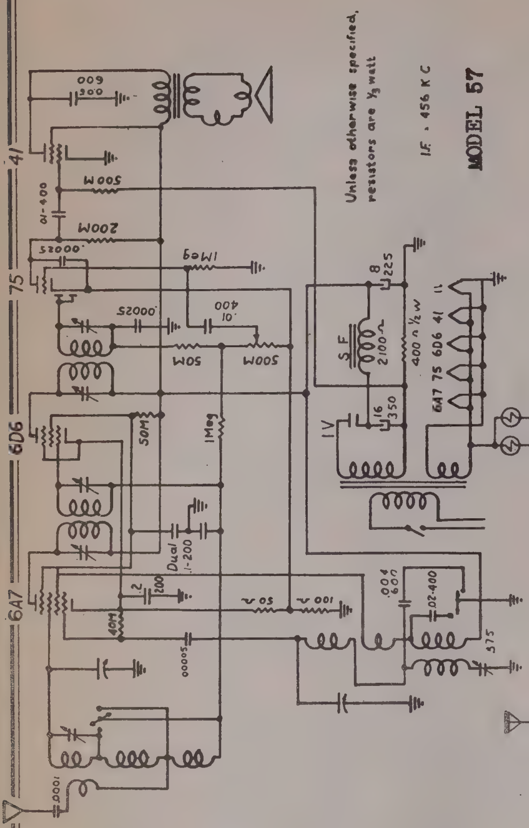


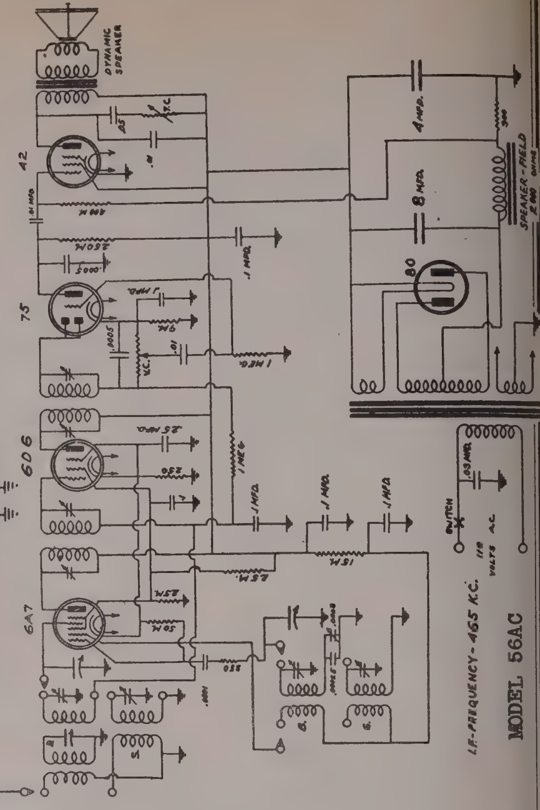
NOTE:
DOTTED LINES DENOTE SHIELDING.
I.F. = 456 K.C.

©John F. Rider, Publisher

MODEL 6V-600W
MODEL 56AC
MODEL 57

WATTERSON RADIO MFG. CO.

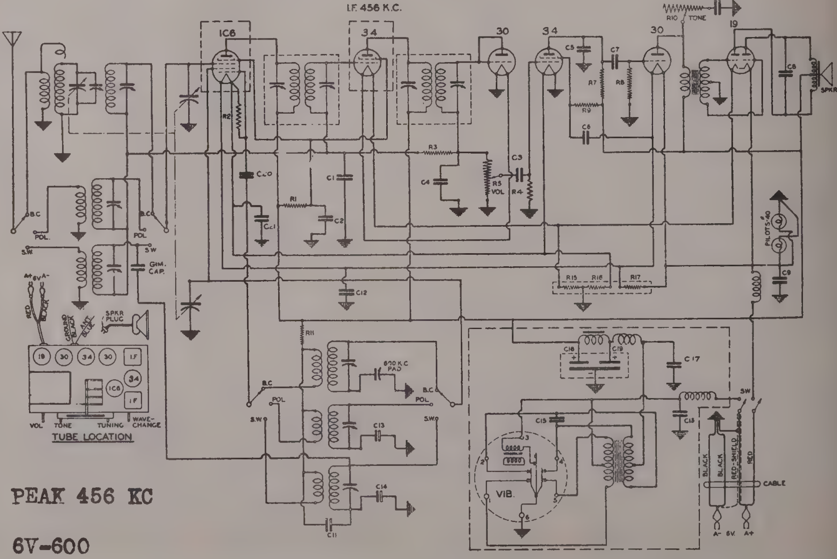




ALL MODELS
CONVENTIONAL
ALIGNMENT

SEE
SPECIAL
SECTION
VOL.VIII

LEGEND					
R1	25M	OHMS	C1	1	MFD
R2	50M	-	C2	1	-
R3	1 MEG	-	C3	[illegible]	-
R4	1 MEG	-	C4	00025	-
R5	500 M	-	C5	0005	-
			C6	1	-
R7	100 M	-	C7	.05	-
R8	500 M	-	C8	006	-
R9	1 MEG		C9	.1	-
R10	50 M	-	C10	03	-
R11	5 M	-	C11	.001	-
			C12	.1	-
			C13	0015	-
			C14	0027	-
R15	20	-	C15	.01	-
R16	33.3	-	C16	5	-
R17	33.3	-	C17	01	-
			C18	8	
			C19	8	
			C20	.0001	
			C21	.1	



I.F. PEAK 456 KC

MODEL 6V-600

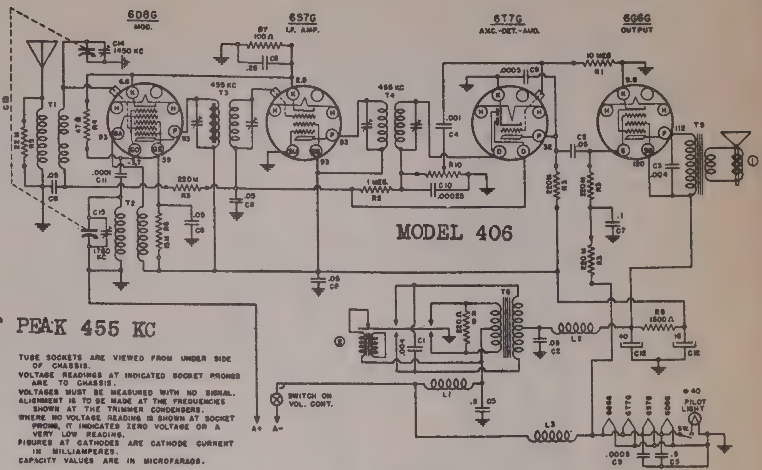
WATTERSON RADIO MFG. CO.

MODEL 79
MODEL 406
MODEL 669

CODE	PART NO	DESCRIPTION
C1	16-127	.004 MFD. 1000 V. BUFFER COND
C2	1607	.05 " 400 V TUB. CONDENSER
C3	16-125	.004 " " " "
C4	16-124	.001 " " " "
C5	16-112	.5 " 200 V. " "
C6	16-120	.25 " " " "
C7	16-115	.1 " " " "
C8	1622	.05 " " " "
C9	15-112	.0005 " MICA CONDENSER
C10	1504	.00025 " " "
C11	1501	.0001 " " "
C12	18-236	40 X 16 MFD ELECTROLYTIC
C13	19-132	2 GANG VARIABLE CONDENSER C14 & C15

CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/3 W RESISTOR
R2	60-195	1 " " "
R3	60-180	220 M OHM " "
R4	60-177	47 M " " "
R5	60-165	22 M " " "
R6	60-202	15 M " " "
R7	60-197	100 " " "
R8	60-203	1500 " 1/2 W "
R9	60-199	[illegible] " " "
R10	24-124	VOLUME CONTROL 500M Ω

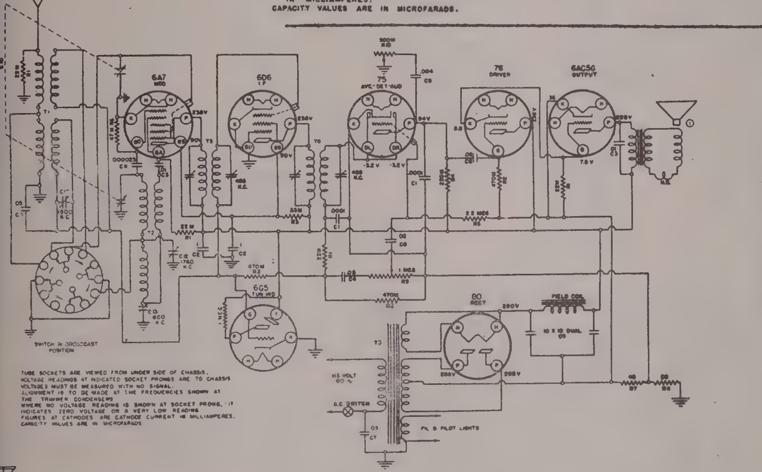
CODE	PART NO.	DESCRIPTION 406
T1	10-239	ANTENNA TRANSFORMER
T2	10-240	OSCILLATOR "
T3	10-253	1ST. I.F. "
T4	10-252	2 ND. I.F. "
T5		OUTPUT TRANS. (ON SPKR.)
T6	60-160	VIBRATOR TRANSFORMER
L1	33-217	VIBRATOR CHOKE
L2	10-246	R.F. "B" "
L3	33-218	FILAMENT "
1	79-256	SPEAKER 5" P.M.
2	34-103	VIBRATOR



MODEL 406

IF PEAK 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS

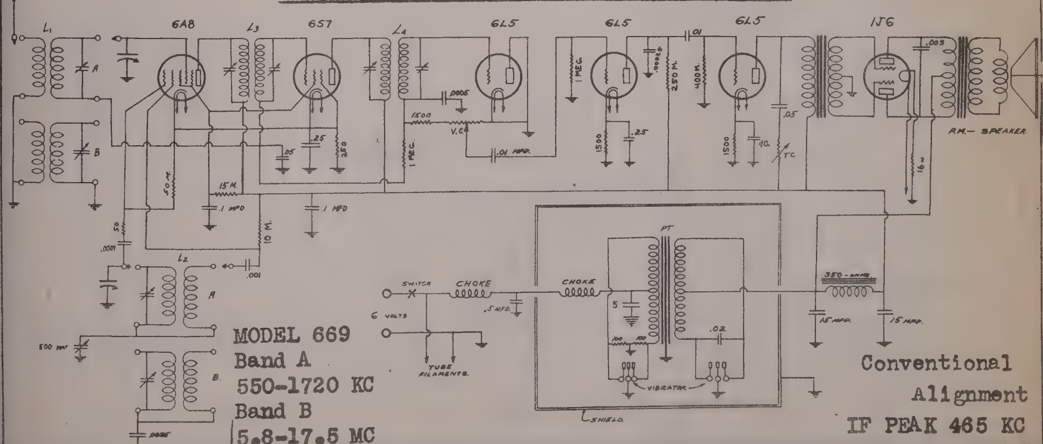
CODE	PART NO	DESCRIPTION
R1	60-185	22 M OHM 1/3 WATT RESISTOR
R2	60 178	470M " " " "
R3	60 188	33M " " " "
R4	60-180	220M " "
R5	60-179	2.2 MEGOHM 1/3 WATT RESISTOR
R6	60-177	47 M OHM 1/3 WATT RESISTOR
R7	60-187	45 " 1/2 " " ±10
R8	60-181	90 " " " " ±10 %
R9	24 173	1 MEGOHM VOLUME CONTROL & SW
R10	26 118	500M OHM TONE CONTROL

CODE	PART NO	DESCRIPTION
C1	1501	100 MMF MICA CONDENSER
C2	16-116	1 MFD 400 V TUBULAR CONDENSER
C3	1604	01 MFD 600 V " "
C4	1622	05 " 200 V "
C5	1651	004 MFD 600 V " "
C6	16-108	02 " " " "
C7	1607	05 " 400 V " "
C8	16 123	02 " 200 V " "
C9	18-226	10 X 10 MFD 400 W V ELECTROLYTIC CONDENSER
C10	19 133	2 GANG VARIABLE CONDENSER

CODE	PART NO	DESCRIPTION
C11	1510	25 MMF MICA CONDENSER
C12	2057	TRIMMERS 3-30 MFD
C13	20-117	PADDING CONDENSER 300-600 MMFD
T1	10 237	ANTENNA COIL
T2	10 238	OSCILLATOR COIL
T3	[illegible] 159	POWER TRANSFORMER
T5	10-227	1ST I F "
T6	10-228	2ND I F "
1	79 245	SPEAKER

MODEL 79

IF PEAK 455 KC



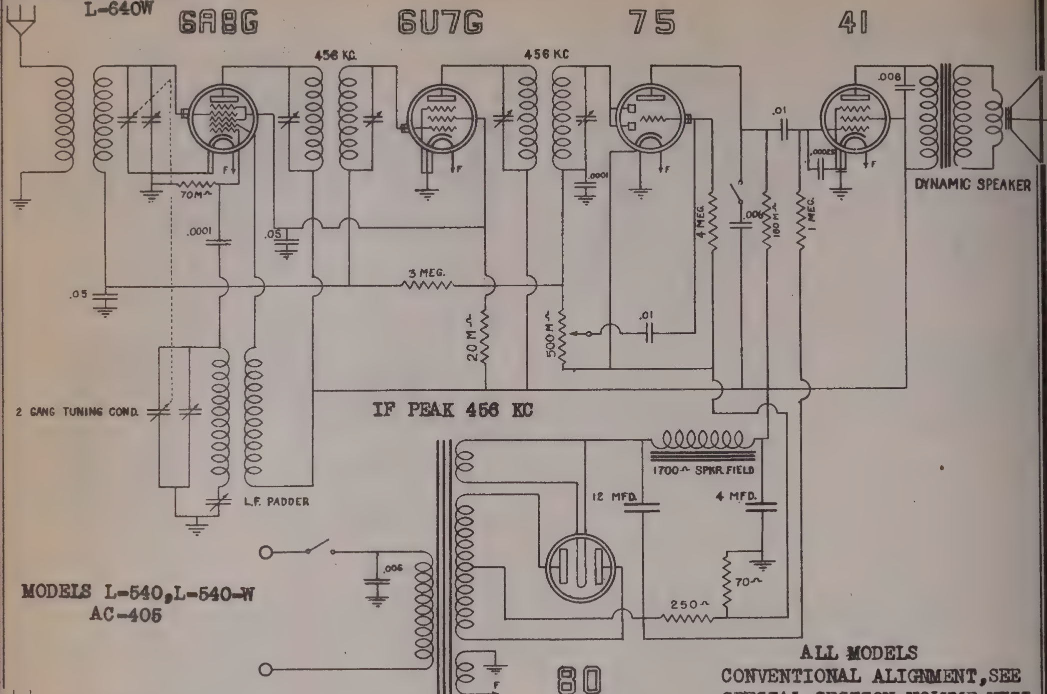
MODEL 669

Band A
550-1720 KC
Band B
5.8-17.5 MC

Conventional
Alignment
IF PEAK 465 KC

MODELS AC-405,
L-540,L-540-W
MODELS AC-406,L-640-W
L-640W

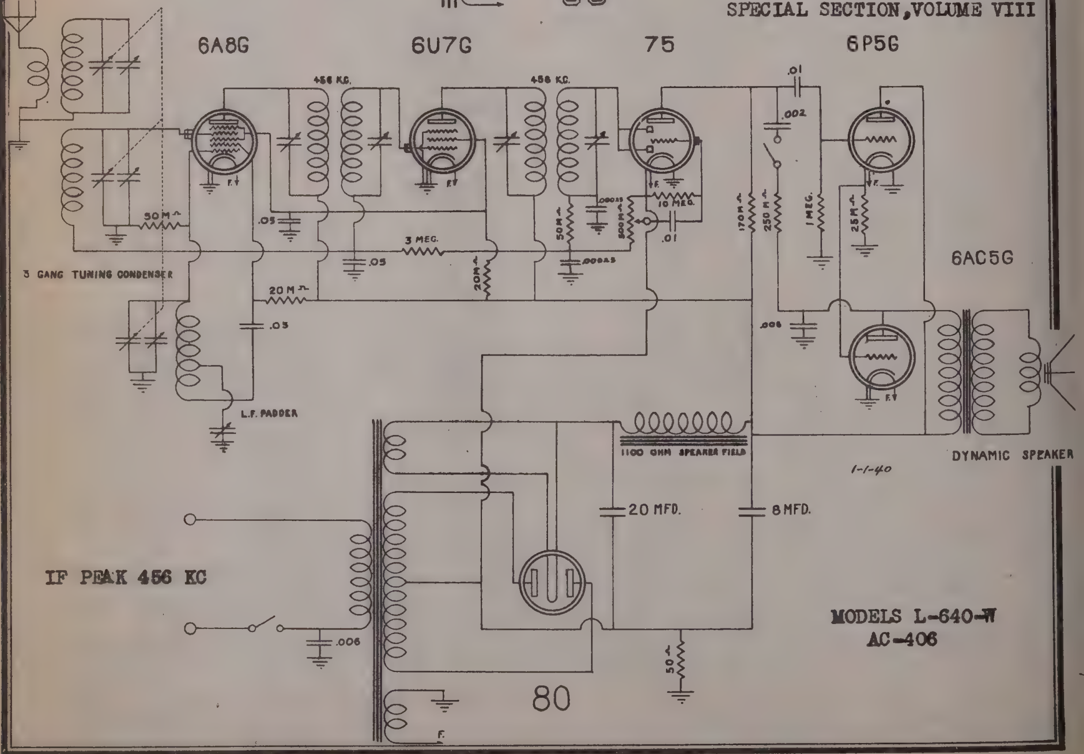
WATTERSON RADIO MFG. CO.



IF PEAK 456 KC

MODELS L-540,L-540-W
AC-405

ALL MODELS
CONVENTIONAL ALIGNMENT,SEE
SPECIAL SECTION,VOLUME VIII

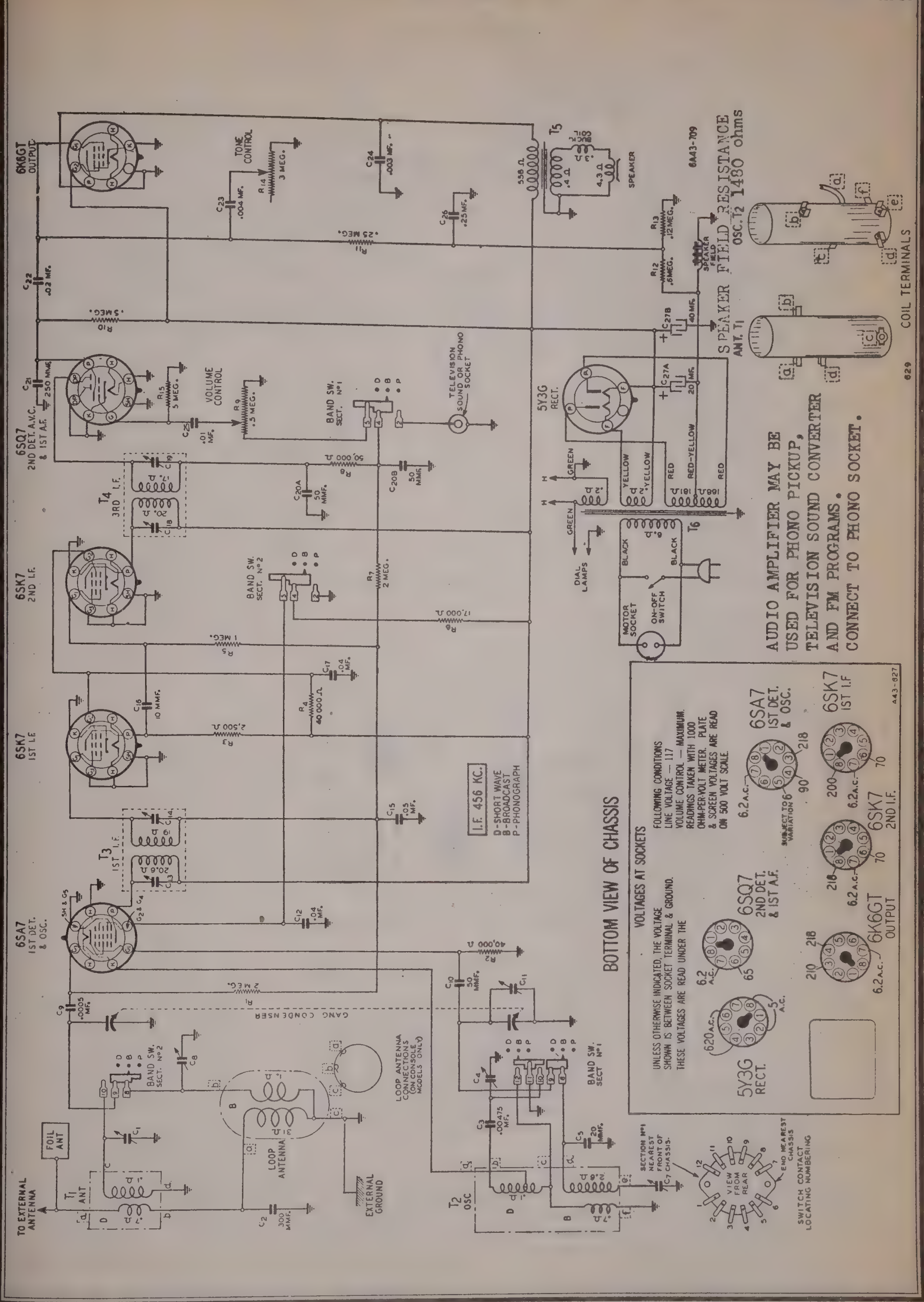


IF PEAK 456 KC

MODELS L-640-W
AC-406

WELLS-GARDNER & CO.

MODEL 6A43



I.F. 456 KC.

SPEAKER FIELD RESISTANCE OSC.12 1480 ohms

AUDIO AMPLIFIER MAY BE USED FOR PHONO PICKUP, TELEVISION SOUND CONVERTER AND FM PROGRAMS. CONNECT TO PHONO SOCKET.

UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND. THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS LINE VOLTAGE — 117 VOLUME CONTROL — MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

SPECIFICATIONS

Power Consumption 57 Watts (At 117 volts 60 cycles)
Power Output................ 1.7 Watts Undistorted
2.5 Watts Maximum
Selectivity.....40 KC Broad at 1000 times Signal
Intermediate Frequency...............456 KC
Speaker ....8" Electro-Dynamic

Tuning Frequency Range
B Range.......................... 528 to 1600 KC
D Range..........................5750 to 18300 KC

Sensitivity —External Antenna—(For 0.5 Watt output)
B Range..................... 7 Microvolts Average
D Range....................15 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

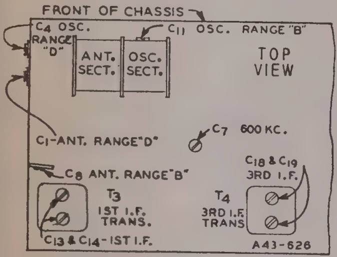
The following equipment is required for aligning:

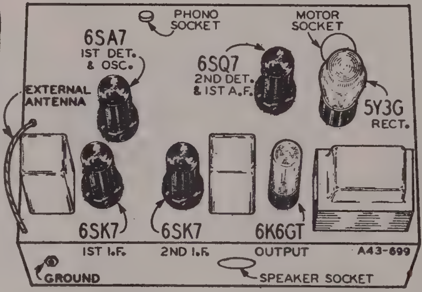
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

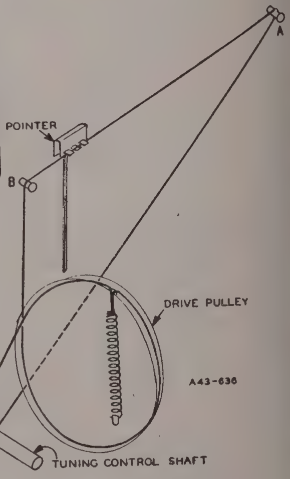
Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Console Model—It is not necessary to remove chassis from cabinet. Merely remove chassis mounting screws so that chassis may be turned to reach oscillator trimmer on gang condenser.					
I.F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 3rd I.F. (C18) & (C19)
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C8)
600 KC	External Antenna Clip or Lead See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C7) Rock Rotor—See Note C
RANGE D					
18,300 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip or Lead See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C8)







Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—(Table Model) By means of wooden blocks, stand the loop aerial assembly upright exactly 4 inches from the back of the chassis.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—(Table Model) Re-assemble chassis in cabinet. Replace back on cabinet. Connect ground post of signal generator to external ground clip on loop antenna (Table Model) or ground screw on chassis (Console Model).

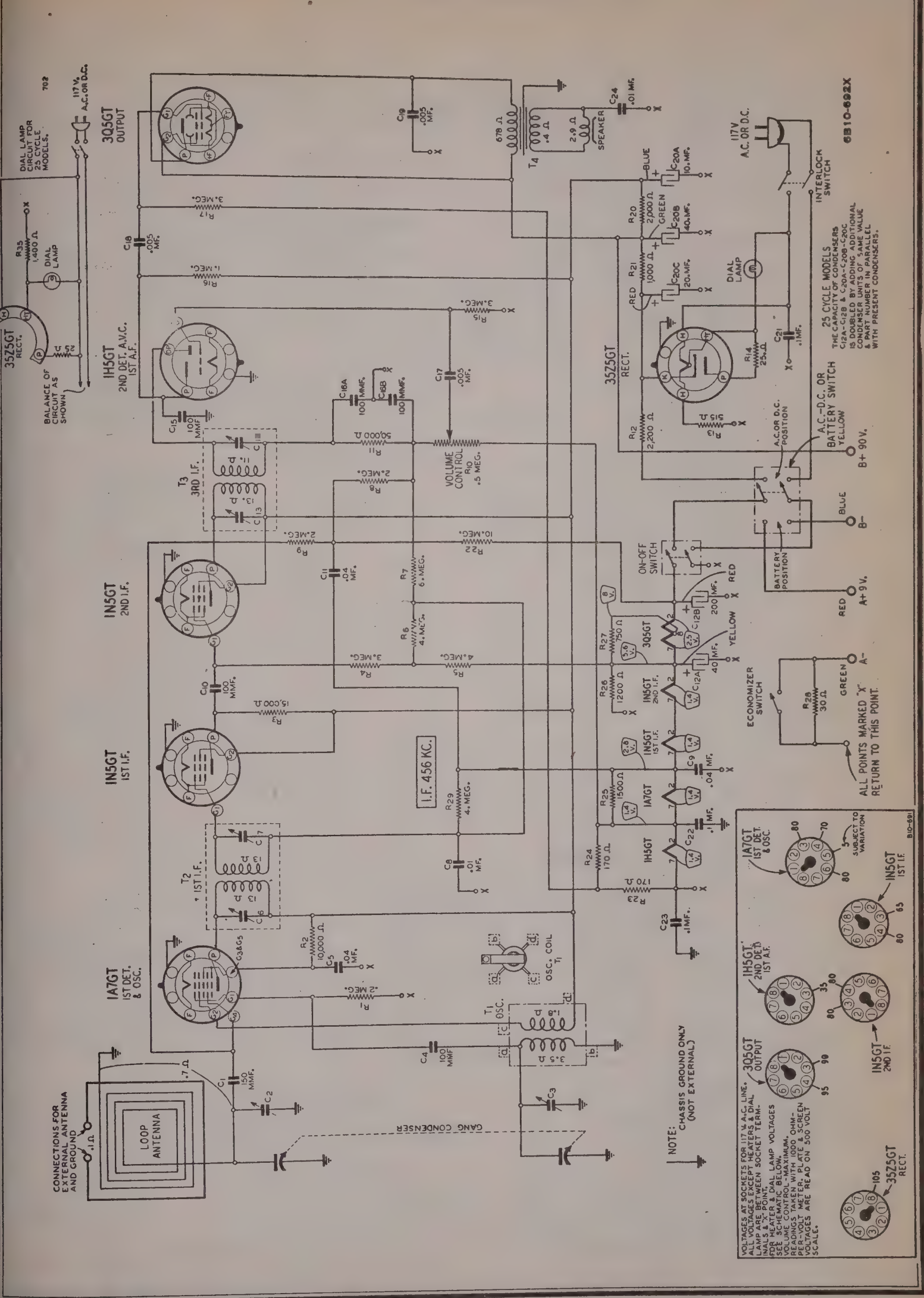
CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

CHANGES
7/26/40

On later models, two resistors were added to the phono circuit. One, a 1.5 Megohm resistor, was connected in series with No. 2 terminal on the band switch (Section No. 1) and the ungrounded terminal of the phono socket. The other resistor, .5 Megohm, was connected between the ungrounded terminal of the phono socket and ground.

WELLS-GARDNER & CO.

MODEL 6B10



NOTE: CHASSIS GROUND ONLY (NOT EXTERNAL)

ALL POINTS MARKED "X" RETURN TO THIS POINT.

25 CYCLE MODELS
THE CAPACITY OF CONDENSERS C12A-C12B & C20A-C20B-C20C IS DOUBLED BY ADDING ADDITIONAL CONDENSER UNITS OF SAME VALUE & PART NUMBER IN PARALLEL WITH PRESENT CONDENSERS.

VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "X" POINT. FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW. VOLUME CONTROL - MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.

©John F. Rider, Publisher

MODEL 6B10

WELLS-GARDNER & CO.

SPECIFICATIONS

Input Voltages and Currents—Battery Operation
"A" Batteries .... 9 Volts—50 Ma.
"B" Batteries .... 90 Volts—11.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output
Battery Operation - - - - 150 Mw Undistorted, 350 Mw Maximum
AC Operation - - - - - 200 Mw Undistorted, 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - 456 KC
Speaker - - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

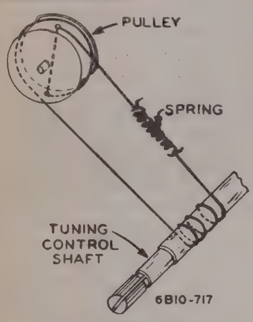
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf.

SIGNAL GENERATOR			DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION			
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	200 mmf.	Turn Rotor to max. output	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet. Close back on cabinet.

DRIVE CORD REPLACEMENT

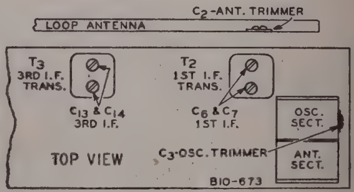


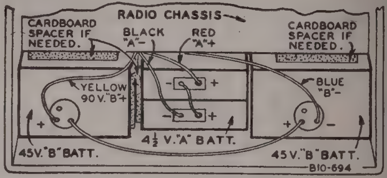
GANG CONDENSER IN CLOSED POSITION

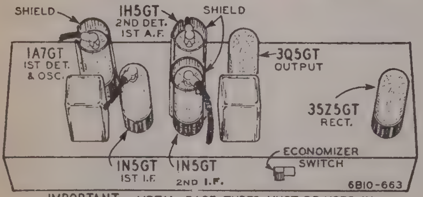
CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen pointer set screw and set the pointer at the 800 KC mark. Retighten set screw.

CAUTION

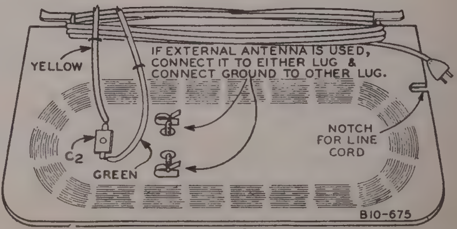
The metal chassis is connected to one side of the line through .20 mfd. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this capacity is grounded and the metal chassis comes in contact with an external ground, this capacity will be connected across the line and there will be an increase in hum.







IMPORTANT - METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.


YELLOW
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
C2
GREEN
NOTCH FOR LINE CORD
B10-675

INSIDE VIEW OF BACK COVER

WELLS-GARDNER & CO.

MODEL 6C13

SPECIFICATIONS

Power Consumption	7.8 Amperes at 6.3 Volts	Selectivity	38 KC Broad at 1000 Times Signal
Power Output	6 Watts Undistorted 8 Watts Maximum	Tuning Frequency Range	540 to 1560 KC
Sensitivity	1 Microvolt at .5 Watt Output (L-D Switch in Distance Position)	Intermediate Frequency	456 KC
		Speaker	6" Electro-Dynamic

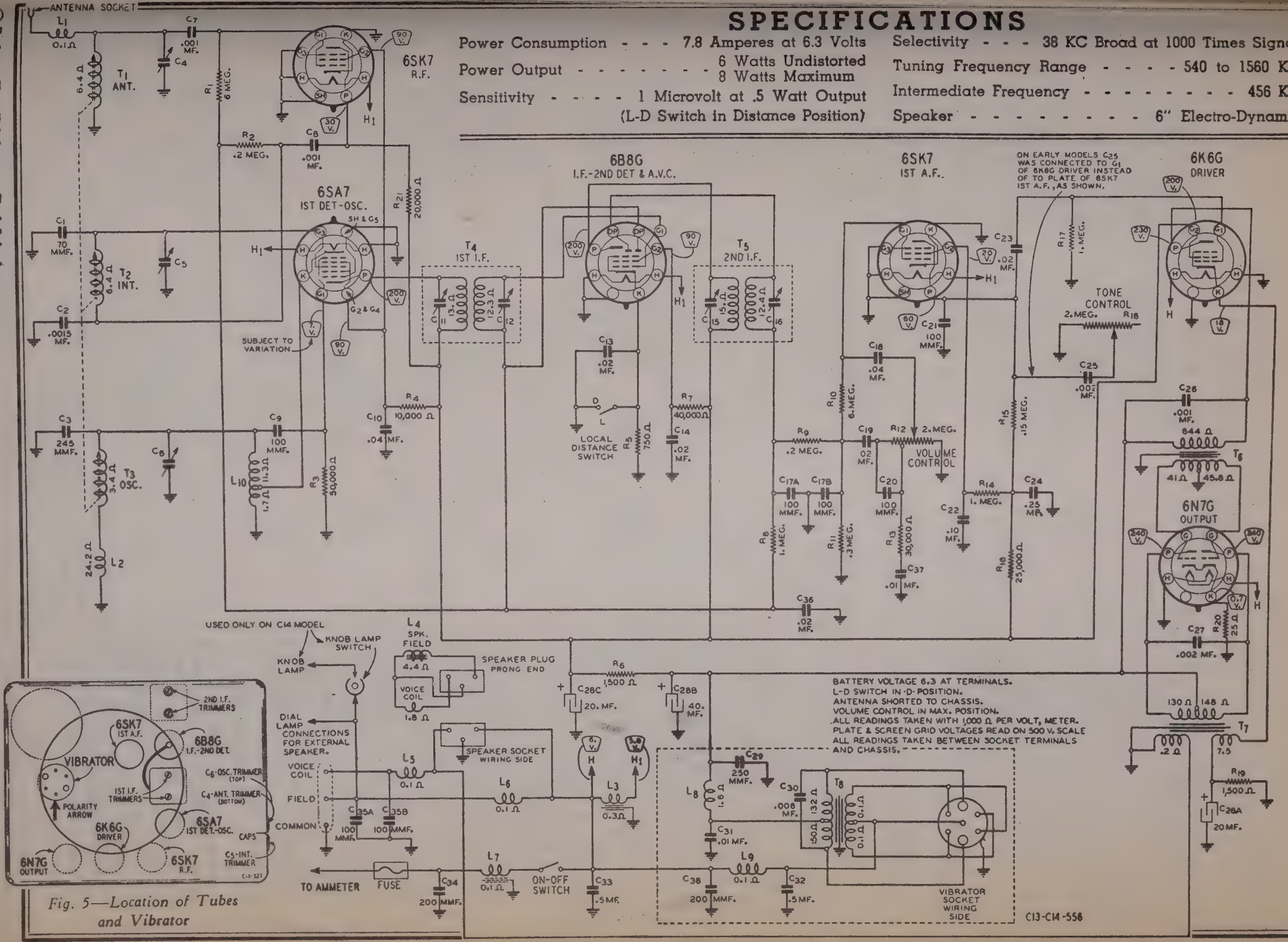


Fig. 5—Location of Tubes and Vibrator

ON EARLY MODELS C25 WAS CONNECTED TO G1 OF 6K6G DRIVER INSTEAD OF TO PLATE OF 6SK7 1ST A.F., AS SHOWN.

BATTERY VOLTAGE 6.3 AT TERMINALS.
L-D SWITCH IN ·D· POSITION.
ANTENNA SHORTED TO CHASSIS.
VOLUME CONTROL IN MAX. POSITION.
ALL READINGS TAKEN WITH 1,000 Ω PER VOLT, METER.
PLATE & SCREEN GRID VOLTAGES READ ON 500 V. SCALE
ALL READINGS TAKEN BETWEEN SOCKET TERMINALS AND CHASSIS.

©John F. Rider, Publisher

ALIGNMENT PROCEDURE

Remove Grille, Speaker, Trimmer Caps and Rear Cover From Chassis Case—(See Figs. 3 and 5).

Volume Control—Maximum All Adjustments.

Local-Distance Switch—"Distance" Position.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 5)
I.F.				
456 KC	Control Grid (prong No. 8) 6SA7 1st Det. Tube	.05 mf.		1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
OSCILLATOR				
1560 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C6)
1000 KC ADJUSTMENT				
1000 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

Car Antenna Readjustment—Tune in weak signal near 1000 KC—Readjust Antenna Trimmer C4 for maximum output.

NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the control unit is the calibration screw. Remove the dial lamp assembly. Hold the tuning knob. Insert a fine bladed screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A 36 inch shielded antenna cable (30 mmf. capacity) with bayonet connector plug is furnished. Whenever possible, this cable should be used rather than the one which may be supplied with the antenna.

The plug on the antenna cable is inserted in the socket at the side of the chassis case as shown in Fig. 3. The wire at the other end of the cable is connected to the antenna.

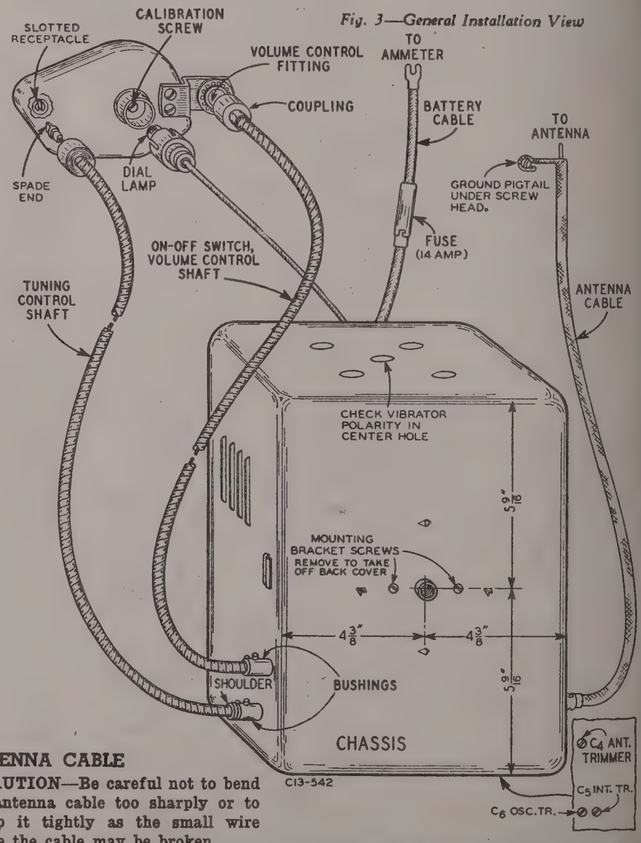
LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (70 to 500 mmf. total capacity of antenna and shielded cable), a 24 inch shielded adapter extension cable is necessary. The adapter is inserted in the socket at the side of the chassis case. Then the antenna cable plug is inserted in the socket at the other end of the adapter.

Fig. 3—General Installation View

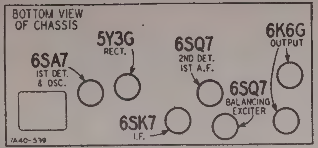


ANTENNA CABLE

CAUTION—Be careful not to bend the antenna cable too sharply or to clamp it tightly as the small wire inside the cable may be broken.

WELLS-GARDNER & CO.

MODEL 7A40



Power Consumption 55 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 3.0 Watts Undistorted
4.5 Watts Maximum

Selectivity - 38 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

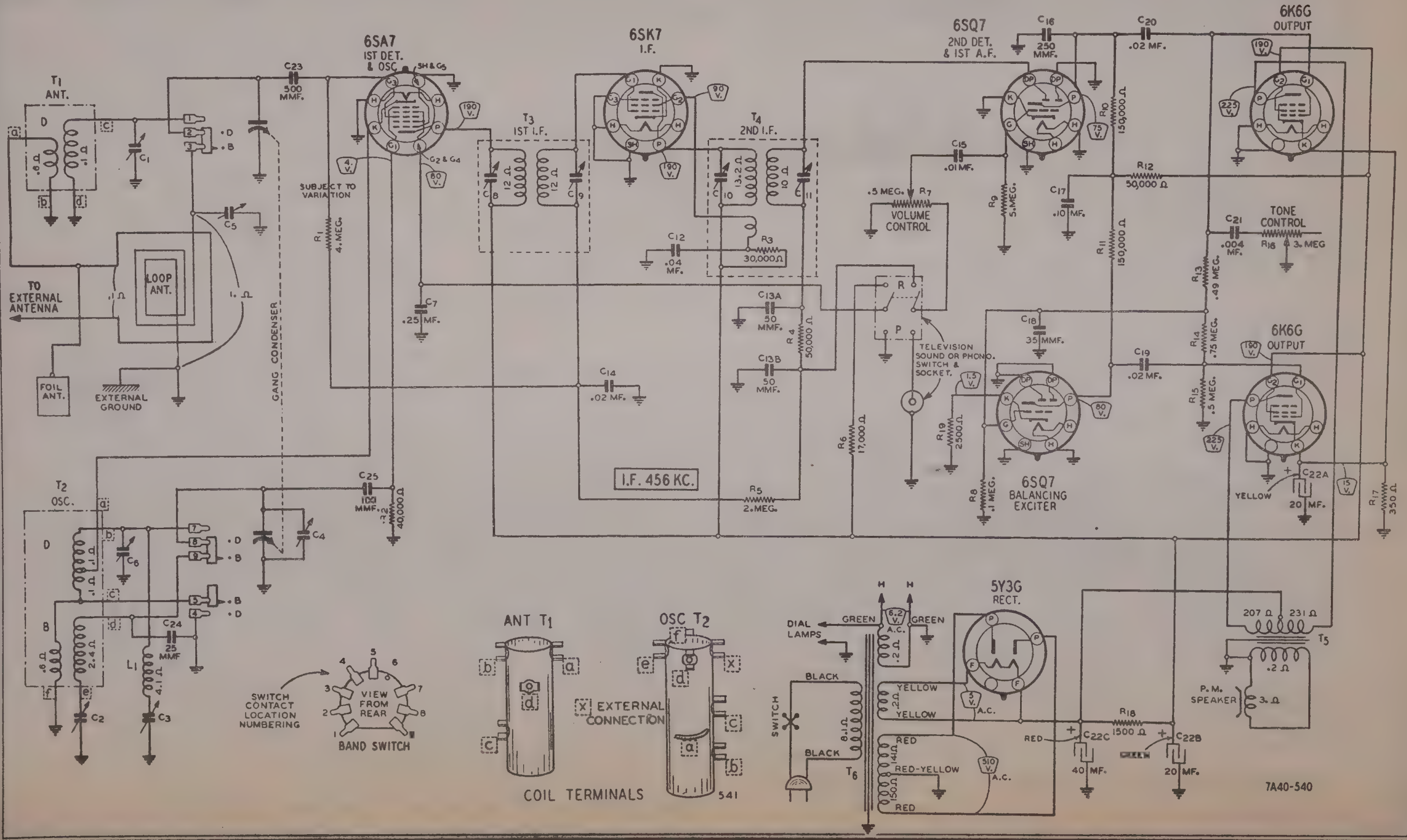
Speaker - - - - - - - - 10" P.M. Dynamic

Tuning Frequency Range

B Range.......................... 528 to 1550 KC
D Range..........................5750 to 18300 KC

Sensitivity—External Antenna—(For 0.5 Watt output)

B Range....................25 Microvolts Average
D Range....................45 Microvolts Average



ALIGNMENT PROCEDURE MODEL 7A40

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

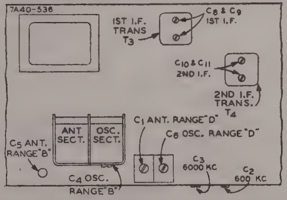
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C8) & (C9) 2nd I.F. (C10) & (C11)
RANGE B					
1550 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C2) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C3) Rock Rotor—See Note B
LOOP RANGE B					
1400 KC See Note C	None See Note C		B Range	Turn Rotor to Max. Output	Ant. Range B (C5)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC. or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Television Sound or Phonograph Connections

On the back panel of the chassis base is a switch and a socket for a single shielded pin tip at which connections are made. The connector on the cable from a television receiver or from a phono pickup can be inserted in the socket. (The cable connector must be a single shielded pin tip type, Part No. 6A224.)

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter." Phonograph records may also be played through the radio.

When phonograph or television sound reproduction is desired, the knob should be moved to the "Television Sound or Phonograph" position. For radio reception, the knob should be in the "Radio" position.

Procedure for Setting the Station Buttons

MODELS 7A40, 7A41

Setting a Station Button

Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon—See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handled screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with button No. 1.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by turning the tuning knob a slight amount back and forth. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION — Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached. Then, with a SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Drive Cord Replacement

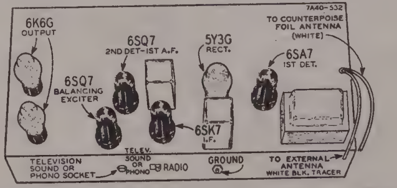
Tie one end of the new drive cord (approximately 70 inches in length) to tension spring. Turn gang condenser to full open position. Thread free end of drive cord up through hole in rim of condenser drive pulley and pull spring flush against pulley rim.

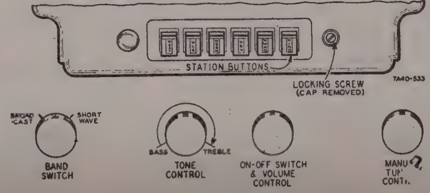
Wind one turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. This turn should progress to the left (from front of chassis). Pass cord in back of guide arm—see illustration. Then wind drive cord 3½ turns counter-clockwise (from front of chassis) around tuning control shaft. Turns should progress away from the chassis.

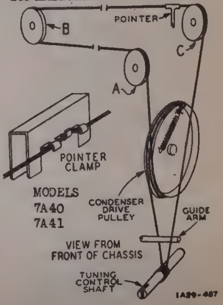
Pass cord around pulleys C, B, and A as shown in illustration. Then wind cord ¾ turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. The turn should be at right side (from front of chassis) of pulley groove.

Thread cord through hole in pulley groove and knot securely to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.







WELLS-GARDNER & CO.

MODEL 7A41-704

FOR OTHER DATA
SEE INDEX

Power Consumption 55 Watts (At 117 volts 60 cycles)
Phonograph Operating { Seeburg Unit—71 Watts; RCA Unit—67 Watts

Power Output - - - - - - - 3.0 Watts Undistorted; 4.5 Watts Maximum

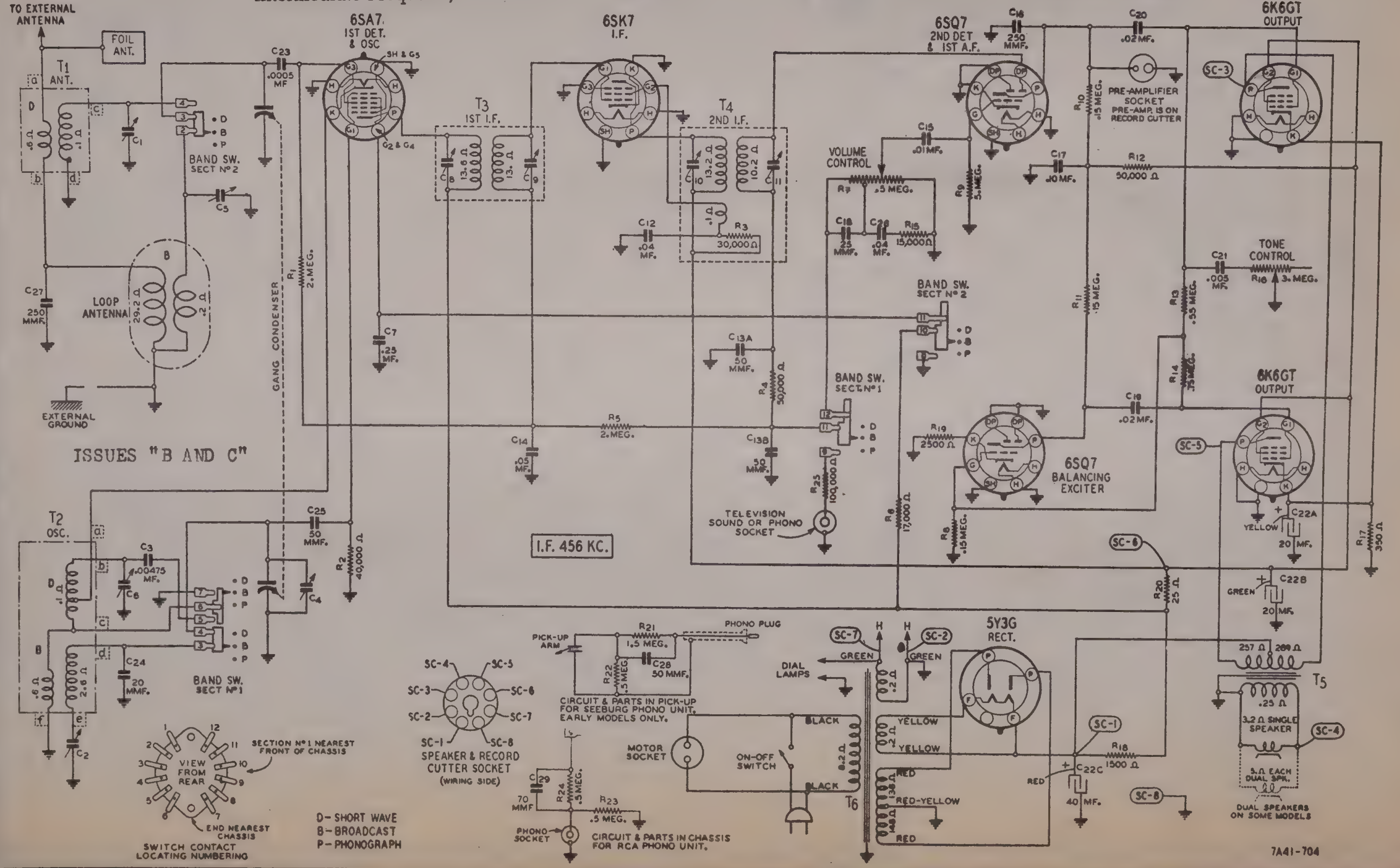
Selectivity - - 38 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" P.M. Dynamic

Tuning Frequency Range
B Range.............................528 to 1600 KC
D Range.............................5750 to 18300 KC

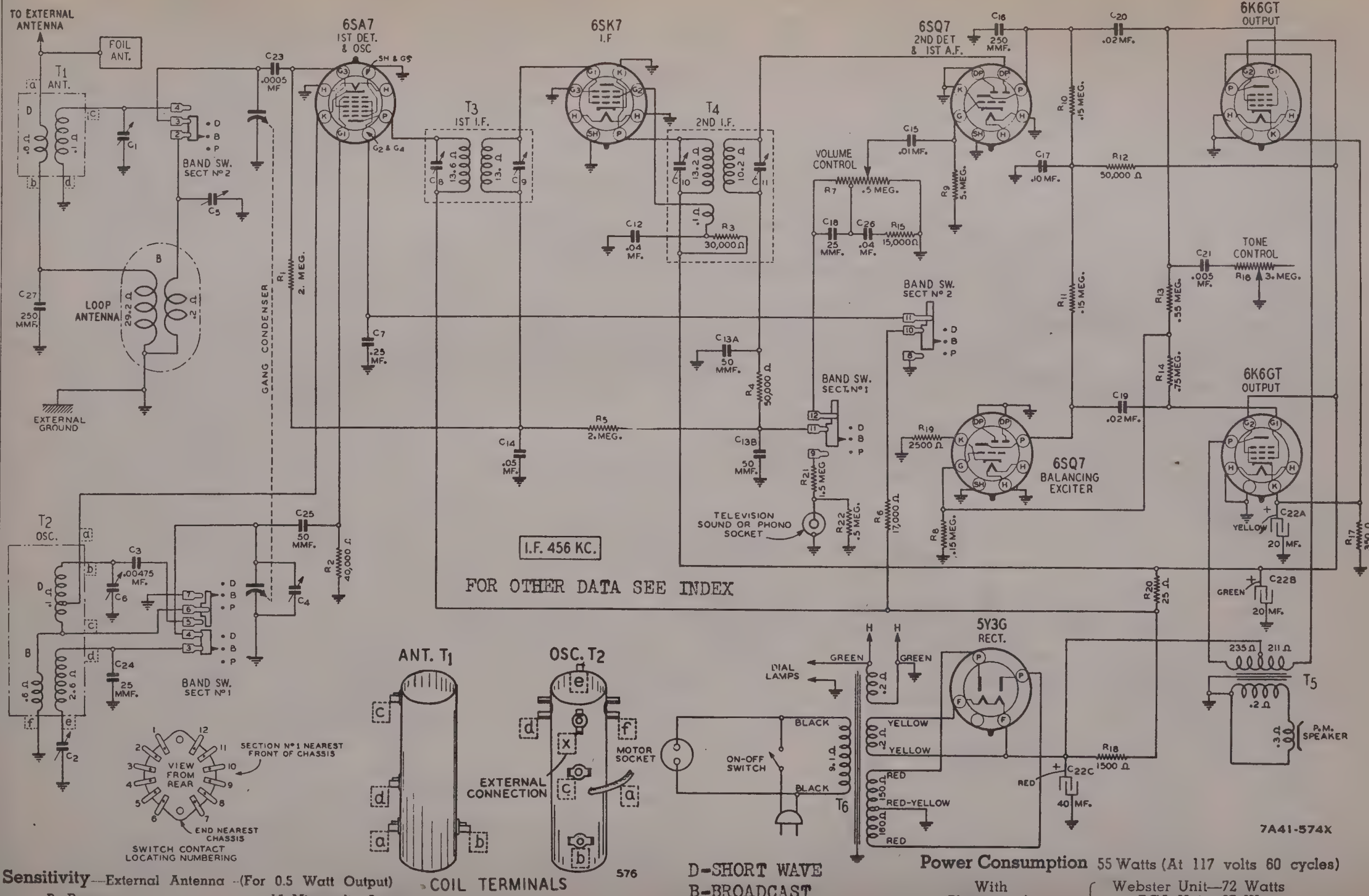
Sensitivity—External Antenna—(For 0.5 Watt Output)
B Range.......................15 Microvolts Average
D Range.......................45 Microvolts Average



ISSUES "B AND C"

MODEL 7A41-574X

WELLS-GARDNER & CO.



Sensitivity—External Antenna—(For 0.5 Watt Output)

B Range........................15 Microvolts Average
D Range........................45 Microvolts Average

D-SHORT WAVE
B-BROADCAST
P-PHONOGRAPH

Power Consumption 55 Watts (At 117 volts 60 cycles)

With Phonograph Operating	
	Webster Unit—72 Watts
	RCA Unit—67 Watts
	Seeburg Unit—71 Watts

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

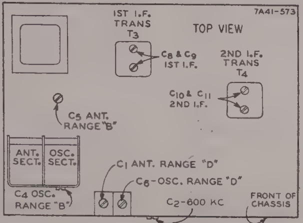
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis and top plate from cabinet as explained in the article on this subject. Remove top plate from chassis. Then place chassis on a stand in such a way that the loop connection plugs can be reinserted in the loop sockets on the chassis.					
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C8) & (C9) 2nd I.F. (C10) & (C11)
RANGE B 1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C2) Rock Rotor—See Note B
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
LOOP RANGE B 1400 KC See Note C	None See Note C		B Range	Turn Rotor to Max. Output	Ant. Range B (C5)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Operating the Automatic Phonograph

The operation of the phonograph is simple but the phonograph instruction folder packed with this instruction book should be carefully read and understood before an attempt is made to put the record changer in operation.

The volume and tone controls are used in the same manner for phonograph reproduction as they are for radio reception—See article "Operating the Radio."

To Turn the Phonograph On

Turn the on-off switch knob to the right. (See illustration—Page 2.) A click will be heard and the dial will light. Wait 30 seconds for the tubes to heat.

Turn the Phonograph-Radio knob to the phonograph (P) position—See illustration.

For detailed instructions regarding the operation of the automatic record changer, see the phonograph instruction folder.

To Turn the Phonograph Off

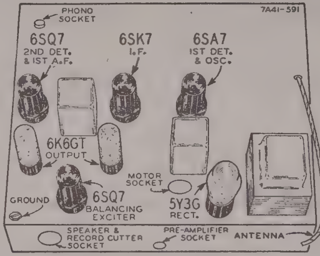
The instructions for turning off the automatic record changer are given in the phonograph instruction folder. Be sure to turn the radio on-off switch knob to the left. A click will be heard and the dial lamps will be off.

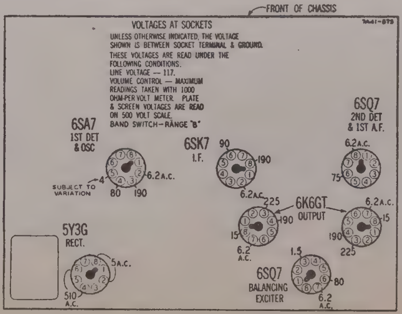
Television-Frequency Modulation -Home Recorder

Television Sound Connections

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter."

On the top of the chassis base is a socket to which is connected the phono cable shielded pin tip. Upon removal of this pin tip, the connector on the cable from a television receiver can be inserted in the socket. (The cable connector must be a single shielded pin tip type, Part No. 6A224.)





VOLTAGES AT SOCKETS

UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND.

THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS.
LINE VOLTAGE — 117.
VOLUME CONTROL — MAXIMUM
READINGS TAKEN WITH 1000 OHM-PER VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.
BAND SWITCH—RANGE "B"

BOTTOM VIEW OF CHASSIS

When Television sound reproduction is desired, the Phonograph-Radio knob should be turned to the Phonograph (P) position. For radio reception, the knob should be in one of the two Radio positions.

Frequency Modulation Connections

If Frequency Modulated programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce these programs in conjunction with any Frequency Modulation Converter.

The connection to the chassis is exactly the same as explained in the preceding article "Television Sound Connections."

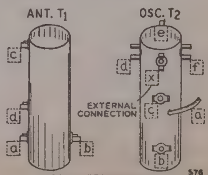
When Frequency Modulated programs are desired, the Phonograph-Radio knob should be turned to the Phonograph (P) position. For radio reception, the knob should be in one of the two Radio positions.

Home Recorder

This radio is designed so that you may take advantage of a *new* and extremely interesting form of entertainment. By replacing the record changer unit in this radio with a unit which includes a record cutter and a record changer, the new world of making your own records is opened to you.

Your favorite radio programs, comedy, dance or symphony may be permanently recorded. By means of a microphone attachment, voice or music of your own production may be recorded.

For detailed information regarding this record cutter unit, get in touch with the dealer from whom the radio was purchased.



COIL TERMINALS

Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted. A 14 ampere fuse is used.

Dial Lamp Cable

Insert the dial lamp assembly in the hole at the top of the lamp housing as indicated in Fig. 3. The dial lamp used in this unit is a 6-8 volt automobile type lamp (Bulb No. 51).

Suppression of Motor Noise

The following procedure has been found to be effective in reducing motor noise to a satisfactory level in most cars. Follow the steps in the order given. Additional procedure, which may be required in exceptional cases of motor noise, is not covered here and will be found by referring to current literature on this subject.

GENERATOR CONDENSER—A generator condenser is required in all cases. Connect the condenser lead to the battery terminal of the generator. The case and mounting strap connect the other side of the condenser to ground. This unit must, therefore, be well grounded at its mounting.

CAUTION—In cars with automatic regulators, it is important not to connect the condenser across the field terminal. Most manufacturers at the present time have a recommendation for the proper post at which to connect the condenser.

DISTRIBUTOR SUPPRESSOR—A distributor suppressor will be required in most cases. Remove the high tension lead to the distributor. Insert a distributor suppressor and connect the wire to the other end of the suppressor (See Fig. 7). If this is not practical, cut the high tension lead *close to the distributor* and use a wood screw end type distributor suppressor in this line.

Withdraw Antenna Cable Plug

Turn on the radio and start the motor.

If motor noise is heard, proceed as follows:

BONDING CABLES—Try grounding to the fire wall all cables and tubing which pass through it such as oil lines, gas lines, etc. By means of a file, contact can be established between any of the lines and the fire wall in order to determine whether such a ground will reduce the noise. To bond the cables to the fire wall, clean the point of contact, wrap a length of braided shielding around the cable, and solder the connection. Then solder the end of the shielding to the fire wall or ground it under a screw head if one is convenient.

Sufficient play should be left in the bonding shielding so that movement of the cables or tubing will not loosen this shielding from the fire wall.

BONDING STEERING COLUMN, ETC.—It is possible for the steering column, foot pedals, and brake lever to carry interference to the back of the fire wall at which point it may affect the radio. See if each of these items is well grounded to the frame of the car. By means of a file or a braided shielding jumper, contact can be established between any of these items and the frame in order to determine whether or not such a ground will reduce the noise. A piece of one inch braided shielding should be used if such a ground is necessary and this shielding may be grounded under a screw head, nut, or may be soldered in position.

Then Reinsert Antenna Cable Plug

If motor noise is heard when the antenna cable is reconnected, proceed as follows until the noise is satisfactorily reduced:

DOME LIGHT LEAD—Noise due to radiation from the dome light lead is generally experienced only when a roof antenna is being used. Disconnect the dome light lead connection at the back of the instrument panel and ground this wire. If this is found to reduce the noise noticeably, interference is being radiated by the dome light lead. Reconnect the dome light lead and then connect a .5 mfd. bypass condenser between the point at which this lead leaves the pillar post and ground.

BYPASS CONDENSERS—Try a .5 mfd. bypass condenser from the ammeter to ground and see if interference is reduced. Install this condenser permanently if there is an improvement.

In like manner, try a .5 mfd. condenser from car fuse to ground, switch to ground, tail light and stop light connections to ground, windshield wiper and various other 6 volt connections to ground, noting what effect these condensers have on the noise pick-up.

Try a .5 mfd. condenser from the "Hot" side of the coil primary to ground.

The electric gauges used for oil, water, and gas are often a source of interference and bypass condensers should be tried.

HIGH AND LOW TENSION LEADS—In some cases, the high and low tension leads between the coil and distributor are run close together. In some cars, they are in the same conduit. If this is the case, remove the low tension lead from this conduit. In any event, keep the high and low tension leads as far apart from each other as possible. If separating the two leads is not sufficient, shield and ground the shield of the low tension lead.

GROUNDING MOTOR AND OTHER PARTS—The motor must, in every case, be well grounded to the frame of the car. If it is not, use a very heavy braided lead for this purpose, similar to a storage battery ground lead. In like manner, it may be necessary to check the grounding of the metal fire wall, instrument panel, transmission, radiator, hood, and muffler to the frame of the automobile. To obtain a good electrical connection, scrape off the paint, if necessary, at the point where ground contact is made.

PEENING ROTOR ARM—In extreme cases of motor noise, it is advisable to peen the distributor rotor arm, that is, increase the length of the arm by using a small machinist's hammer. This will lessen the gap between the rotor arm and the stationary contacts thus reducing the spark. Be sure, after peening the arm, that it does not strike the stationary contacts.

SPARK PLUG SUPPRESSORS—If motor noise persists, spark plug suppressors must be installed. One suppressor is put on each plug. These are not regularly supplied with the radio and must be purchased extra. Ninety-five percent of all cars will not require spark plug suppressors.

Care should be taken that a good mechanical and electrical connection is made between the spark plugs, suppressors, and plug wires.

WHEEL OR BRAKE STATIC—Noise from this source is generally experienced only when an under car antenna is being used. To determine if noise is being caused from this source, set the car in motion; then with the motor shut off and the clutch disengaged, apply the brakes. If the noise stops, the source of the static is in the wheels. The use of a front or rear wheel static eliminator will generally end the trouble.

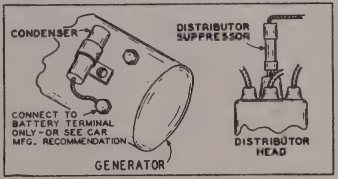

CONDENSER
DISTRIBUTOR SUPPRESSOR
CONNECT TO BATTERY TERMINAL ONLY-OR SEE CAR MFG. RECOMMENDATION
DISTRIBUTOR HEAD
GENERATOR

Fig. 7—Generator Condenser and Distributor Suppressor

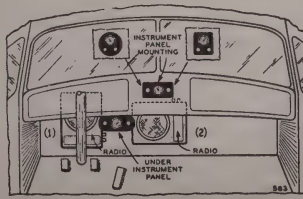


Fig. 1—Control Assembly and Chassis Mountings

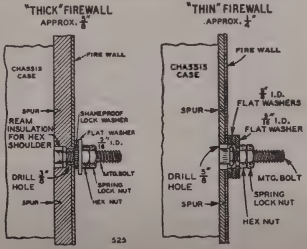


Fig. 2—Details of Chassis Mounting

Procedure for Setting the Stations

There are 6 positions of the Automatic Station Mechanism. Five of these are Automatic Station positions and one is the Manual Tuning position. A sixth station may be tuned in with the Manual Tuning Knob. If the position of this knob is not disturbed, the sixth station will be automatically tuned in when the Automatic Station Mechanism is in the Manual Tuning position.

The different positions are reached by pushing the Automatic Station Knob firmly and gently all the way in and releasing this knob so that it snaps all the way back. Pushing in the knob once in this manner will advance the mechanism to the next position, twice will move it to the second position, etc.

When the radio is in the Manual Tuning position, the dial is illuminated. When it is in any of the 5 station setting positions, one of the numbers on the Automatic Station Knob is illuminated.

Five stations may be set for Automatic Tuning. A sixth station may also be automatically tuned in at the Manual Tuning position as explained above.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the stations in frequency order.

Any station setting position may be used for any station you can receive although it is better to put the stations on your list in frequency order.

In the Chicago area, for example, the following stations might be listed:

Position	Station	Frequency	From Manual Tuning Position
No. 1	WMAQ	670 KC	1 Push
No. 2	WGN	720 KC	2 Pushes
No. 3	WBBM	770 KC	3 "
No. 4	WLS	870 KC	4 "
No. 5	WCFL	970 KC	5 "
No. 6	MANUAL TUNING		6 "

First get the mechanism in the Manual Tuning position. If the dial is illuminated, it is already in this position. If one of the numbers on the Automatic Station Knob is illuminated, depress this knob one or more times until every number is dark.

Select the first station from the list you have made and carefully tune in this station by rotating the Manual Tuning Knob. Determine what program is being broadcast.

Then advance the mechanism to position No. 1 by depressing the Automatic Station Knob once. As shown in Fig. 3, there are 5 small holes in the chassis case through which the station setting screws are reached.

Insert a small bladed screwdriver in the opening for setting screw No. 1 and turn this screw in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with lower kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with higher kilocycle numbers.

There is a card supplied with the radio on which is a frequency scale. Using the screwdriver as a guide, this scale will show the approximate frequency (kilocycle number) at which the setting screw is set.

Be sure not to tune in some other station broadcasting the same program. Turn the screw slowly back and forth until this station is carefully tuned in to the clearest and loudest point. The final motion of the setting screw should be to the right (clockwise). The station is now set for position No. 1.

Next advance the mechanism to position No. 2 by depressing the Automatic Station Knob once more. Tune in the second station on your list by adjusting setting screw No. 2 as explained above.

If you have difficulty in knowing when this station is tuned in, push the Automatic Tuning Knob 4 times to reach the Manual Tuning position. Then tune in this station with the Manual Tuning Knob, noting the program that is being broadcast. Push in the Automatic Station Knob twice to get the mechanism back into position No. 2 and again tune in this station by carefully adjusting setting screw No. 2 until the station is clearest and loudest.

Proceed in like manner to set any remaining stations on your list.

SPECIFICATIONS

Power Consumption	8.1 Amperes at 6.3 Volts
Power Output	6 Watts Undistorted 8 Watts Maximum
Sensitivity	1 Microvolt at .5 Watt Output (L-D Switch in Distance Position)
Selectivity	38 KC Broad at 1000 Times Signal
Tuning Frequency Range	540 to 1560 KC
Intermediate Frequency	456 KC
Speaker	6" Electro-Dynamic

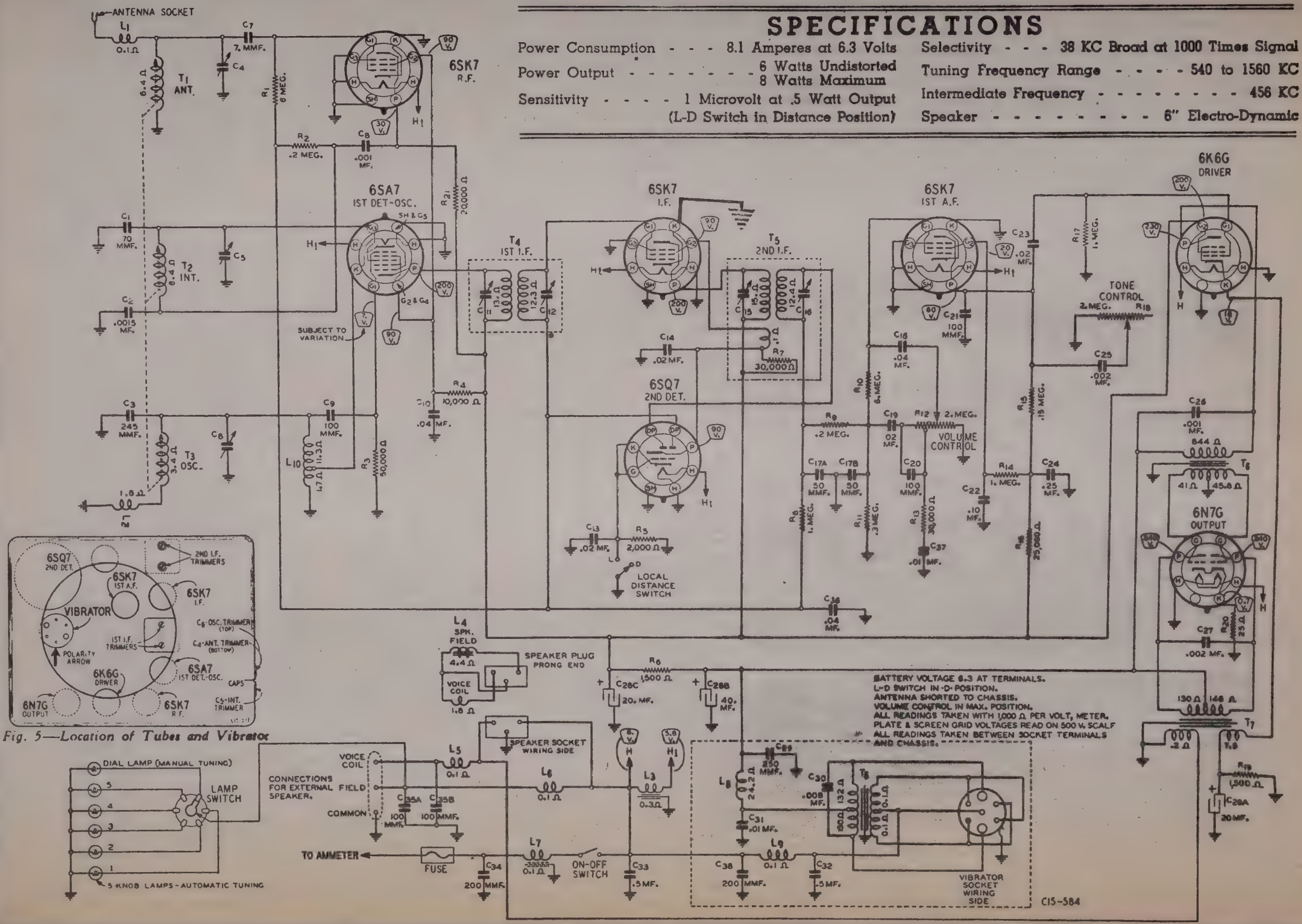


Fig. 5—Location of Tubes and Vibrator

BATTERY VOLTAGE 6.3 AT TERMINALS.
L-D SWITCH IN ·D· POSITION.
ANTENNA SHORTED TO CHASSIS.
VOLUME CONTROL IN MAX. POSITION.
ALL READINGS TAKEN WITH 1,000 Ω PER VOLT, METER.
PLATE & SCREEN GRID VOLTAGES READ ON 500 V. SCALE
ALL READINGS TAKEN BETWEEN SOCKET TERMINALS AND CHASSIS.

Antenna

Practically all car antennas at the present time are supplied with a shielded lead-in cable. The total capacity of the antenna and shielded lead-in should be 35 to 60 mmf. It is recommended that the antenna and lead-in be a type approved by the factory.

The plug on the antenna cable is inserted in the socket at the side of the chassis case as shown in Fig. 3. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Types of Low Capacity Antennas—"Fishpole" type, such as door hinge and cowl; over-the-roof types which are short and are mounted quite a distance from the metal roof of the car.

Mount the antenna on the same side of the car as the radio.

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (70 to 500 mmf. total capacity of antenna and shielded cable), one of two procedures must be followed. If a short length antenna cable is being used, a 24 inch shielded adapter extension cable may be obtained. If a long antenna cable such as a 60 inch antenna cable is being used with the high capacity antenna a small adapter only need be purchased. Either of these two procedures will adapt the high capacity antenna circuit to the low capacity antenna input circuit. In both cases the correct adapter should be inserted in the socket at the side of the chassis case. Then the antenna cable plug should be inserted in the adapter.

Types of High Capacity Antennas—Over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built-in roof antennas (not metal roof). Under car antennas (These are usually high capacity) are not recommended for this radio.

ANTENNA CABLE

Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the "fishpole" and over-the-roof type antenna, the lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

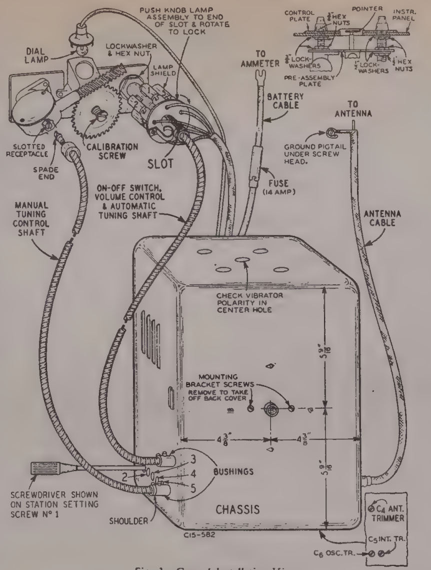


Fig. 3—General Installation View

ALIGNMENT PROCEDURE

Remove Grille, Speaker, Trimmer Caps and Rear Cover From Chassis Case—(See Figs. 3 and 5).

Volume Control—Maximum All Adjustments.

Local-Distance Switch—"Distance" Position.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 5)
I.F.				
456 KC	Control Grid (prong No. 8) 6SA7 1st Det. Tube	.05 mf.		1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
OSCILLATOR				
1560 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C6)
1000 KC ADJUSTMENT				
1000 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)
Reassemble Radio—Install in Car—Connect Car Antenna to Radio.				
Car Antenna Readjustment—Tune in weak signal near 1000 KC—Readjust Antenna Trimmer C4 for maximum output.				

NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the pointer disc shaft is the calibration screw. Turn this screw with the fingers until the pointer on the dial scale is at the frequency of the station being received.

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (—) terminal of the car battery is grounded, line up the — mark on the top of the vibrator with the arrow on the chassis base.

On one side of the chassis case is a hole (See Fig. 3) through which may be seen the vibrator. If a red stripe is seen on the side of the vibrator, the vibrator is inserted for cars on which the positive terminal of the battery is grounded. If no paint mark is visible, the vibrator is inserted for cars with the negative terminal of the battery grounded.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C4) up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibration

(For Later type control with no stop on pointer shaft).

Tune to a station of known frequency (about 850 KC). Turn the knurled calibration screw at the back end of the pointer disc shaft one complete turn (360 degrees) in a clockwise direction (from back of instrument panel). Then continue to turn the screw in a clockwise direction until the pointer is at the frequency of the station being received.

Mounting Speaker in Back of Instrument Panel Grille

Some automobiles have a grille in the instrument panel, in back of which a speaker may be mounted. The speaker may be taken out of the case should it be desired to mount it in back of such a grille.

Remove the grille plate and speaker from the case (see article "Replacing Tubes and Vibrator"). Pull out the speaker plug. Replace the grille, putting the round cardboard gasket under the grille. Cut off the bare ground wire on the speaker as shown in Fig. 4.

At one side of the speaker grille is a rectangular cover. Unscrew the screw at each end and remove this cover. Three clips, each a different color, will be seen. Using the 24 inch, 3 wire cable supplied with the radio, match the color of each wire with a clip and insert the solid pin tips in the clips—See Fig. 4. Pass the cable through the same hole in the cover provided for the other wires. Push each of the connectors at the other end of the cable over the proper prong of the speaker plug, matching the color as shown in Fig. 4. Be sure the insulating sleeves cover the connectors completely. Tape over the speaker plug and connectors. Replace the cover.

Two perforated straps are provided which may be used as mounting brackets to secure the speaker in back of the grille. The method of mounting will vary in different cars. If the spring clamps on the back of the speaker frame interfere with the mounting, they may be cut off.

In the mounting shown in Fig. 4, the long and short straps have each been cut in two pieces and attached as indicated. The speaker should be supported at two points on the rim 180 degrees apart.

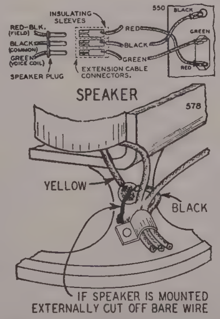
Secure the straps under any nearby screw head or nut which is convenient. Frequently it will be advisable, as shown in Fig. 4, to bend the straps under the flange at the bottom of the instrument panel and then drill two holes in the flange through which to extend the mounting bolts.

A piece of cardboard is provided for use as a baffle. This is cut for a 5¼ inch speaker which may be purchased if it is required. The outline of the hole necessary for a 6 inch speaker (speaker in radio) is shown on the cardboard. Cut the cardboard to size so that it covers all of the grille opening that is not covered by the speaker.

Several pieces of felt are also provided to be used around the rim of the speaker in those cars in which the grille is curved or bent.

Replacing Tubes and Vibrator

To replace the tubes or vibrator, remove the screw on the grille plate. Take off grille plate and pull the speaker out of the case. The speaker is held in place by 2 spring clamps. The tubes and vibrator are now accessible for replacement.



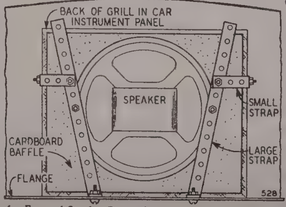
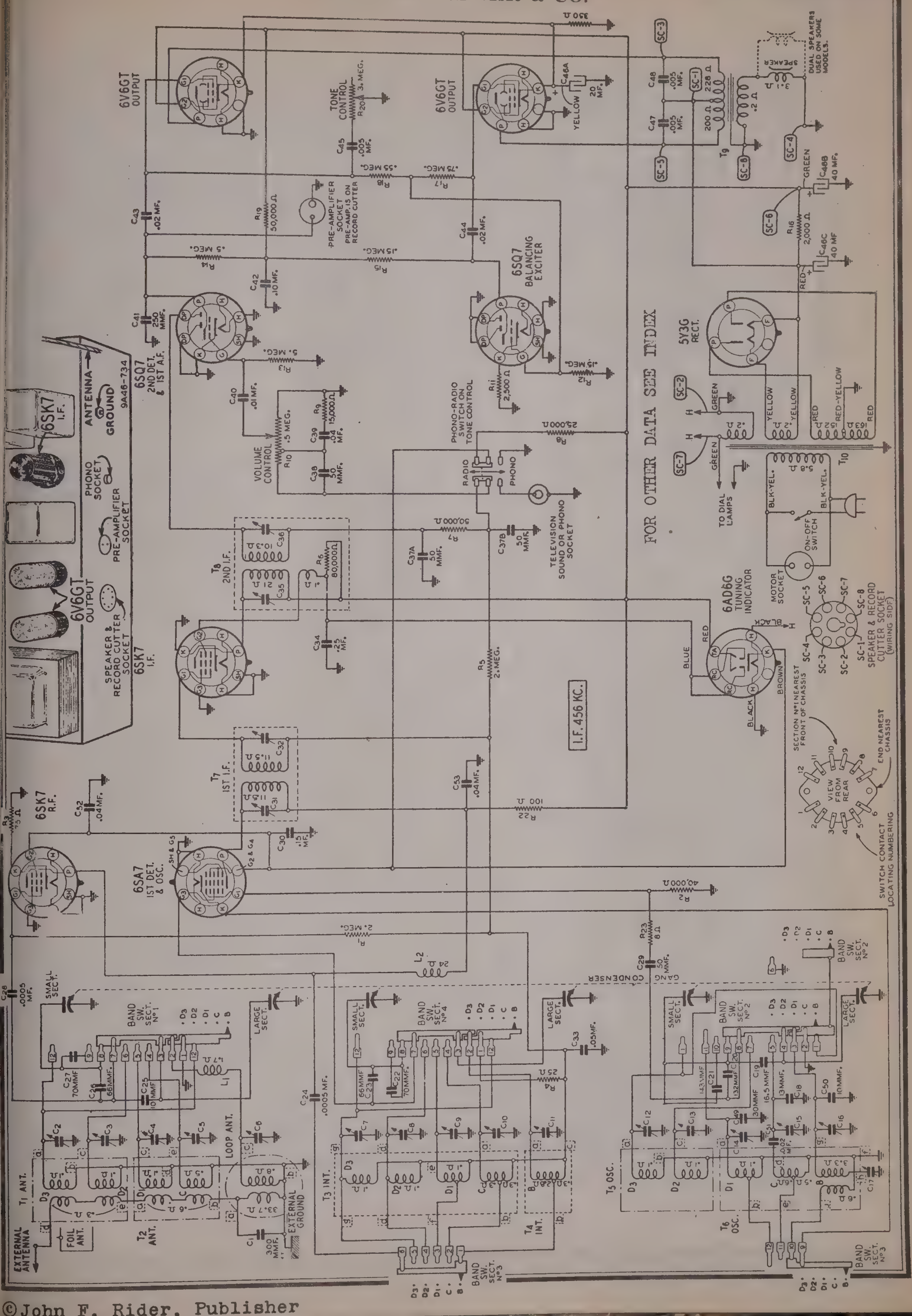


Fig. 4—External Speaker Connections, One Method of Mounting, and Cutting Off Bare Ground Wire When Speaker is Mounted Externally.

WELLS-GARDNER & CO.

MODEL 9A46



FOR OTHER DATA SEE INDEX

Series 9A46

ALIGNMENT PROCEDURE

Volume Control—Maximum All adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet—Reconnect loop antenna plugs.					
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C31) & (C32) 2nd I.F. (C35) & (C36)
RANGE B 1730 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C16)
1500 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C6) Int. Range B (C11)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C17) Rock Rotor—See Note B
RANGE C 7400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C15)
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Ant. Range C (C5) Int. Range C (C10) Rock Rotor—See Note B
RANGE D_1 12,300 KC	Antenna Lead	400 Ohm	D_1 Range	Turn Rotor to Full Open	Oscillator Range D_1 (C14)
11,900 KC	Antenna Lead	400 Ohm	D_1 Range	Turn Rotor to Max. Output	Ant. Range D_1 (C4) Int. Range D_1 (C9) Rock Rotor—See Note B
RANGE D_2 15,450 KC	Antenna Lead	400 Ohm	D_2 Range	Turn Rotor to Full Open	Oscillator Range D_2 (C13)
15,250 KC	Antenna Lead	400 Ohm	D_2 Range	Turn Rotor to Max. Output	Ant. Range D_2 (C3) Int. Range D_2 (C8) Rock Rotor—See Note B
RANGE D_3 21,800 KC	Antenna Lead	400 Ohm	D_3 Range	Turn Rotor to Full Open	Oscillator Range D_3 (C12)
21,500 KC	Antenna Lead	400 Ohm	D_3 Range	Turn Rotor to Max. Output	Ant. Range D_3 (C2) Int. Range D_3 (C7) Rock Rotor—See Note B
LOOP RANGE B 1500 KC	Antenna Lead See Note C	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C6)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

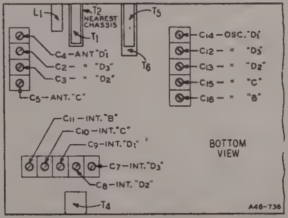
After each range is completed, repeat the procedure as a final check.

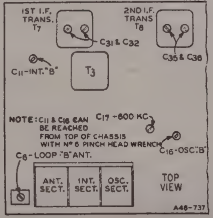
NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

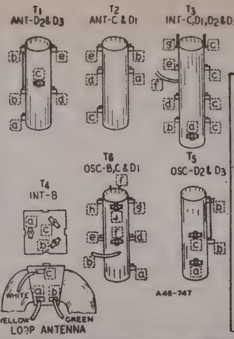
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

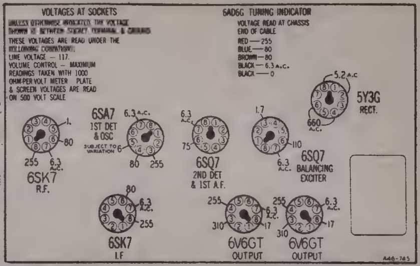
NOTE C—Re-assemble chassis in cabinet.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.









PROCEDURE FOR SETTING THE STATION BUTTONS

SELECTING THE STATIONS TO BE SET

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

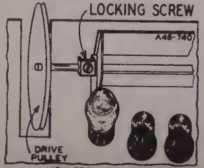
Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

SETTING A STATION BUTTON

Unlock the push button tuning mechanism from the back of the radio. On the drive pulley shaft and at the left side (from back of radio) of the push button tuning assembly is a locking screw—See illustration.



VIEW FROM BACK OF CABINET

Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver.

Using a small handled screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob, using the tuning eye as a guide.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in.* It is better to start with the left hand button.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Slowly release the button after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

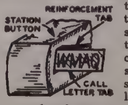
After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver. Then, with the SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks.

In Models With Transparent Buttons—Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

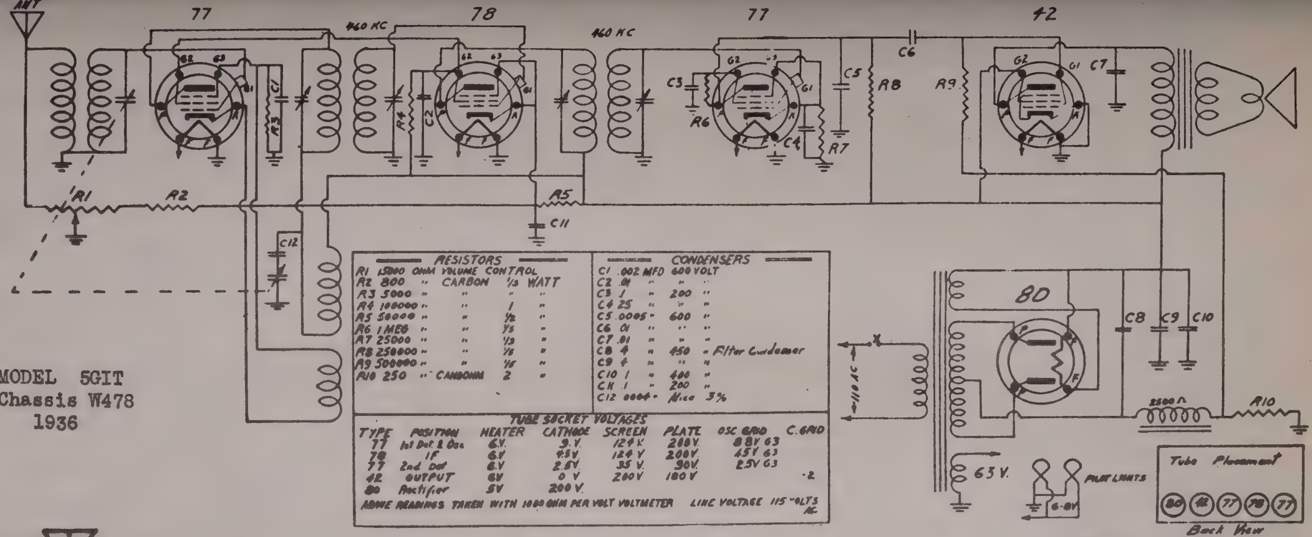
Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



In Models With Brown Opaque Buttons—Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

WESTERN AIR PATROL

MODEL 5G1T, Ch. W478
MODELS 15A, TR14,
TR40, TR44, Ch. W417



MODEL 5GIT
Chassis W478
1936

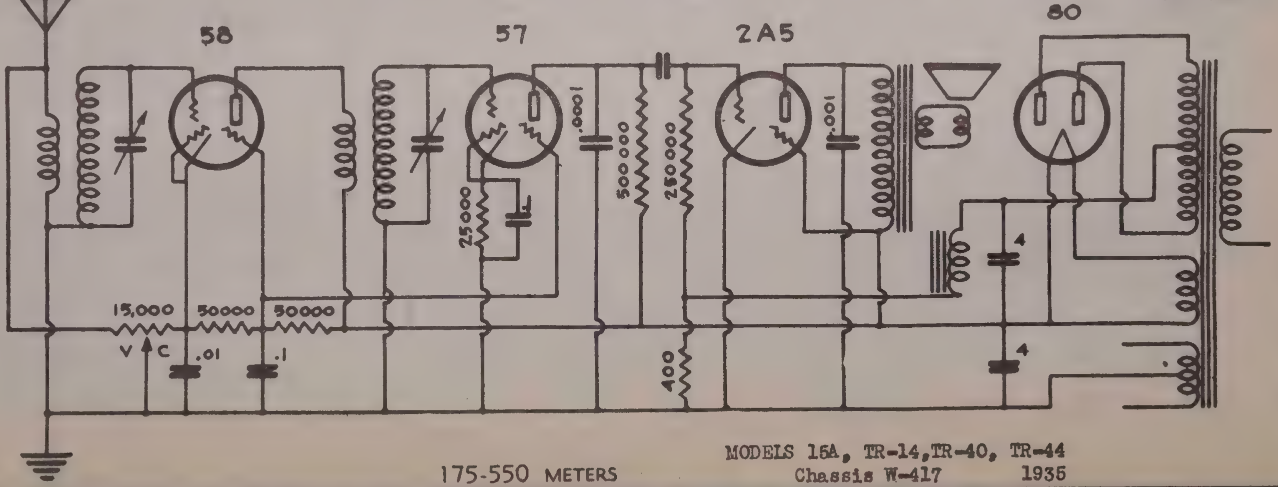
RESISTORS				
R1	15000 OHM	VOLUME CONTROL		
R2	800 "	CARBON	1/3	WATT
R3	5000 "	"	"	"
R4	100000 "	"	1	"
R5	50000 "	"	1/2	"
R6	1 MEG	"	1/5	"
R7	25000 "	"	1/3	"
R8	250000 "	"	1/5	"
R9	500000 "	"	1/5	"
R10	250 "	CARBOHM	2	"

CONDENSERS				
C1	.002 MFD	600 VOLT		
C2	.01 "	"	"	
C3	.1 "	200	"	
C4	25 "	"	"	
C5	.0005 "	600	"	
C6	.01 "	"	"	
C7	.01 "	"	"	
C8	4 "	450	"	Filter Condenser
C9	4 "	"	"	
C10	.1 "	400	"	
C11	.1 "	200	"	
C12	.0004 "	Mica	3%	

TUBE SOCKET VOLTAGES

TYPE	POSITION	HEATER	CATHODE	SCREEN	PLATE	OSC GRID	C. GRID
77	1st Det. & Osc	6.V.	9.V.	124 V	200 V.	8.8 V 63	
78	IF	6.V	4.5 V.	124 V	200 V.	4.5 V 63	
77	2nd Det	6.V	2.5 V.	35 V.	90 V.	2.5 V 63	
42	OUTPUT	6V	0 V	200 V	180 V		·2
80	Rectifier	5V	200 V.				

ABOVE READINGS TAKEN WITH 1000 OHM PER VOLT VOLTMETER   LINE VOLTAGE 115 VOLTS AC

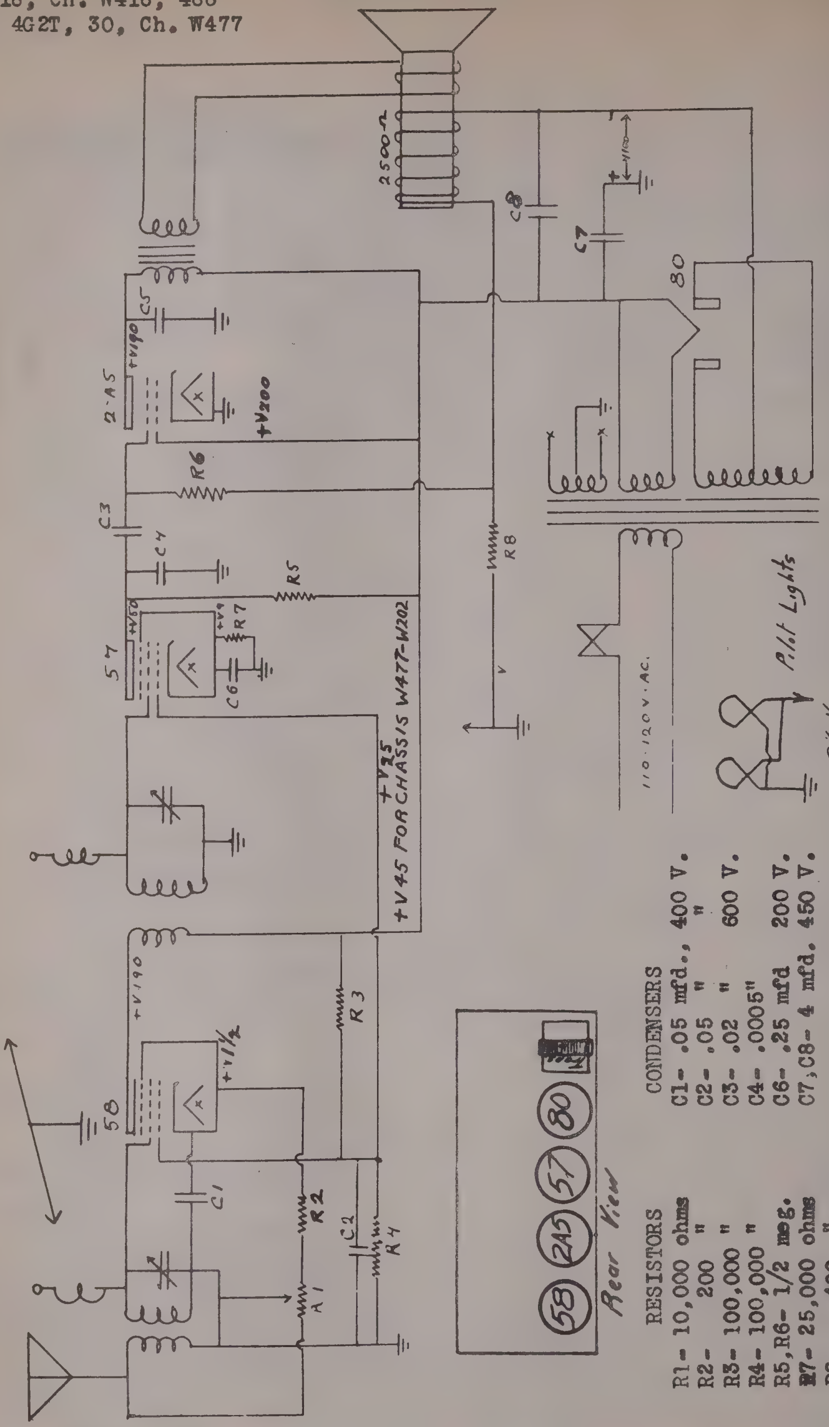


175-550 METERS

MODELS 15A, TR-14, TR-40, TR-44
Chassis W-417 1935

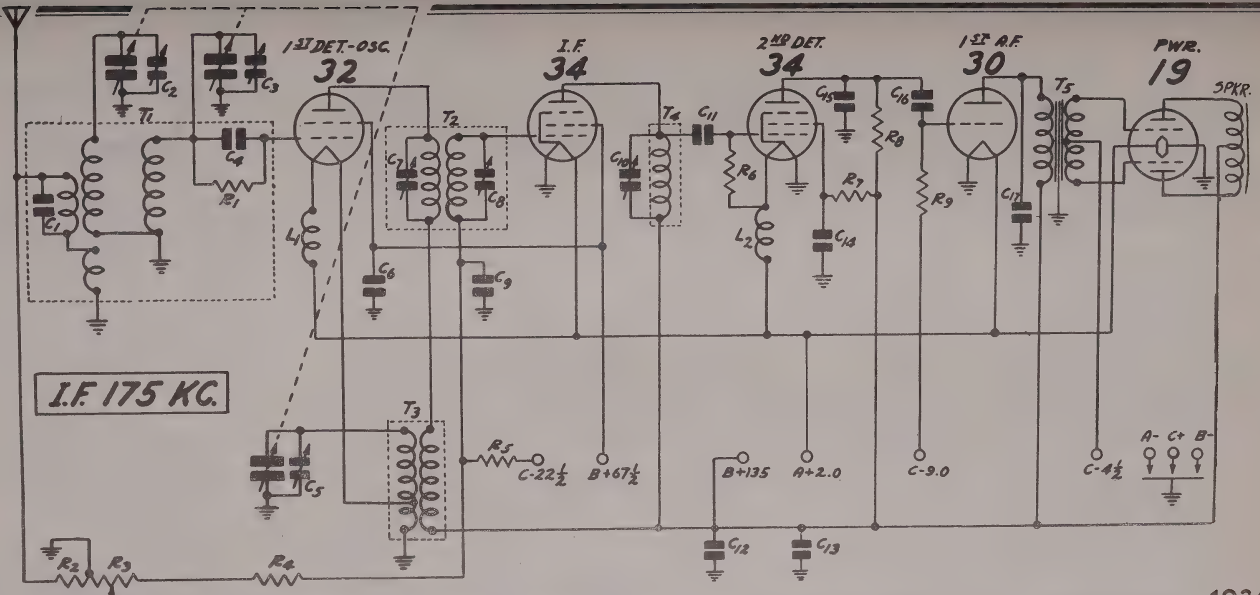
MODEL 17, Ch. W405
MODEL 18, Ch. W418, 488
MODELS 4G2T, 30, Ch. W477

WESTERN AIR PATROL



RESISTORS	
R1-	10,000 ohms
R2-	200 "
R3-	100,000 "
R4-	100,000 "
R5,R6-	1/2 meg.
R7-	25,000 ohms
R8-	400 "

CONDENSERS		
C1-	.05 mfd.,	400 V.
C2-	.05 "	"
C3-	.02 "	600 V.
C4-	.0005"	
C6-	.25 mfd	200 V.
C7,C8-	4 mfd.	450 V.



1936

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C1	150 MMF MOULDED	
C2	GANG TRIMMER	
C3	GANG TRIMMER	
C4	35 MMF MOULDED	
C5	GANG TRIMMER	
C6	.25 MF 180V.	
C7	40-100 MMF	DUAL (P-17A37)
C8	20-70 MMF	
C9	.05 MF 180V.	
C10	40-100 MMF (P-17A38)	
C11	50 MMF MOULDED	
C12	.10 MF 180V.	
C13	4.0 MF 150V. ELECTROLYTIC (P-45X28)	
C14	.10 MF 180V.	
C15	.002 MF 300V.	
C16	.006 MF 300V.	
C17	.002 MF 300V.	

R1	1.0 MEGOHM	.2 W.	
R2	10 000 OHM		VOLUME CONTROL (P-36X201)
R3	60 000 OHM		
R4	900 OHM	.2 W.	
R5	6 500 OHM	.2 W.	
R6	2.0 MEGOHM	.2 W.	
R7	100 000 OHM	.5 W.	
R8	40 000 OHM	.5 W.	
R9	1.0 MEGOHM	.2 W.	

L1	SINGLE FILAMENT REACTOR (P-9A281)
L2	SINGLE FILAMENT REACTOR (P-9A281)

T1	DOUBLE TUNED ANTENNA COIL (P-9A381)
T2	1ST I.F. COIL (P-9A383)
T3	OSC. COIL (P-9A382)
T4	2ND I.F. COIL (P-9A384)
T5	AUDIO INPUT TRANS. (P-50XH)

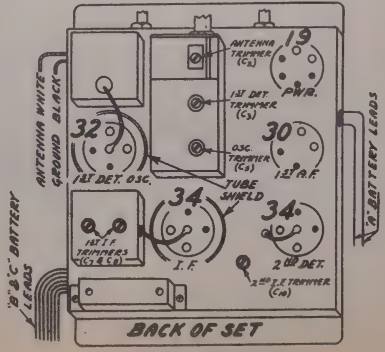


Fig. 8—Tube Arrangement

WESTERN AIR PATROL

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

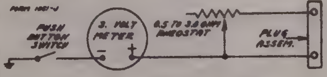


Fig. 5—Schematic Diagram of Voltage Regulator

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

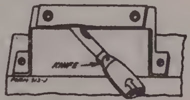


Fig. 6—Prying off Fiber Cover

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery

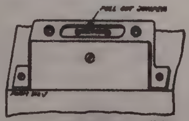


Fig. 7—Removing Jumper Wire

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about ¾" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. *If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.*

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by ¼" long round head machine screws and nuts.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

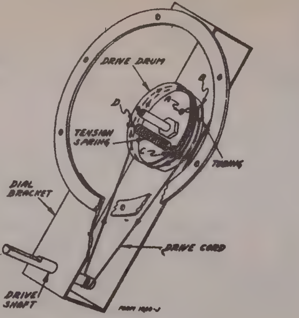


Fig. 9—Replacing Drive Cord

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted to Ground. B+135 Volts
.Voltages to Chassis

Type of Tube	Function	Across Fila-ment	Plate to Gnd.	Screen to Gnd.	Grid to Gnd.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		4.5	3.2 Total

(1) With 250,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at "C" battery.

Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

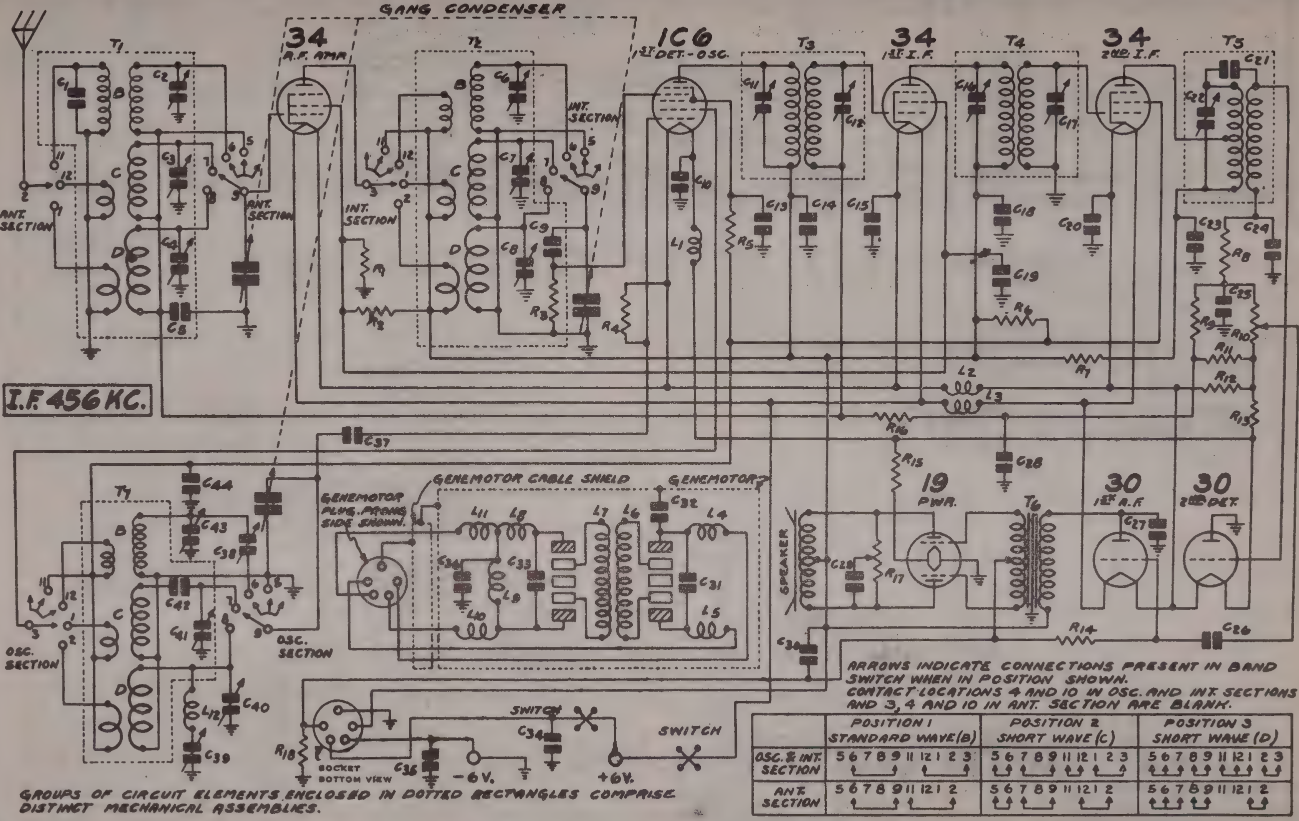
SPECIFICATIONS

Input Voltages	
"A" Battery	**2 Volts (.3 Amperes)**
"B" Batteries	**67½ and 135 Volts**
"C" Batteries	**4½, 9 and 22½ Volts**
Power Output	**1 Watt (Undistorted)**
Sensitivity	**15 Microvolts Absolute**
Tuning Range	**530 to 1750 KC**
Intermediate Frequency	**175 KC**
Speaker	**6" Magnetic**

WESTERN AIR PATROL

Power Consumption - 1.8 Amperes at 6.3 Volts
Power Output - - - - - -1 Watt Undistorted

Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1680 to 4800 KC.
D Range - - - - - - - - - - 5650 to 16000 KC.



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.
CONTACT LOCATIONS 4 AND 10 IN OSC. AND INT. SECTIONS AND 3, 4 AND 10 IN ANT. SECTION ARE BLANK.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. & INT. SECTION	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3
ANT. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 2-25 mmf.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 35 mmf.
C10 .25 mf. 180 V.
C11 70-150 mmf. } ONE
C12 70-150 mmf. } UNIT
C13 .05 mf. 180 V.
C14 20.0 mf. 150 V. Electrolytic
C15 .25 mf. 180 V.
C16 70-150 mmf. } ONE
C17 70-150 mmf. } UNIT
C18 .50 mf. 180 V.
C19 .85 mf. 180 V.
C20 .05 mf. 180 V.
C21 50 mmf.
C22 40-100 mmf.
C23 .05 mf. 180 V.
C24 100 mmf.
C25 50 mmf.
C26 .002 mf. 600 V.
C27 250 mmf.
C28 .01 mf. 180 V.
C29 .05 mf. 240 V.
C30 20.0 mf. 150 V. Electrolytic
C31 .25 mf. 180 V.
C32 .05 mf. 180 V.
C33 .25 mf. 180 V.
C34 .25 mf. 180 V.
C35 .25 mf. 180 V.
C36 .50 mf. 180 V.
C37 35 mmf.
C38 300-600 mmf. } ONE
C39 40-100 mmf. } UNIT
C40 2-25 mmf.
C41 2-25 mmf.
C42 1400 mmf.
C43 2-25 mmf.
C44 .25 mf. 18 V.

R 1 100,000 ohm .2 W.
R 2 60,000 ohm .2 W.
R 3 1 megohm .2 W.
R 4 100,000 ohm .2 W.
R 5 5,000 ohm .2 W.
R 6 10,000 ohm .5 W.
R 7 1,000 ohm .2 W.
R 8 60,000 ohm .2 W.
R 9 3 megohm .2 W.
R10 1 megohm Vol. Control
R11 1 megohm .2 W.
R14 3 megohm .2 W.
R16 500,000 ohm .2 W.
R17 150,000 ohm Tone Control
R12 12.5 ohm 1.0 W. } ARMORED
R13 12.5 ohm 1.0 W. } WIRE-WOUND
R15 .70 ohm .50 W. } RESISTOR
R18 150 ohm 2.0 W. }

T 1 Ant. R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 3rd I. F. Trans.
T 6 Push Pull Input Trans.
T 7 Osc. Inductors

L 1 Single Filament Reactor
L 2 } Double Filament
L 3 } Reactor
L 4 "B" Choke
L 5 "B" Choke
L6, L7, L8 & L9 Genemotor Windings
L10 "A" Choke
L11 "A" Choke
L12 Osc. Tracking Coil

Nov., 1935

MODEL 27E, Ch: W420

WESTERN AIR PATROL

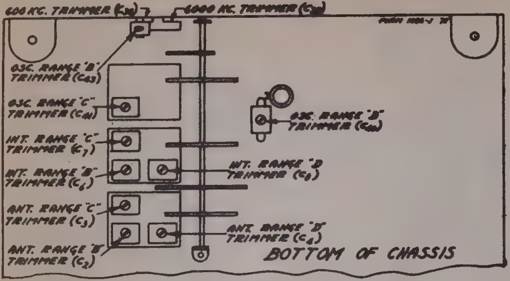

600 KC. TRIMMER
6000 KC. TRIMMER
OSC. RANGE "B" TRIMMER (C_{43})
OSC. RANGE "C" TRIMMER (C_{41})
OSC. RANGE "D" TRIMMER (C_{40})
INT. RANGE "C" TRIMMER (C_7)
INT. RANGE "B" TRIMMER (C_6)
INT. RANGE "D" TRIMMER (C_8)
ANT. RANGE "C" TRIMMER (C_3)
ANT. RANGE "D" TRIMMER (C_4)
ANT. RANGE "B" TRIMMER (C_2)
BOTTOM OF CHASSIS

Fig. 3—Arrangement of Trimmers

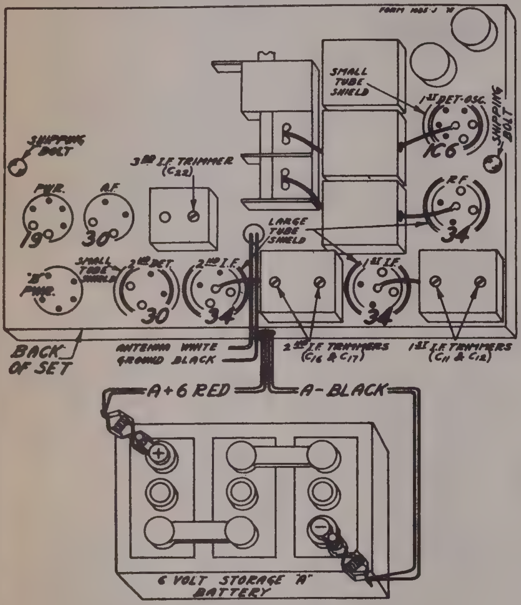


Fig. 4—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS
Antenna Shorted to Ground—Battery 6 Volts under load
Volume Control at Maximum

Type of Tube	Function	Across Fila-ment	Plate to Ground	Screen to Ground	Bias Voltage (see Notes)	Normal Plate M. A.
34	R. F.	2.0	135	45	1.5(1)	1.7
1C6	1st Det.	2.0	135 80(2)	70	2.0(3)	3.2 1.7(2)
34	1st I. F.	2.0	135	45	1.5(1)	1.7
34	2nd I. F.	2.0	135	80	4.0(3)	3.2
30	2nd Det.	2.0				
30	1st A. F.	2.0	135		8.0(4)	2.3
19	Power	2.0	135		3.9(5)	2.3 (per plate)

(1) As read from negative filament leg to low potential end of resistor R12.
(2) Anode Grid
(3) As read from negative filament leg to ground.
(4) Total voltage drop from negative filament leg to ground and across R18.
(5) As read across R18.

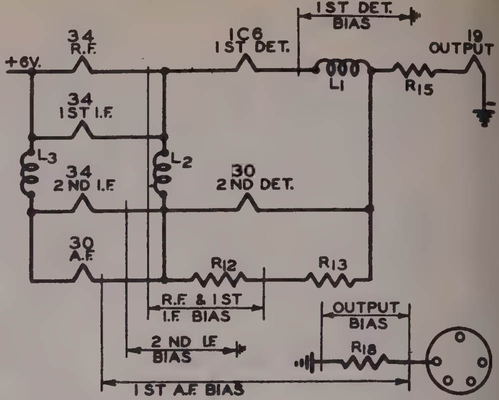


Fig. 6—Abridged Wiring Diagram showing Filament Wiring System and Points at which No-Signal Bias Voltages are obtained.

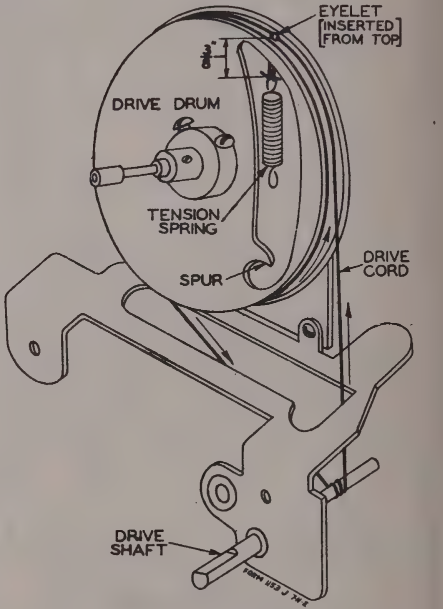


Fig. 7—Drive Cord Replacement

Battery Connections—CAUTION

CAUTION: Do not turn the switch on unless ALL the tubes are in the sockets.

CAUTION: Be sure that the battery clips are properly connected to the battery. If the connections are reversed, the receiver may be damaged.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C9—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 4. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

RANGE B ALIGNMENT

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C43) until maximum output is obtained. The location of this trimmer is shown in Fig. 5.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C6) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of the greatest intensity is obtained. See Fig. 5 for locatin of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

RANGE C ALIGNMENT

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band — green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C41) until maximum output is obtained. See Fig. 5 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C7) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

RANGE D ALIGNMENT

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C40) until maximum output is obtained. See Fig. 5 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of the greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the settings of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 5 for location of this trimmer.

REPLACING DRIVE CORD

Remove the chassis from the cabinet. Take off the station pointer by removing the screw at the center of dial. Loosen the two set screws in the collar on the band selector switch shaft. Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket. Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the dial drum until the opening in this drum is approximately vertical and with the hole at the top. Remove the tension spring and the old drive cord. When replacing this drive cord a 30 pound test cord as regularly supplied by the factory should be used.

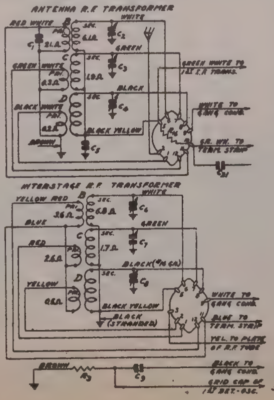
See that the eyelet is in the hole in the drive drum. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum. Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring. Now wrap the cord in a counter clock-wise direction (facing the front of the chassis) around the drive drum for approximately one and one half turns, progressing towards the front. Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and onehalf times around this shaft, progressing toward the back of the chassis. Wrap the cord on directly in line with the drive drum above. Then bring this cord up to the drive drum until it is up to the eyelet in the drive drum.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free and with the slack taken out of the drive cord should be three eights or less from the flang of the drum. Cut off the surplus length of the cord after it has been knotted.

Now secure the other end of the tension spring over the spur on the drive drum. Turn the drive shaft back and forth several times.

Replace the dial assembly and pointer.

Replace the chassis in the cabinet.



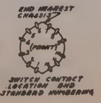
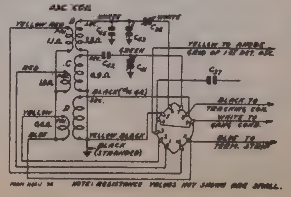
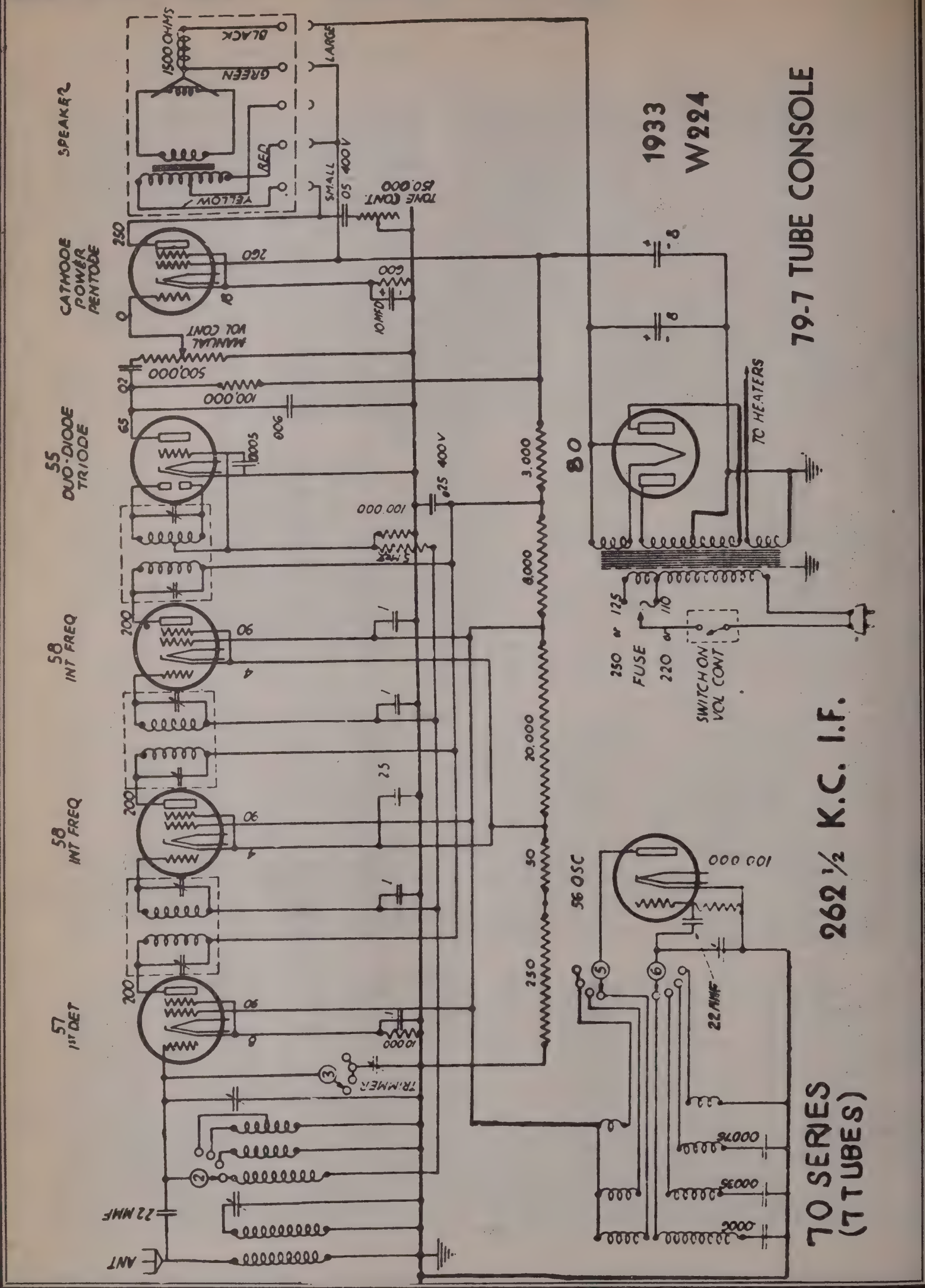


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings.
(Also see complete D. C. Resistance List Below)



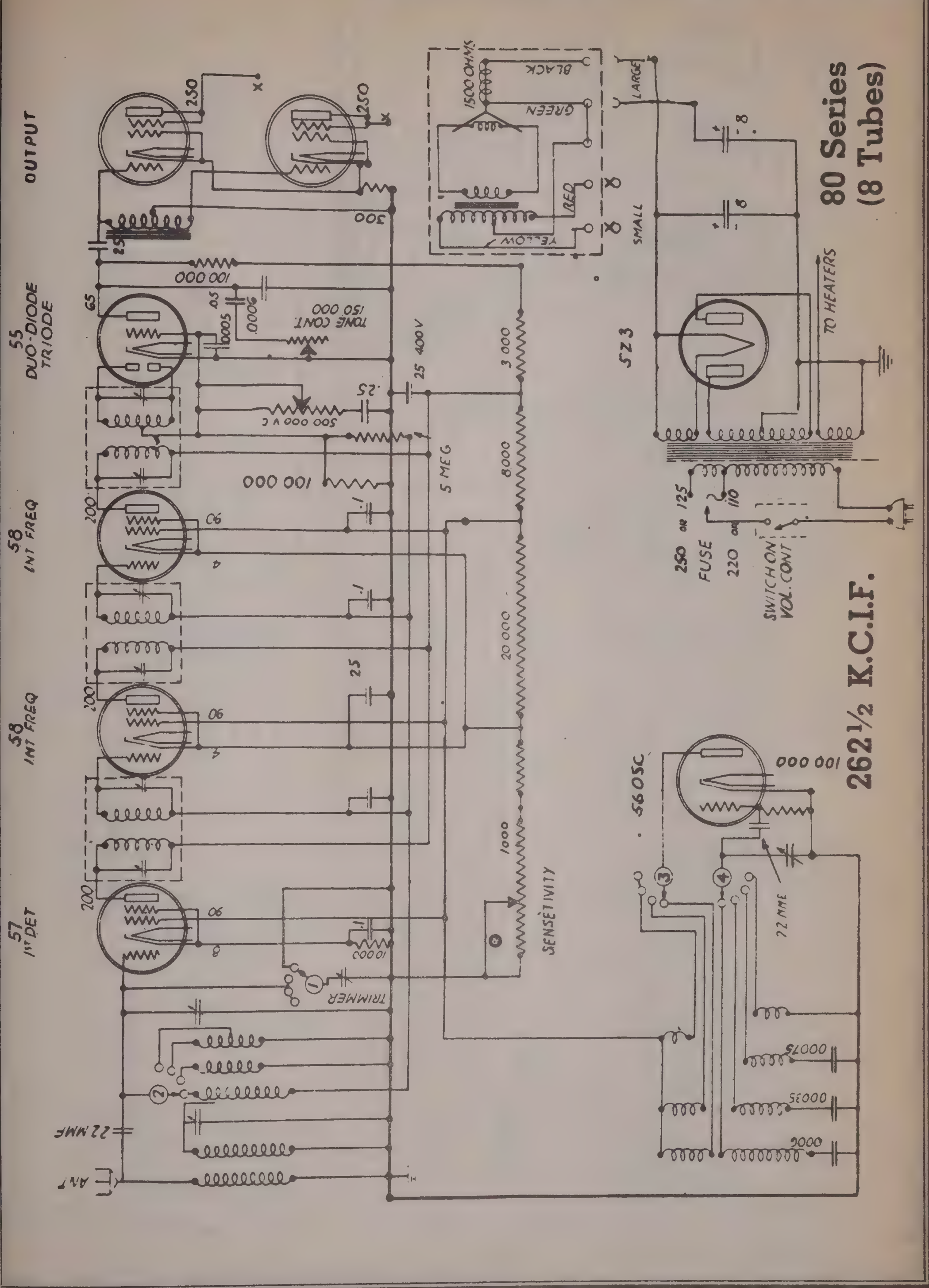
MODEL 79-7, Ch. W224

WESTERN AIR PATROL



WESTERN AIR PATROL

MODEL 79-8, Ch. W224

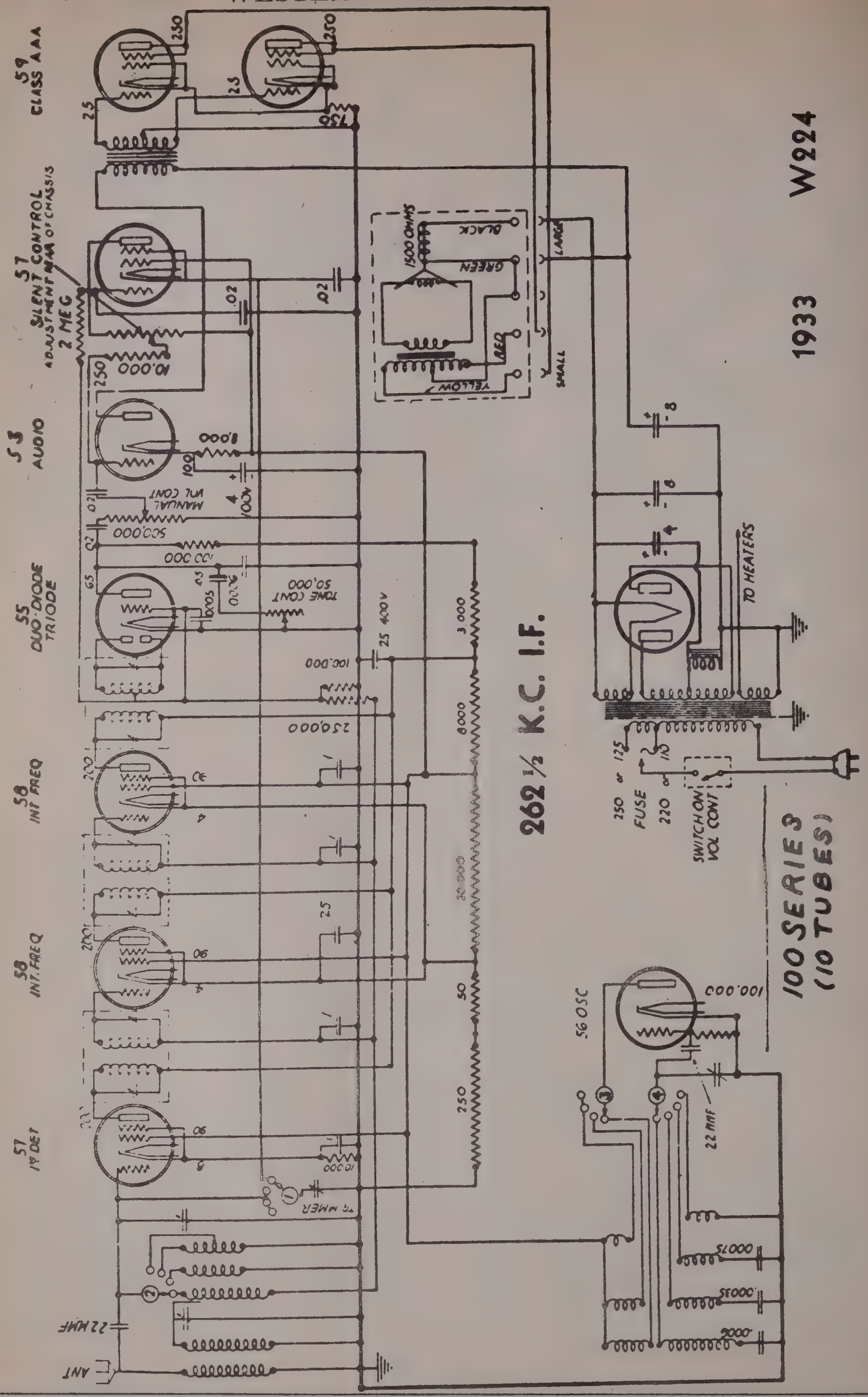


80 Series (8 Tubes)

262½ K.C.I.F.

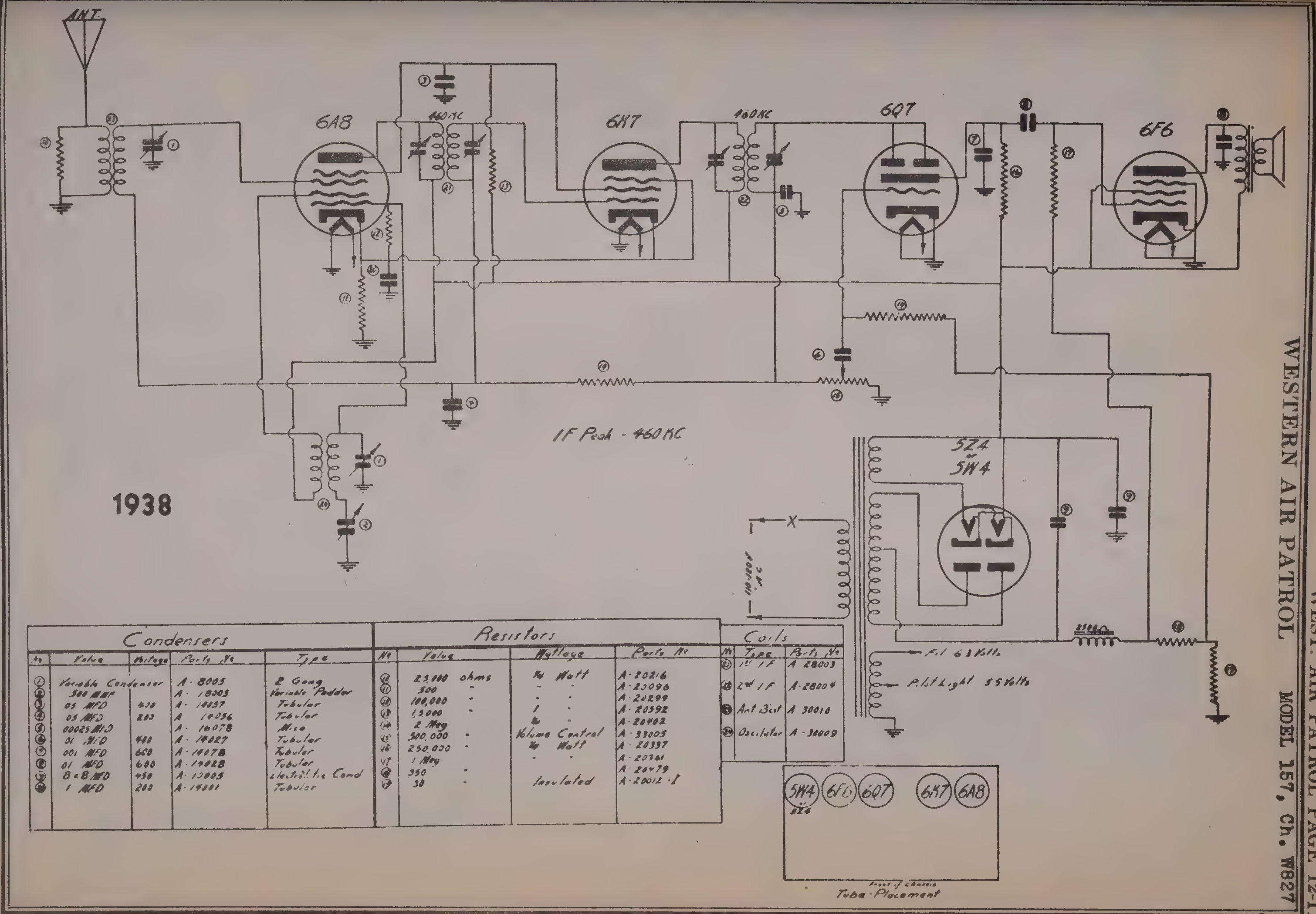
MODEL 79-10, Ch. W224

WESTERN AIR PATROL



WESTERN AIR PATROL

MODEL 157, Ch. W827



IF Peak - 460 KC

1938

Condensers

No	Value	Voltage	Parts No	Type
①	Variable Condenser		A-8005	2 Gang
②	500 MMF		A-18005	Variable Padder
③	.05 MFD	400	A-14037	Tubular
④	.05 MFD	200	A 14036	Tubular
⑤	.00025 MFD		A-16078	Mica
⑥	.01 MFD	400	A-14027	Tubular
⑦	.001 MFD	600	A-14078	Tubular
⑧	.01 MFD	600	A-14028	Tubular
⑨	8 x 8 MFD	450	A-17005	Electrolytic Cond
⑩	.1 MFD	200	A-14001	Tubular

Resistors

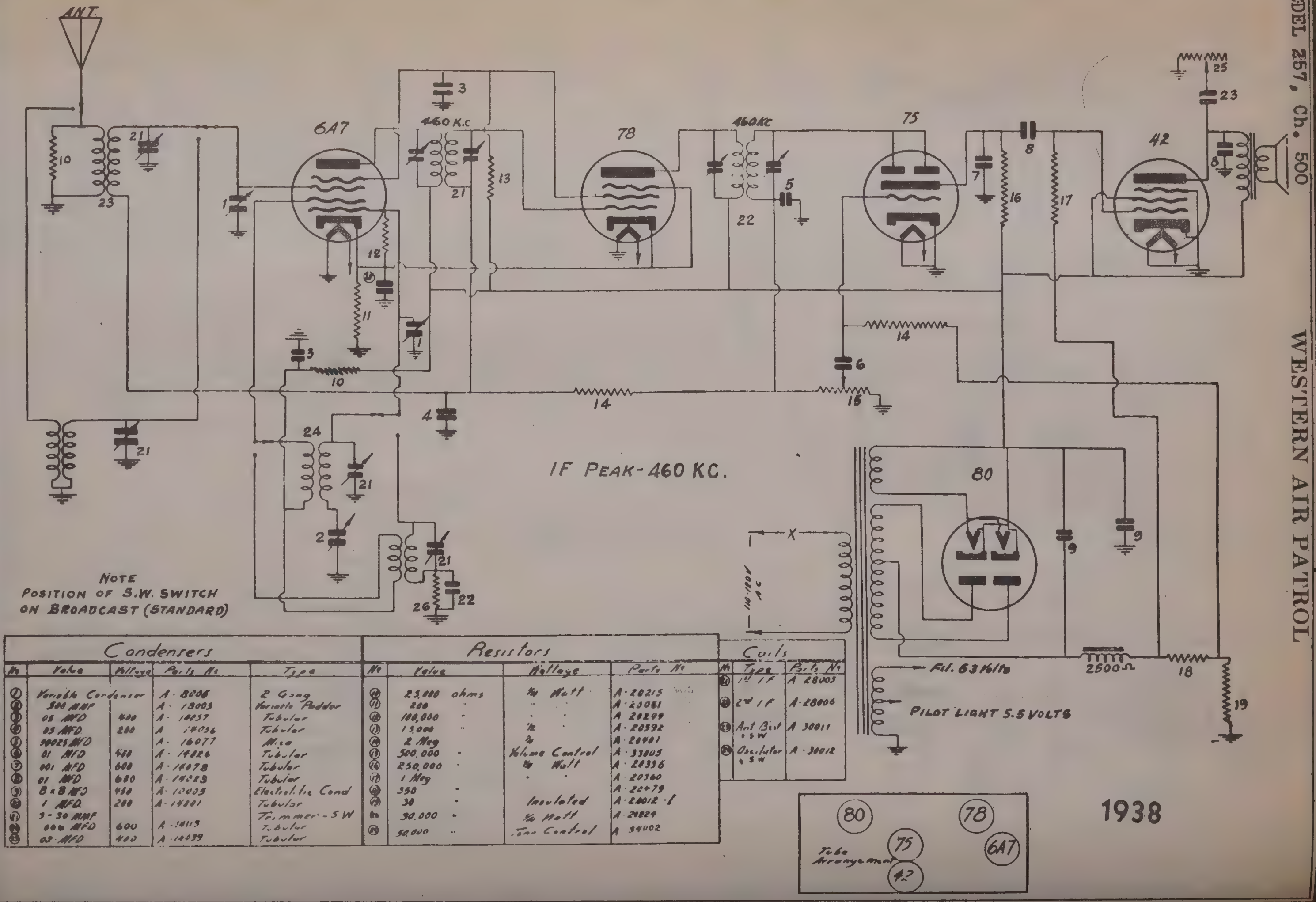
No	Value	Wattage	Parts No
⑩	25,000 ohms	¼ Watt	A-20216
⑪	500 "	" "	A-20096
⑫	100,000 "	" "	A-20299
⑬	15,000 "	1 "	A-20592
⑭	2 Meg	¼ "	A-20402
⑮	500,000 "	Volume Control	A-33005
⑯	250,000 "	¼ Watt	A-20337
⑰	1 Meg	" "	A-20361
⑱	350 "		A-20479
⑲	30 "	Insulated	A-20012-I

Coils

No	Type	Parts No
㉑	1st IF	A 28003
㉒	2nd IF	A-28004
㉓	Ant Coil	A 30010
㉔	Oscilator	A-30009

MODEL 257, Ch. 500

WESTERN AIR PATROL



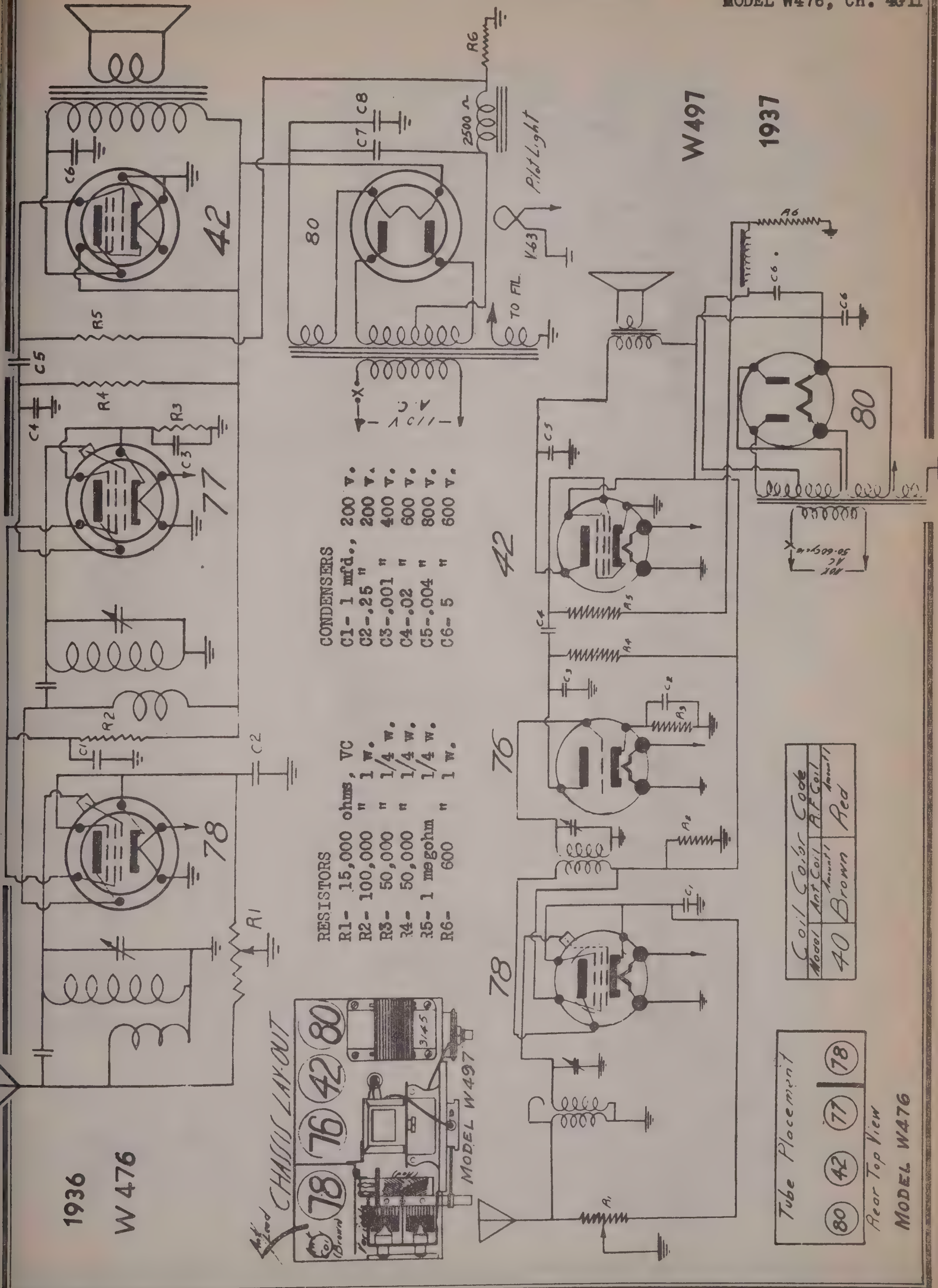
Condensers				
No	Value	Voltage	Parts No	Type
①	Variable Condenser		A · 8006	2 Gang
②	500 MMF		A · 18003	Variable Padder
③	.05 MFD	400	A · 14057	Tubular
④	.05 MFD	200	A · 14036	Tubular
⑤	.00025 MFD		A · 16077	Mica
⑥	.01 MFD	400	A · 14026	Tubular
⑦	.001 MFD	600	A · 14078	Tubular
⑧	.01 MFD	600	A · 14028	Tubular
⑨	8 x 8 MFD	450	A · 10005	Electrolytic Cond
⑳	.1 MFD	200	A · 14801	Tubular
㉑	3 - 30 MMF			Trimmer - SW
㉒	.006 MFD	600	A · 14113	Tubular
㉓	.05 MFD	400	A · 14039	Tubular

Resistors			
No	Value	Wattage	Parts No
⑩	25,000 ohms	¼ Watt	A · 20215
⑪	200 "	" "	A · 20081
⑫	100,000 "	" "	A 20299
⑬	13,000 "	½ "	A · 20392
⑭	2 Meg	¼	A · 20401
⑮	500,000 "	Volume Control	A · 33005
⑯	250,000 "	¼ Watt	A · 20336
⑰	1 Meg	" "	A · 20360
⑱	350 "		A · 20479
⑲	30 "	Insulated	A · 20012 - 1
26	30,000 "	¼ Watt	A · 20224
㉕	50,000 "	Tone Control	A 34002

Coils		
No	Type	Parts No
㉑	1st IF	A 28003
㉒	2nd IF	A · 28006
㉓	Ant Bcst & SW	A 30011
㉔	Oscillator & SW	A · 30012

WESTERN AIR PATROL

MODEL 16, Ch. W497
MODEL W476, Ch. 4G1T



RESISTORS
R1- 15,000 ohms, VC
R2- 100,000 " 1 w.
R3- 50,000 " 1/4 w.
R4- 50,000 " 1/4 w.
R5- 1 megohm 1/4 w.
R6- 600 " 1 w.

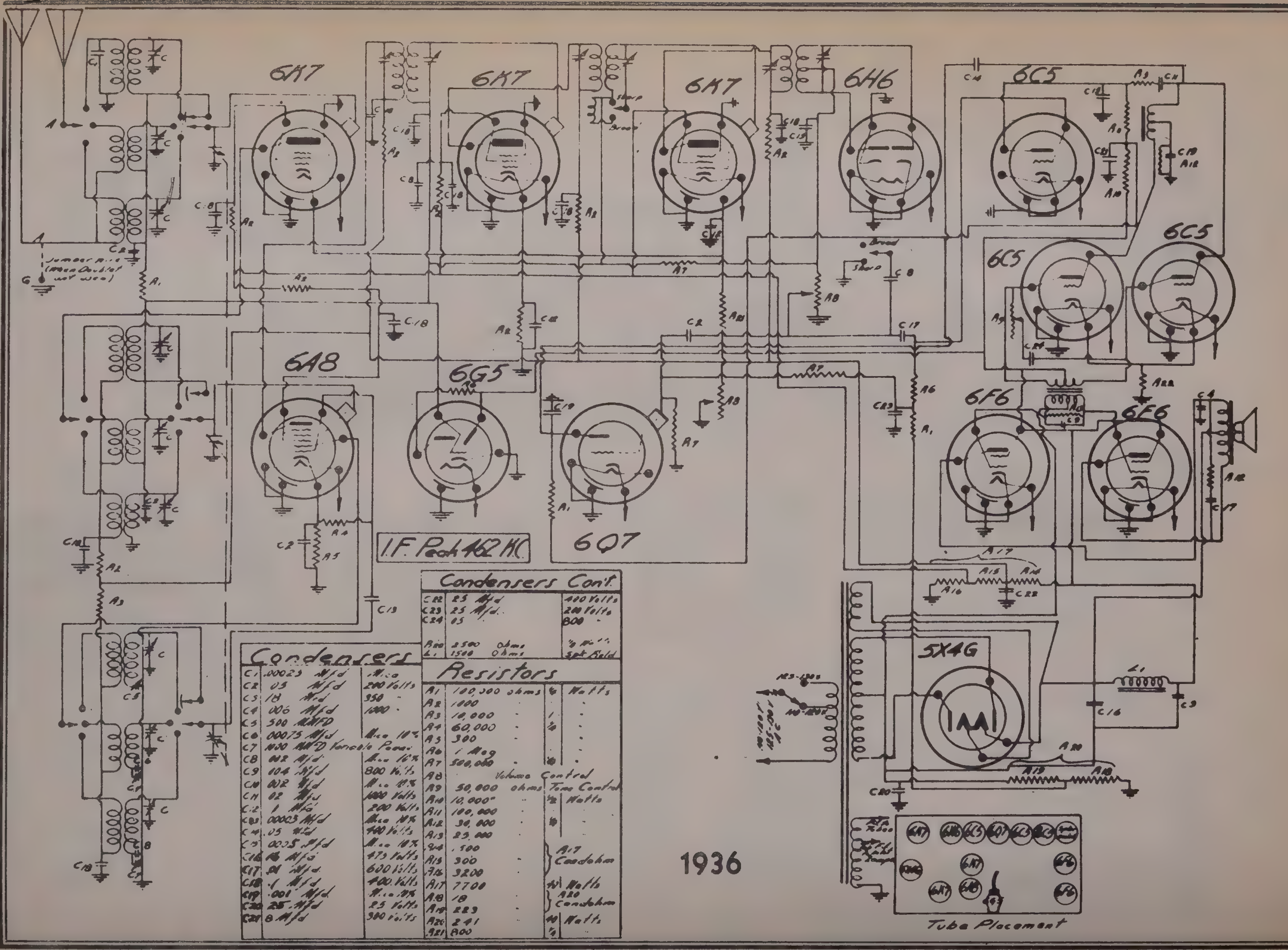
CONDENSERS
C1- 1 mfd., 200 v.
C2-.25 " 200 v.
C3-.001 " 400 v.
C4-.02 " 600 v.
C5-.004 " 800 v.
C6- 5 " 600 v.

Coil Color Code

Model	Ant Coil Amount	R.F. Coil Amount
40	Brown	Red

MODEL 2136, Ch. W492

WESTERN AIR PATROL



Condensers		
C1	.00023 Mfd	Mica
C2	.05 Mfd	200 Volts
C3	.18 Mfd	350 "
C4	.006 Mfd	1000 "
C5	500 MMFD	
C6	.00075 Mfd	Mica 10%
C7	1030 MMFD Variable Padder	
C8	.002 Mfd	Mica 10%
C9	.004 Mfd	800 Volts
C10	.002 Mfd	Mica 10%
C11	.02 Mfd	1000 Volts
C12	.1 Mfd	200 Volts
C13	.00005 Mfd	Mica 10%
C14	.05 Mfd	400 Volts
C15	.0025 Mfd	Mica 10%
C16	16 Mfd	475 Volts
C17	.01 Mfd	600 Volts
C18	.1 Mfd	400 Volts
C19	.001 Mfd	Mica 10%
C20	25 Mfd	25 Volts
C21	8 Mfd	300 Volts

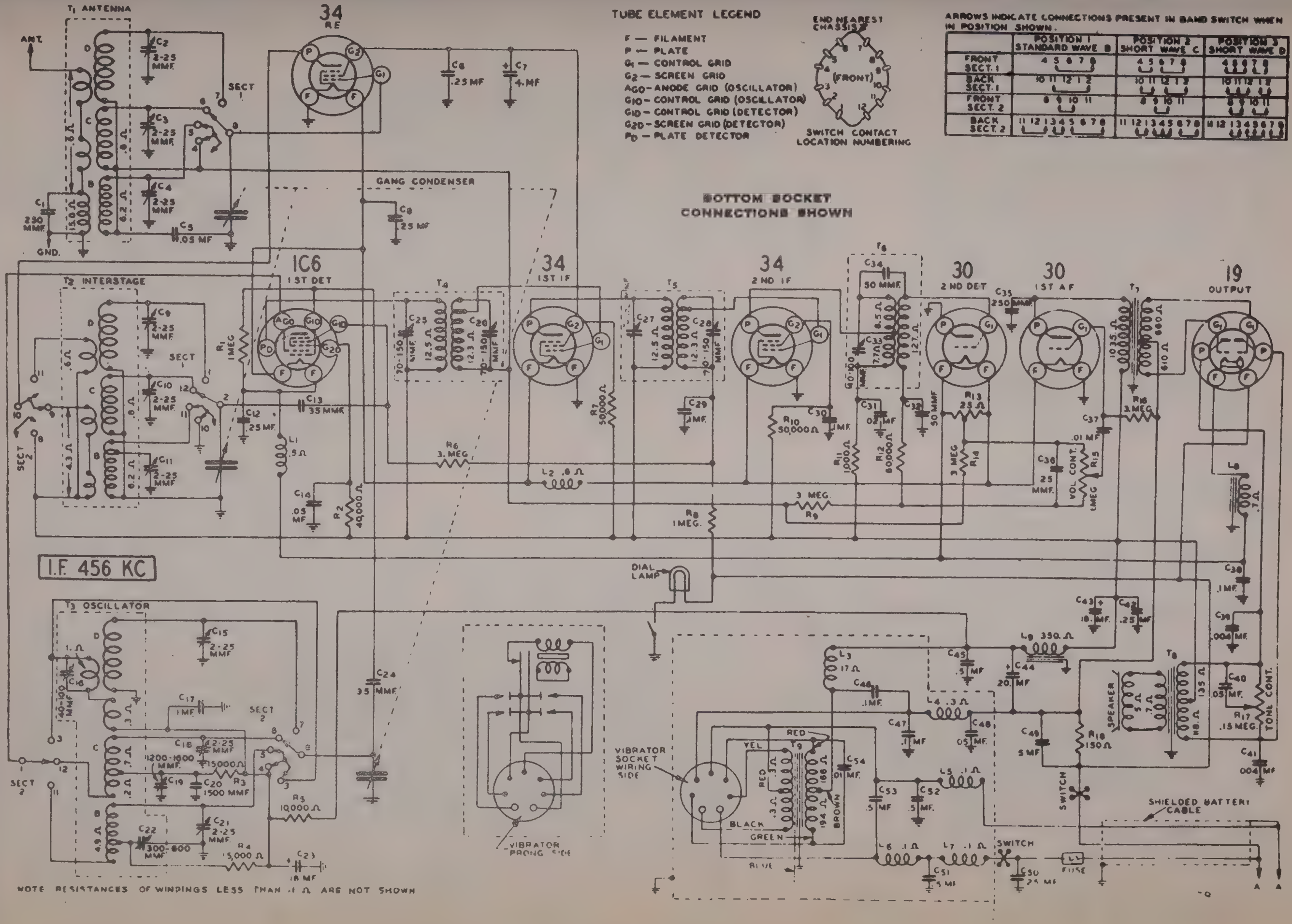
Condensers Cont.		
C22	25 Mfd	400 Volts
C23	25 Mfd.	200 Volts
C24	.05 "	800 "
R22	2500 ohms	½ Watt
L1	1500 Ohms	Spk Field

Resistors			
R1	100,000 ohms	¼	Watts
R2	1000 "	"	"
R3	10,000 "	1	"
R4	60,000 "	½	"
R5	300 "		"
R6	1 Meg "	"	"
R7	500,000 "	½	"
R8	Volume Control		
R9	50,000 ohms	Tone Control	
R10	10,000 "	½	Watts
R11	100,000 "	"	"
R12	30,000 "	½	"
R13	25,000 "		"
R14	1,500 "	R17 Candohm	
R15	300 "		
R16	3200 "		
R17	7700	10	Watts
R18	18 "	R20 Candohm	
R19	223 "		
R20	241 "	10	Watts
R21	800	½	"

©John F. Rider, Publisher

WESTERN AIR PATROL

MODEL 27T, Ch. W496



BOTTOM SOCKET CONNECTIONS SHOWN

NOTE RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN

TUBE ELEMENT LEGEND

- F — FILAMENT
- P — PLATE
- G_1 — CONTROL GRID
- G_2 — SCREEN GRID
- A_{GO} - ANODE GRID (OSCILLATOR)
- G_{1O} - CONTROL GRID (OSCILLATOR)
- G_{1D} - CONTROL GRID (DETECTOR)
- G_{2D} - SCREEN GRID (DETECTOR)
- P_D - PLATE DETECTOR

END NEAREST CHASSIS

(FRONT)

SWITCH CONTACT LOCATION NUMBERING

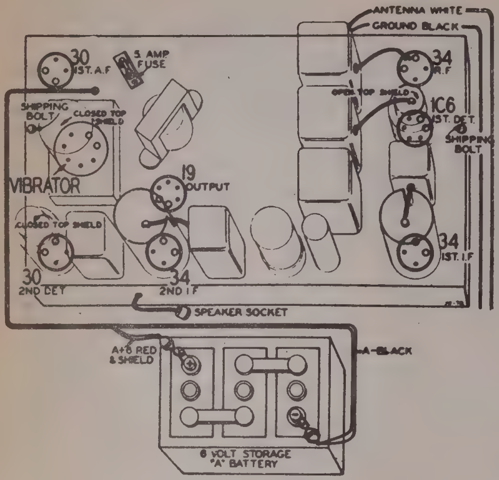
ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE B	POSITION 2 SHORT WAVE C	POSITION 3 SHORT WAVE D
FRONT SECT. 1	4 5 6 7 8	4 5 6 7 8	4 5 6 7 8
BACK SECT. 1	10 11 12 1 2	10 11 12 1 2	10 11 12 1 2
FRONT SECT. 2	8 9 10 11	8 9 10 11	8 9 10 11
BACK SECT. 2	11 12 1 3 4 5 6 7 8	11 12 1 3 4 5 6 7 8	11 12 1 3 4 5 6 7 8

FOR OTHER DATA SEE INDEX

MODEL 27T, Ch. W496

WESTERN AIR PATROL



VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground

Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0(1)
1C6	1st Det.-Osc.	2.0	145 90(2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0(1)
34	2nd I.F.	2.0	140	90	4.0(3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

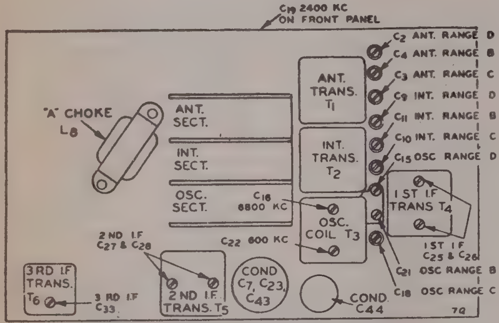
(1) As read from negative filament leg to tap of resistor R13.

(2) Anode grid to ground.

(3) As read from negative filament leg to A—.

(4) Total voltage drop from negative filament leg to low potential end of resistor R18.

(5) As read across resistor R18.

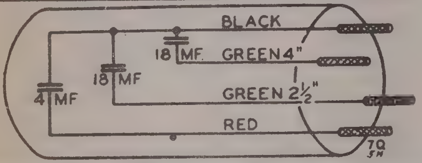


ALIGNMENT

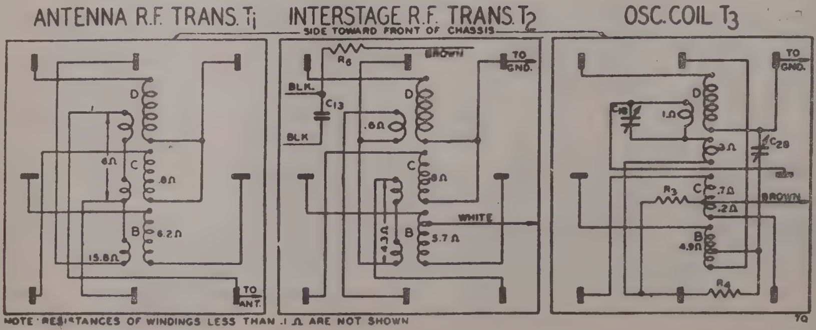
Peak I.F. trimmers at 456 KC.
Range B-
Peak osc. trimmer (C21) at 1730 KC. Peak C11 and C4 at 1500 KC. Pad C22 at 600 KC.
Range C-
Peak C18 at 6700 KC.
Peak C3 and C10 at 6000 KC.
Pad C19 at 2400 KC.
Range D-
Peak C15 at 18,400 KC.
Peak C9 and C2 at 15,000 KC.
Pad C16 at 6800 KC.

NOTE

When adjusting interstage and antenna trimmers, rock gang condenser rotor until peak is obtained.



Electrolytic Condenser Internal Connections

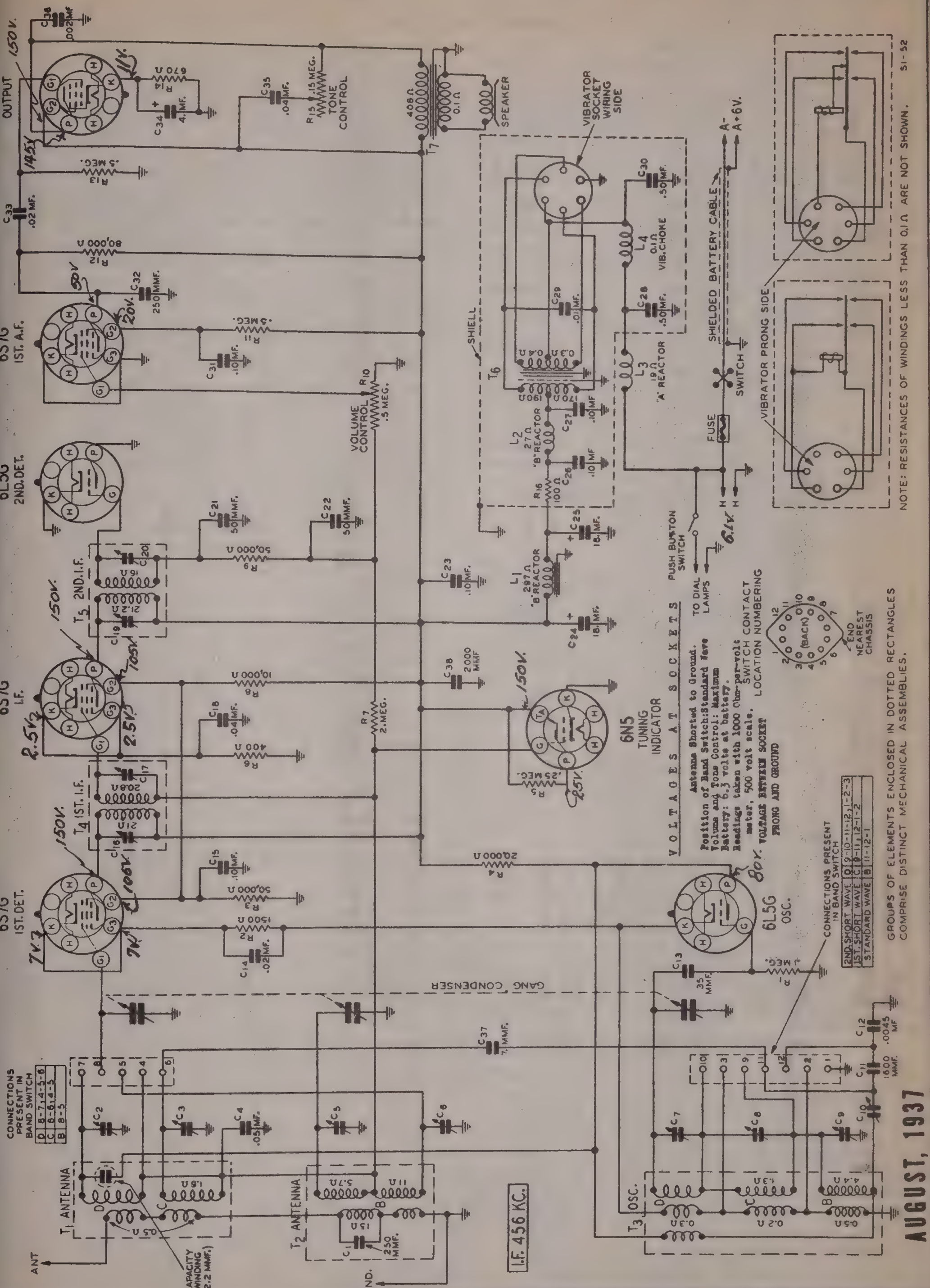


NOTE RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN

Fig. 7 R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

WESTERN AIR PATROL

MODEL 708, Ch. W832



VOLTAGES AT SOCKETS

Antenna Shorted to Ground.
Position of Band Switch: Standard Wave
Volume and Tone Control: Maximum
Battery: 6.3 volts at battery.
Readings taken with 1000 Ohm-per-volt meter, 500 volt scale.
VOLTAGE BETWEEN SOCKET PRONG AND GROUND

SWITCH CONTACT LOCATION NUMBERING

(BACK)

END NEAREST CHASSIS

CONNECTIONS PRESENT IN BAND SWITCH

D	2ND. SHORT WAVE	9-10-11-12, 1-2-3
C	IST. SHORT WAVE	9-11, 12-1-2
B	STANDARD WAVE	11-12-1

CONNECTIONS PRESENT IN BAND SWITCH

D	8-7, 4-5-6
C	8-6, 4-5
B	8-5

I.F. 456 KC.

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

GROUPS OF ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

51-52

AUGUST, 1937

MODEL 708, Ch.832
MODEL 56, Ch. W485

WESTERN AIR PATROL

MOD.708 ALIGNMENT PROCEDURE W832

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR		TRIMMERS ADJUSTED See Illustration	PROCEDURE	
			FREQUENCY SETTING	CONNECTION AT RADIO		INITIAL STEPS	ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

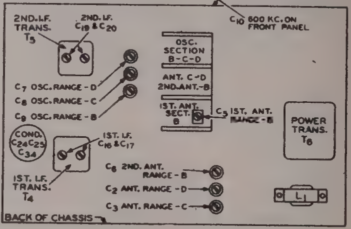
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

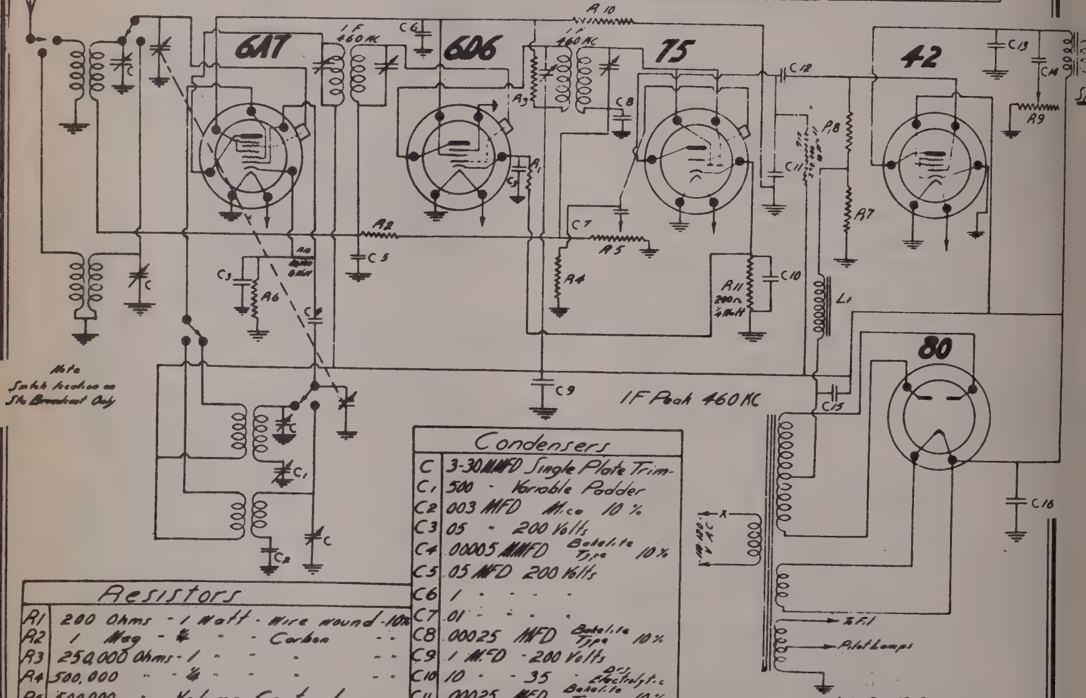
After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image





Resistors

R1	200 Ohms - 1 Watt - Wire wound - 10%
R2	1 Meg - ¼ - - Carbon - -
R3	250,000 Ohms - 1 - - - - -
R4	500,000 - - ¼ - - - - -
R5	500,000 - Volume Control
R6	500 - - ¼ Watt - Carbon - -
R7	300 - - 1 - - - - -
R8	500,000 - - ¼ - - - - -
R9	50,000 - Tone Control
R10	100,000 - - ½ Watt - Carbon - -

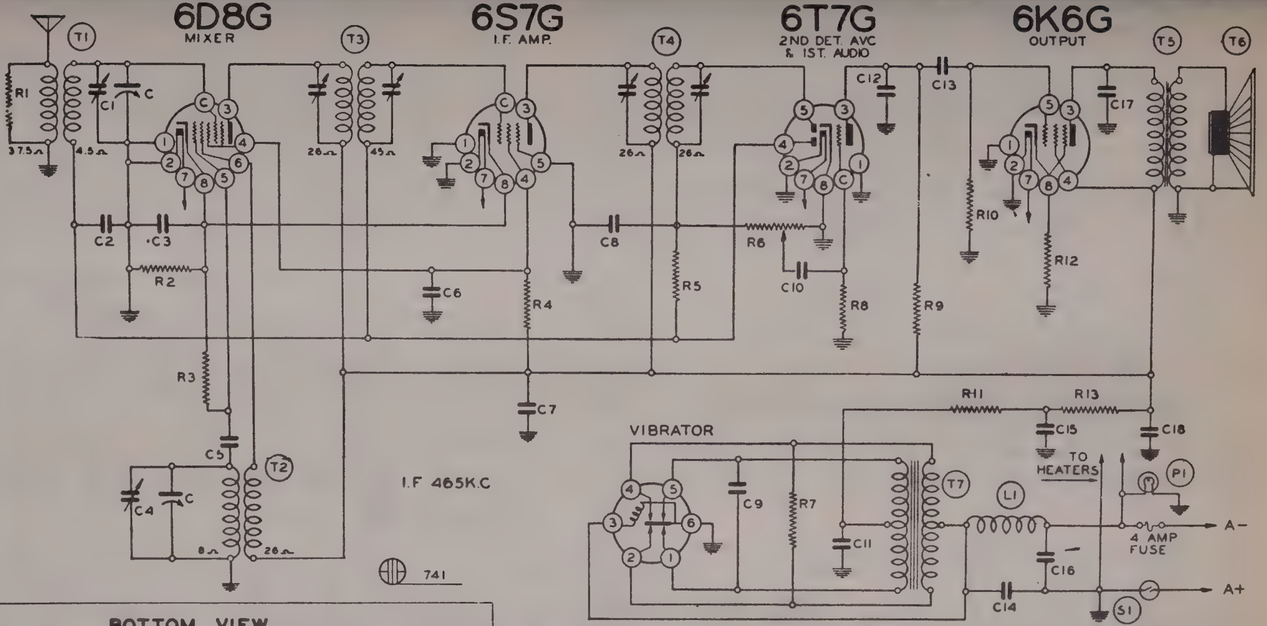
Condensers

C	3-30 MMFD Single Plate Trim-
C1	500 - Variable Padder
C2	.003 MFD Mica 10%
C3	.05 - 200 Volts
C4	.00005 MMFD Bakelite Type 10%
C5	.05 MFD 200 Volts
C6	.1 - - - -
C7	.01 - - - -
C8	.00025 MFD Bakelite Type 10%
C9	.1 MFD - 200 Volts
C10	10 - - 35 - Dry Electrolytic
C11	.00025 MFD Bakelite Type 10%
C12	.02 MFD - 400 Volts
C13	.006 - - 800 -
C14	.02 - - 600 -
C15	5 - - - Filter
C16	- - - - -

MOD. 56
W485
1937

WESTERN AUTO SUPPLY CO.

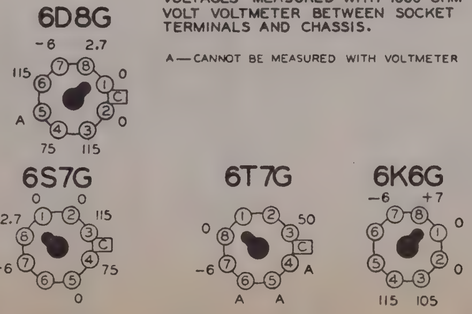
Broadcast Band 6-Volt Storage Battery Operated Superheterodyne Receiver
WITH FOUR BUTTON AUTO-TUNER
Frequency Range—535 - 1735 Kilocycles



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

A—CANNOT BE MEASURED WITH VOLTMETER



Nov. 1938

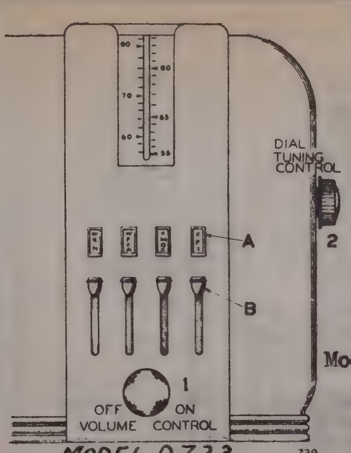
REAR OF CHASSIS

740

Fig 3

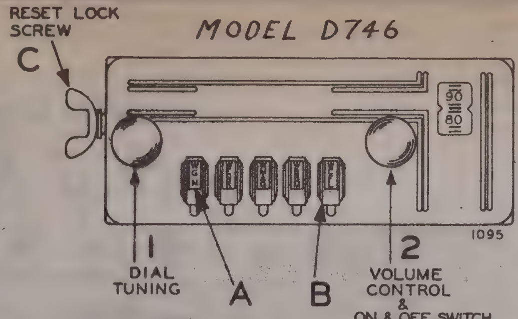
Circuit Diagram Reference	Part No.	Description
		RESISTORS
R1	13017	10M ohm—⅓ w.
R2	130239	250 ohm—⅓ w.
R3	13012	50M ohm—⅓ w.
R4	130263	12M ohm—⅓ w.
R5	1304	3 megohm—⅓ w.
R6	101108	1 megohm—volume control
R7	13084	200 ohm—⅓ w.
R8	130225	15 megohm—⅓ w.
R9	13011	250M ohm—⅓ w.
R10	13019	1 megohm—⅓ w.
R11	130231	75 ohm—⅓ w.
R12	13070	500 ohm—⅓ w.
R13	130199	1500 ohm—1 watt
		CONDENSERS
C	10271B	2 gang variable condenser
C1		Antenna Trimmer
C2	1009	.05 x 200 v.
C3	10020	.1 x 200 v.
C4		Oscillator Trimmer
C5	12912	.00025 mica
C6	10020	.1 x 200 v.
C7	10020	.1 x 200 v.
C8	1295	.0001 mica
C9	10068	.003 x 1400 v.
C10	10019	.006 x 600 v.
C11	10020	.1 x 200 v.
C12	1292	.0005 mica
C13	10011	.01 x 400 v.
C14	10040	.5 x 120 v.
C15	11959C	30 mfd.—150 w. v. lytic
C16	10040	.5 x 120 v.
C17	10019	.006 x 600 v.
C18	11959C	10 mfd. 150 w. v. lytic
		PARTS
T1	11185B	Antenna Coil
T2	110103	Oscillator Coil
T3	10896E	Input I. F.—465 kc.
T4	10895E	Output I. F.—465 kc.
T5	10582	Output Transformer
T6	114142	5" P. M. Speaker
T7	104137C	Power Transformer
L1	10568	"A" Choke
P1	10789	6-8 v. pilot light
S1		Off-on switch on volume control

WESTERN AUTO SUPPLY CO.



MODEL D723

FIG. 2—FRONT VIEW



PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are four levers on the dial by means of which four stations may be selected, (See "B" Fig. 2).

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2.)

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn and with a coin (half dollar) tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

Model D-723

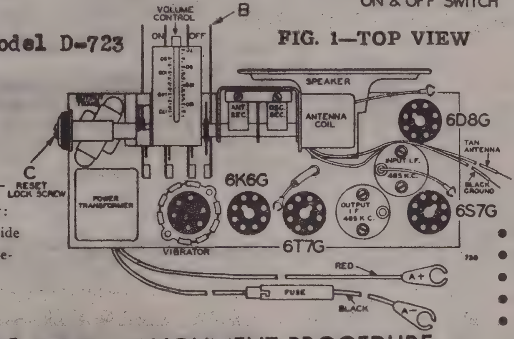


FIG. 1—TOP VIEW

Model D-723 ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6S7G I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6D8G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROADCAST BAND	1735 Kc.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

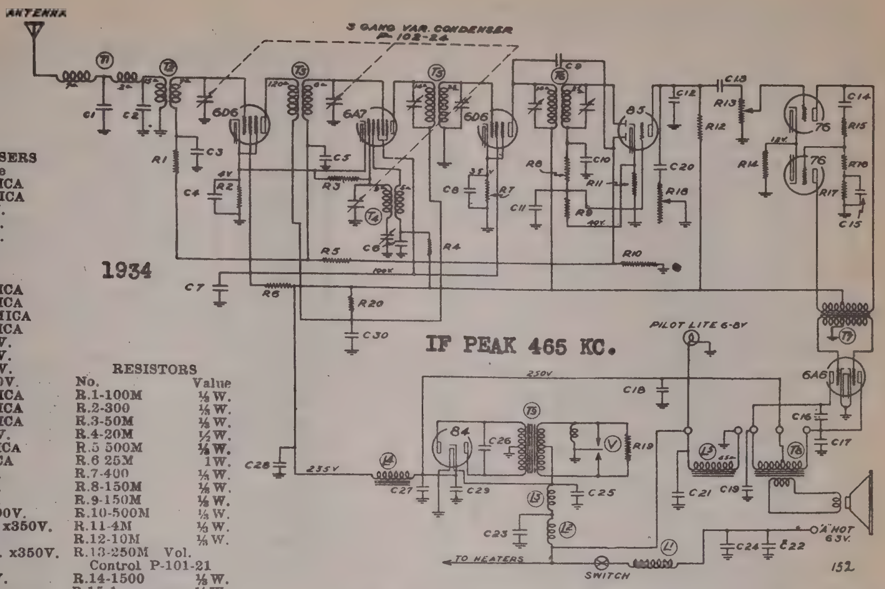
After each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE
535 to 1735KC.

Power Consumption.......2.1 Amperes at 6.3 Volts
Power Output.......350 Milliwatts Undistorted, 800 Milliwatts Maximum
Intermediate Frequency.......465 KC.

WESTERN AUTO SUPPLY CO.

MODEL S-741



CONDENSERS

No. Value

C.1-.00009 MICA
C.2-.00002 MICA
C.3-.01x400V.
C.4-.25x200V.
C.5-.05x200V.
C.6-.1x200V.
C.7-.1x200V.
C.8-.1x200V.
C.9-.00002 MICA
C.10-.0001 MICA
C.11-.00005 MICA
C.12-.0001 MICA
C.13-.02x400V.
C.14-.02x400V.
C.15-.01x400V.
C.16-.006x600V.
C.17-.0005 MICA
C.18-.0005 MICA
C.19-.0005 MICA
C.20-.05x400V.
C.21-.0005 MICA
C.22-.002 MICA
C.23-.5x120V.
C.24-.5x120V.
C.25-.5x120V.
C.26-.015x1400V.
C.27-8.0 mfd. x350V. P-119-16
C.28-12.0 mfd. x350V. P-119-16
C.29-.01x400V.
C.30-.1x400V.
117-2 Dash Mounting Bracket
117-1 Bracket Steering Column
Dash Mounting Assembly

RESISTORS

No.	Value
R.1-100M	⅓ W.
R.2-300	⅓ W.
R.3-50M	⅓ W.
R.4-20M	½ W.
R.5 500M	⅓ W.
R.6 25M	1W.
R.7-400	⅓ W.
R.8-150M	⅓ W.
R.9-150M	⅓ W.
R.10-500M	⅓ W.
R.11-4M	⅓ W.
R.12-10M	⅓ W.
R.13-250M Vol. Control P-101-21	
R.14-1500	⅓ W.
R.15-1 meg	⅓ W.
R.16-91M	⅓ W.
R.17-75M	⅓ W.
R.18-100M Tone Control P-101-39	
R.19-200	⅓ W.
R.20-1500	⅓ W.

PARTS

No.	Part No.				
T1-Antenna Filter	P-111-43	T5-Input I.F. Coil	P-108-56	L1-"A" Choke	P-105-18
T2-Antenna Coil	P-111-42	T6-Output I.F. Coil	P-108-57	L2-"A" Choke	P-105-18
T3-R.F. Coil	P-109-20	T7-Audio Trans.	P-105-13	L3-"A" Choke	P.105-19
T4-Oscillator Coil	P-110-34	T8-Output Trans.		L4-Filter Choke	P-105-11
		T9-Power Trans.	P-104-21	L5-Speaker Field	
				V-Vibrator	142-4

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plates of the type 6A6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: Series A & B

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

I.F. ALIGNMENT: Series C

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-56) and output (108-57) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

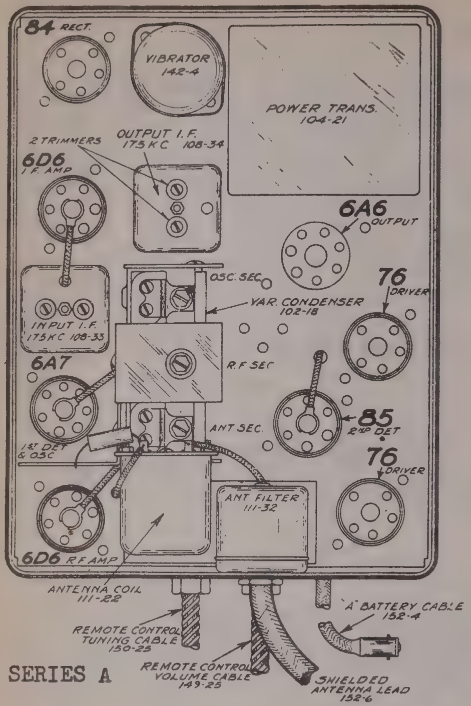
In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

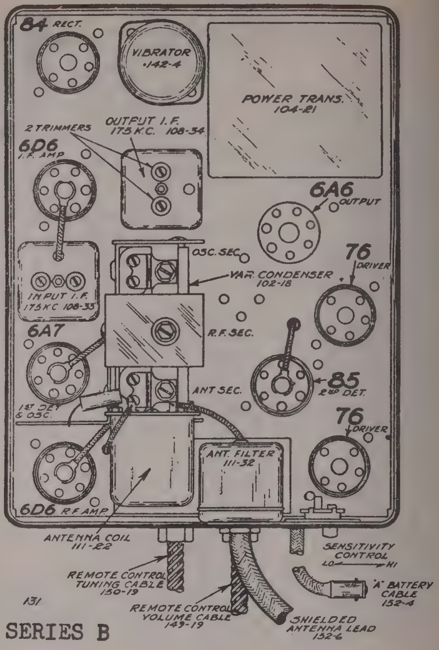
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
4. Re-set external oscillator to 600 K.C. and adjust series pad to resonance, rotate condenser and move dial pointer to 600 K.C. by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance. This adjustment is accessible from the bottom of the chassis.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

MODEL S-741
Series A, B, C

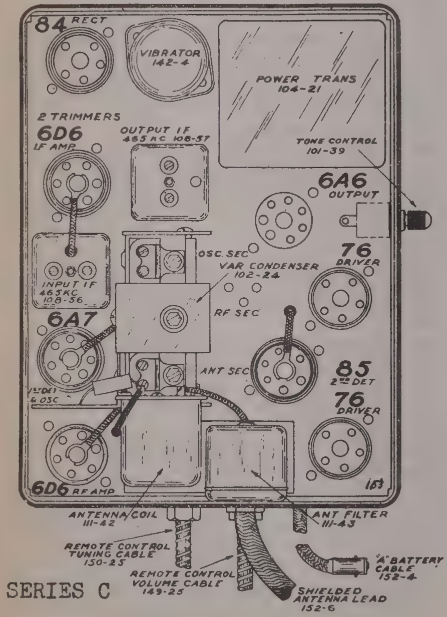
WESTERN AUTO SUPPLY CO.



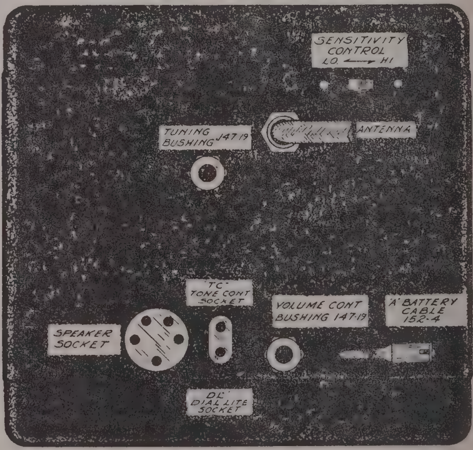
SERIES A



SERIES B



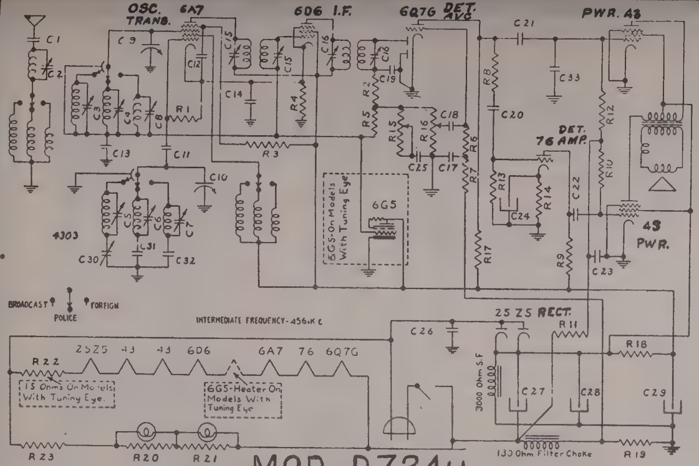
SERIES C



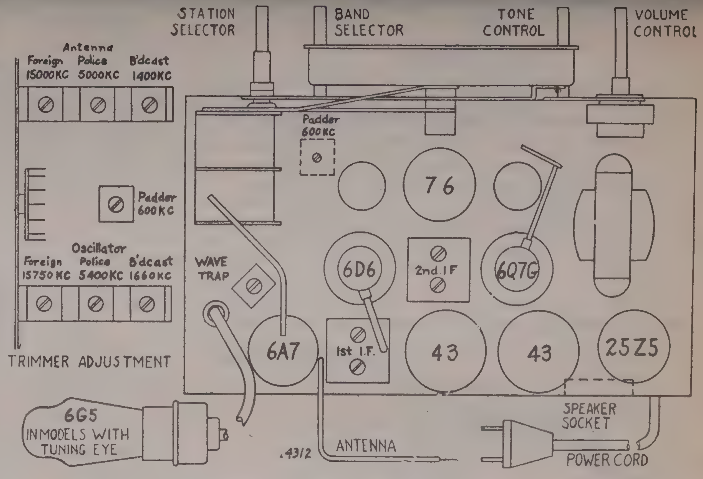
Arrangemnet of Series A & C is similar to Series B, except that Series A & C have no Sensitivity Control Switch

WESTERN AUTO SUPPLY CO.

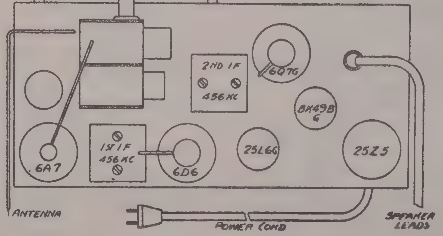
MODEL D724U
MODEL D905



MOD. D724U



MODEL D-724U

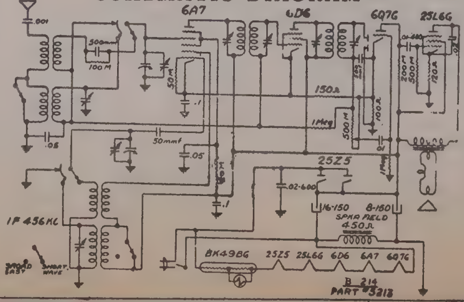


MODEL D-905

6A7—Oscillator Translator
6D6—IF Amplifier
6Q7G—Detector-AVC-1st Audio

25L6G—Power Output
25Z5—Rectifier
BK49BG—Ballast

SCHEMATIC DIAGRAM



FOR CONVENTIONAL

ALIGNMENT, SEE

SPECIAL SECTION

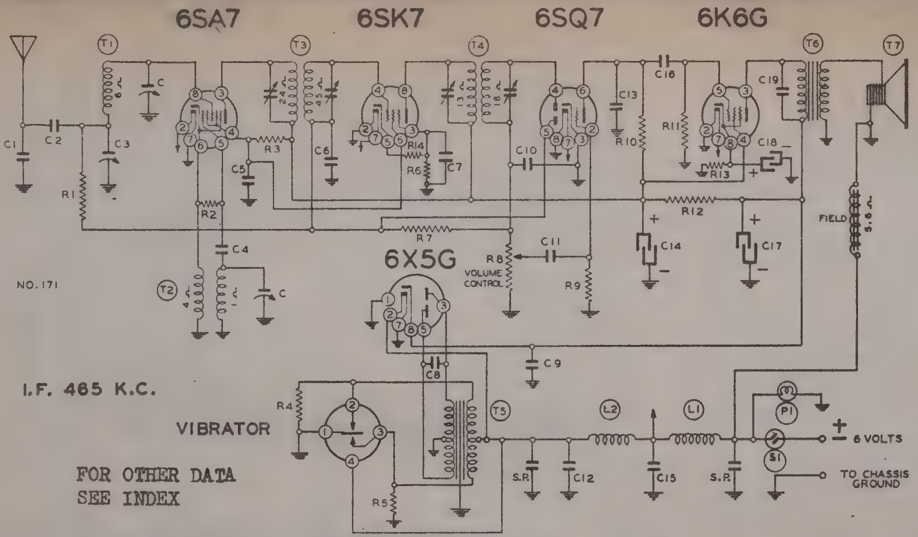
VOLUME VIII

Symbol	Part No.	Description
Symbol	Part No.	Description
C-1	3137	.001-400 V.
C-2	2559	180 MMF Trimmer
C-3, 4, 5, 6, 7	2597	1-10 MMF Trimmer
C-8	1611	3-35 MMF Trimmer
C-9, 10	2871	350 MMF Variable
C-11, 33	2780	50 MMF Mica
C-12, 13	580	.05-200 V.
C-14, 17	572	.1-200 V.
C-15, 16	2445	IF Trimmer
C-18, 20, 21, 22	576	.02-400 V.
C-19	1286	250 MMF Mica
C-23	566	.5-200 V.
C-25	581	.005-600 V.
C-26	2600	.02-600 V.
C-27	4297	20 MF-150 V.
C-24	4298	4 MF-18 V.
C-28		30 MF-150 V.
C-29		10 MF-150 V.
C-30	2560	220-550 MMF Padder
C-31	2741	1330 MMF 5%
C-32	2740	3850 MMF 5%
R-1, 2	631	50 M-⅓ W.
R-3, 14	4302	20 M-⅓ W. 10%
R-4	2689	100 OHM-⅓ W.
R-5, 6, 7	624	1 Meg.-⅓ W.
R-8	2599	1 Meg.-⅓ W.-10%
R-9	4300	250 M-⅓ W.-10%
R-10, 12	2731	500 M-⅓ W.-10%
R-11	2568	300 M-⅓ W.-10%
R-13	2880	100 M-⅓ W.-10%
R-15	2737	2 Meg. Tone Control
R-16	2726	500M Volume Control
R-17	2730	200 M-⅓ W.-10%
R-18	2886	500 OHM-1 W.-10%
R-19	3580	100 OHM-.5 W.
R-20, 21	4296	32 OHM 3 W.
R-22	4304	15 OHM—On Eye Models
	4301	35 OHM—4W—Wire Wound
R-23	802	300 OHM Line Cord
	2755	Antenna Coil
	2724	Band Switch
	2857	Oscillator Coil
	2860	1st IF Transformer
	2859	2nd IF Transformer
	4295	Filter Choke
	1489	5 Prong Socket
	789	6 Prong Socket
	2165	7 Prong Socket
	2557	7 Prong Octal Socket
	530	Pilot Lamp
	2378	Pointer
	1408	Pointer Screw
	2981	Tuning Eye Cable
	4307	Speaker—10"
	4306	Speaker—8"

©John F. Rider, Publisher

MODEL D746

WESTERN AUTO SUPPLY CO.



I.F. 465 K.C.

FOR OTHER DATA
SEE INDEX

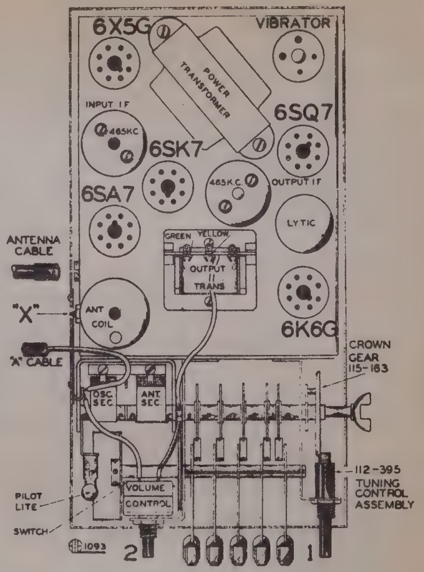


FIG. 3—TOP VIEW

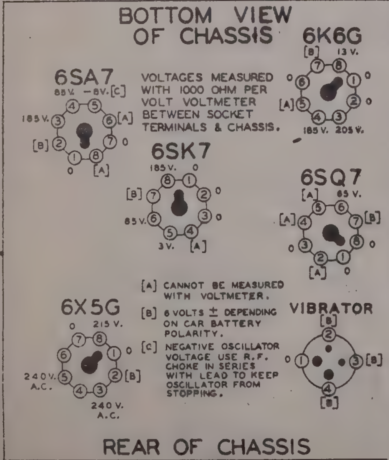

BOTTOM VIEW OF CHASSIS
6SA7
85 V.
-8 V. [C]
185 V.
[A]
[B]
0
[A]
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
6K6G
[B]
13 V.
0
[A]
185 V.
205 V.
6SK7
185 V.
0
[B]
85 V.
3 V.
[A]
6SQ7
[A]
85 V.
[B]
0
[A]
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 6 VOLTS ± DEPENDING ON CAR BATTERY POLARITY.
[C] NEGATIVE OSCILLATOR VOLTAGE USE R.F. CHOKE IN SERIES WITH LEAD TO KEEP OSCILLATOR FROM STOPPING.
6X5G
0
215 V.
240 V. A.C.
240 V. A.C.
[B]
VIBRATOR
[B]
REAR OF CHASSIS

FIG. 4

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13011	250M ohm—⅓ w.
R2	130236	30M ohm—⅓ w.
R3	130307	15M ohm—1 watt
R4	13060	100 ohm—⅓ w.
R5	13060	100 ohm—⅓ w.
R6	13070	500 ohm—⅓ w.
R7	1304	3 megohm—⅓ w.
R8	101110	1 megohm volume control
R9	130257	5 megohm—⅓ w.
R10	13011	250M ohm—⅓ w.
R11	1303	500M ohm—⅓ w.
R12	130199	1500 ohm—1 watt
R13	130308	750 chm—1 watt
R14	130174	50 ohm—⅓ w.
		CONDENSERS
C	10269	2 gang variable condenser
C1	1293	.00002 mica
C2	10055	.01 x 400 volts
C3	12434	Adj. Antenna Trimmer
C4	12921	.0002 mica
C5	100115	.05 x 400 v.
C6	1009	.05 x 200 v.
C7	10020	.1 x 200 v.
C8	10034	.005 x 1200 v.

Circuit Diagram Ref. No.	Part No.	Description
C9	12912	.00025 mica
C10	1295	.0001 mica
C11	10025	.002 x 600 v.
C12	10031	.5 x 120 v.
C13	1292	.0005 mica
C14	119105	15 ufd. lytic x 350 w. v.
C15	10031	.5 x 120 v.
C16	10078	.01 x 200 v.
C17	119105	15 ufd. lytic x 350 w. v.
C18	119105	20 ufd. lytic x 25 w. v.
C19	10087	.01 x 600 v.
		C14, C17 and C18 in same unit
		PARTS
T1	11195B	Antenna Coil
T2	110146	Oscillator Coil
T3	108139	Input I. F. Coil—465 kc.
T4	108121B	Output I. F. Coil—465 kc.
T5	104131	Power Transformer
T6	10567	Output Transformer
T7	114114-R	5" Dynamic Speaker (5.6 ohm field)
L1	10568	"A" Choke
L2	10566	"A" Choke
S1		Switch on volume control
P1	10797	Pilot light (T51) 6-8 volts
S.P.	11749	(2) Spark Plates

TUBE COMPLEMENT

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes.

1—Type No. 6SA7—Mixer first detector and oscillator.

1—Type No. 6SK7—Remote Cut-off Pentode as an I.F. Amplifier.

1—Type No. 6SQ7—Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1—Type No. 6K6G—Pentode Output Amplifier.

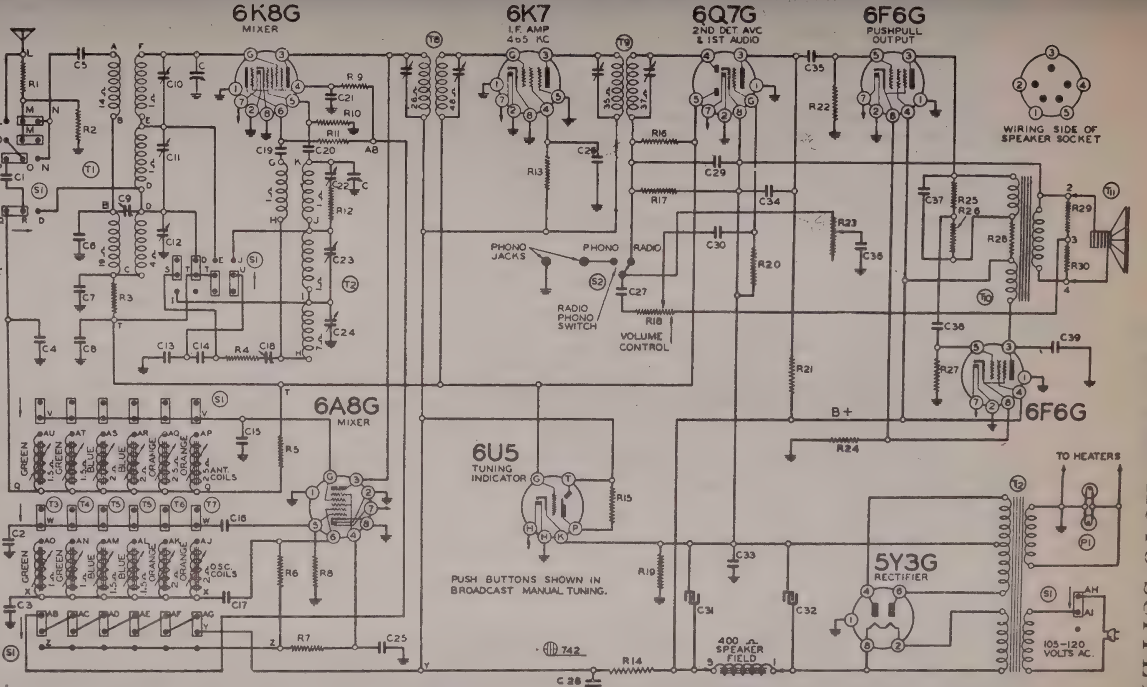
1—Type No. 6X5G—High Vacuum Rectifier.

JANUARY, 1940

MODEL D-920B

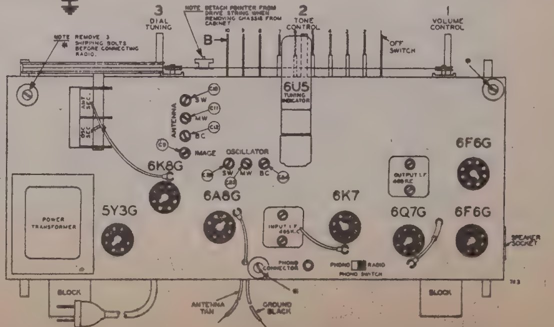
Cir. Dia. Ref. No.	Part No.	Description
		RESISTORS
R1	13041	800 ohm—⅓ w.
R2	13017	10M ohm—⅓ w.
R3	130103	100M ohm—⅓ w.
R4	130231	75 ohm—⅓ w.
R5	1309	200M ohm—⅓ w.
R6	130149	15M ohm—⅓ w.
R7	13012	50M ohm—⅓ w.
R8	13012	50M ohm—⅓ w.
R9	13012	50M ohm—⅓ w.
R10	13012	50M ohm—⅓ w.
R11	13065	30M ohm—1 watt
R12	130174	50 ohm—⅓ w.
R13	130103	100M ohm—⅓ w.
R14	130260	3500 ohm—1 watt
R15	130110	1 megohm—in tuning indicator socket
R16	1304	3 megohm—⅓ w.
R17	1303	500M ohm—⅓ w.
R18	101133	1 megohm volume control
R19	130197	20 ohm—⅓ w.
R20	130225	15 megohm—⅓ w.
R21	1309	200M ohm—⅓ w.
R22	1303	500M ohm—⅓ w.
R23	101134	300M ohm tone control
R24	130261	220 ohm— 2 watt
R25	1303	500M ohm—⅓ w.
R26	130193	3000 ohm—⅓ w.
R27	1303	500M ohm—⅓ w.
R28	130262	450 ohm—1 watt
R29	130215	25 ohm—⅓ w.
R30	130168	100 ohm—⅓ w.
		CONDENSERS
C	10283	2 gang variable
C1	10025	.002 x 600 v.
C2	129119	.000329 mica (0-Temp Coeff
C3	129123	.0008 mica (0-Temp Coeff
C4	12971	.002 mica
C5	12987	.000105 mica
C6	129126	.00007 mica
C7	10077	.00304 x 600 v.
C8	10093	.05 x 200 v.
C9	12459	Image rejection trimmer
C10	12459	S. W. Antenna trimmer
C11	12459	M. W. Antenna trimmer
C12	12459	B. C. Antenna trimmer
C13	129125	.00422 compression type mica
C14	129124	.00125 compression type mica
C15	129111	.000484 mica (0-Temperature Coefficient)
C16	12912	.00025 mica
C17	10025	.002 x 600 v.
C18	12444	Series Pad
C19	10025	.002 x 600 v.
C20	12939	.00005 mica
C21	10094	.05 x 600 v.
C22	12458	S. W. Oscillator trimmer
C23	12458	M. W. Oscillator trimmer
C24	12458	B. C. Oscillator trimmer
C25	10094	.05 x 600 v.
C26	10094	.05 x 600 v.
C27	10026	.02 x 400 v.
C28	10045	.1 x 600 v.
C29	12921	.0002 mica
C30	10071	.004 x 600 v.
C31	10316	30 mfd. lytic—350 v.
C32	10317	30 mfd. lytic—450 v.
C33	10020	.1 x 200 v.
C34	1292	.0005 mica
C35	10097	.02 x 600 v.
C36	10012	.003 x 600 v.
C37	10012	.003 x 600 v.
C38	10097	.02 x 600 v.
C39	10012	.003 x 600 v.
		PARTS
T1	111109	Antenna Coils
T2	11094	Oscillator Coil
T3	110100	High Frequency P. B. Coil
T4	110100B	High Frequency P. B. Coil
T5	110101	Medium Frequency P. B. Coil
T6	110102	Low Frequency P. B. Coil
T7	110102B	Low Frequency P. B. Coil
T8	108105K	Input I. F.—465 kc.
T9	108106K	Output I. F.—465 kc.
T10	10577	Output Transformer
T11	114144	10" Dynamic Speaker (600 ohm Field)
T12	104151	Power Transformer
S1	12565	Push Button Switch
S2	12561	Radio—Phono Switch
P1	10794	2—6-8 v. pilot lights

1938,1939



PUSH BUTTONS SHOWN IN BROADCAST MANUAL TUNING.

IF PEAK 465 KC



MODEL D920B
MODEL D921

WESTERN AUTO SUPPLY CO.

BAND	SIGNAL GENERATOR		Connection to Radio	Pushbutton Indicated Below Pushed "In"	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	465 Kc.	.1 MFD.	Grid of 6K7 I.F Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C22) (See Fig. 1)	Short wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C10) (See Fig. 1)	Short wave antenna	Adjust to maximum output
MEDIUM WAVE BAND	5 Mc.	400 ohms	Antenna lead	Med. Wave	Set dial at 5 MC	Trimmer (C23) (See Fig. 1)	Medium wave oscillator	Adjust to maximum output
	5 Mc.	400 ohms	Antenna lead	Med. Wave	Dial set at 5 MC	Trimmer (C11) (See Fig. 1)	Medium wave antenna	Adjust to maximum output
BAND BROADCAST	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C24) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 1400 Kc.	Trimmer (C12) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 600 Kc.	Trimmer (C18) (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
IMAGE REJECTION ADJUSTMENTS	1930 Kc.	200 mmf.	Antenna lead	Broadcast	Pick up signal at 1000 Kc. on dial	Trimmer (C9) (See Fig. 1)	Image rejection	Adjust for minimum output (See note "B")

NOTE "A". Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

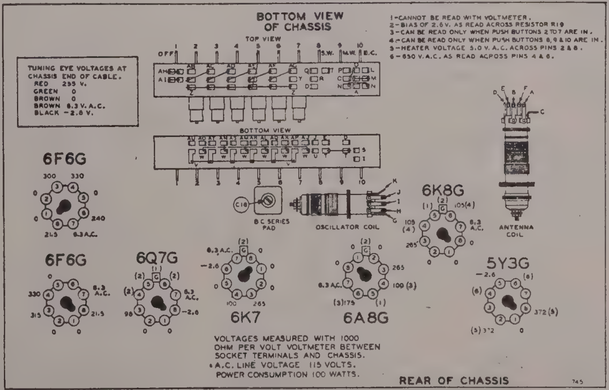
NOTE "B". 1930 Kc. is the image frequency of 1000 Kc. Adjust Trimmer (C9) until a minimum output is obtained.

Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

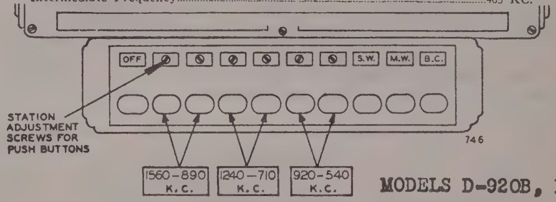
BAND	FREQUENCY RANGE
Broadcast	535 to 1600 Kc.
Medium Wave	1.58 to 5.5 MC.
Short Wave	5.0 to 18.3 MC.

Power Consumption..........130 Watts (At 115 volts 50-60 cycles)
Power Output..........8 Watts Undistorted. 12 Watts Maximum
Intermediate Frequency..........465 KC.


BOTTOM VIEW OF CHASSIS
TOP VIEW
BOTTOM VIEW
OFF
S.W.
M.W.
B.C.
1-CANNOT BE READ WITH VOLTMETER.
2-BIAS OF 2.6 V. AS READ ACROSS RESISTOR R19
3-CAN BE READ ONLY WHEN PUSH BUTTONS 2 TO 7 ARE IN.
4-CAN BE READ ONLY WHEN PUSH BUTTONS 8, 9 & 10 ARE IN.
5-HEATER VOLTAGE 5.0 V. A.C. ACROSS PINS 2 & 8.
6-650 V.A.C. AS READ ACROSS PINS 4 & 6.
TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 255 V.
GREEN 0
BROWN 0
BROWN 6.3 V. A.C.
BLACK -2.6 V.
6F6G
6F6G
6Q7G
6K7
6A8G
6K8G
5Y3G
C18
B C SERIES PAD
OSCILLATOR COIL
ANTENNA COIL
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 100 WATTS.
REAR OF CHASSIS
745

7 Tube Including Cathode-Ray Tuning Indicator

2-Band A. C. Superheterodyne Receiver



MODELS D-920B, D-921

FIG. 3—Showing Station Adjustment Screws.

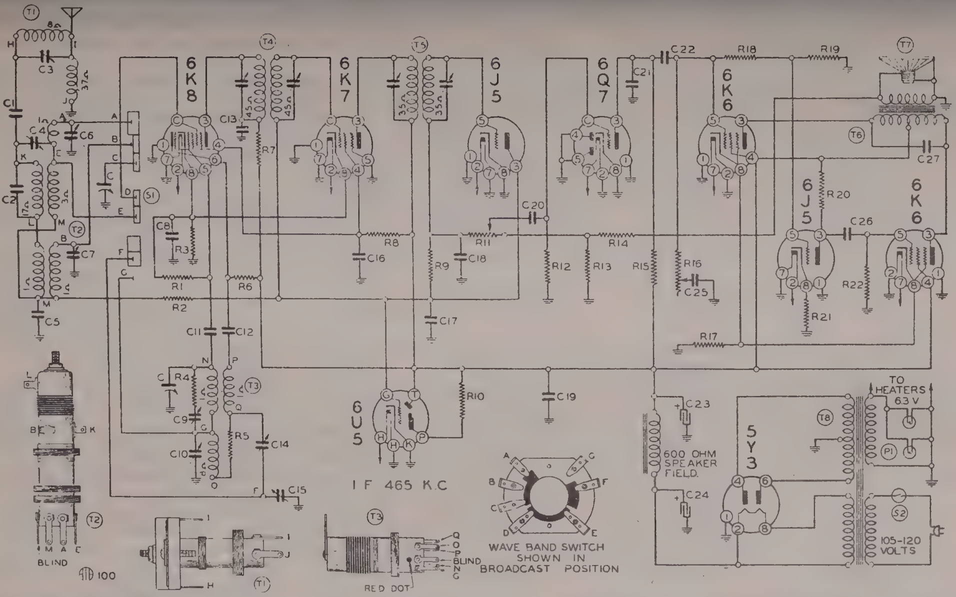
PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

Only a single adjustment for each station is required in setting up your favorite stations for automatic pushbutton operation. These adjustments are located at the front of the chassis shown in Fig. 3 and are accessible through the station call letter tab holes. The only equipment needed is a small screw driver to make the adjustments.

After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 3). Adjust screw through station tab opening above button pressed until the same station is heard clearly and tuning indicator indicates that it is correctly tuned.

WESTERN AUTO SUPPLY CO.

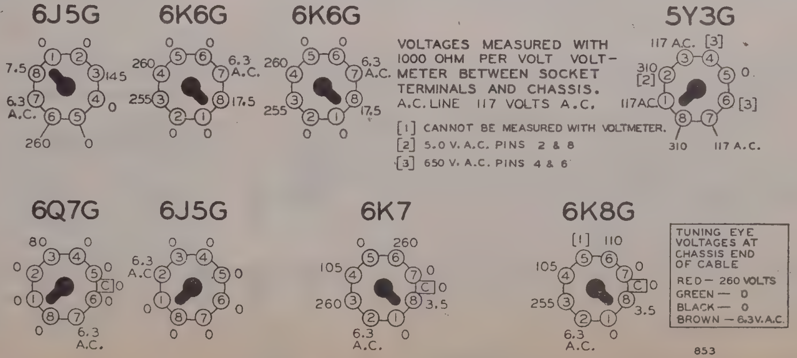
MODEL D921



FOR TUNER
SEE INDEX

BOTTOM VIEW OF CHASSIS

I. F. FREQUENCY 465 KC.



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. A.C. LINE 117 VOLTS A.C.

[1] CANNOT BE MEASURED WITH VOLTMETER.
[2] 5.0 V. A.C. PINS 2 & 8
[3] 650 V. A.C. PINS 4 & 6

TUNING EYE VOLTAGES AT CHASSIS END OF CABLE
RED — 260 VOLTS
GREEN — 0
BLACK — 0
BROWN — 6.3 V. A.C.

853

REAR OF CHASSIS

MARCH, 1939

ISSUE A
March 1939
Serial No. 9C628200 up

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13094	50M ohm—⅓ w.
R2	13011	250M ohm—⅓ w.
R3	13097	200 ohm—⅓ w.
R4	130174	50 ohm—⅓ w.
R5	130174	50 ohm—⅓ w.
R6	130281	35M ohm—1 watt
R7	130192	2M ohm—⅓ w.
R8	130196	30M ohm—1 watt
R9	1304	3 megohm—⅓ w.
R10	130110	1 megohm—1/10 in tuning ind. socket
R11	101159	1 megohm volume control
R12	130225	15 megohm—⅓ w.
R13	130215	25 ohm—⅓ w.
R14	130168	100 ohm—⅓ w.
R15	1309	200M ohm—⅓ w.
R16	101165	1 megohm tone control
R17	130220	300 ohm—1 watt
R18	130163	400M ohm—⅓ w.
R19	130103	100M ohm—⅓ w.
R20	13094	50M ohm—⅓ w.
R21	130218	5M ohm—⅓ w.
R22	1303	500M ohm—⅓ w.
		CONDENSERS
C	102101	2 gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	12467	Wave Trap Trimmer
C4	12482	Image Trimmer
C5	129131	.002775 mica
C6	12475	B.C. Antenna Trimmer
C7	12475	S.W. Ant. Trimmer
C8	100104	.5 x 100 v.
C9	12476	S.W. Osc. Trimmer
C10	12476	B.C. Osc. Trimmer
C11	12939	.00005 Mica
C12	10025	.002 x 600 v.
C13	10013	.05 x 400 v.
C14	12444	.000422 B. C. Series Pad
C15	129138	.0015 S. W. Series Pad. Comp. Type
C16	1001	.1 x 400 v.
C17	10020	.1 x 200 v.
C18	1295	.0001 mica
C19	1001	.1 x 400 v.
C20	10019	.006 x 600 v.
C21	1292	.0005 Mica
C22	10026	.02 x 400 v.
C23	11969	16 mfd. 350 w.v. lytic
C24	11973B	16 mfd. 400 w.v. lytic
C25	1009	.05 x 200 v.
C26	10076	.02 x 400 v.
C27	10012	.003 x 600 v.
		PARTS
T1	108144	Wave Trap
T2	111119	B.C. & S.W. Antenna Coils
T3	110111	B.C. & S.W. Osc. Coils
T4	108122C	Input I.F. Coil
T5	108106P	Output I.F. Coil
T6	10554C	Output Transformer
T7	114159	10" Dynamic Speaker
T8	104160	Power Transformer
S1	12572	Wave Band Switch
S2		Off-On Switch on Tone Control
P1	10794	2 - 6-8 v. Pilot lights

MODEL D921

WESTERN AUTO SUPPLY CO.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	540 to 1750 KC. (Kilocycles)
Short Wave	Lower	5.5 to 18.3 MC. (Megacycles)

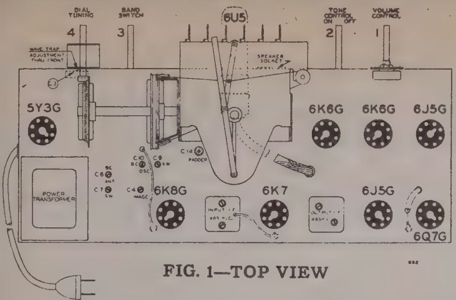


FIG. 1—TOP VIEW

TUBES:

The tube complement of this chassis consists of the following octal base glass and metal tubes:

The type and function of each tube is as follows:

1—Type 6K8G Converter (Oscillator and First Detector).
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier.
1—Type 6J5G Second Detector and A. V. C.
1—Type 6Q7G First Audio Amplifier.
1—Type 6J5G Phase Inverter
2—Type 6K6G Pentode Push-Pull Output Amplifiers.
1—Type 5Y3G High Vacuum Rectifier.
1—Type 6U5 Cathode-Ray Tuning Indicator.

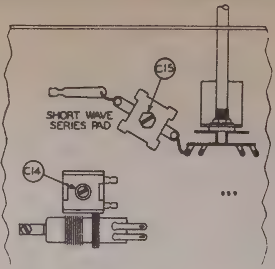


FIG. 4

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8G	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROADCAST BAND	1750 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C10) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1500 Kc.	Trimmer (C6) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C14) (See Fig. 1)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
	465 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C3) (See Fig. 1)	I. F. Wave Trap	Adjust for minimum output
IMAGE REJECTION ADJUSTMENTS	2430 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1500 Kc. on dial	Trimmer (C4) (See Fig. 1)	Image rejection	Adjust for minimum output (See note "B")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 MC.	Trimmer (C9) Top of Chassis (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial Set at 17 MC.	Trimmer (C7) (See Fig. 1)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 6 MC.	Trimmer (C15) (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A." Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

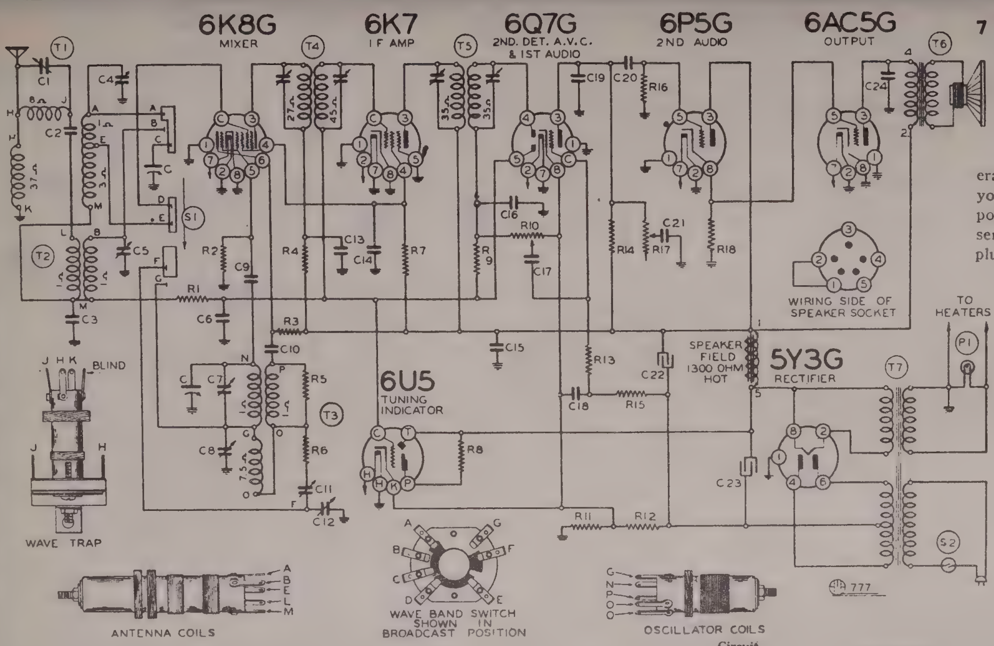
NOTE "B." 2430 Kc. is the image frequency of 1500 Kc. Adjust Trimmer (C4) until a minimum output is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme right rotation	Short Wave	5.5 to 18.3 MC.
Extreme left rotation	Broadcast	540 to 1750 KC.

Power Consumption .... 85 Watts (At 115 volts 50-60 cycles)
Power Output .... 5 Watts Undistorted, 7 Watts Maximum
INTERMEDIATE FREQUENCY .... 465 KC.



7 Tube Including Cathode-Ray Tuning Indicator

2-Band A. C. Superheterodyne Receiver

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, 50-60 cycle A. C. supply only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

TUBES:

The tube complement of this chassis consists of the following octal base glass and metal tubes:

The type and function of each tube is as follows:

1—Type 6K8G Triode Hexode, First Detector-oscillator.

1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K. C.).

1—Type 6Q7G Duplex Diode Triode Second Detector, A. V. C. and First Audio.

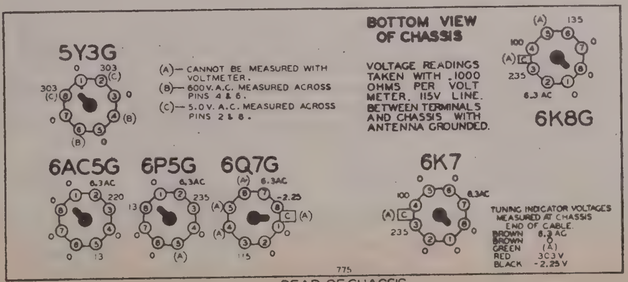
1—Type 6P5G Driver Stage.

1—Type 6AC5G Positive Grid Triode Output Amplifier.

1—Type 5Y3G High Vacuum Rectifier.

1—Type 6U5 Cathode-Ray Tuning Eye.

I. F. FREQUENCY 465 KC.



(A)— CANNOT BE MEASURED WITH VOLTMETER.
(B)— 600 V. A.C. MEASURED ACROSS PINS 4 & 6.
(C)— 5.0 V. A.C. MEASURED ACROSS PINS 2 & 8.

VOLTAGE READINGS TAKEN WITH 1000 OHMS PER VOLT METER. 115V LINE. BETWEEN TERMINALS AND CHASSIS WITH ANTENNA GROUNDED.

TUNING INDICATOR VOLTAGES MEASURED AT CHASSIS END OF CABLE.

BROWN	6.3 AC
BROWN	0
GREEN	(A)
RED	303 V
BLACK	-2.25 V

FIG. 3

1939

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13011	250M ohm—⅓ w.
R2	13012	50M ohm—⅓ w.
R3	1301	25M ohm—⅓ w.
R4	13023	2000 ohm—⅓ w.
R5	130235	1500 ohm—⅓ w.
R6	130240	30 ohm—⅓ w.
R7	13076	30M ohm—⅓ w.
R8	130110	1 megohm—in tuning indicator socket
R9	1304	3 megohm—⅓ w.
R10	101137	1 megohm volume control
R11	130203	40 ohm—⅓ w.
R12	130203	40 ohm—⅓ w.
R13	13019	1 megohm—⅓ w.
R14	1309	200M ohm—⅓ w.
R15	1303	500M ohm—⅓ w.
R16	13019	1 megohm—⅓ w.
R17	101157	250M ohm tone control
R18	1301	25M ohm—⅓ w.
		CONDENSERS
C	10285	2 gang variable condenser
C1	12451	Wave Trap adjustable trimmer
C2	10011	.01 x 400 v.
C3	129129	.0025 mica
C4	12473	B.C. Antenna Trimmer
C5	12473	S.W. Antenna Trimmer
C6	1009	.05 x 200 v.
C7	12472	S.W. Oscillator Trimmer
C8	12472	B.C. Oscillator Trimmer
C9	12939	.00005 mica
C10	10025	.002 x 600 v.
C11	12466	B. C. Oscillator Series Pad
C12	12466	S.W. Oscillator Series Pad
C13	10026	.02 x 400 v.
C14	1001	.1 x 400 v.
C15	10013	.05 x 400 v.
C16	1295	.0001 mica
C17	10019	.006 x 600 v.
C18	10020	.1 x 200 v.
C19	1292	.0005 mica
C20	10011	.01 x 400 v.
C21	10019	.006 x 600 v.
C22	11980	12 mfd. lytic—450 w. v.
C23	11980	12 mfd. lytic—450 w. v.
C24	10019	.006 x 600 v.
		PARTS
T1	108124	Wave Trap
T2	111115	Antenna Coils
T3	110104	Oscillator Coils
T4	108122	Input I. F.—465 kc.
T5	108106J	Output I. F.—465 kc.
T6	114148	10 in. Dynamic Speaker (Field Resis. 1300 ohms)
T7	104139B	Power Transformer
S1	12569	Wave Band Switch
S2		Off-on switch on tone control
P1	10794	6-8 v. pilot light

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 17 MC.	Trimmer (C7) Top of Chassis (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial Set at 17 MC.	Trimmer (C5) (See Fig. 1)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 6 MC.	Trimmer (C12) (See Fig. 1)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROADCAST BAND	1735 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C8) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 1400 Kc.	Trimmer (C4) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 600 Kc.	Trimmer (C11) (See Fig. 1)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
	465 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 600 Kc.	Trimmer (C1) (See Fig. 1)	I. F. Wave Trap	Adjust for minimum output

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme right rotation	Short Wave	5.6 to 18.3 MC.
Extreme left rotation	Broadcast	540 to 1735 KC.

Power Consumption............70 Watts (At 115 volts 50-60 cycles)
Power Output............3 Watts Undistorted, 5 Watts Maximum
INTERMEDIATE FREQUENCY............465 KC.

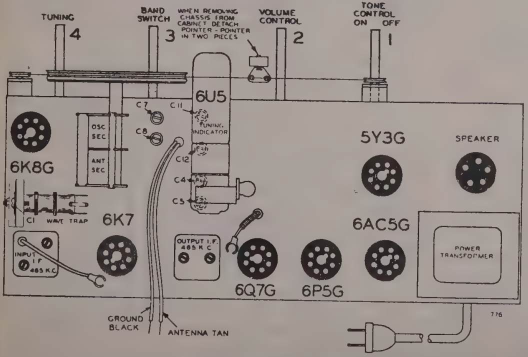


FIG. 1—TOP VIEW

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

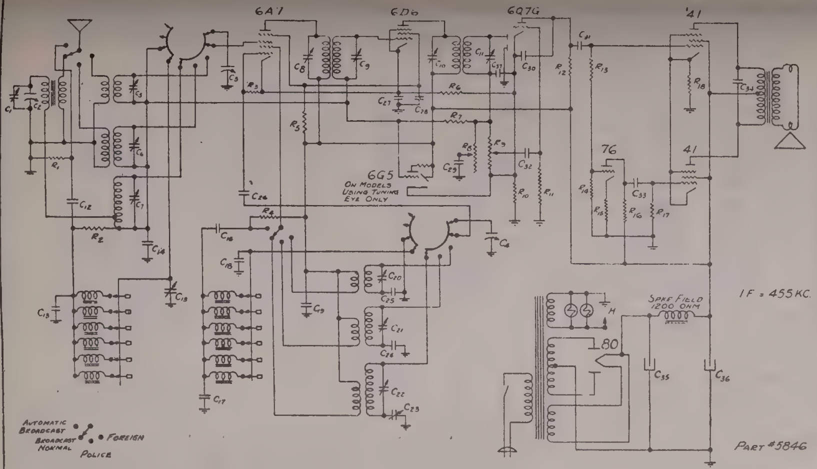
To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

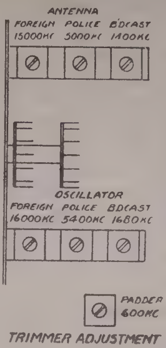
BAND	FREQUENCY RANGE
Broadcast	540 to 1735 KC. (Kilocycles)
Short Wave	5.6 to 18.3 MC. (Megacycles)

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 50-60 cycles are so marked. The power consumption of this receiver is 70 watts.

NOTE:—On the back of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.



SETTING UP THE PUSH BUTTON STATION SELECTOR



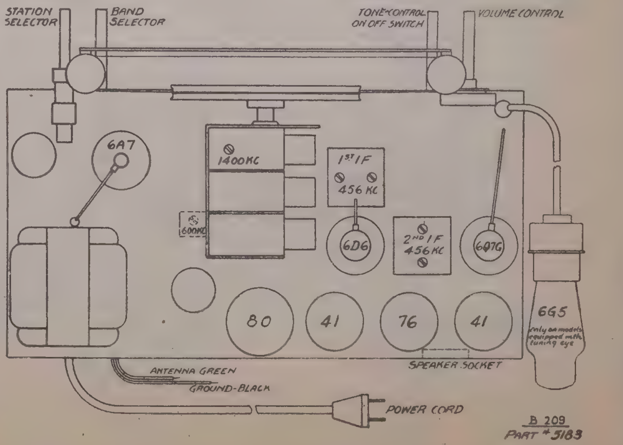
TRIMMER ADJUSTMENT

Call station nearest 1600 KC end of dial the No. 1 station and number five other stations consecutively as they are tuned in on the dial, tuning from left to right. Set band selector at "B", or second position from left, and tune in station No. 1. Observe program. Turn band selector knob to extreme left position. Push No. 1 button in as far as it will go. Insert screwdriver thru opening directly above No. 1 button and turn screwdriver until same station is heard. If station is not heard reverse direction of rotation.

Tubes required are:

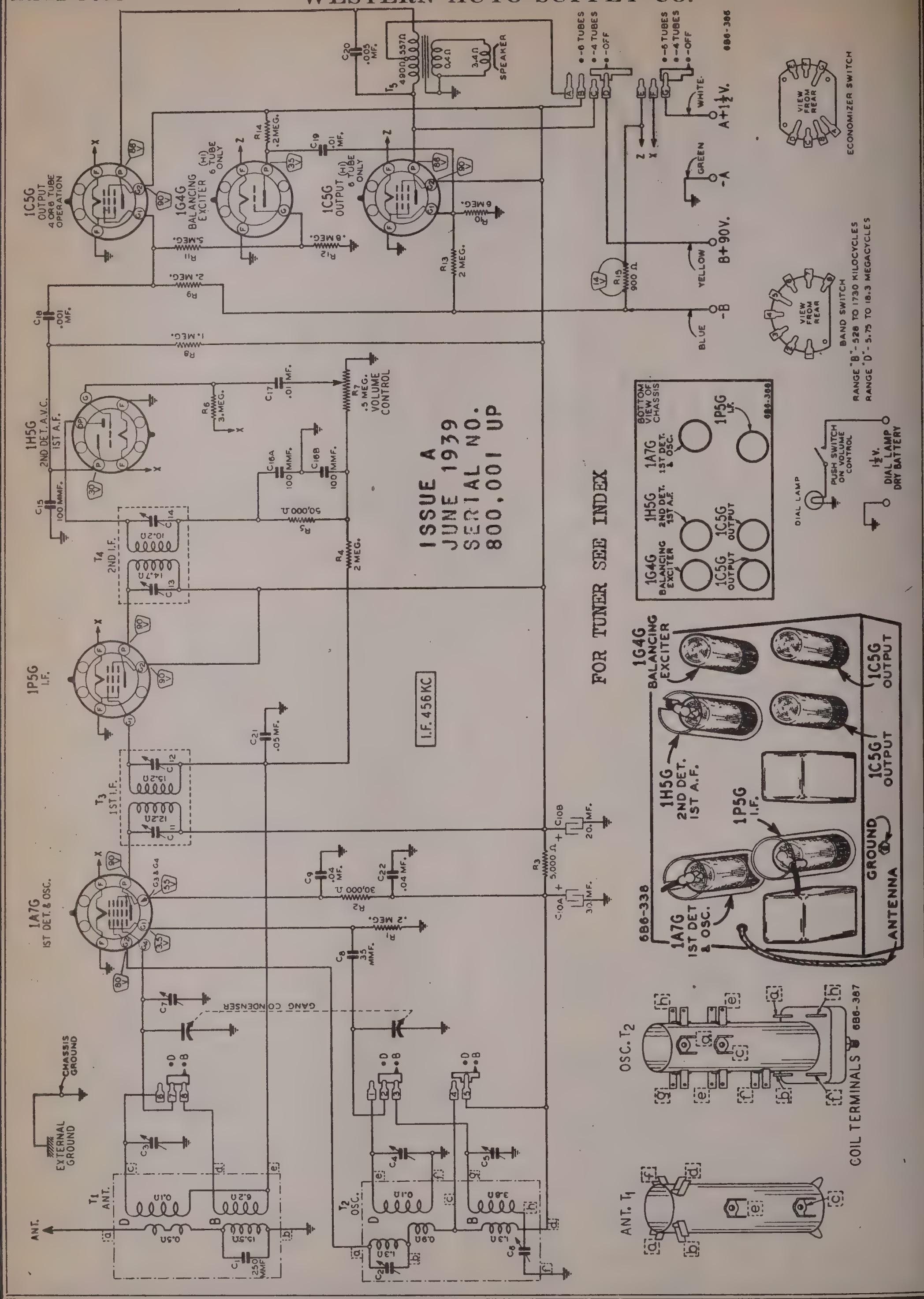
1—6A7 Oscillator-translator
1—6D6 Intermediate Frequency Amplifier
1—6Q7G Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
2—41 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Symbol	*Part No.*	*Description*
C1		Trimmer on variable
C2, 3, 4	5092	3-gang 362 mmfd. variable
C5, 20, 22	1611	3-35 mmfd. trimmer
C6, 7, 21	2597	1-10 mmfd. trimmer
C8, 9, 10, 11		I.F. Trimmers
C12, 30, 37	4810	.0005 400 V.
C13	5193	.002 Special 5%
C14, 28	572	.1 200 V.
C15	3272	30-140 mmf. trimmer
C16, 31, 33	576	.02 400 V.
C17, 18		370 mmf. Special 3%
C19	563	.05 400 V.
C23	2560	350 mmfd. Var. Padder
C24	2741	1330 mmfd. Padder
C25	2793	.006 600 V.
C26	2780	50 mmfd. Mica
C27	2792	.2 200 V.
C29	2695	.003 600 V.
C32	568	.01 400 V.
C34	824	.002 600 V.
C35	3285	16 mfd. 350 W.V. Elect.
C36	5101	16 mfd. 225 W.V. Reg. Elect.
R1	617	20M 1/3 W.
R2, 7, 11	624	1 Meg. 1/3 W.
R3, 16	631	50M 1/3 W.
R4	4529	10M 1/3 W.
R5	636	40M 1/3 W.
R6	2605	200 ohms 1/3 W.
R8	5099	2 meg. tone control
R9	5100	500M Volume Control
R10	2689	100 ohm 1/3 W.
	2647	50 ohm 1/3 W. on models using tuning eye
R12	2730	200M 1/3 W.
R13	2881	400M 1/3 W. 10%
R14	2880	100M 1/3 W. 10%
R15	2883	5M 1/3 W. 10%
R17	2731	500M 1/3 W.
R18	5184	310 ohm 5% Flexohm
	5091	Power Transformer
	3463-5	1st I.F. Transformer
	3463-6	2nd I.F. Transformer
	5096	Oscillator Coils
	5095	Antenna Coils
	2845	B.C. Antenna Coil
	2163	Drive Cable
	5185	Speaker 8"
	5832	Push Button Tuning Assembly Complete. (Replacement of individual component parts not recommended.)
	5810	Glass Indicator



MODEL D934

WESTERN AUTO SUPPLY CO.



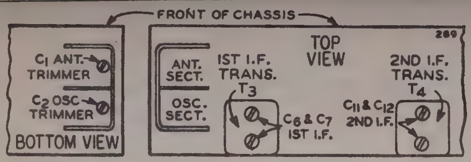
ISSUE A
JUNE 1939
SERIAL NO.
800,001 UP

FOR TUNER SEE INDEX

©John F. Rider, Publisher

WESTERN AUTO SUPPLY CO.

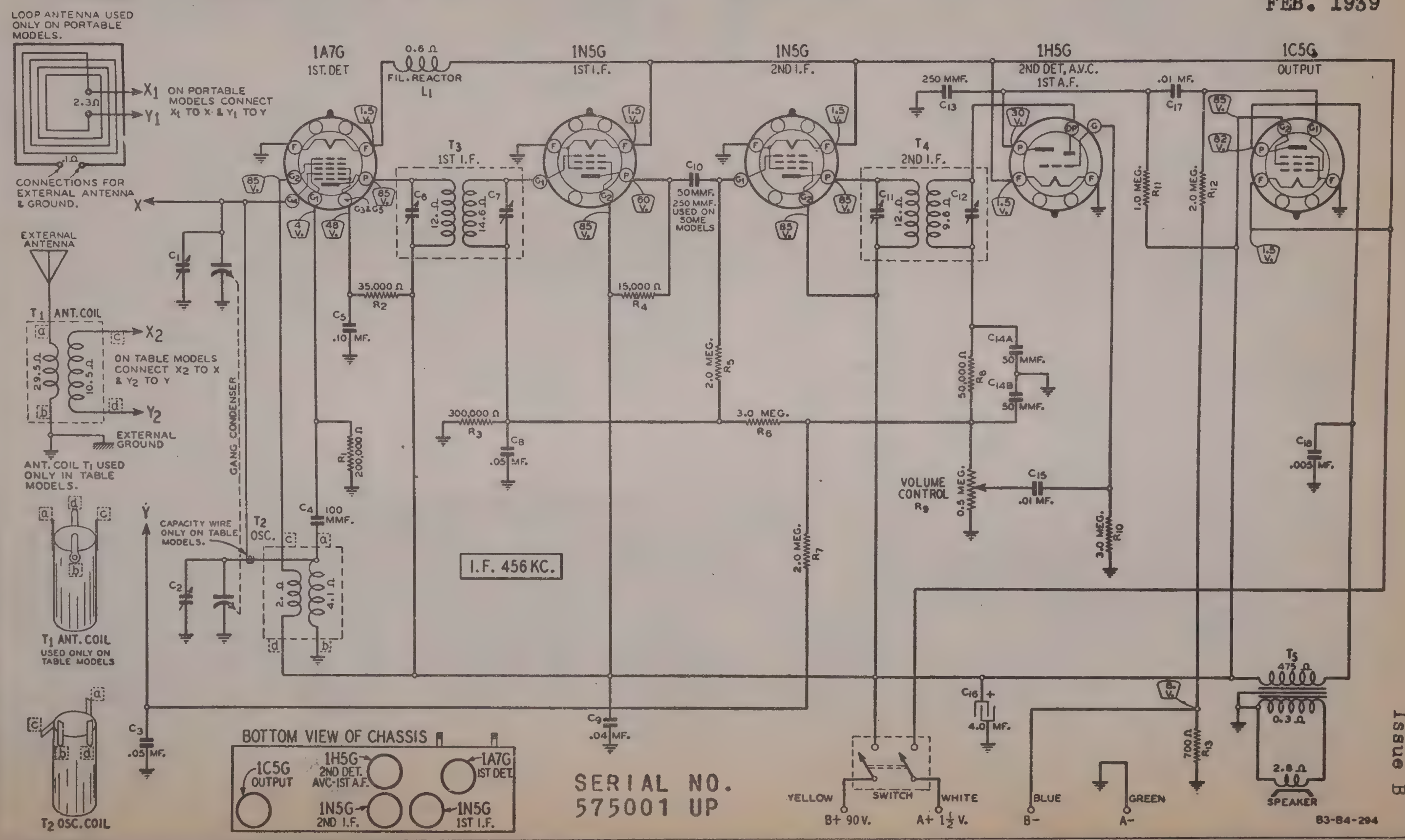
MODEL D937
Issue B



Caution

On models having an On-Off indicator disk behind the front of the cabinet, it is necessary to take the following precautions, when removing the chassis: Pull the chassis away from the front of the cabinet until the control shafts are clear of the cabinet. Then tilt the rear of the chassis upward. At the same time, keep the front of the chassis base clear of the bottom of the cabinet to prevent breaking the On-Off indicator disk on the volume control shaft. Now carefully pull the chassis out of the cabinet.

FEB. 1939

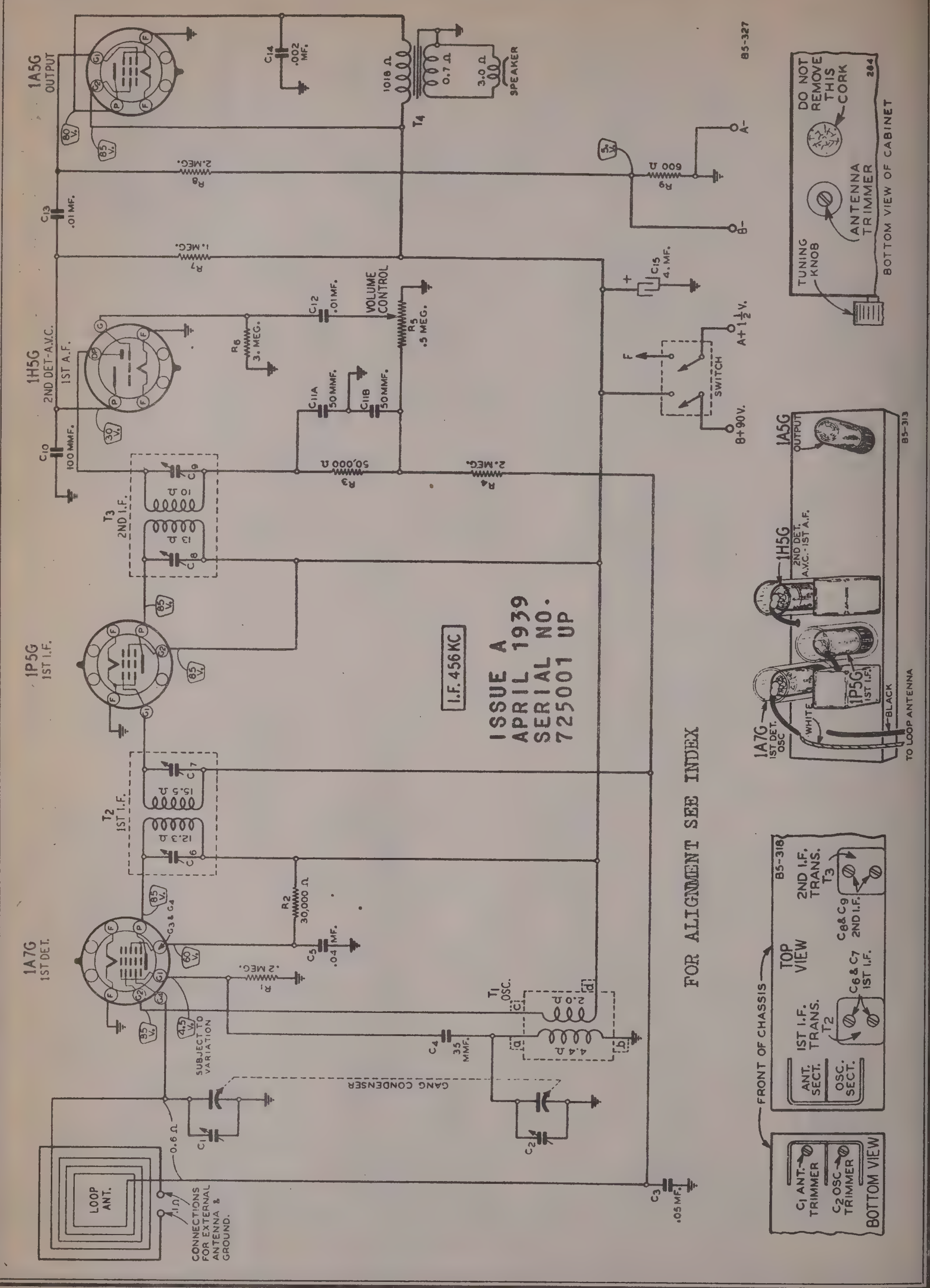


SERIAL NO. 575001 UP

©John F. Rider, Publisher

MODEL D938

WESTERN AUTO SUPPLY CO.

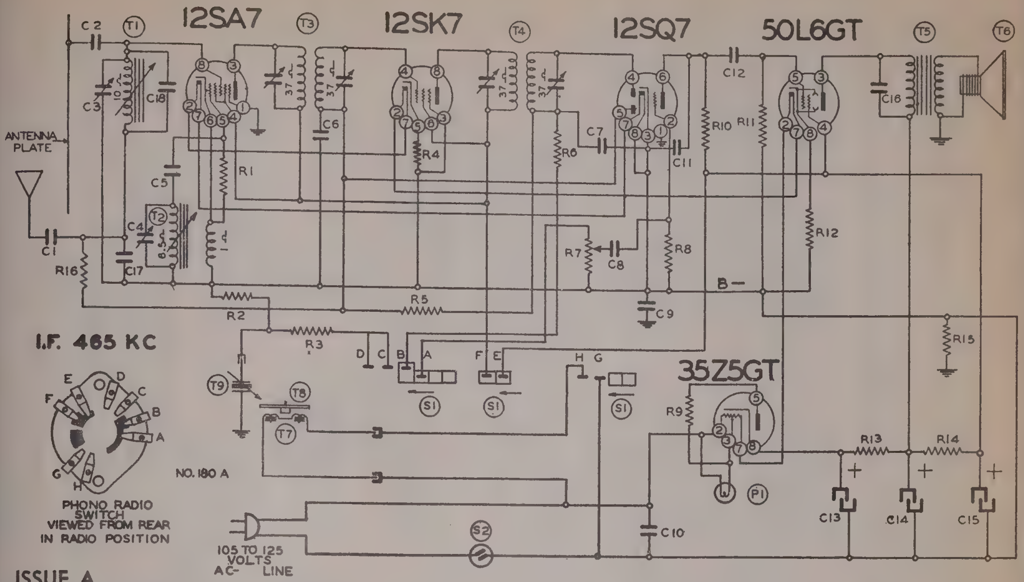


ISSUE A
APRIL 1939
SERIAL NO.
725001 UP

FOR ALIGNMENT SEE INDEX

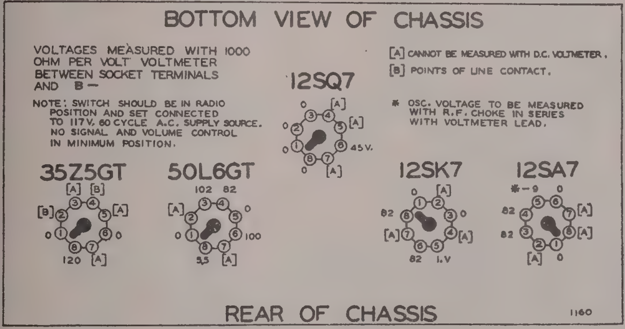
WESTERN AUTO SUPPLY CO.

MODEL D1C70



ISSUE A

April 1940 Serial No. OC371605B



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B —

NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117V. 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.

[B] POINTS OF LINE CONTACT.

* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.

REAR OF CHASSIS

1160

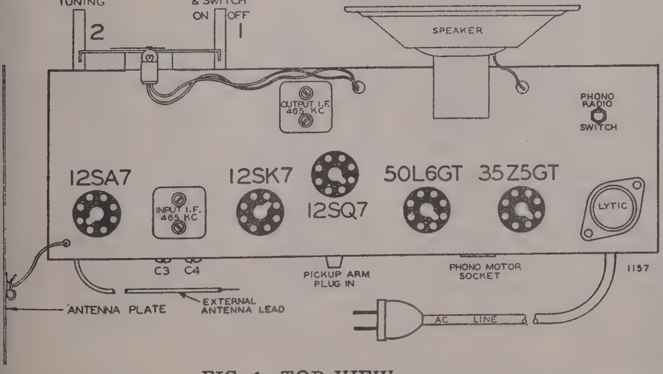


FIG. 1—TOP VIEW

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—⅓ w.
R2	130118	600M ohm—⅓ w.
R3	130118	600M ohm—⅓ w.
R4	13056	100 ohm—⅓ w.
R5	130170	3 megohm—⅓ w.
R6	13012	50M ohm—⅓ w.
R7	101217	½ megohm—volume control
R8	130257	5 megohm—⅓ w.
R9	130215	25 ohm—½ w.
R10	1309	200M ohm—⅓ w.
R11	13037	750M ohm—⅓ w.
R12	130166	150 ohm—⅓ w.
R13	13097	200 ohm—⅓ w.
R14	130287	1200 ohm—1 watt
R15	1309	200M ohm—⅓ w.
R16	1309	200M—⅓ w.
		CONDENSERS
C1	1295	.0001 Mica Condenser
C2	129114	.0003 mfd. mica
C3	124136	Antenna Trimmer
C4	124136	Oscillator Trimmer
C5	1295	.0001 mica
C6	1009	.05 x 200 v.
C7	1295	.0001 mica
C8	10025	.002 x 600 v.
C9	100119	.1 x 400 v.
C10	1001	.1 x 400 v.
C11	12912	.00025 mica
C12	10019	.006 x 600 v.
C13	11994	40 mfd. lytic—150 w. v.
C14	11994	20 mfd. lytic—150 w. v.
C15	11994	20 mfd. lytic—150 w. v.
C16	10011	.01 x 400 v.
C17	129162	.0008 Mica Condenser
C18	129163	.000025 Ceramicon Condenser
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
T1	112767	Antenna Coil—Permeability tuning assembly complete
T2	112767	Oscillator Coil
T3	108140F	Input I. F. Coil—465 kc.
T4	108145D	Output I. F. Coil—465 kc.
T5	105108	Output Transformer
T6	114193	5" P.M. Speaker
T7	104206	Phono Motor
T8	12228	Turntable
T9	114194	Phono pick up arm
S1	125113	Phono Switch
S2		Switch on volume control
P1	107249	Pilot light T47
		T1 and T2 in same unit

IMPORTANT: See Aligning Instructions on Page 4

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas .1 Mfd.; and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Trimmer (C4) (See Fig. 4)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Trimmer (C3) (See Fig. 4)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left. (See Fig. 3)	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Terminal "B" (See Fig. 4)	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Fig. 4)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

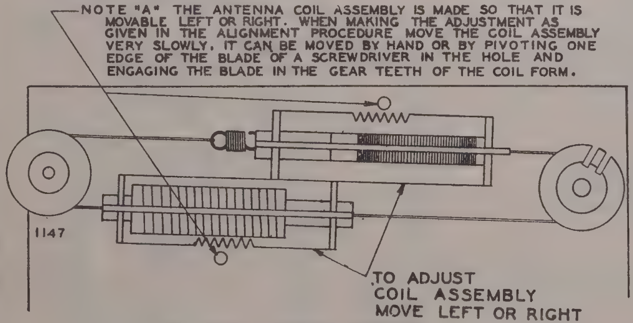

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.
1147
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

FIG. 3.—TUNING ASSEMBLY

TUBES:

The tube complement of this chassis consists of the following octal base glass and metal tubes.

The type and function of each tube is as follows.

1—Type 12SA7 Mixer, First Detector-oscillator.
1—Type 12SK7 I. F. Amplifier.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at

FREQUENCY RANGE
535 to 1690 K.C.

Power Consumption........Radio Only 30 Watts
Power Output........900 Milliwatts Undistorted, 1.7 Watts Maximum
Intermediate Frequency........465 K.C.

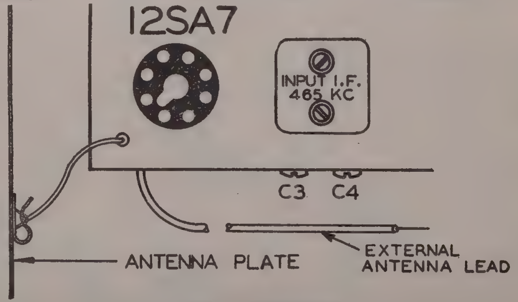


FIG. 4.—TRIMMERS

1—Type 12SQ7 Second Detector, A.V.C. and First Audio.
1—Type 50L6GT Beam Output Amplifier.
1—Type 35Z5GT Rectifier.

SPECIFICATIONS — MOD. D-934

Input Voltages and Currents

"A" Battery (LO Operation)	1.5 volts - 250 Ma.
"B" Battery (LO Operation)	90 volts—10.5 to 12 Ma.
"A" Battery (HI Operation)	1.5 volts—400 Ma.
"B" Battery (HI Operation)	90 volts—13.5 to 17.5 Ma.
Dial Lamp Battery (HI & LO Operation)	1.5 volts—1 Amp.

Power Output

(LO Operation)	70 Milliwatts Undistorted
(LO Operation)	200 Milliwatts Maximum
(HI Operation)	250 Milliwatts Undistorted
(HI Operation)	270 Milliwatts Maximum

Selectivity - 38 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - - 6" P.M. Dynamic

Tuning Frequency Range

B Range	528 to 1730 KC
D Range	5750 to 18300 KC

Sensitivity (For .05 Watt Output)

B Range	25 Microvolts Average
D Range	80 Microvolts Average

From an inspection of the circuit diagram it will be noted the LO operation is that of a 4 tube radio—one output tube and the phase inverter having their filaments open circuited. The HI position permits normal operation with all 6 tubes operating, and with push-pull output.

ALIGNMENT PROCEDURE

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C13) & (C14) 1st I.F. (C11) & (C12)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C5)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C7)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C6) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C2) Rock Rotor—See Note B

Volume Control—Maximum All Adjustments.

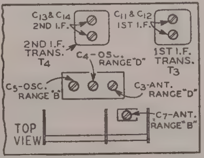
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

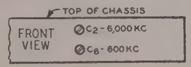
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

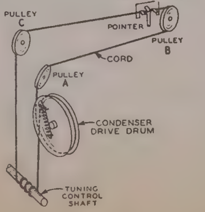
NOTE A—If the pointer is not at 1500 KC on the dial, slip the drive cord out from under one of the end clamps on the pointer head. Move pointer to 1500 KC on the dial and replace drive cord under end clamp.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.





CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



Drive Cord Replacement

Tie one end of the new drive cord to the tension spring.

Turn the gang condenser to the full open position. Secure the free end of the spring over the hook on the condenser drive drum—See illustration. Pass the cord through the hole in the drum rim and over pulleys A, B, and C as shown. Wind 3½ turns in a clockwise direction (from front of chassis) around the tuning control shaft, progressing toward the chassis. Pull drive cord taut. Then wind one complete turn in a clockwise direction (from right side of chassis) around condenser drive drum. This turn must be wound on the left side (from front of chassis) of the drive drum groove. Pass cord through hole in drum rim and tie to tension spring as shown.

Dial Pointer Attachment—Tune in a station of known frequency. Set the pointer at this frequency on the dial scale and secure pointer to cord—See illustration.

Procedure for Setting the Station Buttons – MOD. D-934

Setting a Station Button

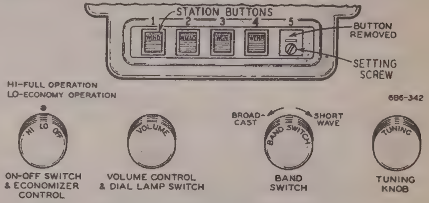
Pull the button at the left (No. 1) off the shaft. When this is done, the locking screw under the shaft will be exposed.

Loosen this screw with a small screwdriver by turning several turns in a counter-clockwise direction. Continue to press in firmly on the screwdriver, thus holding the station button shaft depressed. Select the first station from the list you have prepared and carefully tune in this station by means of the manual tuning knob.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure as outlined above. If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of the others.

Continue to press in firmly on the screwdriver and lock the mechanism by turning the locking screw in a clockwise direction until it is tight. The station is now set on this button.

Proceed in the same manner to set stations on any of the remaining buttons.



SPECIFICATIONS MOD. D-937

Input Voltages and Currents

"A" Battery	1.5 Volts—.30 Amperes
"B" Battery	90 Volts—12 to 15 Ma

Power Output - - - 140 Milliwatts Undistorted

Selectivity - - 41 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - - 6" P.M. Dynamic

Tuning Frequency Range - - - 540 to 1600 KC.

Sensitivity (For .05 Watt Output)

Portable Model..........20 Microvolts Per Meter Average

ALIGNMENT PROCEDURE – MOD. D-937 & D-938

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1500 KC	None—See Note		Turn rotor to max. output	Antenna (C1)

TRIMMERS C8+C9 FOR MODEL 938

The following equipment is required for aligning:
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For model with pointer in back of celluloid dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. **IF THE POINTER IS AT A HIGHER KC MARK THAN 800 KC,** grasp the drive cord below the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord down until the pointer is at the 800 KC mark. **IF THE POINTER IS AT A LOWER KC MARK THAN 800 KC,** grasp the drive cord above the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord up until the pointer is at the 800 KC mark.

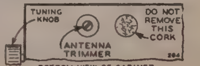
CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

Adjusting Antenna Trimmer

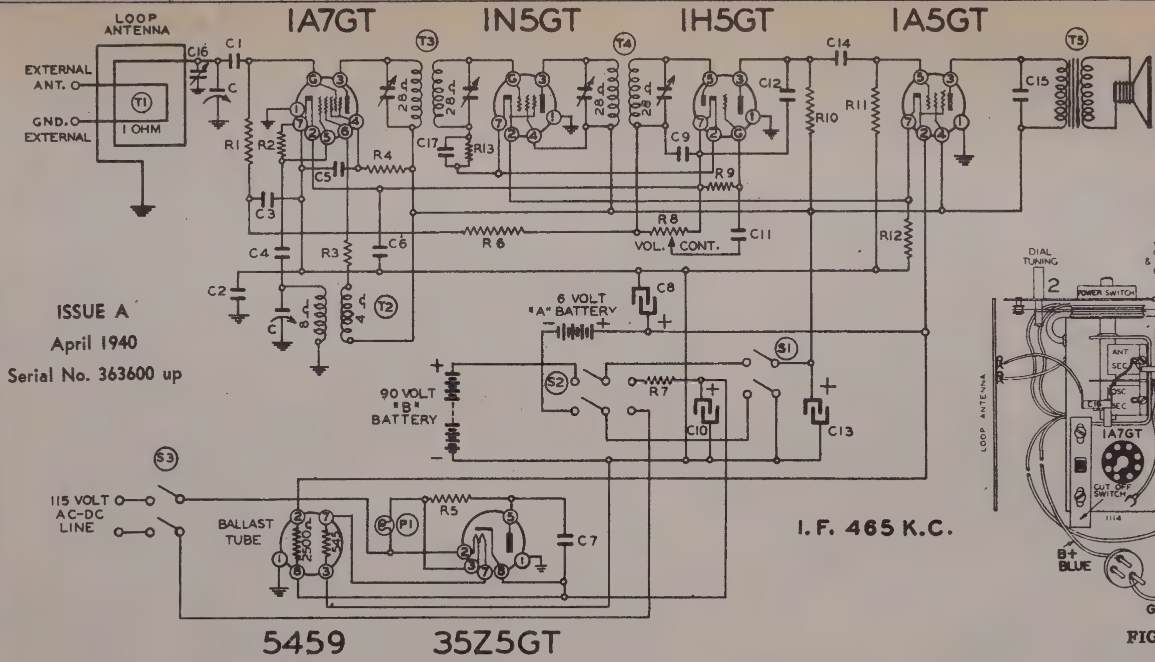
After the batteries are installed and the back of the cabinet is in place, adjust the antenna trimmer.

Accurately tune in a weak station signal between 1400 and 1500 KC on the dial. With a screwdriver turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. This trimmer is reached through an opening in the bottom of the cabinet—see illustration. CAUTION: Do not remove the cork from the other opening at the bottom of the cabinet.

Readjust the antenna trimmer when a new set of batteries is installed.



BOTTOM VIEW OF CABINET



ISSUE A
April 1940
Serial No. 363600 up

ALIGNMENT FREQUENCIES:
IF - 465 KC
B-C Osc. - 1550 KC
B-C Ant (C-16) - 1400 KC

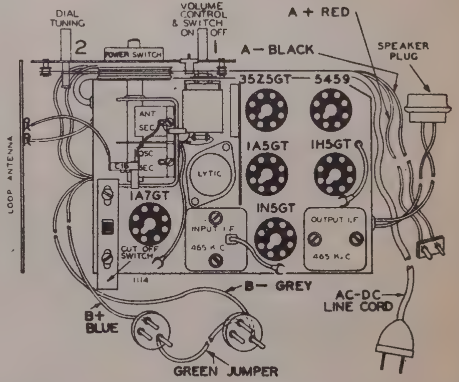


FIG. 2—TOP VIEW

TUBES—

The tube complement of this chassis consists of the following tubes.

The type and function of each tube is as follows:

1A7GT Mixer, First Detector-oscillator.

1N5GT Remote Cut-Off Pentode, 1st I. F. Amplifier (465 K. C.).

1H5GT Second Detector, A.V.C. 1st Audio.

1A5GT Output Amplifier.

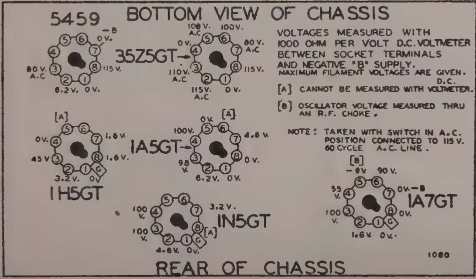
35Z5GT Rectifier.

5459 Ballast Resistor.

Circuit Diagram Ref. No.	Part No.	
		RESISTORS
R1	13038	2 megohm—⅓ w.
R2	130266	200M ohm—⅓ w.
R3	13018	4M ohm—⅓ w.
R4	130208	40M ohm—⅓ w.
R5	130215	25 ohm—½ w.
R6	130170	3 megohm—⅓ w.
R7	130129	2500 ohm—⅓ w.
R8	101210	1 megohm volume control
R9	130257	5 megohm—⅓ w.
R10	1303	500M ohm—⅓ w.
R11	13038	2 megohm—⅓ w.
R12	13092	1M ohm—⅓ w.
R13	130100	150M Ohm—⅓ w.
		CONDENSERS
C	102125	2 gang variable condenser
C1	12912	.00025
C2	100110	.2 mfd. x 400 v.
C3	1009	.05 x 200 v.
C4	12912	.00025
C5	1009	.05 x 200 v.

Circuit Diagram Ref. No.	Part No.	
C6	10020	.1 x 200 v.
C7	10011	.01 x 400 v.
C8	119104	Lytic 200 mfd. x 6 w. v.
C9	1295	.0001 mfd.
C10	119104	Lytic 40 mfd. x 150 w. v.
C11	10025	.002 x 600 v.
C12	1292	.0005 mfd.
C13	119104	Lytic 20 mfd. x 150 w. v.
C14	10011	.01 x 400 v.
C15	10025	.002 x 600 v.
C16	124116	Adjustable antenna trimmer
C17	10026	.02 x 400 v.
		C8, C10 and C13 in same unit
		PARTS
T1	111171	Loop Antenna
T2	110144	Oscillator Coil
T3	108171B	Input I. F. Coil—465 kc.
T4	108172	Output I. F. Coil—465 kc.
T5	114189	Speaker with output transformer
S1	101210	Switch on volume control
S2	125106	Power Switch
S3	125107	Cut-off switch in line cord
P1	107249	Pilot light T47

BOTTOM VIEW OF CHASSIS



VOLTAGES MEASURED WITH 1000 OHM PER VOLT D.C. VOLTMETER BETWEEN SOCKET TERMINALS AND NEGATIVE "B" SUPPLY. MAXIMUM FILAMENT VOLTAGES ARE GIVEN. D.C.

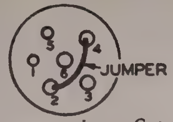
[A] CANNOT BE MEASURED WITH VOLTMETER.

[B] OSCILLATOR VOLTAGE MEASURED THRU AN R.F. CHOKE.

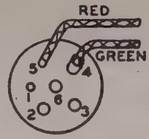
NOTE: TAKEN WITH SWITCH IN A.C. POSITION CONNECTED TO 115 V. 60 CYCLE A.C. LINE.

REAR OF CHASSIS

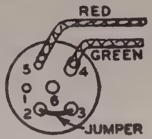
Roof Speaker and Dual Speaker Connections



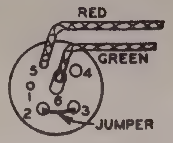
-Jumper Connection for Chassis Speaker only



Single 5¼ Inch Roof Speaker



Dual 5¼ In. Roof & 6 In. Chassis Speakers

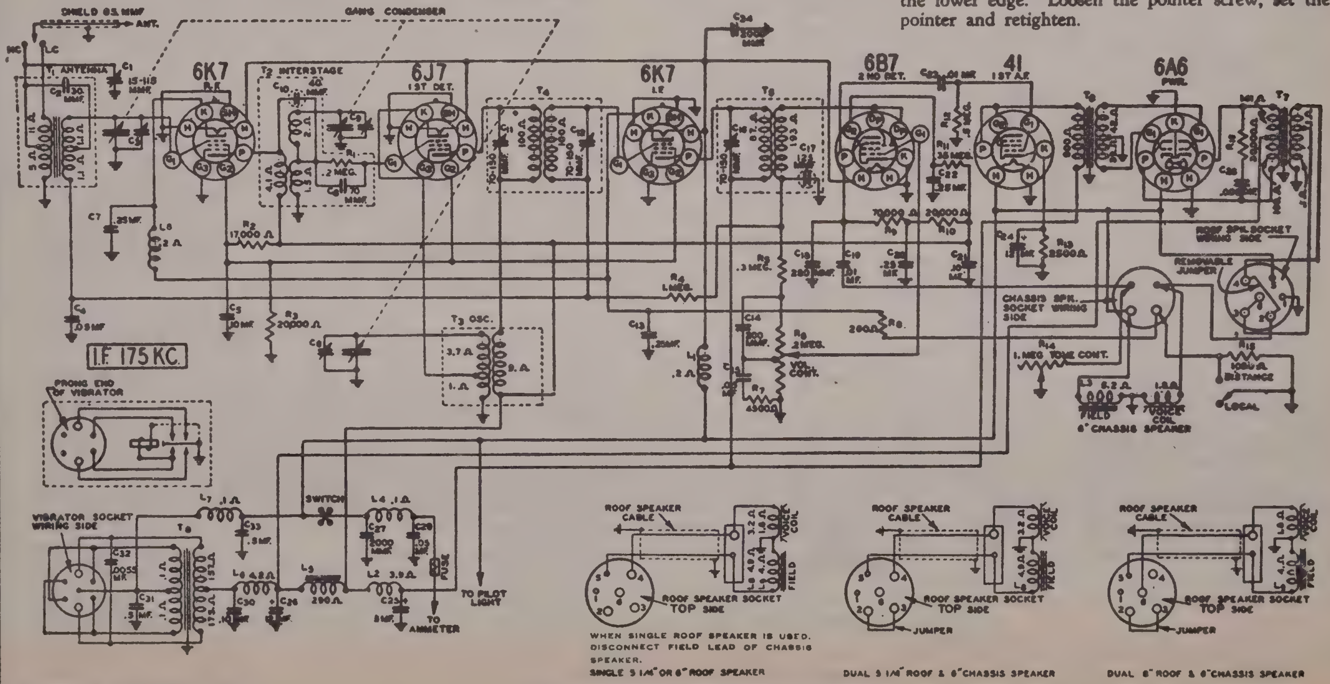


Dual 8 Inch Roof and 6 Inch Chassis Speakers.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw—see Fig. 10. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.



Inserting Vibrator Unit

Note that the vibrator unit can be inserted in two ways. The proper method of insertion will depend on which side of the car battery is grounded. Complete information is shown on the label on the vibrator.

CHANGES IN LATER MODELS

June, 1937

Later models of the Series   have changes incorporated in them which are explained below. The models which have these changes may be identified by the issue letter which is a large letter stamped on top of the chassis base. The tube arrangement label on the chassis case cover also shows this issue letter.

When ordering parts, it is important that the issue letter be noted and the correct part number, as shown in the parts list, be specified.

The "D" issue Series   is different from the "B" and "C.The gang condenser used in the "D" issue radios does not have the cut plate oscillator section. A padding condenser (600 KC) was added in series with the oscillator section of this gang condenser and the oscillator coil. The padding condenser is a part of the 2nd I. F. trimmer unit and is mounted in the 2nd I. F. coil can.

The capacity (C17) shown within a dotted circle in the 2nd I.F. coil assembly on the schematic has been changed to an actual part as shown in the supplementary parts list

The antenna, R.F. Interstage, oscillator, and 2nd I.F. coil assemblies have been changed and have been given new part numbers as shown in the supplementary parts list.

SUPPLEMENTARY REPLACEMENT PARTS

The PARTS of the Series   are used on the Series   "D" issue Radio with the following EXCEPTIONS:

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

THE FOLLOWING NEW PARTS ARE USED:

No.	Code	Description	List Price
9A859	T1	Antenna Transformer and Can Assembly.......	$1.65
9A861	T2	R. F. Interstage Transformer and Can Assembly..	1.75
9A862	T3	Oscillator Coil and Can Assembly....	.95
9A858	T5	2nd I. F. Transformer and Can Assembly.....	2.35
47X57	C17	100 mmf. Molded Condenser............ . ..	.10
17A79	(C16 (	30-100 mmf. 2nd I.F. Trimmer) 900-1300 mmf. Oscillator 600 KC Padder)...	.45
14A77		3 Section Gang Condenser Complete with Drive Gears.....................................	5.05

THE FOLLOWING PARTS OF THE SERIES   ARE NOT USED ON THE SERIES   "D" ISSUE RADIO:

No.	Code	Description	List Price
9A740) or 9A771)	T1	Antenna Transformer and Can Assembly.......	$1.65
9A741) or 9A765)	T2	R.F. Interstage Transformer and Can Assembly....................................	1.70
9A742) or 9A772)	T3	Oscillator Coil and Can Assembly...........	.85
9A744	T5	2nd I.F. Coil and Can Assembly.............	1.60
17A65	C16	30-100 mmf. 2nd I.F. Trimmer.............	.20
14A65		3 Section Gang Condenser Complete with Drive Gears..................................	5.85

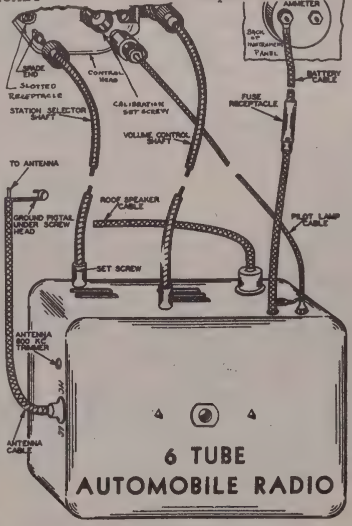
The Following Changes apply to all Issues of the Series 6J:

THE FOLLOWING NEW PARTS ARE USED:

46X213	C29	.5 mf. 180 volt Tubular Condenser........	$0.30
16X16		15 Ampere Fuse................................	.10

THE FOLLOWING PARTS ARE NOT USED:

46X207	C29	.5 mf. 180 volt Tubular Condenser........	$0.30
16X14		20 Ampere Fuse................................	.10



General Installation View

Alignment Procedure

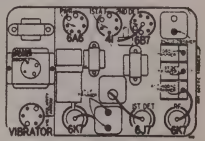
Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Set the volume control at the maximum position and attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC and adjust the 600 KC antenna trimmer to maximum (see Fig. 10 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.



Location of Tubes and Vibrator

Adjusting Antenna 600 KC Trimmer

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 9 for location of this trimmer.

Antenna

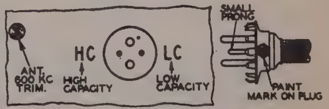


Fig. 9—Antenna Plug Insertion

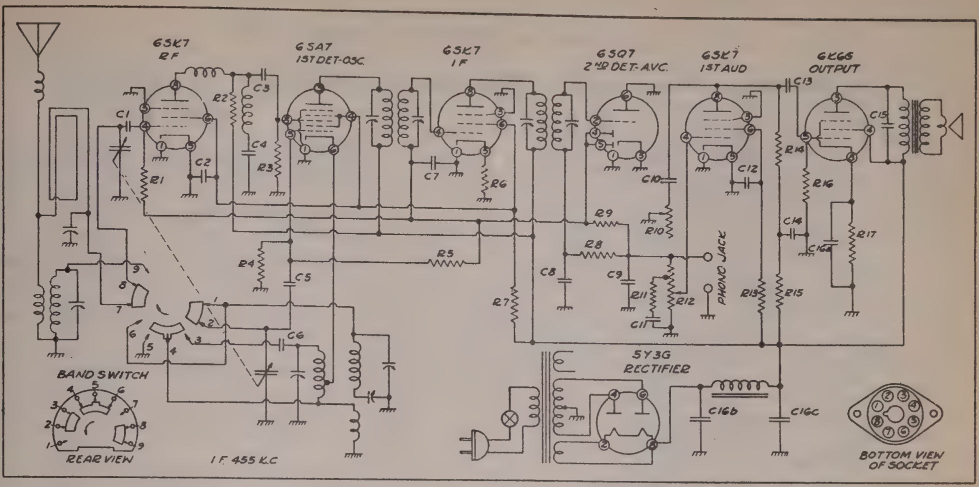
IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 9.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as is the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

WESTERN AUTO SUPPLY CO.

MODEL D-1003



Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R10	500,000	T.C.
R2	4,000	½	R11	10,000	¼
R3	100,000	½	R12	500,000	V.C.
R4	25,000	½	R13	2,000,000	¼
R5	5,000,000	¼	R14	250,000	¼
R6	100	¼	R15	50,000	¼
R7	15,000	2	R16	500,000	¼
R8	50,000	¼	R17	600—10%	½
R9	1,000,000	¼			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C10	.002	600
C2	.05	400	C11	.05	200
C3	.0001	Mica	C12	.25	400
C4	.00006—5%	Mica	C13	.01	400
C5	.0001	Mica	C14	.25	400
C6	.003—5%	Mica	C15	.005	600
C7	.05	200	C16a	20.	25
C8	.0001	Mica	C16b	20.	350
C9	.00025	Mica	C16c	20.	350

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, on the 300 volt scale. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with 117 volts A.C. input to receiver. Resistance and actual connections of coils and transformers, electrolytic condenser information and speaker data are given under Service Information.

To check for open by pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

SERVICE INFORMATION

Speaker (Part No. P4206) 6½" PM.

D. C. voice coil resistance	3.6 ohms
Voice coil impedance at 400 cycles	4.0 ohms

S. W. Antenna Coil (Part No. P3198)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, plate; No. 2, B+; No. 3, grid; No. 4, pad.

Primary—No. 3 and No. 4—Resistance	.08 ohm
Secondary—No. 1 and No. 2—Resistance	.37 ohm

Oscillator Coil (Part No. P4194)

Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.

B.C. Primary—No. 1 and No. 5—Resistance	.29 ohm
S.W. Primary—No. 5 and No. 2—Resistance	.06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance	5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance	.08 ohm

First I.F. Transformer (Part No. P4108)

Primary—Blue, plate; red, B+—Resistance	18.2 ohms
Secondary—White, grid; black, AVC—Resistance	15.1 ohms

Second I.F. Transformer (Part No. P4109)

Primary—Blue, plate; red B+—Resistance	20.8 ohms
Secondary—White, diode; black, AVC—Resistance	17.4 ohms

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in.

	Volts
6SK7 (RF) TUBE	
Plate (8) to ground	208
Screen (6) to ground	93
6SA7 TUBE	
Plate (3) to ground	255
Screen (4) to ground	93
6SK7 (IF) TUBE	
Plate (8) to ground	255
Screen (6) to ground	93
6SK7 (AF) TUBE	
Plate (8) to ground	20
Screen (6) to ground	10
6K6G TUBE	
Plate (3) to ground	240
Screen (4) to ground	258
Cathode (8) to ground	18
5Y3G TUBE	
Filament (8) to ground	266

MODEL D-1003

WESTERN AUTO SUPPLY CO.

ISSUE A
MAY 1940
Serial No.
D-69,751 & Up

SEVEN TUBE AC SUPERHETERODYNE RECEIVER

Broadcast and Short Wave Bands

Frequency Range 535-1630 Kilocycles and 5,700-18,100 Kilocycles

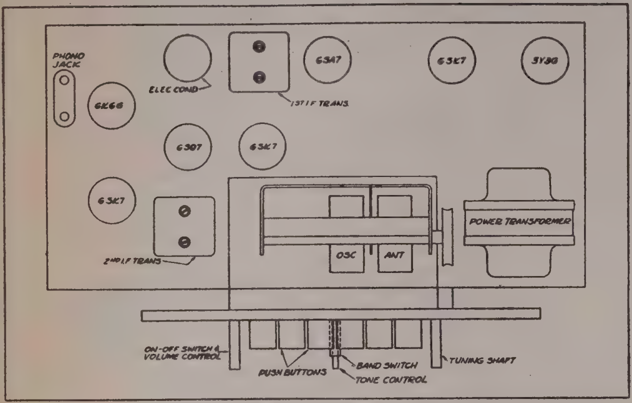


Fig. 1—Top View

TUBE COMPLEMENT

The tube complement of this receiver consists of the following tubes.

1—Type 6SK7—Remote cut-off Pentode as RF Amplifier.

1—Type 6SA7—Pentagrid Converter as First Detector and Oscillator.

1—Type 6SK7—Remote cut-off Pentode as an IF amplifier (455 KC).

1—Type 6SQ7—Duplex Diode Triode Second Detector and A.V.C.

1—Type 6SK7—Remote cut-off Pentode as First Audio.

1—Type 6K6G—Power Amplifier.

1—Type 5Y3G—Rectifier.

PROCEDURE FOR SETTING UP PUSH BUTTONS

There are six push buttons by means of which six stations may be selected. Make a list of six stations tuned in regularly. Loosen one of the push buttons by inserting a screw driver thru the center hole in the push button to the locking screw and turn the locking screw counter-clockwise one full turn and push in, while holding this screw in tune in the desired station by means of the station selector.

Turn the selector very slowly back and forth until the signal is clearest. Now while still holding the above screw in, tighten it by turning clockwise. Release and turn the station selector to one end of the dial; then check the button by pushing it down and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and repeat the above procedure for the remaining buttons.

If it is desired to change a button to a different station simply re-set by repeating the above procedure.

Punch the correct station call letter tabs from the set of sheets supplied and insert them from the side into the grooves in the front of the push buttons. Punch six celluloid squares from the sheet supplied and insert them in the afore mentioned grooves over the station call letter tabs.

The dial is now set up for quick tuning and all that is necessary is to push the button of the desired station down and then release.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting		Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
		Dummy Antenna					
I. F.	455 KC.	.1 Mfd.	Grid of 6SK7 I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 6SA7 tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROADCAST	1,630 KC.	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Upper left, front of chassis	Oscillator	Adjust to maximum output
	1,400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Lower right, front of chassis	Broadcast Antenna	Adjust to maximum output
	600 KC.	200 Mmf.	Antenna lead	Set dial at 600 KC.	Trimmer—Underside of chassis, center	Oscillator Series Pad.	Adjust to maximum rock dial See Note 'A'
SHORT WAVE	18,100 KC.	400 ohms	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Lower left, front of chassis	Short Wave Oscillator	Adjust to receive signal
	16,000 KC.	400 ohms	Antenna lead	Tune signal	Trimmer—Upper right, front of chassis	Short Wave Antenna	Adjust to maximum output

Note "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.

Do not bend variable condenser to correct tracking.

Frequency Range — 535 to 1630 and 5,700 to 18,100 K.C.
Power output 2.6 watts undistorted — 4.1 watts maximum.
Intermediate Frequency 455 K.C.
Power Consumption—60 watts.

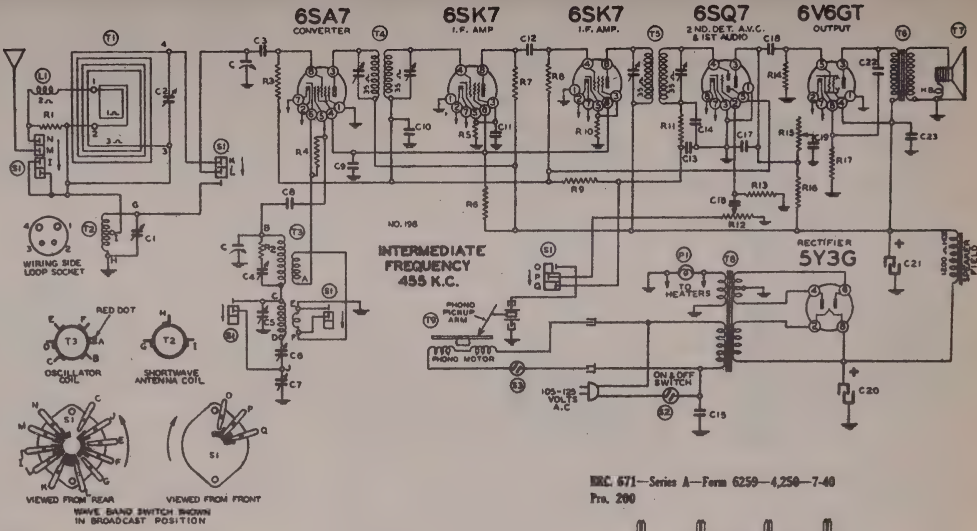
WESTERN AUTO SUPPLY CO.

MODEL D-1076

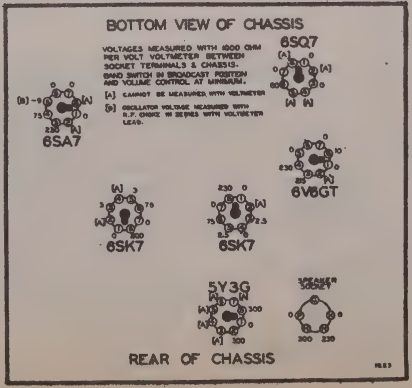
Code No.	Part No.	Description
		RESISTORS
R1	13071	4000 ohm—⅓ w.
R2	130128	20 ohm—⅓ w.
R3	13019	1 megohm—⅓ w.
R4	130236	30M ohm—⅓ w.
R5	130283	750 ohm—⅓ w.
R6	130324	18M ohm—1 watt
R7	130218	5M ohm—⅓ w.
R8	13020	100M ohm—⅓ w.
R9	130170	3 megohm—⅓ w.
R10	130222	350 ohm—⅓ w.
R11	13012	50M ohm—⅓ w.
R12	101232	1 megohm volume control
R13	130223	10 megohm—⅓ w.
R14	1303	500M ohm—⅓ w.
R15	101231	1 megohm tone control
R16	130172	250M ohm—⅓ w.
R17	130323	270 ohm—1 watt
		CONDENSERS
C	102137	Two gang variable condenser
C1	124149	S. W. Antenna trimmer
C2	124149	B. C. Antenna trimmer
C3	1292	.0005 mica
C4	124142	S. W. Oscillator trimmer
C5	124142	B. C. Oscillator trimmer
C6	124146	B. C. Padding Condenser
C7	124146	S. W. Padding Condenser
C8	12960	150 mmfd. mica
C9	10013	.05 x 400 v.
C10	10022	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1292	.0005 mica
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10061	.02 x 600 v.
C16	10025	.002 x 600 v.
C17	12912	.00025 mica
C18	10026	.02 x 400 v.
C19	10071	.004 x 600 v.
C20	119115	16 mfd. x 400 w. v. lytic
C21	119115	16 mfd. x 400 w. v. lytic
C22	10019	.006 x 600 v.
C23	1001	.1 x 400 v.

C1 and C2 are in same unit C4 and C5 in same unit
C6 and C7 are in same unit C13 and C14 in same unit
C20 and C21 are in same unit

Code No.	Part No.	Description
		PARTS
T1	111208	Loop antenna assembly
T2	111184	S. W. Antenna Coil
T3	110154	B. C. and S. W. Oscillator Coil
T4	108169E	Input I. F. Coil—455 kc.
T5	108106U	Output I.F. Coil—455 kc.
T6	105118	Output Transformer
T7	114216	8" Electro Dynamic Speaker
T8	104225B	60 cycle power transformer
and	104238B	25 cycle power transformer
T9	104228	60 cycle Seeburg Record Changer and Phono Assembly
and	104229	25 cycle Seeburg Record Changer and Phono Assembly
S1	125132	Phono-band switch
S2		Switch on volume control
S3		Switch on record changer
L1	12312	R. F. Choke coil
P1	10794	Pilot light bulb No. T-44



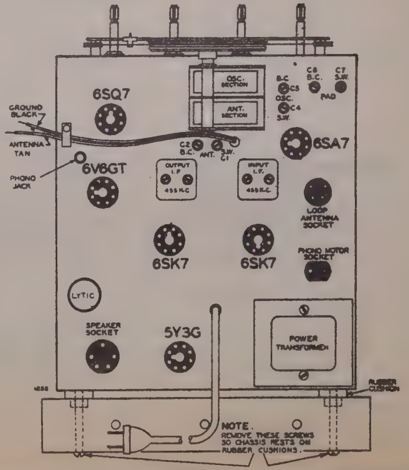
ERC. 671—Series A—Form 6259—4,250—7-40
Pro. 200



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS. BAND SWITCH IN BROADCAST POSITION AND VOLUME CONTROL AT MINIMUM.

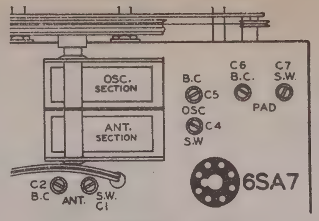
[A] CANNOT BE MEASURED WITH VOLTMETER

[B] OSCILLATOR VOLTAGE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.



TECHNICAL DATA

Power Consumption	Radio Only	70 Watts
	Motor Only	20 Watts
Power Output		2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 15 Microvolts Average		
Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC		
Tuning Frequency Range	Broadcast Band	530 to 1600 KC
	Shortwave Band	5.46 to 18.3 MC
Intermediate Frequency		455 KC
Speaker		8 in. Electro Dynamic



TRIMMER VIEW

MANUAL ISSUE A
AUG. 1940
Serial No. 634,400 up

6 TUBE A. C.

2 BAND

BUILT-IN AERIAL

RECORD CHANGER

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1—mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR		Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna						
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Top View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Top View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 530 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

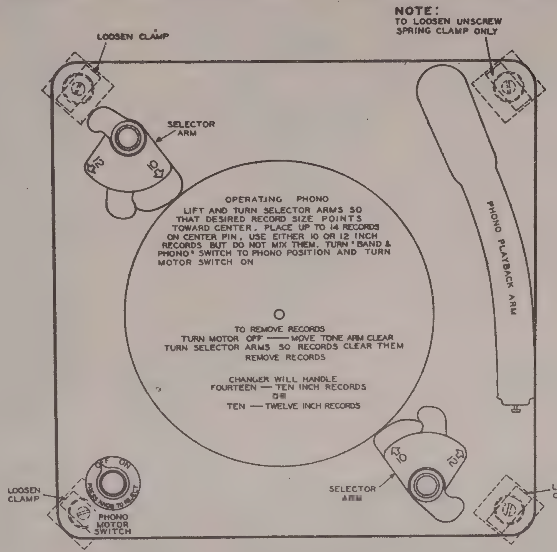
NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." leads.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Automatic Record Changer--Operating Instructions


NOTE:
TO LOOSEN UNSCREW SPRING CLAMP ONLY
LOOSEN CLAMP
SELECTOR ARM
12
10
OPERATING PHONO
LIFT AND TURN SELECTOR ARMS SO THAT DESIRED RECORD SIZE POINTS TOWARD CENTER. PLACE UP TO 14 RECORDS ON CENTER PIN, USE EITHER 10 OR 12 INCH RECORDS BUT DO NOT MIX THEM. TURN "BAND & PHONO" SWITCH TO PHONO POSITION AND TURN MOTOR SWITCH ON
TO REMOVE RECORDS
TURN MOTOR OFF —— MOVE TONE ARM CLEAR
TURN SELECTOR ARMS SO RECORDS CLEAR THEM
REMOVE RECORDS
CHANGER WILL HANDLE
FOURTEEN — TEN INCH RECORDS
OR
TEN — TWELVE INCH RECORDS
PHONO PLAYBACK ARM
OFF ON
PRESS KNOB TO REJECT
LOOSEN CLAMP
PHONO MOTOR SWITCH
SELECTOR ARM
LOOSEN CLAMP

Setting for Size of Record

The Changer plays up to fourteen 10" or ten 12" records at one loading. **All records must be the same size for each loading.**

On each post you will see selecting arms. The position of these arms determines the setting for different size records. To set for 10 or 12 inch records, it is merely necessary to grasp the posts by the knobs at the top, lift, and turn until the 10" or 12" arrows are pointing toward the center of the turntable. When in either the 10" or 12" position, the posts will snap into place except when they are lifted by hand. Be sure to set both posts for the same size record.

Loading

See that the selecting arms of both posts are turned toward the center of the turntable as indicated by the engraved arrows, and that both sets of arms are set for the same size (10" or 12") records as described in the preceding paragraph.

Place the stack of records (up to fourteen 10" or ten 12") over the center pin so that they will rest on the selecting arms.

Starting the Changer

1. Turn on the radio (allowing approximately 30 seconds for the tubes to warm up) and turn the phonograph-radio knob, to the phonograph position.

2. Turn the switch knob on the Record Changer panel to "ON". The motor will then start and the record changer will go into automatic operation of its own accord.

How to Reject a Record

Merely press the switch knob on the Changer panel. You can do it any time after the needle has come into contact with that record.

Playing Individual Records

Should it be desired to play an individual record merely set up the machine as described above for the proper size (10" or 12" as indicated on the selecting arms), place the record on top of the arms as described under "Loading", and set the machine in operation by means of the switch knob described under "Starting the Changer." In other words, play an individual record in the same manner as you would play a stack of that size.

Unloading

First switch off the motor. Grasp each post by its knob at the top and turn them out of the way.

Lift the played records from the turntable. Then return the posts to the proper playing position as indicated by the arrows on the selecting arms.

The Changer may then be loaded with a new stack of records according to the size shown on the selecting arms.

Turning Off Changer

Throw Changer switch knob to "OFF" position.

Lift tone arm and place it in the rest position. (If you happen to turn off the Changer switch while the mechanism is going through a "change cycle," you will notice that it does not stop until the cycle has been completed, and the tone arm is again in playing position, at which point it is ready to be lifted to the rest position. If you prefer to turn off your Changer with the radio switch, be sure to turn it off while needle is resting upon a record; otherwise, the selecting arms cannot be correctly reset.

To avoid warping of records, never leave records resting on posts.

If Changer is Left Running

No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

Phonograph Needles

Various types and kinds of needles are available for use in phonograph tone arms. All have their virtues, as well as their faults, for use in ordinary phonographs, where needles can be changed after each record. For playing ten or more records at one set-up, as with this Changer, no attempt should be made to use ordinary steel or fibre points, since continued use of worn points will be likely to ruin both quality of reproduction and the records as well. Any kind of needle can be used which has a point durable enough to play ten records or more without damaging them.

It should be remembered that, no matter what the quality of the tone arm, amplifying system and speaker, all of the recorded music must pass through the needle. For this reason, it is absolutely essential that particular care be taken to use good needles, and to see that they are changed often enough so that the records are not damaged and the quality of the music is not impaired.

In general there are two types of needles which can be satisfactorily used on an Automatic Record Changer: those which require changing after approximately 12 records, and the so-called permanent type needles which are rated in terms of "hours of service." In no case should the manufacturers' claims for these needles be exceeded, since in all probability the needles are rated in terms of their maximum life. If at any time short of the rated life, particularly in the case of the semi-permanent type needles, there is any reason to suspect that the needle has become unduly worn, it would probably be advisable to replace it with a new one. **Never under any conditions should a needle be removed from the tone arm head and then replaced—needle manufacturers' claims notwithstanding.**

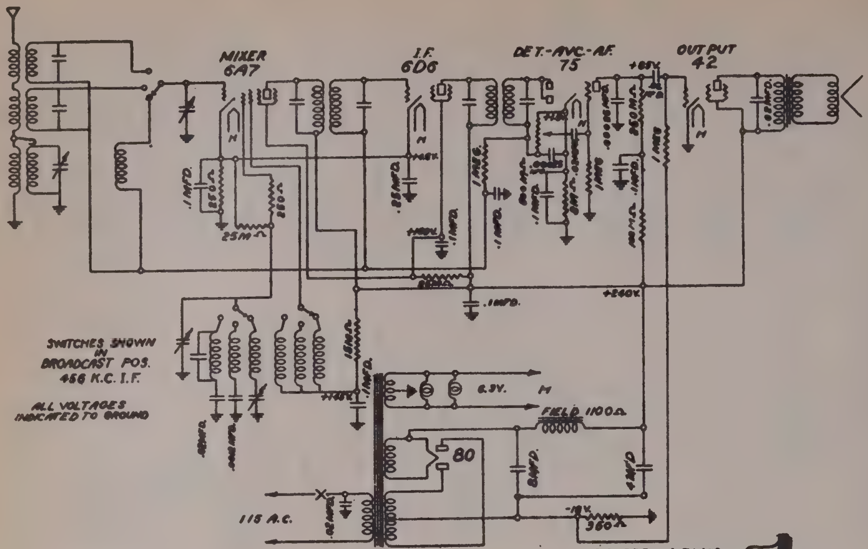
For convenience, the tone arm on your changer may be raised to a nearly vertical position, so that the needle may be easily inserted; the needle screw should be tightened firmly.

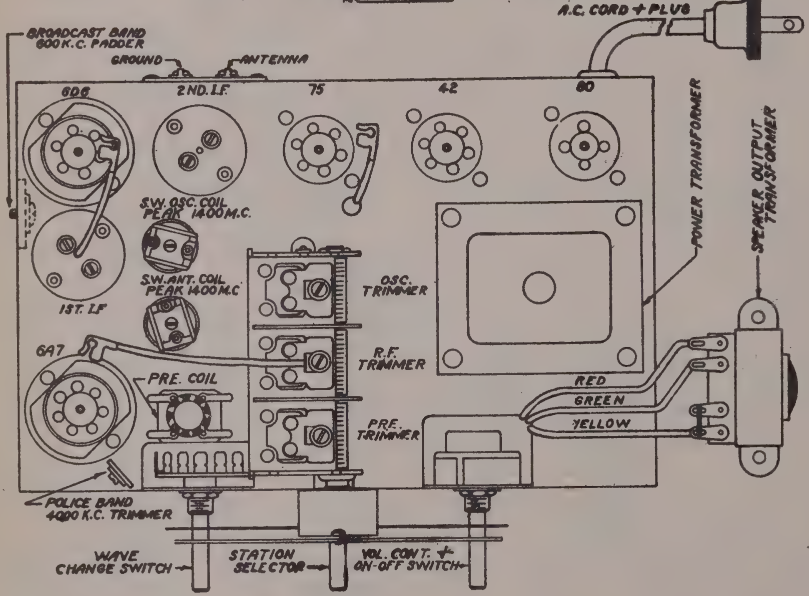
Care of Records

To insure long life for your records requires only slight effort. Do not expose them to heat from the sun, nor to heat from nearby stoves or radiators. Store them preferably in albums, but in any case keep them always in a cool, dry place, resting vertically or horizontally. Remove dust and dirt, using soft cloth and light circular motion. If fluids are used for lubricating record surfaces, keep in mind that these often tend to attract dust, and extra effort is necessary to clean it off. Even a fine film of dust very often contains abrasive particles which, when grounded against the record surface by the steel needle, can cause very rapid wear of the recorded music.

MODEL D-728

WESTERN AUTO SUPPLY CO.





CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION VOL. VIII

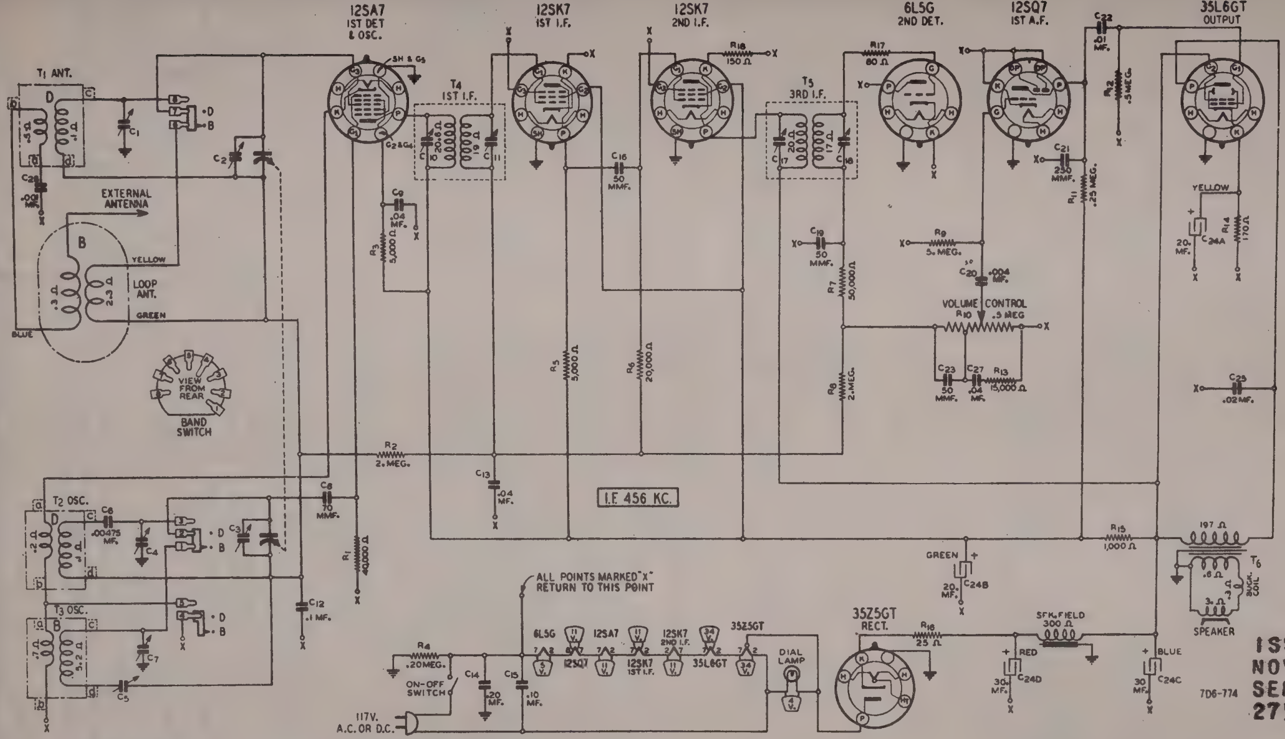
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT trimmers to a maximum peak of 1400 KC, then pad the Oscillator circuit at 600 KC while rocking gang condenser.

SHORTWAVE - 5800 to 15200 KC - Adjust the OSC and ANT trimmers to a maximum peak of 14000 KC. No padding required.

POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to a maximum peak of 4000 KC. No other adjustments required.

WESTERN AUTO SUPPLY CO.

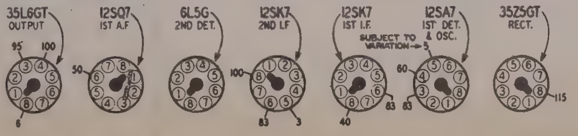
MODEL D-1117

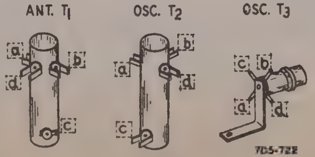


ISSUE A
NOVEMBER 1940
SERIAL NO.
275001 UP

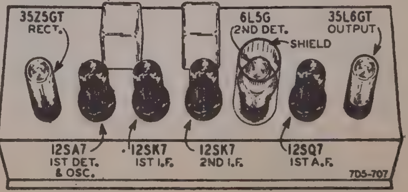
VOLUME CONTROL-MAXIMUM
READINGS TAKEN WITH 1000
OHM-PER-VOLT METER. PLATE
& SCREEN VOLTAGES ARE READ
ON 500 VOLT SCALE.

VOLTAGES AT SOCKETS FOR 117 V A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN
SOCKET TERMINALS & "X" POINT.
FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW.





COIL TERMINALS



SPECIFICATIONS

Power Consumption....28 Watts (At 117 volts AC Supply)

Power Output.. .75 Watt Undistorted
1.3 Watts Maximum

Selectivity................49 KC Broad at 1000 times Signal

Intermediate Frequency..456 KC

Speaker ....5" Electro-Dynamic

Tuning Frequency Range

B Range .... 528 to 1600 KC

D Range ....5750 to 18,300 KC

Sensitivity (For .05 watt output)—External Antenna

B Range .... 5 Microvolts Average

D Range ....40 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohm.

SIGNAL GENERATOR			DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION				
I. F.						
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	Point "X" 12SQ7—1st A.F. Prong No. 3	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C10) & (C11) 3rd I.F. (C17) & (C18)
RANGE B						
1600 KC	Signal Grid of 1st Det.	Point "X"	.1 mf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C3) See Note A
1400 KC	External Antenna Lead	Point "X"	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note B	Antenna Range B (C2)
600 KC	External Antenna Lead	Point "X"	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note C
RANGE D						
18,300 KC	External Antenna Lead	Point "X"	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C4)
17,000 KC	External Antenna Lead	Point "X"	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

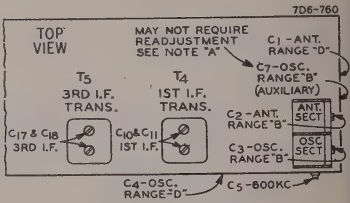
After each range is completed, repeat the procedure as a final check.

NOTE A—Adjust Oscillator Range B (C3) trimmer on gang condenser. Oscillator Range B (C7) auxiliary trimmer on side of chassis is adjusted at factory and ordinarily need not be readjusted in the field.

NOTE B—If the pointer is not at 1400 KC on the dial, set pointer at this mark on the dial scale.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



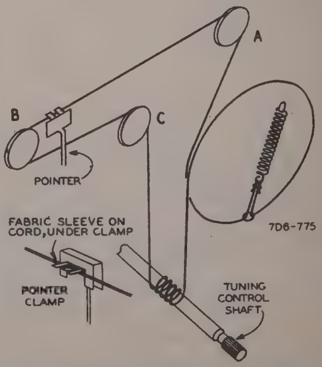
DRIVE CORD REPLACEMENT

Turn gang condenser to completely closed position—see illustration.

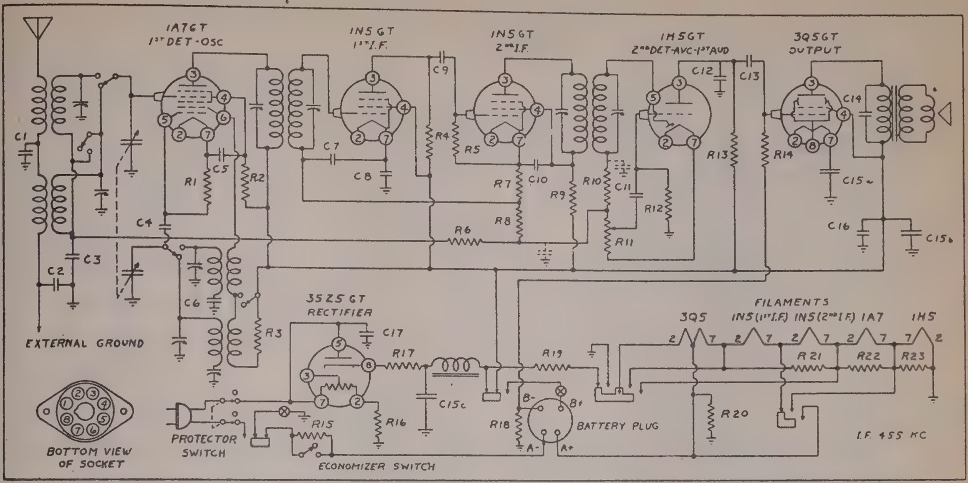
Using a new drive cord approximately 50 inches in length, tie one end to tension spring. Pass other end of cord down through hole in groove of drive pulley. Pull spring flush against inside of pulley rim. Wind cord ¼ turn clockwise (from front of chassis) around drive pulley. Then pass over idler pulleys A, B, and C as shown.

Wind cord 4½ turns counterclockwise (from front of chassis) around tuning control shaft. These turns should progress away from the chassis. Then wind cord ¾ turn clockwise (from front of chassis) around drive pulley. This turn should be on the left side (from gang condenser side of chassis) of pulley groove. Pass cord through hole in pulley groove. Tie cord to tension spring. Stretch tension spring and secure free end to hook on pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set pointer at this frequency mark on dial scale. Fasten pointer to cord—See illustration.



WESTERN AUTO SUPPLY CO.



Band switch shown in broadcast position.

AC-DC-Battery switch shown in AC-DC position.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	70,000	½	R13	1,000,000	½
R2	30,000	½	R14	2,000,000	½
R3	150	½	R15	0.5	½
R4	20,000	½	R16	550	15
R5	1,000,000	½	R17	30	½
R6	2,000,000	½	R18	400	½
R7	5,000,000	½	R19	1,950	5
R8	5,000,000	½	R20	3,000	½
R9	5,000	½	R21	500	½
R10	70,000	½	R22	200	½
R11	1,000,000	V.C.	R23	110	½
R12	10,000,000	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.01	400
C2	.01	400	C12	.0001	Mica
C3	.05	200	C13	.01	400
C4	.0001	Mica	C14	.002	600
C5	.01	400	C15a	40.	25
C6	.004	Mica	C15b	30.	150
C7	.01	400	C15c	30.	150
C8	.25	200	C16	.05	400
C9	.0001	Mica	C17	.05	400
C10	.01	400			

SERVICE INFORMATION

When removing the chassis it is first necessary to remove the "Protector Switch" located on the left side of the cabinet. When checking the chassis on AC or DC it is necessary to insert a piece of metal, similar to the one on the cardboard back, into the "Protector Switch" to close the line circuit.

Speaker (Part No. P-4572) 6" PM Type.

D.C. voice coil resistance.......7.3 ohms
Voice coil impedance at 400 cycles.......8.0 ohms

B.C. and S.W. Antenna Coil (Part No. P4582)

Starting with the lug that is connected to ground lead in a clockwise direction, the terminals are: No. 1, ground; No. 2, cond; No. 3, pad; No. 4, grid; No. 5, grid; No. 6, ant.

S.W. Primary—No. 6 and No. 2—Resistance....... .35 ohm
B.C. Primary—No. 1 and No. 2—Resistance.......24.1 ohms
S.W. Secondary—No. 3 and No. 4—Resistance....... .07 ohm
B.C. Secondary—No. 3 and No. 5—Resistance....... 2.9 ohms

B.C. and S.W. Oscillator Coil (Part No. P-4566)

In a clockwise direction starting at the mounting lug on same side as single lug on other end, the connections are: No. 1, plate; No. 2, grid; No. 3, S.W. pad; No. 4, B.C. pad; No. 5, grid, No. 6, switch; other end, No. 7, B+.

S.W. Primary—No. 1 and No. 6—Resistance....... .8 ohm
B.C. Primary—No. 7 and No. 6—Resistance....... 3.8 ohms
S.W. Secondary—No. 2 and No. 3—Resistance....... .05 ohm
B.C. Secondary—No. 5 and No. 4—Resistance....... 4.5 ohms

First I.F. Transformer (Part No. P-4569)
Primary—Blue white, plate; red white B+—Resistance 12.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 24.9 ohms.

Second I.F. Transformer (Part No. P-4420)
Primary—Blue white, plate; red white B+—Resistance 15.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 11.8 ohms.

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 150 volt scale (except AC readings). Line voltage 117 volts AC. Volume control maximum and no signal tuned in.

	Volts
1A7GT TUBE	
Plate (3) to ground	98
Screen (4) to ground	60
Grid (6) to ground	99
1N5GT (1st I.F.) TUBE	
Plate (3) to ground	76
Screen (4) to ground	100
1N5GT (2nd I.F.) TUBE	
Plate (3) to ground	91
Screen (4) to ground	93
3Q5GT TUBE	
Plate (3) to ground	97
Screen (4) to ground	100
35Z5GT TUBE	
Plate (5) to ground	117 (AC)
Cathode (8) to ground	120

MODEL D-1123

WESTERN AUTO SUPPLY CO.

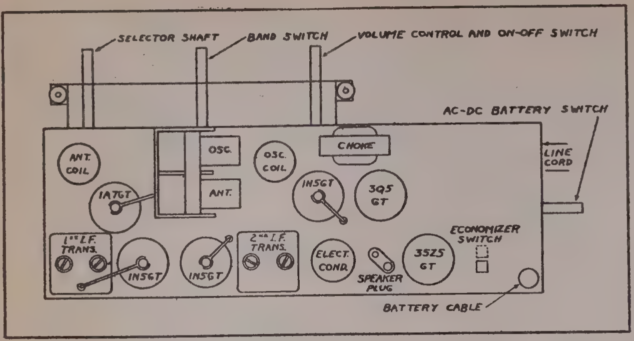


Fig. 1—Top View

TUBE COMPLEMENT

The tube complement of this receiver consists of the following tubes:

1—Type 1A7GT—Pentagrid Converter (Composite first detector and oscillator).

1—Type 1N5GT—Sharp cut-off Pentode as 1st IF Amplifier (455 KC).

1—Type 1N5GT—Sharp cut-off Pentode as 2nd IF Amplifier (455 KC).

1—Type 1H5GT—Duplex Diode Triode Second Detector, AVC and First Audio.

1—Type 3Q5GT—Beam Power Amplifier.

1—Type 35Z5—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the voltage chart.

In order to prevent the signal from acting upon the AVC and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages should be measured with 117 volts AC input to receiver. Resistance and actual connections of coils and transformers and speaker data are given under Service Information.

To check for open by pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmfd., 400 ohms.

BAND	SIGNAL GENERATOR		Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
	Frequency Setting	Dummy Antenna					
I. F.	455 KC.	.1 Mfd.	Grid of 1N5GT I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 1A7GT tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE	18,100 KC.	400 ohms	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Upper left, front of chassis	Short Wave Oscillator	Adjust to receive signal
	16,100 KC.	400 ohms	Antenna lead	Tune Signal	Trimmer—Center, front of chassis	Short Wave Antenna	Adjust to maximum output
BROADCAST	1730 KC.	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Lower left, front of chassis	Broadcast Oscillator	Adjust to maximum output
	1400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Right, front of chassis	Broadcast Antenna	Adjust to maximum output
	600 KC.	200 Mmf.	Antenna lead	Set dial at 600 KC.	Trimmer—Top of chassis (See Fig. 1)	Oscillator Series Pad	Adjust to maximum rock dial See Note 'A'

Note "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.

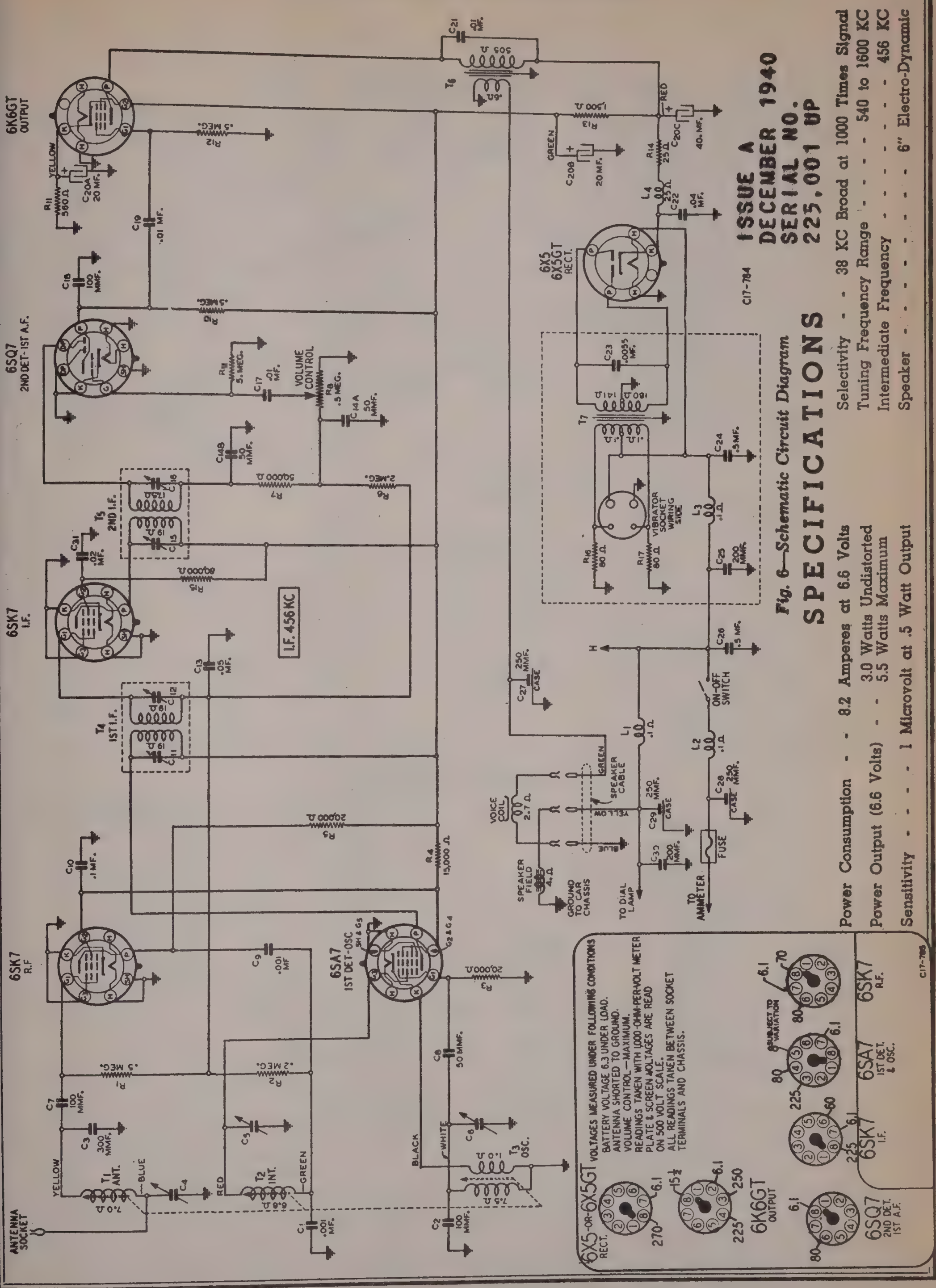
Do not bend variable condenser to correct tracking.

Frequency Range—535 to 1730 and 5,750 to 18,100 K.C.

Power output .27 watt undistorted—.35 watt maximum.

Intermediate Frequency 455 K.C.

WESTERN AUTO SUPPLY CO.



VOLTAGES MEASURED UNDER FOLLOWING CONDITIONS
BATTERY VOLTAGE 6.3 UNDER LOAD.
ANTENNA SHORTED TO GROUND.
VOLUME CONTROL—MAXIMUM.
READINGS TAKEN WITH 1,000-OHM-PER-VOLT METER
PLATE & SCREEN VOLTAGES ARE READ
ON 500 VOLT SCALE.
ALL READINGS TAKEN BETWEEN SOCKET
TERMINALS AND CHASSIS.

ISSUE A
DECEMBER 1940
SERIAL NO.
225,001 UP

Fig. 6—Schematic Circuit Diagram

SPECIFICATIONS

Power Consumption - - - 8.2 Amperes at 6.6 Volts

Power Output (6.6 Volts) - - 3.0 Watts Undistorted
5.5 Watts Maximum

Sensitivity - - - - 1 Microvolt at .5 Watt Output

Selectivity - - - 38 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - - - 540 to 1600 KC

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - 6" Electro-Dynamic

WESTERN AUTO SUPPLY CO.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C4) up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the control unit. The calibration screw is at the bottom of the dial lamp tube. Insert a fine bladed screwdriver and turn this screw until the pointer is at the frequency of the station being received.

A short insulated screwdriver will be helpful.

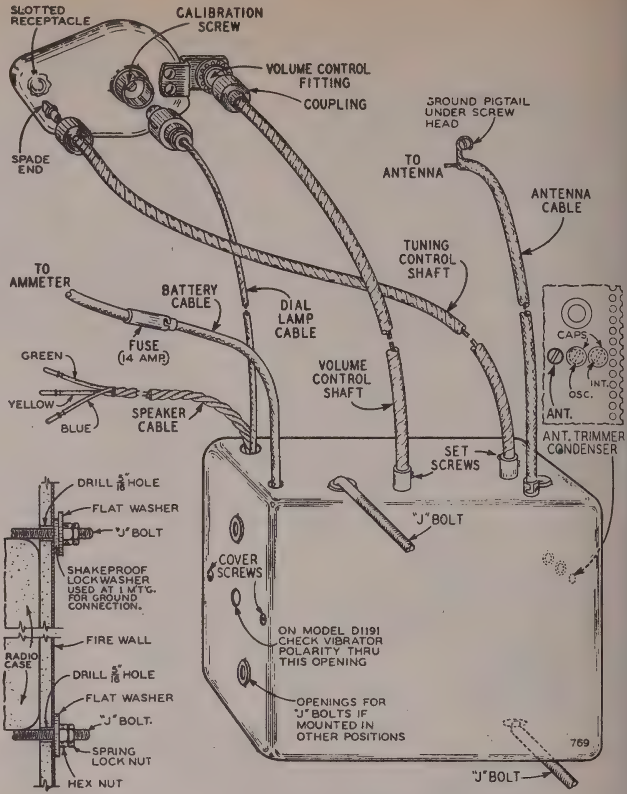


Fig. 3—General Installation View

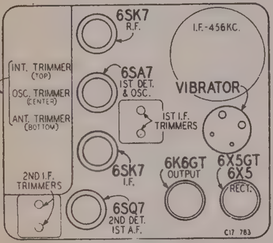


Fig. 4—Location of Tubes and Vibrator

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 4)
I.F.				
456 KC	Control Grid (prong No. 8) 6SA7 1st Det. Tube	.05 mf.	Extreme Position out of Coil	1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
OSCILLATOR				
1600 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C6)
1400 KC ADJUSTMENT				
1400 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

Car Antenna Readjustment—Tune in weak signal near 1400 KC—Readjust Antenna Trimmer C4 for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

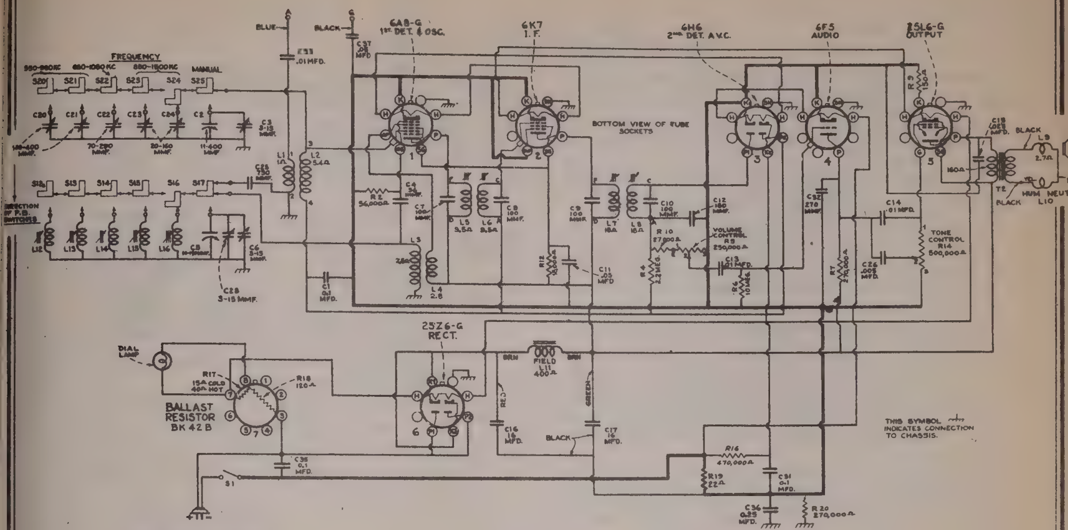
After each range is completed, repeat the procedure as a final check.

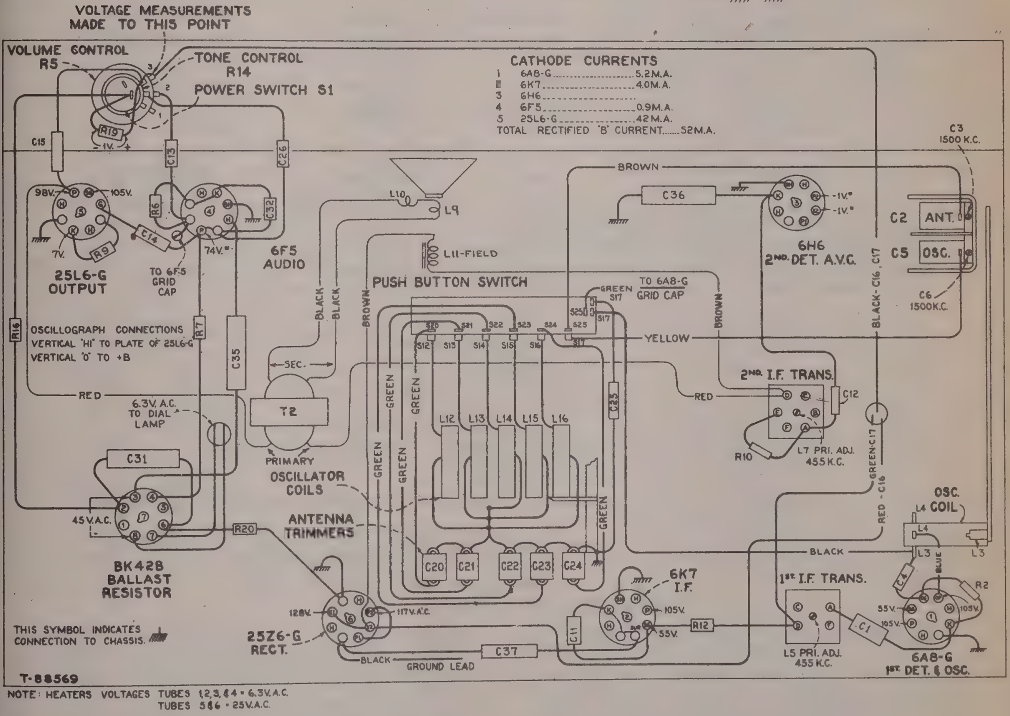
NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the control unit is the calibration screw. Remove the dial lamp assembly. Insert a fine bladed screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

WESTINGHOUSE ELEC. SUPPLY CO.INC.

MODEL WR-158





Bottom View of Chassis Showing Socket Voltages, Parts Location, and R-F Wiring

*** NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. These voltages will be lower when measured with a voltmeter drawing current through the circuit. Exact voltage may be measured with a vacuum-tube voltmeter if desired. The other values will not be affected by measuring with an ordinary high-resistance voltmeter.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing. Turn the receiver volume control to maximum.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-v-c action.

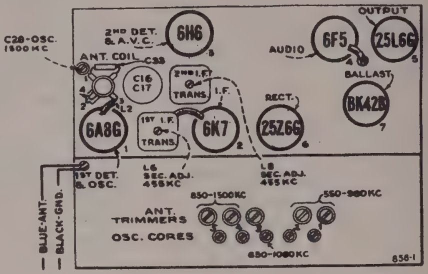
Calibration Marks.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.

After completion of alignment, seal the i-f core-adjustment screws with household cement.

The dial tuning (right hand) push-button must be pushed in for steps 1 to 3, inclusive.

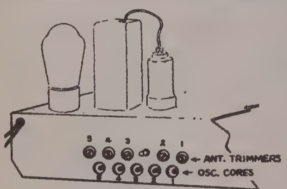


Tube and Trimmer Locations

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Trans.)
2	6A8-G grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Trans.)
3	Antenna lead (blue) in series with 200 mmf.	1,500 kc	1,500 kc calibration mark	C6 (osc.)* C3 (ant.)
4	Follow "Adjustments for Electric Tuning"			

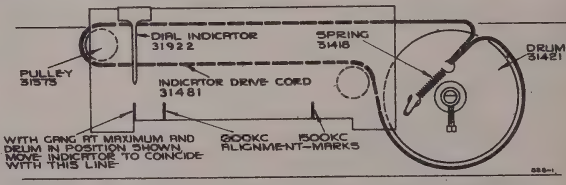
* Use minimum capacity peak if two peaks can be obtained.

The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.



Push-Button Adjustments

Nos. 1, 2—Approximately 550-980 kc.
No. 3—Approximately 650-1,080 kc.
Nos. 4, 5—Approximately 850-1,500 kc.



DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

Dial-Indicator and Drive Mechanism

Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing

Adjustments for Electric Tuning

These models have six push-buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetically-tuned oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

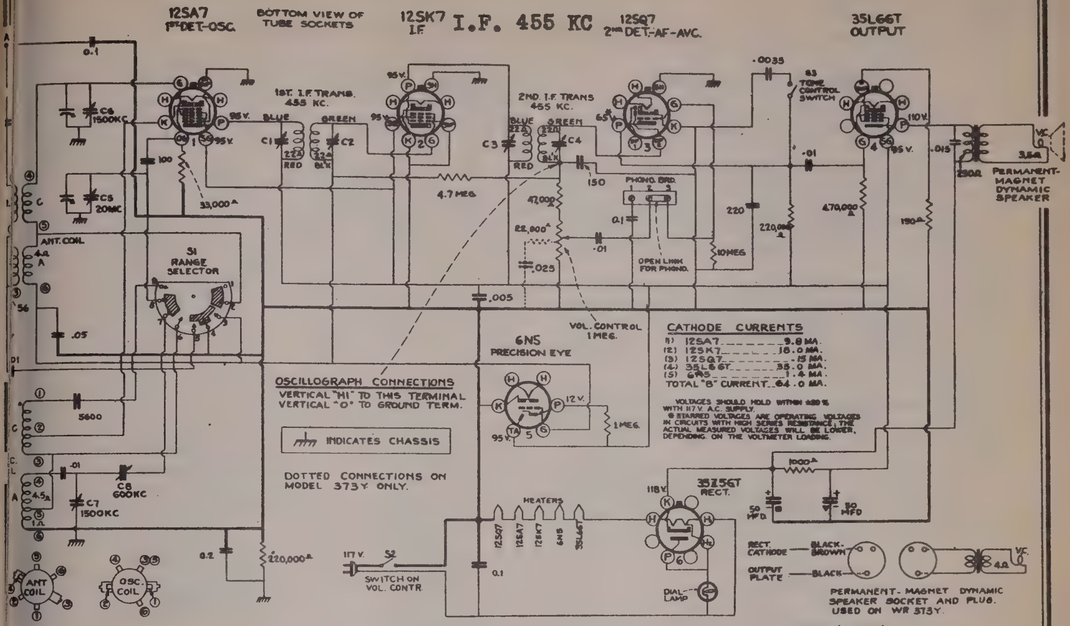
1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning (right-hand) button, and manually tune in the first station on the list.
3. Push in station-button No. 1 (left-hand) and adjust No. 1 oscillator core (L12) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station it received.
4. Adjust No. 1 antenna trimmer (C20) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

6. Make a final careful adjustment of the oscillator cores and antenna trimmers, using one or two feet of wire as an antenna to ensure sharp peaking.

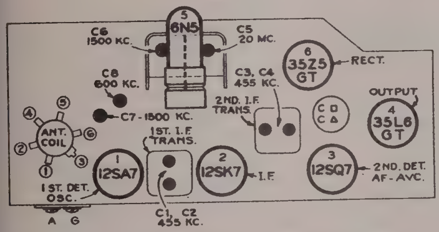
WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODELS WR-172, WR-373Y

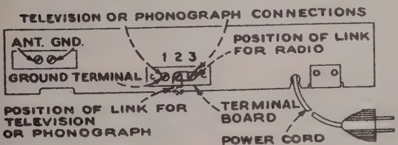


Schematic Circuit Diagram

RC 474 A (WR 373Y), RC 474 (WR 172)



Tube and Trimmer Locations


TELEVISION OR PHONOGRAPH CONNECTIONS
ANT. GND.
1 2 3
POSITION OF LINK FOR RADIO
GROUND TERMINAL
POSITION OF LINK FOR TELEVISION OR PHONOGRAPH
TERMINAL BOARD
POWER CORD

Back of Chassis

FOR FURTHER DATA SEE INDEX

WR-172 is a table model with a six inch speaker; WR-373Y is a console model with a twelve inch speaker. Both models have six tubes, are AC-DC operated, have six push buttons for tuning, a horizontal Slide Rule dial, and a Precision Eye for precise manual tuning.

Power Output (125 volts, 60 cycle supply)

Undistorted .... 0.8 watts
Maximum .... 1.4 watts

Power Supply Ratings

A-C Rating .... 105-125 volts, 50-60 cycles, 35 watts
D-C Rating .... 105-125 volts, direct current, 35 watts

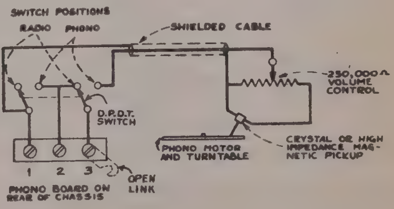
Loudspeaker

Type .... Permanent Magnet Dynamic

	Model WR-172	Model WR-373Y
Diameter	6-inch	12-inch
Voice Coil Impedance at 400 cycles	3.5 ohms	4 ohms

Phonograph Terminal Board.—A 3-terminal board is located on the rear of the chassis for connecting a phonograph pickup, or Record Player, into the audio amplifier of the receiver. The accompanying schematic shows connections for a high-impedance pickup with a switch for changing from radio to records. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phono switch.

Record Player Connections, Using a Double-Pole, Double-Throw Toggle Switch →


SWITCH POSITIONS
RADIO
PHONO
SHIELDED CABLE
250,000Ω VOLUME CONTROL
D.P.D.T. SWITCH
PHONO MOTOR AND TURNTABLE
CRYSTAL OR HIGH IMPEDANCE MAGNETIC PICKUP
1 2 3
OPEN LINK
PHONO BOARD ON REAR OF CHASSIS

©John F. Rider, Publisher

MODELS WR-172, WR-272,
WR-372, WR-373, WR-373Y,
WR-473, WR-474
MODELS WR-175, WR-176
MODELS WR-272, WR-372

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODELS WR-172,WR-272,WR-372,WR-373,WR-373Y,WR-473,WR-474

Alignment Procedure

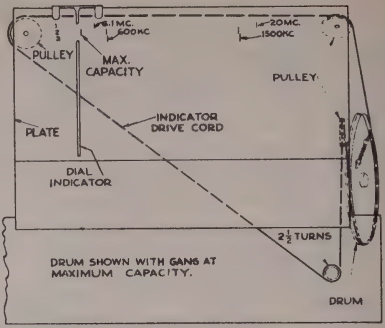
Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground binding post, and keep the output as low as possible to avoid A.V.C. action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, 6.1 mc, and 20 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point 1/16 inch to the left of the mark at the extreme left (low frequency) end of the dial scale.



Dial-Indicator and Drive Mechanism
Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Antenna terminal	455 kc	"A" Band Quiet point between 550-750 kc	C3 and C4 (2nd I-F trans.)
2				C1 and C2 (1st I-F trans.)
3	Antenna terminal in series with 300 ohms	20 mc	"C" Band 20 mc calibration mark	C5 (osc.)*
4	Antenna terminal in series with 200 mmf.	1,500 kc	"A" Band 1,500 kc calibration mark	C7 (osc.) C6 (ant.)
5		600 kc	"A" Band 600 kc calibration mark	C8 (osc.) Rock gang
6	Repeat step 4			

* Use minimum peak if two can be obtained. Check to determine that C5 has been adjusted properly by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

Note: Oscillator tracks above signal on both bands.

Alignment Procedure

WR-175 and WR-176

Output Meter Alignment.—Connect the meter across the voice coil and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. loop in series with 100 mmfd.	1,600 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

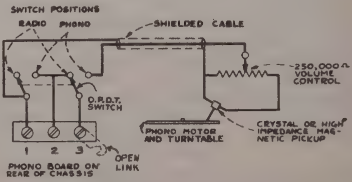
RECORD PLAYER CONNECTIONS, WR-272,WR-372

Phonograph or Television Attachment.—A terminal board is provided on the rear of the chassis for connecting a record player or television attachment into the audio-amplifying circuit.

On Models WR-272 and WR-372 the cable from the attachment should be connected to terminals 1 and 3. The shielded or ground lead going to terminal 1. When using the attachment the connection link is disconnected and volume is controlled by the control on the phonograph or television attachment.

The accompanying schematic shows connections for a high-impedance pickup with switch for changing from radio to records. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phono switch.

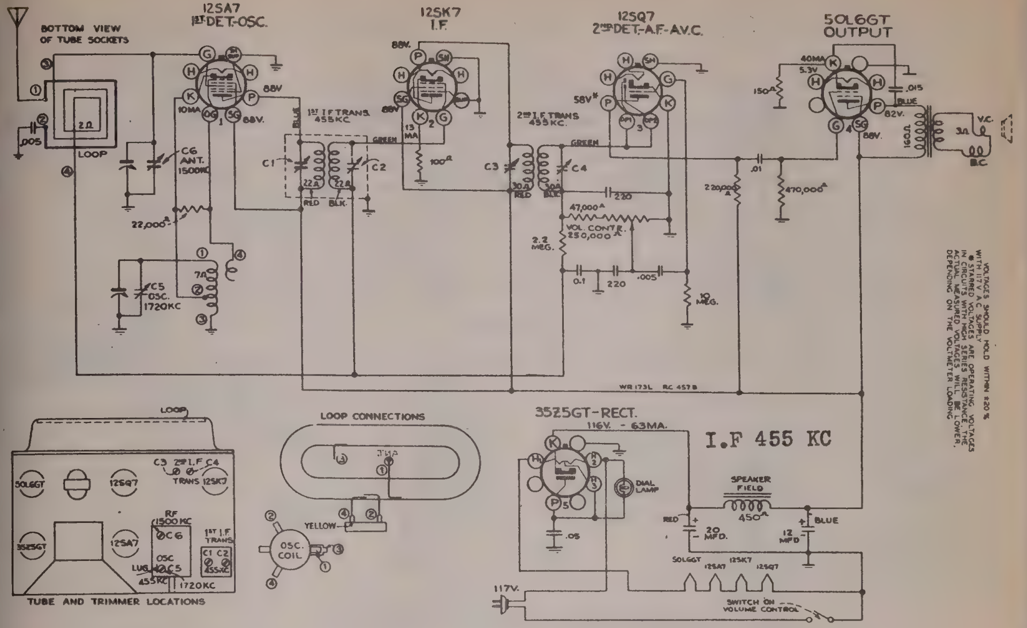
The Model WR-373 has the Radio-Phono-Television switch built into the chassis, allowing switching to be accomplished thru the "Tone-Radio-Phono-Television" Control on the front of cabinet:


SWITCH POSITIONS
RADIO
PHONO
SHIELDED CABLE
250,000 Ω VOLUME CONTROL
D.P.D.T. SWITCH
PHONO MOTOR AND TURNTABLE
CRYSTAL OR HIGH IMPEDANCE MAGNETIC PICKUP
1
2
3
OPEN LINK
PHONO BOARD ON REAR OF CHASSIS

Record Player Connections, Using a Double-Pole Double-Throw Toggle Switch Models WR-272 and WR-372

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-173L
MODEL WR-174L



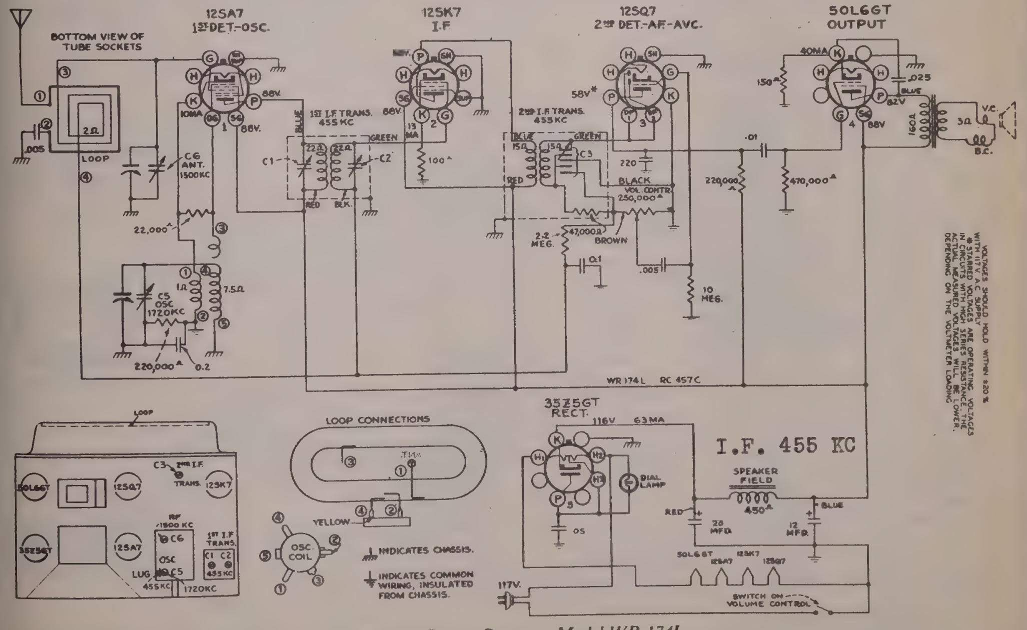
VOLTAGES SHOULD HOLD WITHIN ±20 %
WITH 117 V A C SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES
IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE
ACTUAL MEASURED VOLTAGES WILL BE LOWER,
DEPENDING ON THE VOLTMETER LOADING

Schematic Circuit Diagram Model WR-173L

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.

TRIM OSC 1720 KC
TRIM ANT 1500 KC

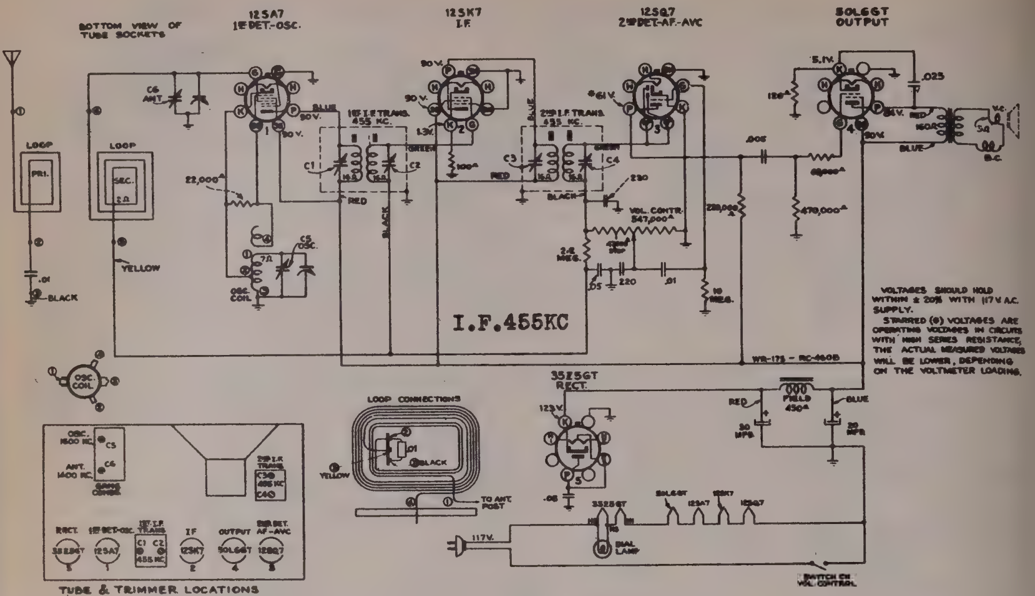


VOLTAGES SHOULD HOLD WITHIN ±20 %
WITH 117 V A C SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES
IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE
ACTUAL MEASURED VOLTAGES WILL BE LOWER,
DEPENDING ON THE VOLTMETER LOADING

Schematic Circuit Diagram Model WR-174L

MODEL WR-175
MODEL WR-176

WESTINGHOUSE ELEC. SUPPLY CO. INC.



VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V AC. SUPPLY.
STARRED (*) VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.

Schematic Circuit Diagram Model WR-175

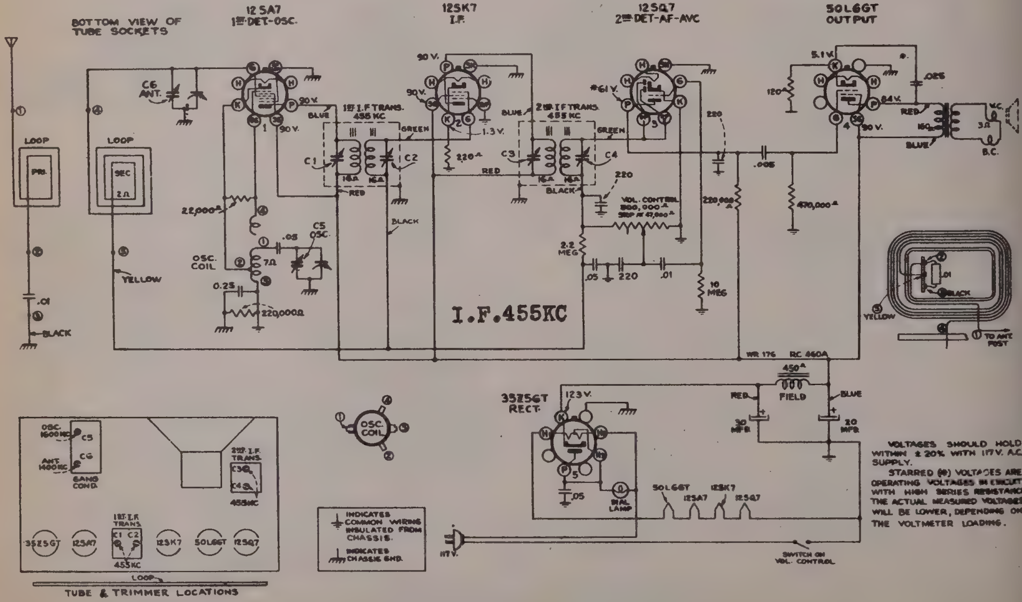
Power Supply Ratings

105-125 volts, 50-60 cycles, 30 watts
105-125 volts, direct current, 30 watts

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress leads from terminal board on loop support away from loop.

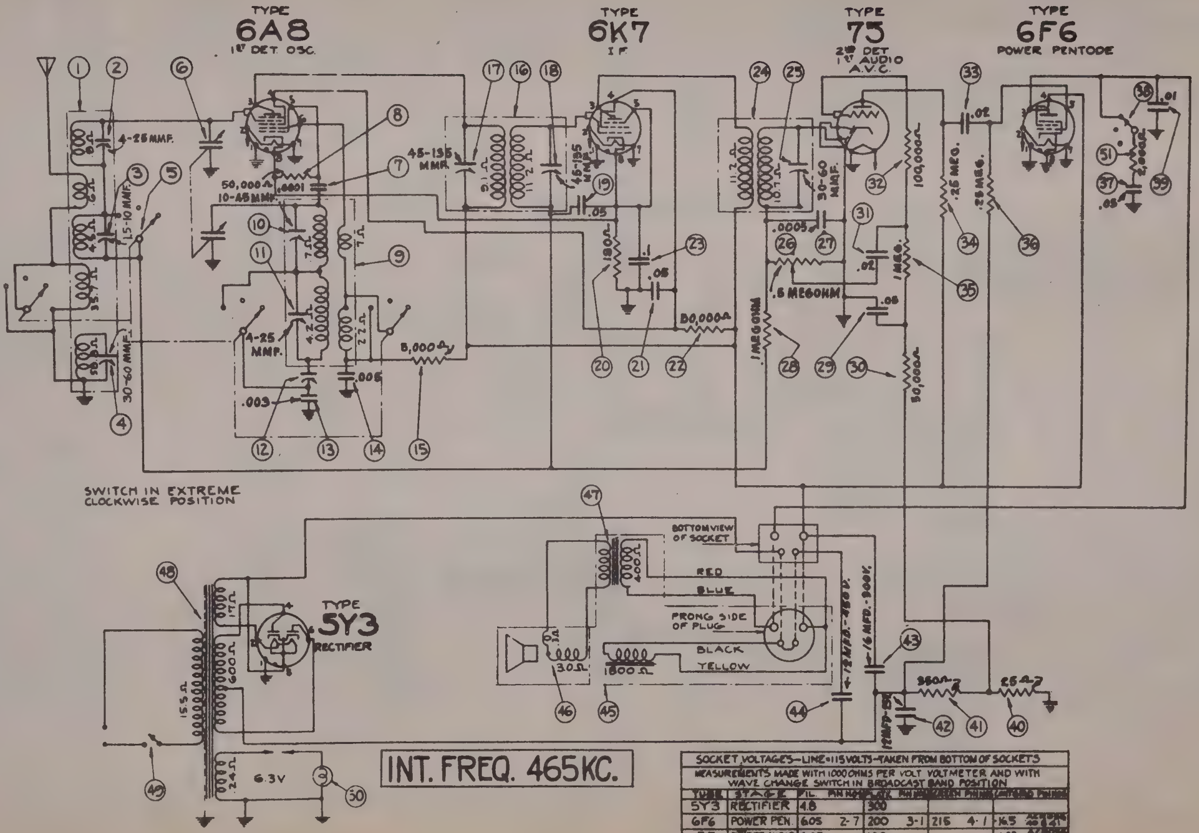
FOR OTHER DATA SEE INDEX



VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. AC SUPPLY.
STARRED (*) VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.

Schematic Circuit Diagram Model WR-176

WESTINGHOUSE RADIO MODELS WR-210 AND WR-310



SOCKET VOLTAGES—LINE=115 VOLTS—TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
5Y3	RECTIFIER	4.8		300					
6F6	POWER PEN.	6.05	2-7	200	3-1	215	4-1	-16.5	ACROSS 40 & 41
75	2ND DET-AUDIO	6.05		100				-1.08	ACROSS 28
6K7	I F	6.05	2-7	215	3-1	75	4-1	-2.75	8-1
6A8	DET. OSC.	6.05	2-7	215 DET 190 OSC	3-1 6-1	75	4-1	-2.25	8-1

MODELS WR-210,
WR-310

WESTINGHOUSE ELEC. SUPPLY CO. INC.

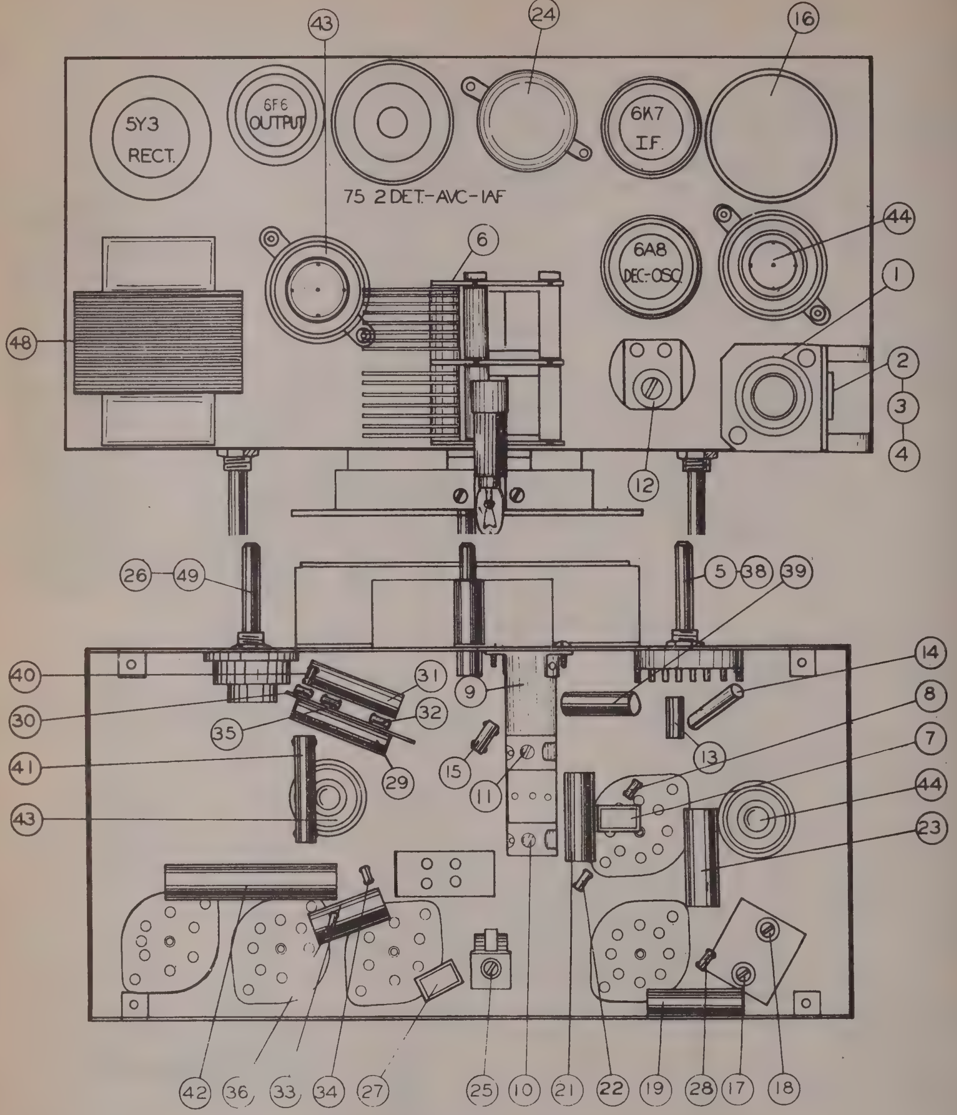


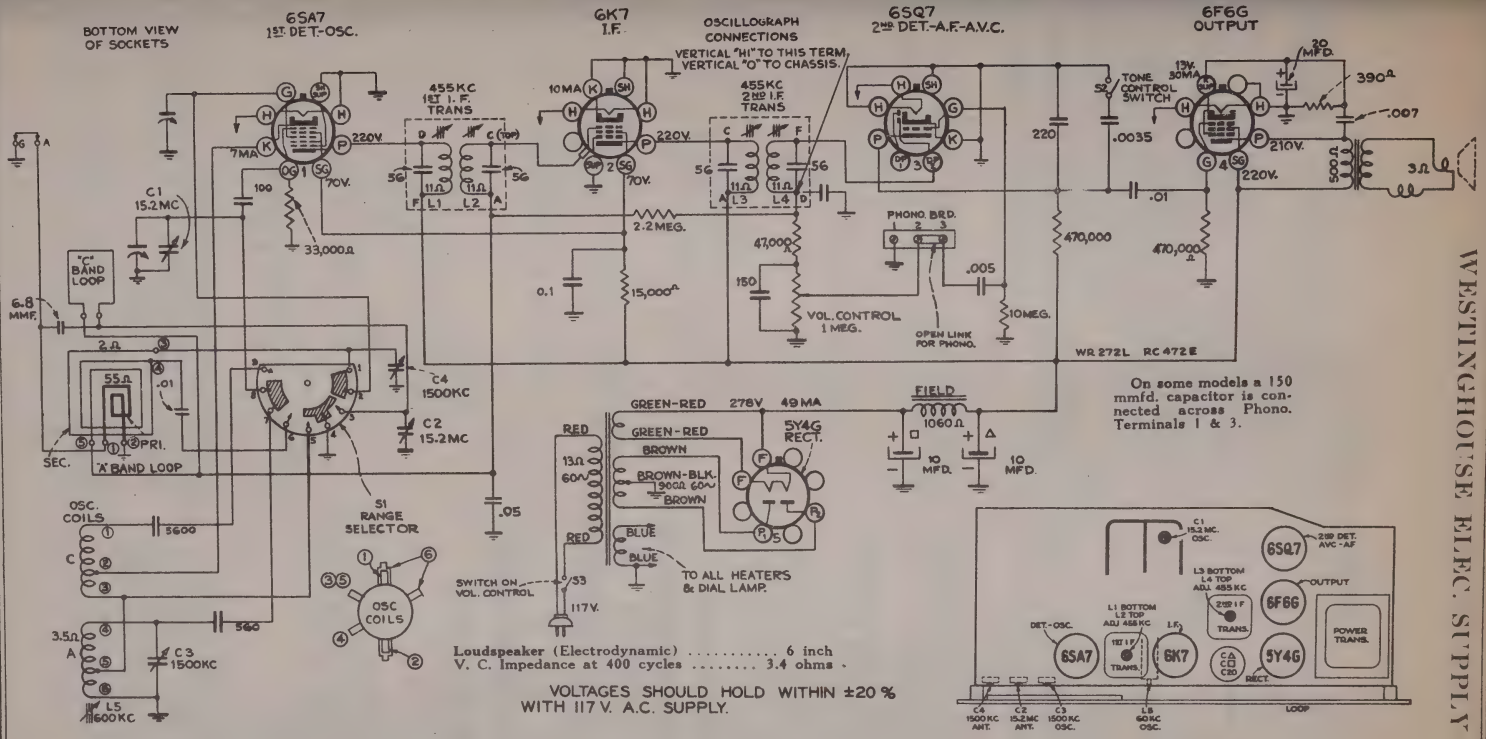
Figure No. 2

I-F ALIGNMENT: Volume control, maximum. Tone control treble. Wave switch, broadcast. Dial set 600 kc. Apply 465 kc to grid of 6K7 i-f tube. Adjust trimmer 25 for maximum output. Apply 465 kc to grid of 6A8 and adjust trimmers 17 and 18 for maximum output.

BROADCAST BAND ALIGNMENT: Apply 465 kc to antenna lead; adjust wavetrap trimmer 4 for minimum output. Apply 1700 kc through .0002 mf dummy; adjust trimmer 11 until signal is received. Adjust trimmer 3 (middle). Set dial and generator to 600 kc; adjust trimmer 12.

S-W BAND ALIGNMENT: Wave switch to s-w position. Set dial and generator to 6000 kc; adjust trimmer 10 until signal is received. Adjust trimmer 2 (top) for maximum output.

WESTINGHOUSE ELEC. SUPPLY CO. INC. MODEL WR-272L



On some models a 150 mmfd. capacitor is connected across Phono. Terminals 1 & 3.

Loudspeaker (Electrodynamic) .... 6 inch
V. C. Impedance at 400 cycles .... 3.4 ohms .

VOLTAGES SHOULD HOLD WITHIN ±20 %
WITH 117 V. A.C. SUPPLY.

Tube and Trimmer Location

Frequency Range

Standard Broadcast (A) .... 540-1,560 kc
Short Wave (C) .... 5.8-18 mc

Intermediate Frequency .... 455 kc

Power Supply Rating

Rating A .... 105-125 volts, 50-60 cycles, 60 watts
Rating B .... 105-125 volts, 25-60 cycles, 60 watts

Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons by turning counter-clockwise about one turn from their tight position so they turn freely.

2. Check to be sure the link connection on back of chassis is in "Radio" position (connected between terminals 2 and 3).

3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the button. Do not tighten more than ¼ turn after the screw begins to grip or damage to the mechanism may result.

4. Proceed in a similar manner for the remainder of the push-buttons.

5. Insert the station marker tabs in the recesses above the push-buttons.

Alignment Procedure

Before proceeding with alignment the following lead dress should be carefully checked.

1. **Dress loop lead (3) away from tap lead (4) and chassis.**
2. **Dress AC power leads away from sockets.**
3. **Dress leads from band switch to trimmers away from each other and away from chassis.**
4. **Dress blue lead and two green leads from terminal board away from chassis and away from each other.**
5. **Dress green lead from volume control to rear terminal away from all parts and against chassis.**

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

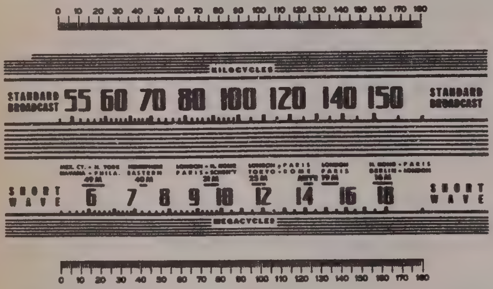
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

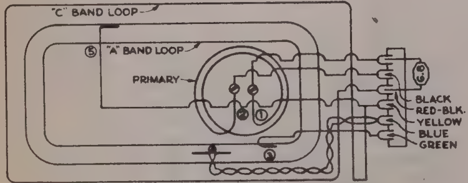
Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator 1/16 inch to the left of the mark at the extreme left (540 kc) end of the dial scale, with gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.



Receiver Dial Scales, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 24° on the calibration scale corresponds to 600 kc on "A" band. Read instructions under "Alignment Procedure."

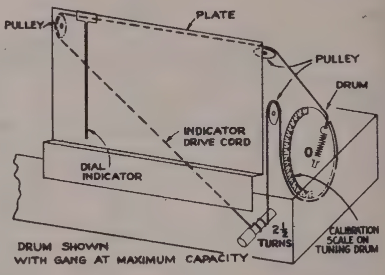


LOOP CONNECTIONS

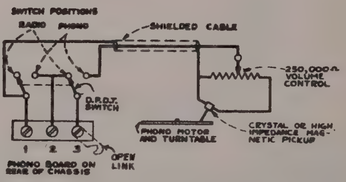
Steps	Connect test-osc. output to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid through 0.1 mfd. capacitor and ground	455 kc	Quiet point between 550-750 kc	L-3 and L-4 (2nd I-F trans.)
2	1st det. grid through 0.1 mfd. capacitor and ground	455 kc		L-1 and L-2 (1st I-F trans.)
3	Antenna terminal (open link between "A" and "G") in series with 300 ohms	15.2 mc	15.2 mc (134°) "C" band	C-1 oscillator*
4		15.2 mc	Rock at 15.2 mc (134°)	C-2 antenna† while rocking
5	Antenna terminal (open link between "A" and "G") in series with 200 mmfd.	1,500 kc	1,500 kc (156°) "A" band	C-3 oscillator C-4 antenna
6		600 kc	Rock at 600 kc (24°) "A" band	L-5 oscillator while rocking
7		1,500 kc	1,500 kc (156°) "A" band	C-3 oscillator C-4 antenna

* Oscillator should track on high frequency side of signal. If two peaks are obtained use high frequency (minimum capacity) peak.

† If two peaks can be obtained use low frequency (maximum capacity) peak.


PULLEY
PLATE
PULLEY
DRUM
INDICATOR DRIVE CORD
0
DIAL INDICATOR
2½ TURNS
CALIBRATION SCALE ON TUNING DRUM
DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

Dial-Indicator and Drive Mechanism


SWITCH POSITIONS
RADIO
PHONO
SHIELDED CABLE
250,000Ω VOLUME CONTROL
D.P.D.T. SWITCH
PHONO MOTOR AND TURNTABLE
CRYSTAL OR HIGH IMPEDANCE MAGNETIC PICKUP
1
2
3
OPEN LINK
PHONO BOARD ON REAR OF CHASSIS

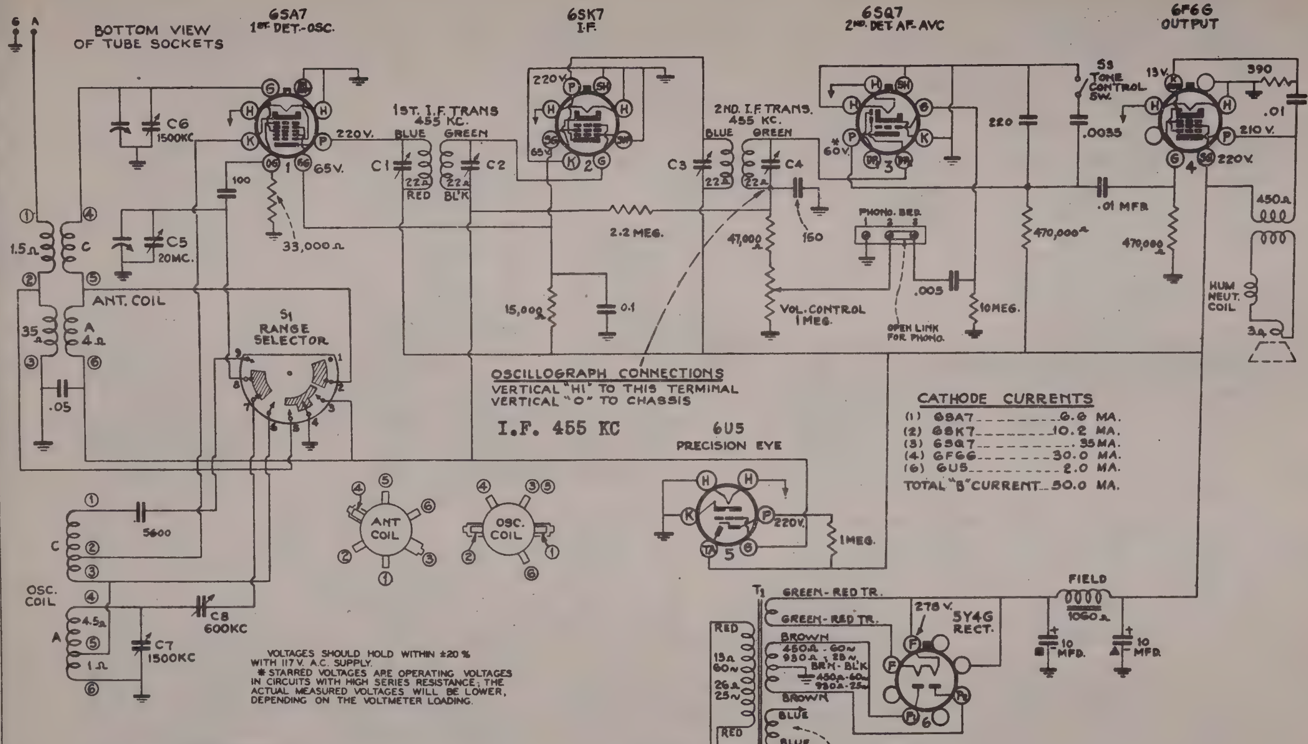
Record Player Connections, Using a Double-Pole Double-Throw Toggle Switch

The accompanying schematic shows connections for a high-impedance pickup with switch for changing from radio to records. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phono switch.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws, holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-272



OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS TERMINAL
VERTICAL "O" TO CHASSIS

I.F. 455 KC

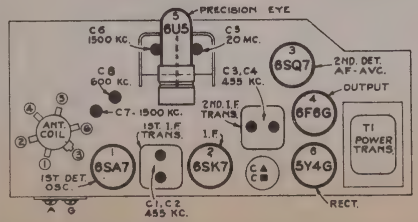
CATHODE CURRENTS

(1)	6SA7	6.6 MA.
(2)	6SK7	10.2 MA.
(3)	6SQ7	.35 MA.
(4)	6F6G	30.0 MA.
(6)	6U5	2.0 MA.
TOTAL "B" CURRENT		50.0 MA.

VOLTAGES SHOULD HOLD WITHIN ±20 % WITH 117 V. A.C. SUPPLY.
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.

SWITCH ON VOLUME CONTROL S4 117 V.

Model WR-272 Schematic Circuit Diagram



Model WR-272, Tube and Trimmer Locations

FOR OTHER DATA
SEE INDEX

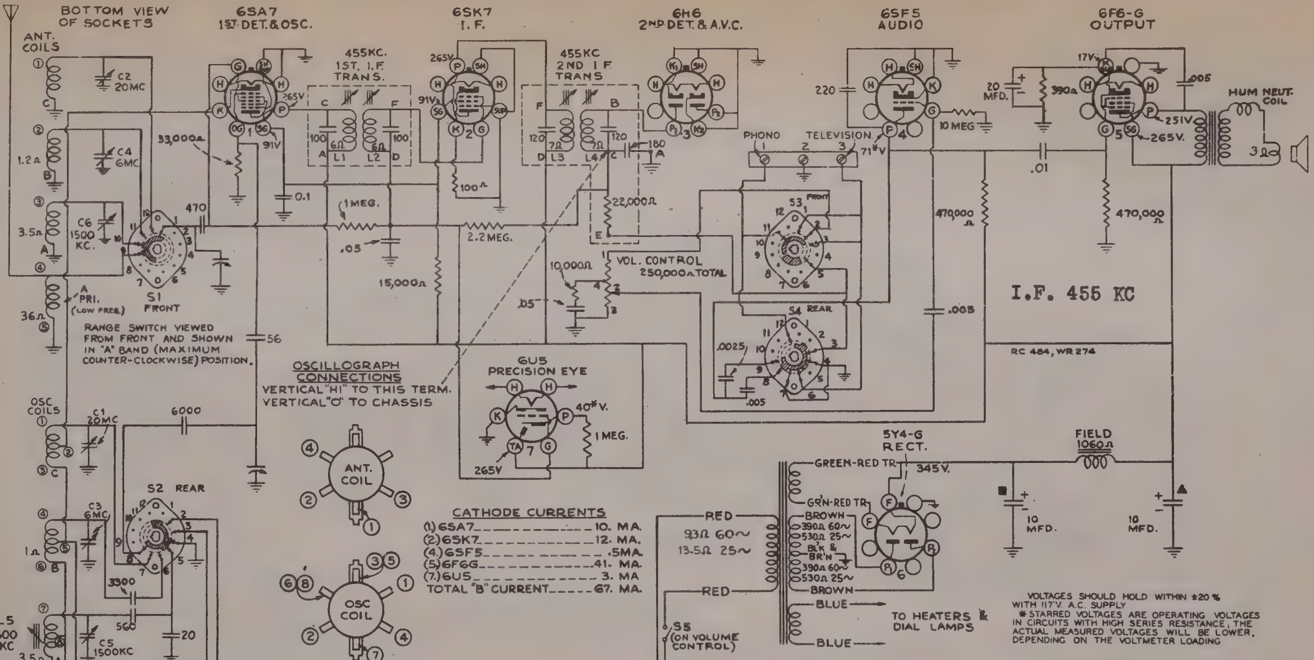
TUBE COMPLEMENT

Model WR-272

(1)	RCA-6SA7	First Detector-Oscillator
(2)	RCA-6SK7	I-F Amplifier
(3)	RCA-6SQ7	Second Det., A.V.C. and A-F Amplifier
(4)	RCA-6F6G	Power Output
(5)	RCA-6U5	Precision Eye
(6)	RCA-5Y4G	Full Wave Rectifier

DIAL LAMP .... Mazda 51, 7.5 volts, 0.2 amp.

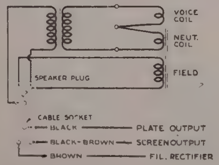
WESTINGHOUSE ELEC. SUPPLY CO. INC.



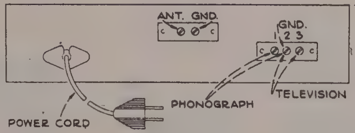
CATHODE CURRENTS

(1) 6SA7	10. MA.
(2) 6SK7	12. MA.
(4) 6SF5	.5 MA.
(5) 6F6G	41. MA.
(7) 6U5	3. MA.
TOTAL "B" CURRENT	67. MA.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

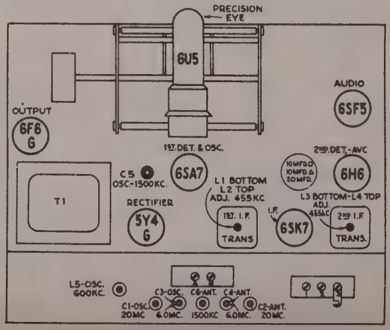


Speaker Connections
Model WR-274



Back of Chassis

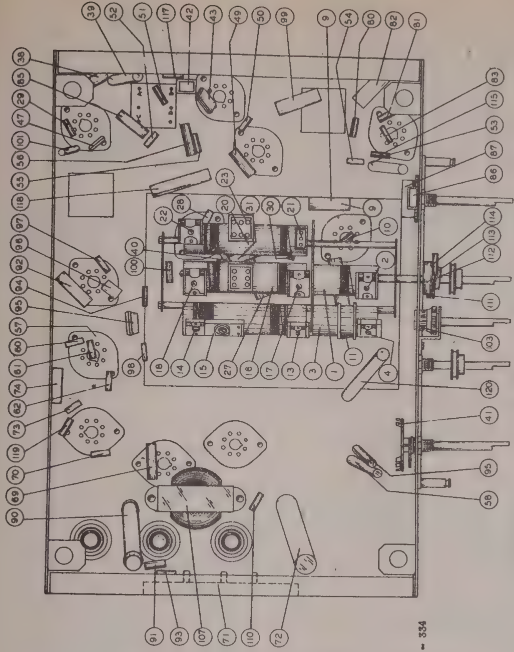
FOR OTHER DATA
SEE INDEX



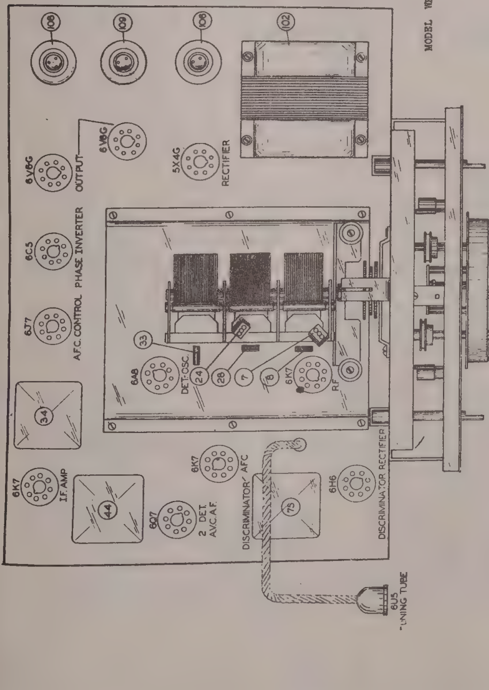
Tube and Trimmer Location, WR-274

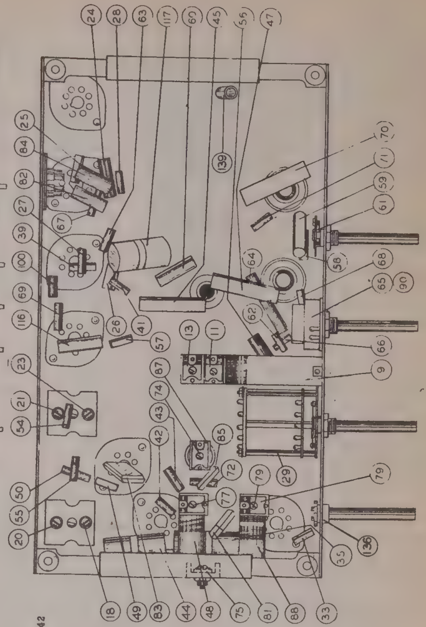
WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-334
MODEL WR-342

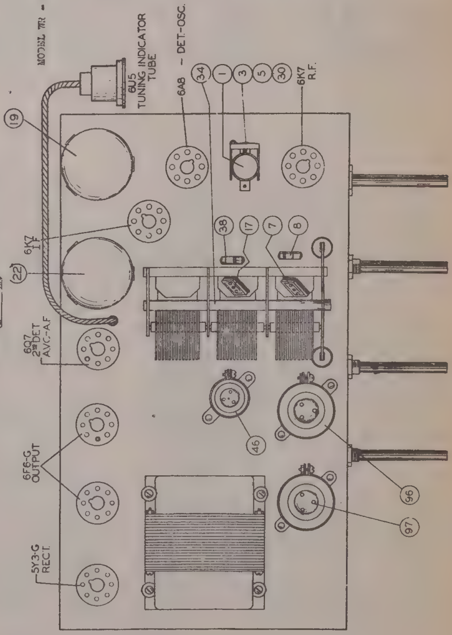


MODEL WR - 334





MODEL WR - 342



WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR - 334

To properly align the circuits of the receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied when the individual circuits are brought into alignment. A conventional output meter should be connected across the speaker voice coil terminals to indicate proper alignment. The sensitivity of the output meter must be sufficient to give a satisfactory reading with a low input signal.

A zero center micro-ammeter with an approximate 0-30 scale is absolutely essential for the proper alignment of the discriminator circuit.

Before attempting to align the receiver, the circuit, position of alignment adjustments and chassis layout should be familiarized. The top and bottom views of the chassis are shown in figures #1 and #2.

ADJUSTMENT OF THE I.F. DIODE COIL 465 KC.

1. Refer to bottom view of chassis and connect a 20,000 ohm resistor between points "C" and "D" under 2nd I.F. coil #44.
2. Turn the receiver "ON" and to the position immediately after set is turned on. Set volume control on full. Set A.F.C. switch in "OFF" position. Set high fidelity control in a left hand or MINIMUM position. Set wave change switch to broadcast position.

3. Connect the output meter across the speaker voice coil.

4. Set the test oscillator to 465 KC. and adjust the output to give a readable deflection of the output meter when the signal is applied to the grid of the 6K7 I.F. tube through a .5 mfd. blocking condenser.

5. Adjust the bottom adjustment screw on coil #44 for maximum output.

6. Remove the 20,000 ohm resistor from points "C" and "D" and connect between points "A" and "B".

7. Adjust the top adjustment screw on coil #44 for maximum output.

8. Remove the 20,000 ohm resistor.

ALIGNMENT OF DISCRIMINATOR COIL

1. Connect the micro-ammeter between the #4 terminal of the 6H6 discriminator rectifier tube and ground.

2. With test signal still applied to the I.F. tube increase the signal output of the oscillator.

3. Adjust the bottom screw on the discriminator coil #75 for maximum deflection of the micro-ammeter (either direction).

4. Adjust the top screw on the discriminator coil until a zero reading on the micro-ammeter is reached. To check this alignment, vary the I.F. signal slightly to each side of the 465 setting and the micro-ammeter should show a deflection first on one side then the other of the zero point.

ADJUSTMENT OF 1ST I.F. COIL 465 KC.

1. Apply the test signal to the grid of the 6A8 detector-oscillator tube through a .5 mfd. blocking condenser.

2. Adjust first the bottom, second the middle and third the top alignment screws on I.F. coil #34 for maximum output.

ADJUSTMENT OF THE BROADCAST BAND

1. With the gang condenser completely in mesh, check the position of the dial pointer which should be at the end horizontal line of the scale.

2. Set the test oscillator and dial pointer to 1500 KC.

3. Adjust the oscillator trimmer #14.

4. Connect the test oscillator to the antenna terminal of the receiver through a .0002 mfd. condenser.

5. Adjust the R.F. and antenna trimmers #13 and #4 for maximum output.

6. Set the test oscillator and dial pointer to 600 KC.

7. Adjust the oscillator series (lag) condenser #15 at the same time turning the gang condenser slightly back and forth until a maximum is reached.

8. Return the test oscillator and dial pointer to the 1500 KC. setting and recheck trimmers #14, #13 and #4.

9. Check sensitivity and calibration over the scale.

NOTE: In adjusting the two remaining bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted between the test oscillator and the antenna terminal of the receiver. This combination is the approximate equivalent of a short wave antenna.

ADJUSTMENT OF THE GREEN BAND

1. Turn the wave change switch to the green band position.

2. Set the test oscillator and dial pointer at 5000 KC.

3. Adjust the oscillator trimmer #22.

4. Check sensitivity and calibration over the scale.

ADJUSTMENT OF THE RED BAND

1. Turn the wave change switch to the red band position.

2. Set the test oscillator and dial pointer at 16,000 KC.

3. Adjust the oscillator trimmer #18. Two positions may be found at which the signal can be heard. Use the one with the least capacity or with the trimmer farther out.

4. Adjust the R.F. and antenna trimmers #17 and #2 for maximum output.

5. Check calibration and sensitivity over the scale.

MODEL WR - 342

This model is an eight-tube, alternating-current, three-band, superheterodyne receiver, designed to operate over the standard broadcast band, extending from 535 to 1800 KC. The first short-wave band includes frequencies between 1730 and 6000 KC., and the second short-wave band includes frequencies between 5700 and 18,500 KC.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of the meter must be sufficient to give satisfactory readings with low input signals.

ALIGNMENT OF I.F. (455 KC.)

1. Set the volume control to maximum position, the wave-change switch to the standard broadcast band and the dial pointer to approximately 600 KC.

2. Connect the output meter across the voice coil terminals of the speaker.

3. Set the test oscillator to 455 KC., and adjust its output to produce a measurable reading on the output meter when the test signal is applied to the grid of the first detector-oscillator tube through a 0.5 mfd. blocking condenser.

4. Adjust the four I.F. trimmer condensers #18, #20, #21 and #23 to maximum output.

ALIGNMENT OF BROADCAST BAND

1. Check the pointer setting to be sure that it is exactly horizontal when the tuning condenser is completely closed.

2. Set the oscillator and dial indicator at 1500 KC., and adjust the broadcast oscillator trimmer #74.
3. Set the test oscillator and dial pointer to 600 KC.

4. Adjust the oscillator lag condenser #75 for maximum output, at the same time rocking the gang condenser.

5. Reset test oscillator and gang condenser to 1500 KC., and recheck operation #2.

6. Connect the test oscillator to the antenna terminal through a .0002 mfd. condenser and adjust the R.F. and antenna trimmers #11 and #3.

7. Check sensitivity and calibration over the scale.

NOTE: In adjusting the two short-wave bands, a .0002 mfd. condenser and a 400 ohm resistor in series should be inserted between the antenna terminal and the high side of the test oscillator. This combination is the approximate equivalent of a short-wave antenna.

ALIGNMENT OF FIRST SHORT-WAVE BAND

1. Turn the wave-change switch to the first short-wave position (1730-6000 KC. scale).

2. Set the test oscillator and dial pointer to 5200 KC., and adjust the oscillator and antenna trimmers #77 and #5.

3. Check sensitivity and calibration over the scale.

ALIGNMENT OF SECOND SHORT-WAVE BAND

1. Turn the wave-change switch to the second short-wave position (5700-18,500 KC. scale).

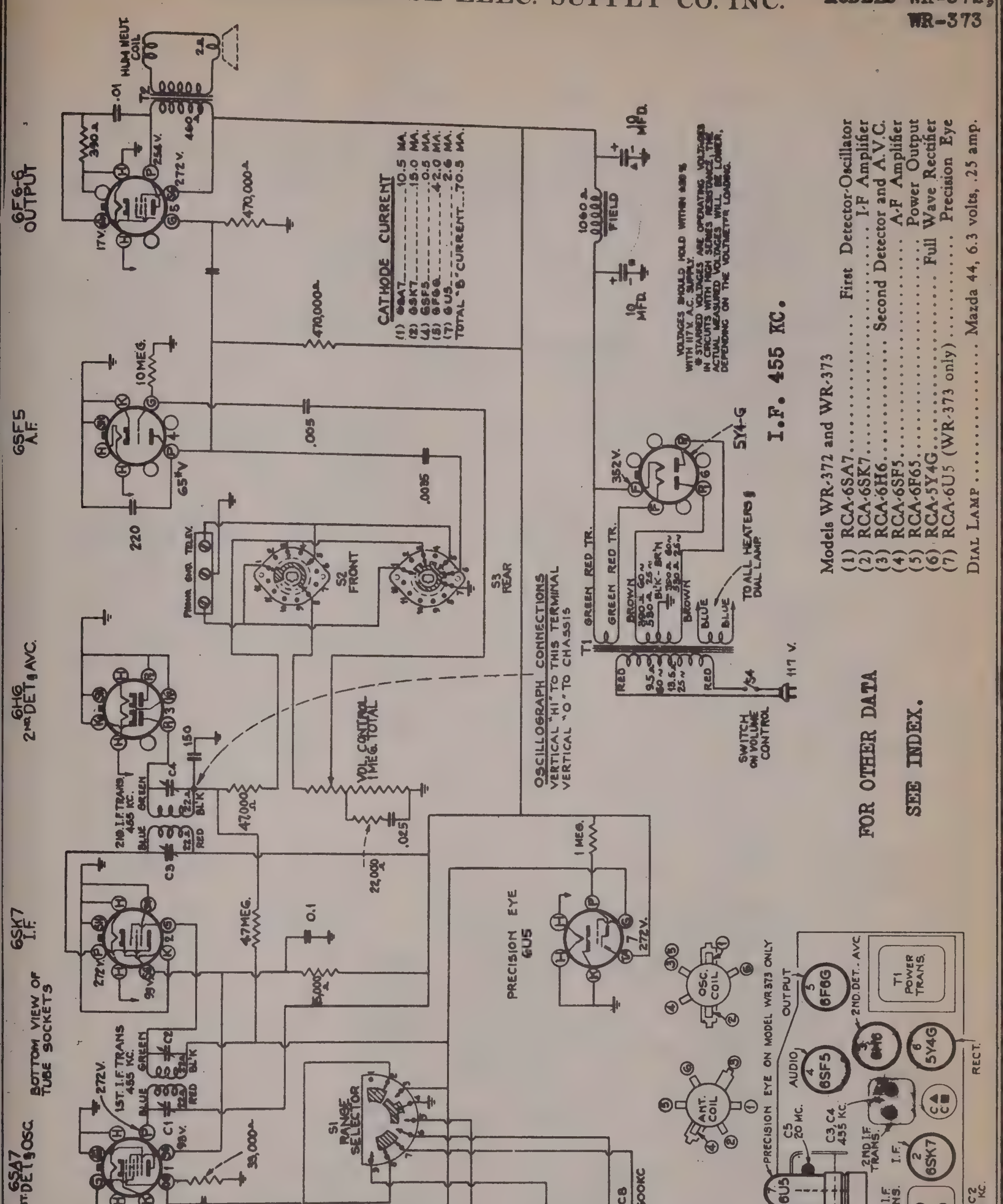
2. Set the test oscillator and dial pointer to 16,500 KC., and adjust the oscillator trimmer #79. Two positions may be found. Use the one with the least capacity, that is, with the trimmer screw farthest out.

3. Adjust the antenna trimmer #30.

4. Check sensitivity and calibration over the scale.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODELS WR-372, WR-373



I.F. 455 KC.

Models WR-372 and WR-373

(1)	RCA-6SA7	First Detector-Oscillator
(2)	RCA-6SK7	I-F Amplifier
(3)	RCA-6H6	Second Detector and A.V.C.
(4)	RCA-6SF5	A-F Amplifier
(5)	RCA-6F6S	Power Output
(6)	RCA-5Y4G	Full Wave Rectifier
(7)	RCA-6U5 (WR-373 only)	Precision Eye

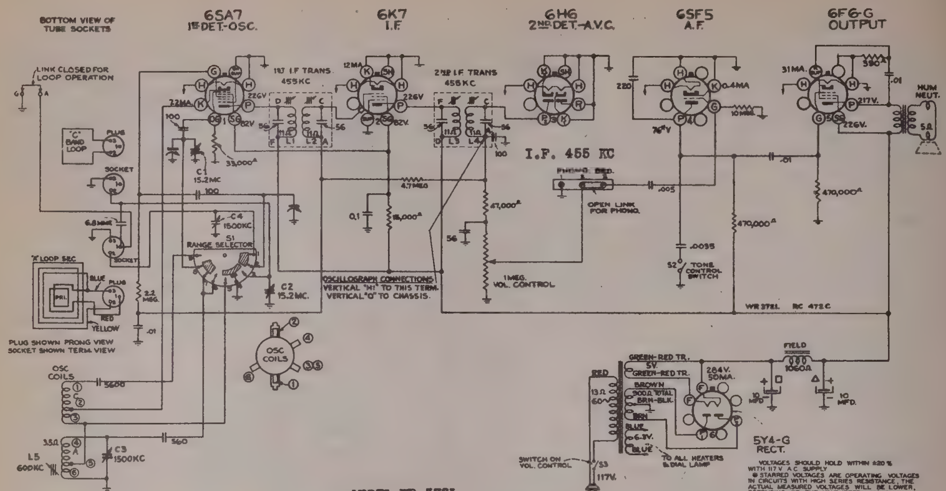
Dial Lamp.......... Mazda 44, 6.3 volts, .25 amp.

FOR OTHER DATA

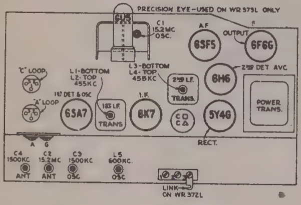
SEE INDEX.

MODEL WR-372L
MODEL WR-373L

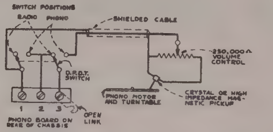
WESTINGHOUSE ELEC. SUPPLY CO. INC.


BOTTOM VIEW OF TUBE SOCKETS
6SA7 1ST DET.-OSC.
6K7 I.F.
6H6 2ND DET.-A.V.C.
6SF5 A.F.
6F6-G OUTPUT
LINK CLOSED FOR LOOP OPERATION
1ST I.F. TRANS. 455KC
2ND I.F. TRANS. 455KC
HUM NEUT.
I.F. 455 KC
PHONO. BRD.
OPEN LINK FOR PHONO.
"C" BAND LOOP
PLUG
SOCKET
C4 1500KC
S1 RANGE SELECTOR
"A" LOOP SEC.
C2 15.2MC.
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
1MEG. VOL. CONTROL
S2 TONE CONTROL SWITCH
PLUG SHOWN PRONG VIEW SOCKET SHOWN TERM. VIEW
OSC COILS
L5 600KC
C3 1500KC
WR 372L RC 472C
FIELD 1060Ω
5Y4-G RECT.
SWITCH ON VOL. CONTROL
TO ALL HEATERS & DIAL LAMP
117V.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY
⊕ STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

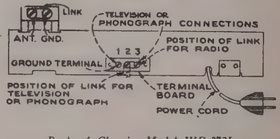
MODEL WR-372L



Tube and Trimmer Locations


SWITCH POSITIONS
RADIO
PHONO
SHIELDED CABLE
250,000Ω VOLUME CONTROL
D.P.D.T. SWITCH
PHONO MOTOR AND TURNTABLE
CRYSTAL OR HIGH IMPEDANCE MAGNETIC PICKUP
PHONO BOARD ON REAR OF CHASSIS
OPEN LINK

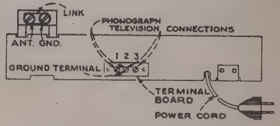
Record Player Connections, Using a Double-Pole Double-Throw Toggle Switch (Model WR-372L)


LINK
TELEVISION OR PHONOGRAPH CONNECTIONS
ANT. GND.
POSITION OF LINK FOR RADIO
GROUND TERMINAL
POSITION OF LINK FOR TELEVISION OR PHONOGRAPH
TERMINAL BOARD
POWER CORD

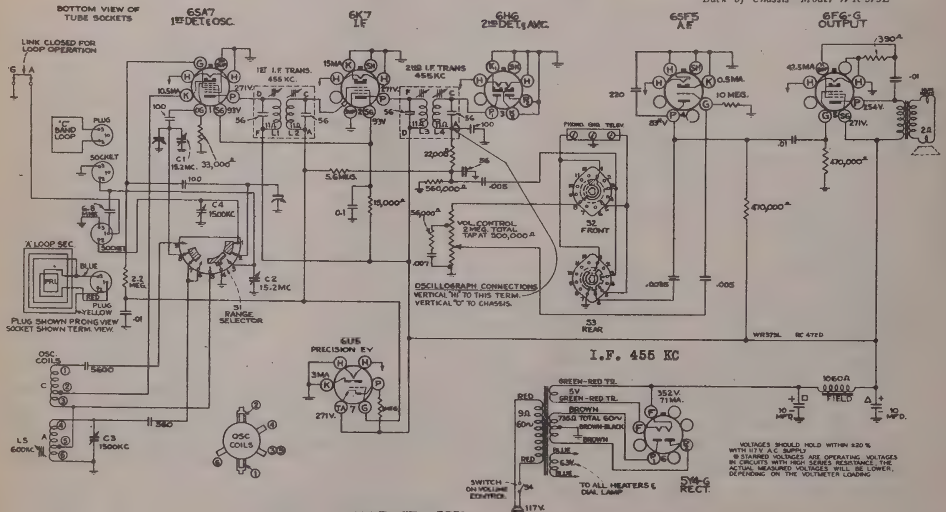
Back of Chassis—Model WR-372L

FOR OTHER DATA

SEE INDEX



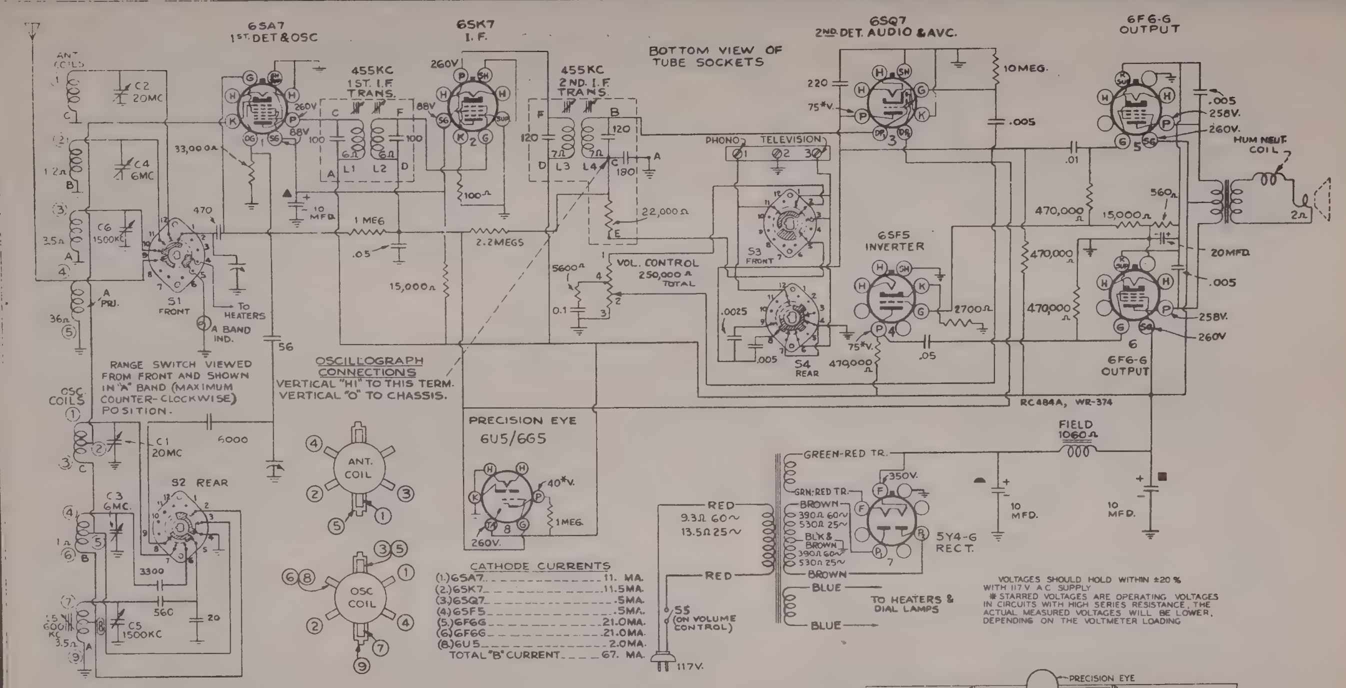
Back of Chassis—Model WR-373L


BOTTOM VIEW OF TUBE SOCKETS
6SA7 1ST DET & OSC.
6K7 I.F.
6H6 2ND DET & AVC.
6SF5 A.F.
6F6-G OUTPUT
LINK CLOSED FOR LOOP OPERATION
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455KC
"C" BAND LOOP
PLUG
SOCKET
C4 1500KC
"A" LOOP SEC.
C2 15.2MC
S1 RANGE SELECTOR
PLUG SHOWN PRONG VIEW SOCKET SHOWN TERM. VIEW
PHONO. GND. TELEV.
S2 FRONT
S3 REAR
VOL. CONTROL 2 MEG. TOTAL TAP AT 500,000Ω
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
WR373L RC 472D
I.F. 455 KC
6U5 PRECISION EY
OSC. COILS
L5 600KC
C3 1500KC
1060Ω FIELD
5Y4-G RECT.
SWITCH ON VOLUME CONTROL
TO ALL HEATERS & DIAL LAMP
117V.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY
⊕ STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

MODEL WR- 373L

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-374

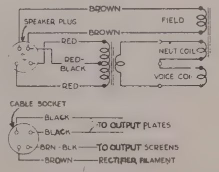


CATHODE CURRENTS

(1.)6SA7	11. MA.
(2.)6SK7	11.5MA.
(3.)6SQ7	.5MA.
(4.)6SF5	.5MA.
(5.)6F6G	21.0MA.
(6.)6F6G	21.0MA.
(8.)6U5	2.0MA.
TOTAL "B" CURRENT	67. MA.

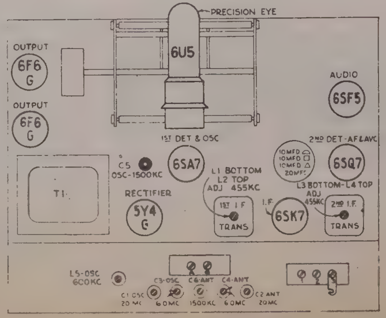
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

	Model WR-274	Model WR-374
Dial Lamp .... Mazda 44, 6.3 volts, .25 amp.		
Power Supply Ratings		
Rating A—105-125 volts, 50-60 cycles..	65 watts	75 watts
Rating B—105-125 volts, 25-60 cycles..	65 watts	75 watts
Rating C—100-130, 140-160, 195-250 volts, 50-60 cycles.......	65 watts	75 watts
Power Output (125 volts, 60 cycle supply)		
Undistorted	2.5 watts	5.0 watts
Maximum	4.5 watts	5.5 watts
Loudspeaker (Electrodynamic).........	6-inch	12-inch
V.C. Impedance at 400 cycles..........	3.4 ohms	2.2 ohms



Speaker Connections
Model WR-374

FOR ALIGNMENT, PUSH-BUTTON DATA, DRIVE CABLE, SEE INDEX.



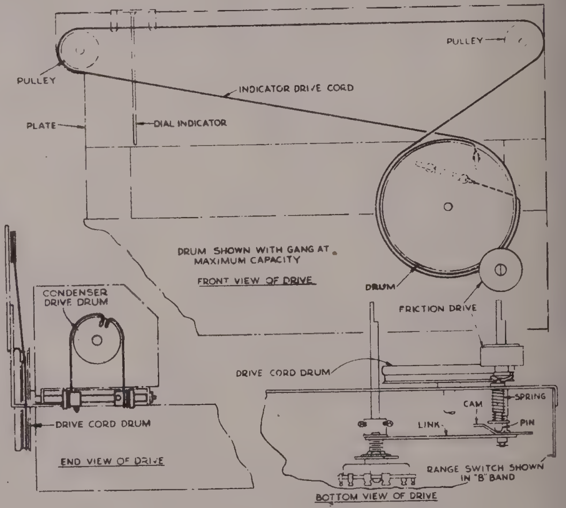
Tube and Trimmer Location, WR-374

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc	"A" band Quiet point between 550-750 kc	L3 and L4 (2nd I-F trans.)
2	6SA7 grid in series with .01 mfd.			L1 and L2 (1st I-F trans.)
3	Ant. terminal in series with 300 ohms	20 mc	20 mc (200°) "C" band	C1 (osc.)* C2 (ant.)
4		6 mc	6 mc (187.5°) "B" band	C3 (osc.)** C4 (ant.)
5	Ant. terminal in series with 200 mmfd.	1,500 kc	1,500 kc (198.25°) "A" band	C5 (osc.) C6 (ant.)
6		600 kc	600 kc (39.75°) "A" band	L5 (osc.) Rock gang
7	Repeat step 5.			

* Use **minimum** capacity peak if two can be obtained. Check to determine that C1 has been adjusted to correct peak by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

** Use **minimum** capacity peak if two can be obtained. Check to determine that C3 has been adjusted to correct peak by tuning receiver to approximately 5.09 mc where a weaker signal should be received.

Note.—Oscillator tracks **above** signal on all bands.



Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

Phonograph or Television Attachment.—A terminal board is provided on the rear of the chassis for connecting a record player or Television attachment into the audio-amplifying circuit. The cable from the record player should be connected to terminals 1 and 2, the cable from the Television attachment going to terminals 2 and 3. Terminal 2 is chassis ground and the shield or ground lead from either of the attachments should be connected to this terminal.

Precautionary Lead Dress.—

On Model WR-274, the lead from 6SF5 plate to 6F6G should be dressed close to chassis.

Power cord should be dressed away from power transformer.

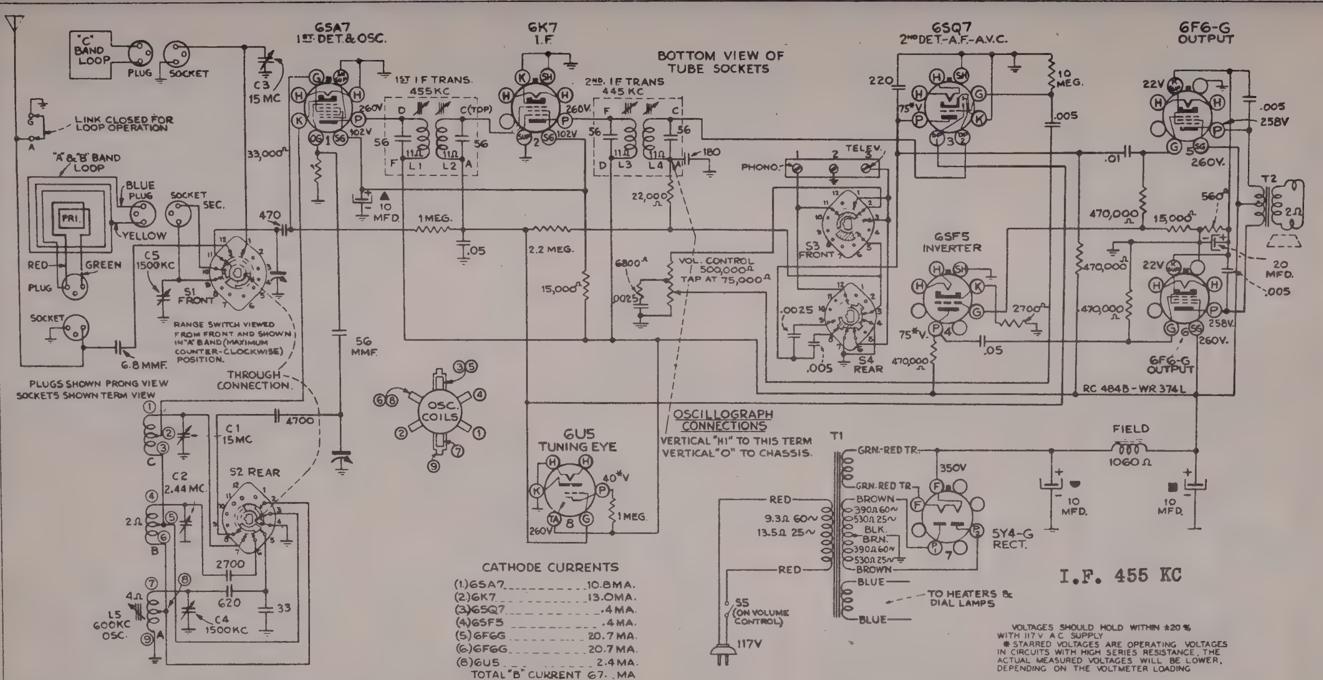
Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push-buttons by turning counter-clockwise about one turn from their tight position so they turn freely.
2. Check to be sure the Phono-Radio switch is in "Radio" position.
3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the button. Do not tighten more than ¼ turn after the screw begins to grip or damage to the mechanism may result.
4. Proceed in a similar manner for the remainder of the push-buttons.
5. Insert the station marker tabs in the recesses above the push-buttons.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-374L

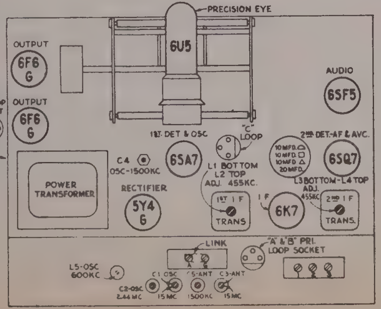


I.F. 455 KC

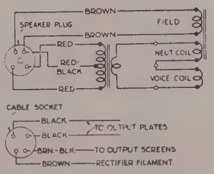
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V A C SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

CATHODE CURRENTS

(1) 6SA7	10.8 MA.
(2) 6K7	13.0 MA.
(3) 6SQ7	.4 MA.
(4) 6SF5	.4 MA.
(5) 6F6G	20.7 MA.
(6) 6F6G	20.7 MA.
(8) 6U5	2.4 MA.
TOTAL "B" CURRENT	67. MA



Tube and Trimmer Location



Speaker Connections

POWER OUTPUT (125 volts, 60 cycle supply)

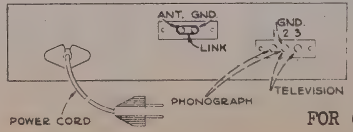
Undistorted	5.0 w
Maximum	5.5 w

POWER SUPPLY RATINGS

Rating A	105-125 volts, 50-60 cycles, 75 watts
Rating B	105-125 volts, 25-60 cycles, 75 watts
Rating C	100-130, 140-160, 195-250 volts, 50-60 cycles, 75 watts

LOUDSPEAKER

Electrodynamic	12-inch
V.C. Impedance at 400 cycles	2.2 ohms

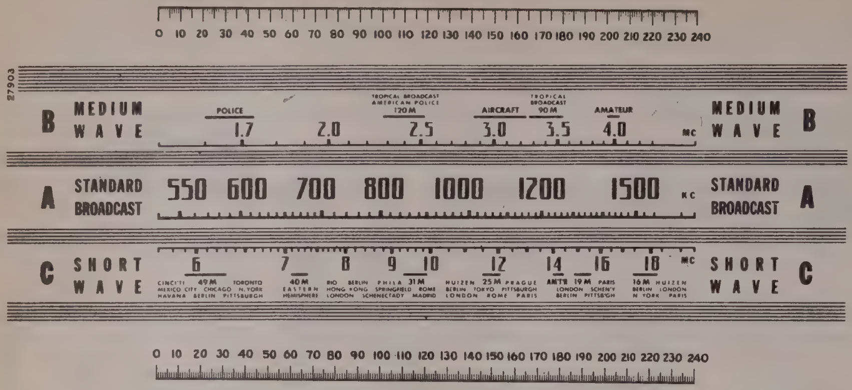


Back of Chassis

FOR OTHER DATA
SEE INDEX

MODEL WR-374L
MODELS WR-476

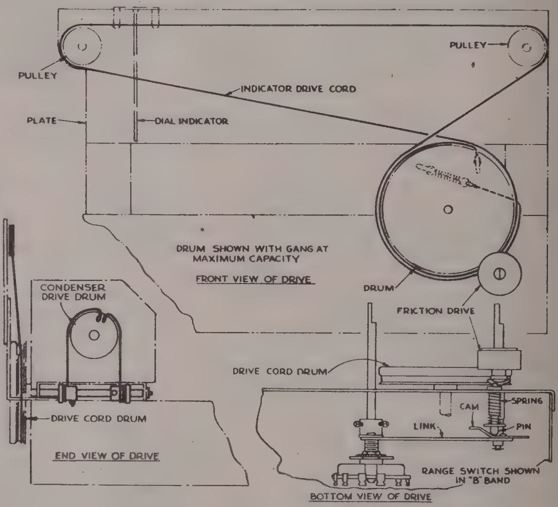
WESTINGHOUSE ELEC. SUPPLY CO.INC.


0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240
27903
B MEDIUM WAVE
POLICE
TROPICAL BROADCAST AMERICAN POLICE 120 M
AIRCRAFT
TROPICAL BROADCAST 90 M
AMATEUR
1.7 2.0 2.5 3.0 3.5 4.0 MC
MEDIUM WAVE B
A STANDARD BROADCAST
550 600 700 800 1000 1200 1500 KC
STANDARD BROADCAST A
C SHORT WAVE
6 7 8 9 10 12 14 16 18 MC
CINCI'TI 49M TORONTO MEXICO CITY CHICAGO N.YORK HAVANA BERLIN PITTSBURGH
40M EASTERN HEMISPHERE
RIO BERLIN PHILA 31M HONG KONG SPRINGFIELD ROME LONDON SCHENECTADY MADRID
HUIZEN 25M PRAGUE BERLIN TOKYO PITTSBURGH LONDON ROME PARIS
AMT'R 19M PARIS LONDON SCHEN'Y BERLIN PITTSB'GH
16M HUIZEN BERLIN LONDON N YORK PARIS
SHORT WAVE C
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

Receiver Dial Scales, and Corresponding 0-240° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 37.5° on the calibration scale corresponds to 600 kc on "A" band. Read instructions under "Alignment Procedure."

Note: In the Dial Indicator Drive Cord Assembly drawing at the right the mechanism is shown with the range switch in the "B" band position. In the "A" band position the trip arm on the range shaft must be adjusted so that when the push-buttons are operated, the drive cord drum will turn freely without rubbing or binding against the drive roller.



Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push-buttons by turning counter-clockwise about one turn from their tight position so they turn freely.

2. Check to be sure the Phono-Radio switch is in "Radio" position.

3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the button. Do not tighten more than 1/4 turn after the screw begins to grip or damage to the mechanism may result.

4. Proceed in a similar manner for the remainder of the push-buttons.

5. Insert the station marker tabs in the recesses above the push-buttons.

Alignment Procedure

Before proceeding with alignment the following lead dress should be carefully checked:

1. Dress AC switch leads away from tube sockets.
2. Do not twist loop leads together or around each other. Spacing between leads from "C" band loop to chassis is important—see alignment step "7" below.
3. "High side" leads from loop sockets, range switch, oscillator coil, and trimmers must be dressed away from chassis and each other.
4. Dress the 470 mmf. and 56 mmf. condensers going to the grid and osc. grid of the 6SA7 tube away from each other.

Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 120° mark on the drum scale must be vertical and directly under the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

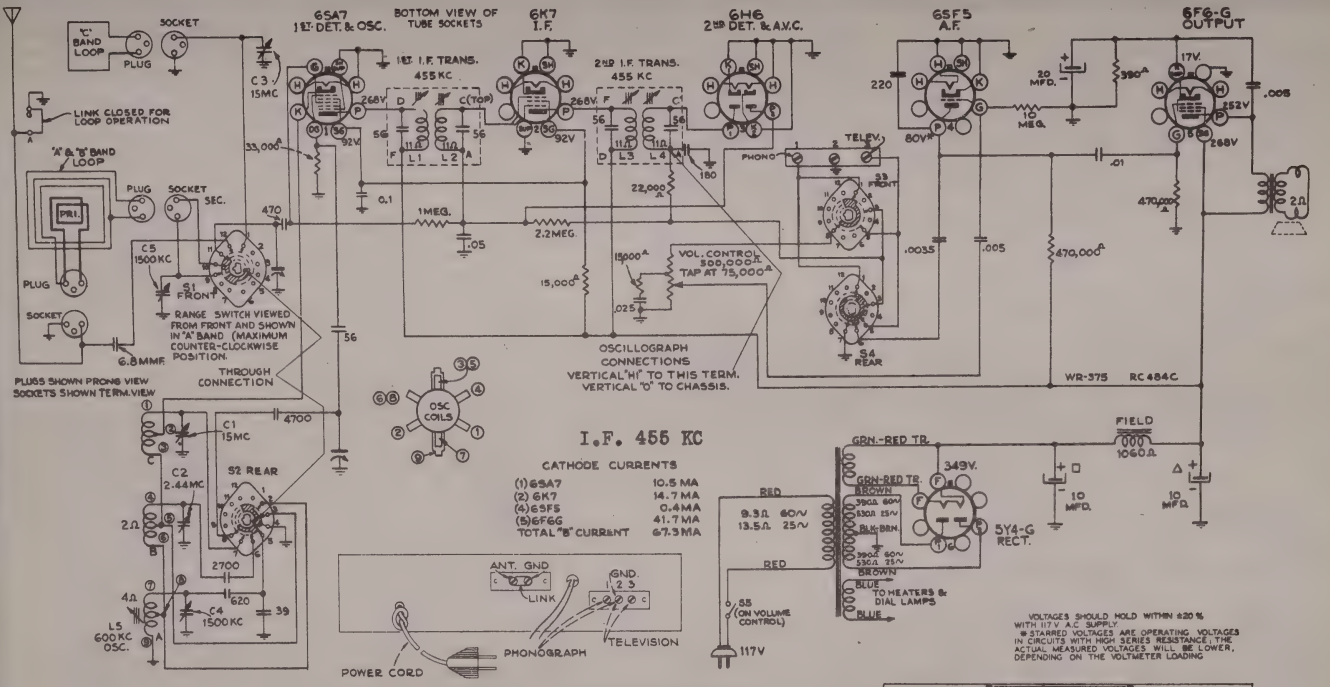
On the inner side of the tuning drum are two projections which serve as stops to prevent extreme rotation of the gang condenser. The tuning drum should be set so that the stop limiting clockwise movement of the drum takes effect just as the gang condenser plates are becoming fully meshed, thus preventing stress on the gang due to extreme rotation.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator set 1/8 inch to the left of the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-375



I.F. 455 KC

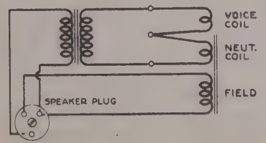
CATHODE CURRENTS

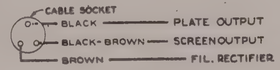
(1) 6SA7	10.5 MA
(2) 6K7	14.7 MA
(4) 6SF5	0.4 MA
(5) 6F6G	41.7 MA
TOTAL "B" CURRENT	67.3 MA

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V A.C SUPPLY.

* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

Schematic Circuit Diagram





Speaker Connections

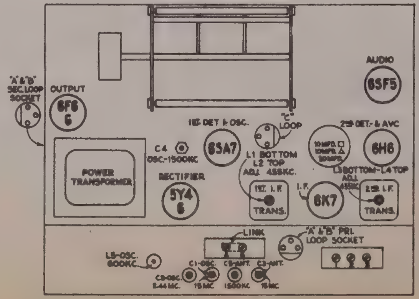
Power Supply Ratings

Rating A	105-125 volts, 50-60 cycles, 75 watts
Rating B	105-125 volts, 25-60 cycles 75 watts
Rating C	100-130, 140-160, 200-250 volts, 50-60 cycles, 75 watts

Loudspeaker

Electrodynamic	12-inch
V.C. Impedance at 400 cycles	2.2 ohms
Power Output	
Undistorted	2.5 watts
Maximum	4.5 watts

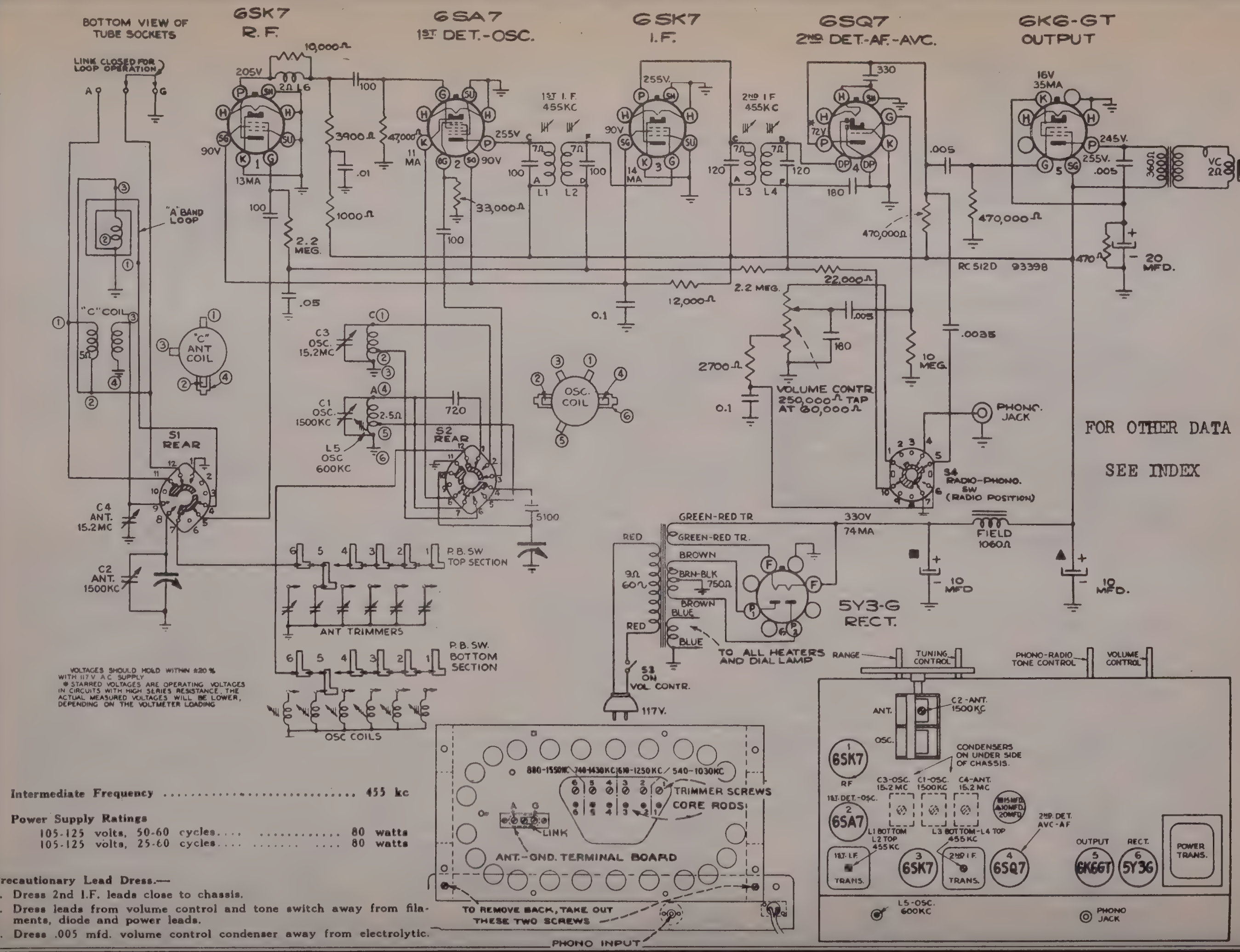
FOR OTHER DATA
SEE INDEX



Tube and Trimmer Location

MODEL WR-386

WESTINGHOUSE ELEC. SUPPLY CO. INC.



FOR OTHER DATA

SEE INDEX

Intermediate Frequency .... 455 kc

Power Supply Ratings

105-125 volts, 50-60 cycles.... .... 80 watts
105-125 volts, 25-60 cycles.... .... 80 watts

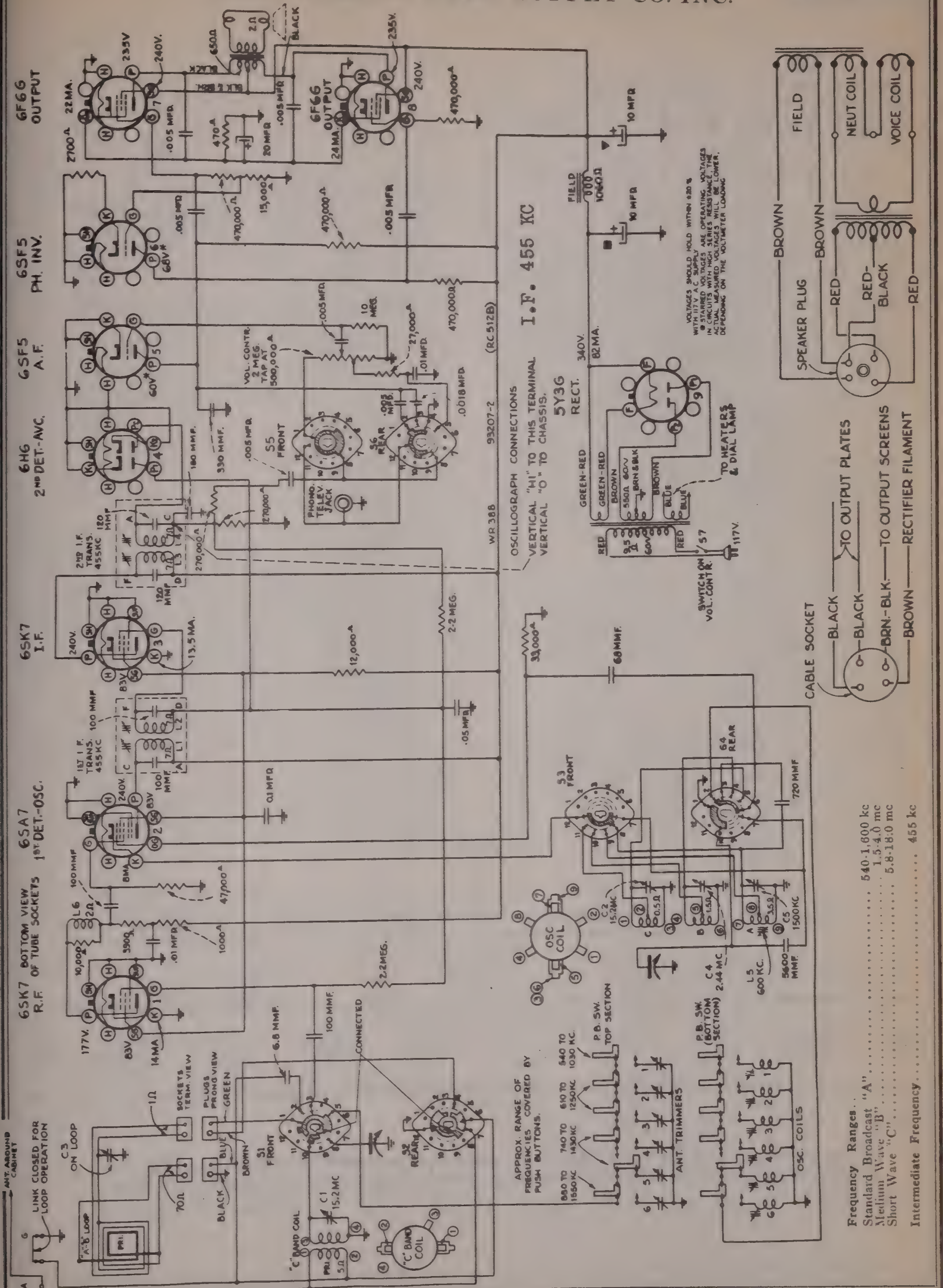
Precautionary Lead Dress.—

1. Dress 2nd I.F. leads close to chassis.
2. Dress leads from volume control and tone switch away from filaments, diode and power leads.
3. Dress .005 mfd. volume control condenser away from electrolytic.

©John F. Rider, Publisher

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-388



VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V A.C. SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

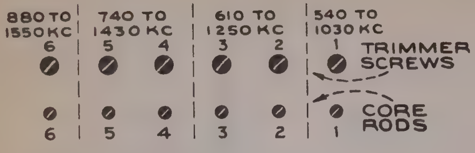
Frequency Ranges . .
Standard Broadcast "A" . . . . 540-1,600 kc
Medium Wave "B" . . . . 1.5-4.0 mc
Short Wave "C" . . . . 5.8-18.0 mc

Intermediate Frequency . . . . 455 kc

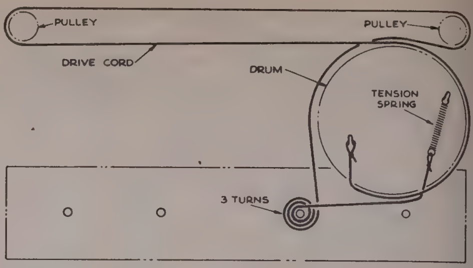
©John F. Rider, Publisher

MODEL WR-388

WESTINGHOUSE ELEC. SUPPLY CO. INC.



Push Button Adjustments



Arrangement of Drive Cord for Condenser and Dial Indicator

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "90°" mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

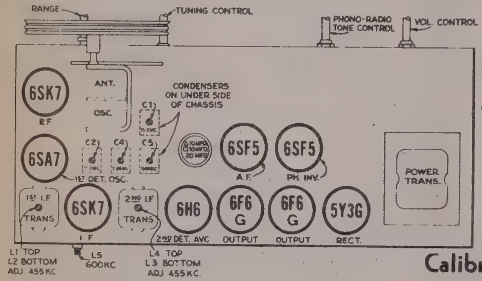
To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Precautionary Lead Dress.—

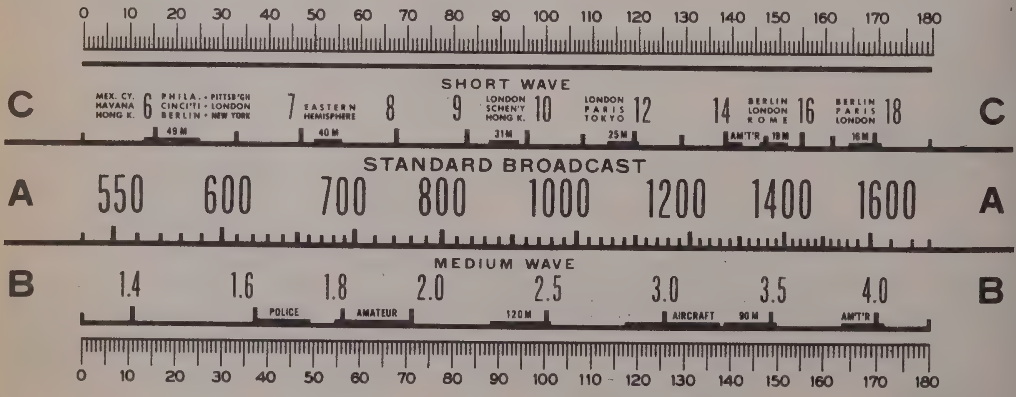
1. Dress 2nd I.F leads close to chassis.
2. Dress leads from volume control and tone switch away from filaments, diode and power leads.
3. Dress .005 mfd. volume control condenser away from electrolytic.



Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A"	Quiet Point near 180°	L3 and L4 (2nd I-F Trans.)
2	6SA7 1st Detector in series with .01 mfd.				L1 and L2 (1st I-F Trans.)
3	Ant. terminal "A" in series with 47 mmf.	15.2 mc	"C"	148.5°	C1 (ant.) C2 (osc.)*
4	Ant. section of gang condenser in series with 300 ohms	2.44 mc	"B"	97°	C4 (osc.)*
5		1,500 kc	"A"	160°	C5 (osc.)*
6		600 kc		30°	L5 (osc.) (Rock gang)
7	Fasten chassis in cabinet. Connect loop, see that link is closed on the antenna board, attach dial indicator to drive cord, with indicator at 540 kc mark and gang at maximum capacity.				
8	Radiation loop consisting of two turns of wire 18 in. in diameter located 4 to 6 feet from receiver	1,500 kc	"A"	1,500 kc	C3 (ant.) (on loop)
9		600 kc		600 kc	L5 (osc.) (Rock gang)
10		Repeat steps 8 and 9			

*Use minimum capacity peak if two peaks can be obtained.
Note: Oscillator tracks above signal on all bands.

Calibration Scale

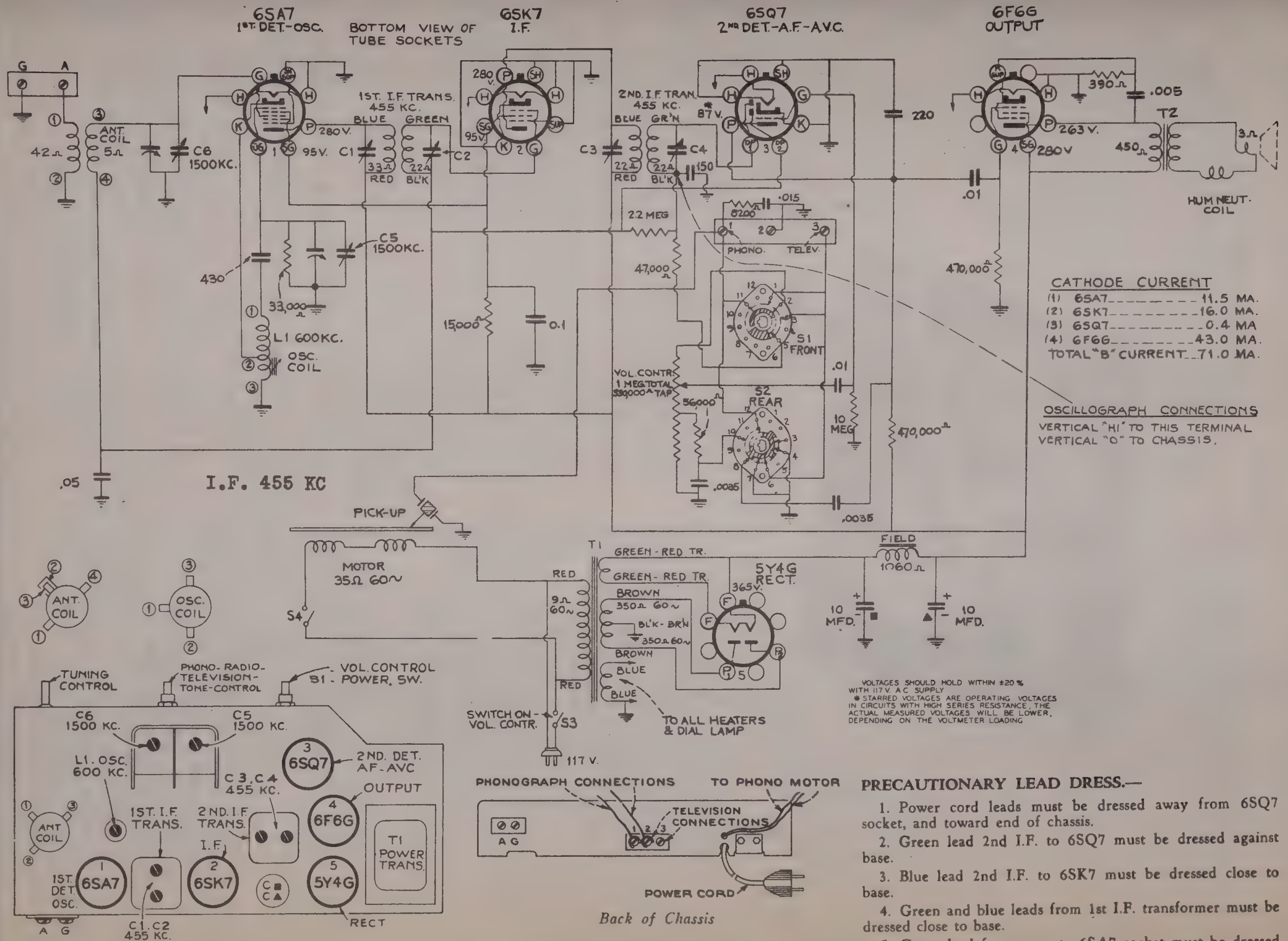


Receiver Dial Scales, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 30° on the calibration scale corresponds to 600 kc on "A" band. Read instructions under "Alignment Procedure."

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-470



Back of Chassis

Tube and Trimmer Locations

CATHODE CURRENT	
(1) 6SA7	11.5 MA.
(2) 6SK7	16.0 MA.
(3) 6SQ7	0.4 MA
(4) 6F6G	43.0 MA.
TOTAL "B" CURRENT	71.0 MA.

OSCILLOGRAPH CONNECTIONS

VERTICAL "HI" TO THIS TERMINAL
VERTICAL "O" TO CHASSIS.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A C SUPPLY

* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

FOR FURTHER DATA
SEE INDEX

PRECAUTIONARY LEAD DRESS.—

1. Power cord leads must be dressed away from 6SQ7 socket, and toward end of chassis.
2. Green lead 2nd I.F. to 6SQ7 must be dressed against base.
3. Blue lead 2nd I.F. to 6SK7 must be dressed close to base.
4. Green and blue leads from 1st I.F. transformer must be dressed close to base.
5. Green lead from gang to 6SA7 socket must be dressed toward side apron way from other parts.

Voice Coil Impedance............. 3.4 ohms at 400 cycles

MODELS WR-473
WR-474
WR-474L

WESTINGHOUSE ELEC. SUPPLY CO. INC.

AUTOMATIC RECORD CHANGER

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

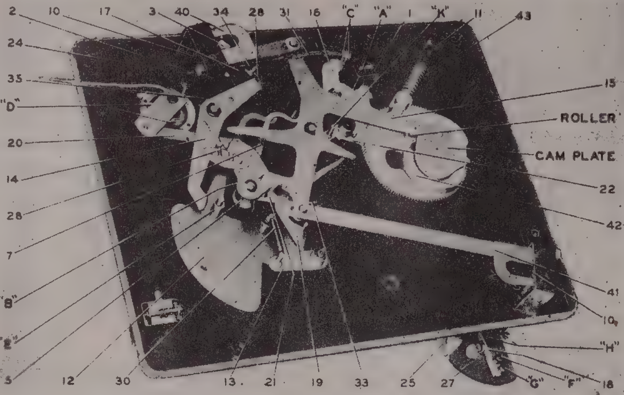
The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.



NOTE: Numbers refer to parts—letters refer to adjustments

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

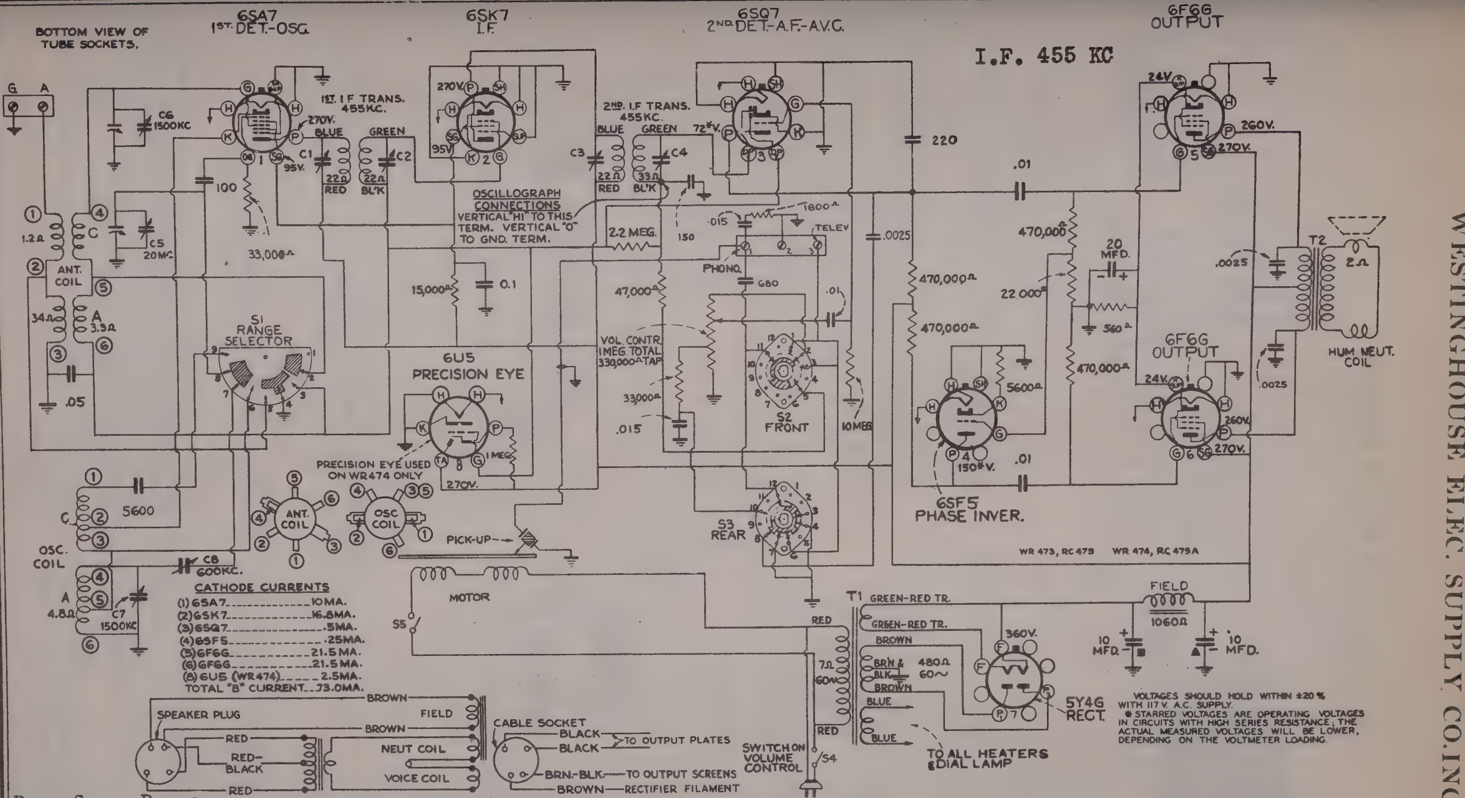
MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10 and 12 inch records —Make complete adjustments "D" and "E."
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34."

WESTINGHOUSE ELEC. SUPPLY CO.INC.

MODELS WR-473,
WR-474



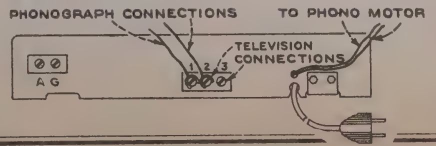
CATHODE CURRENTS
(1) 6SA7..........10MA.
(2) 6SK7..........16.8MA.
(3) 6SQ7..........5MA.
(4) 6SF5..........25MA.
(5) 6F6G..........21.5MA.
(6) 6F6G..........21.5MA.
(8) 6U5 (WR474)..........2.5MA.
TOTAL "B" CURRENT..........73.0MA.

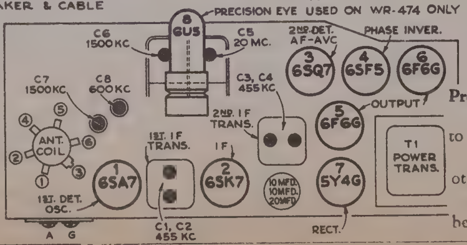
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY.
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.

CONNECTIONS & COLORS OF SPEAKER & CABLE

Power Supply Rating
Rating A............. 105-125 volts, 60 cycles, 105 watts

Loudspeaker (RL-70J-1)
Type............................ 12-inch electrodynamic
V-C Impedance.................. 2.2 ohms at 400 cycles





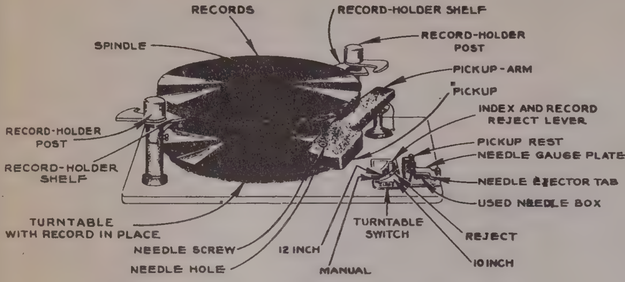
Precautionary Lead Dress.—

1. Heater lead from 6F6G to 6SQ7 must be dressed close to chassis base.
2. AC leads to the power switch must be dressed away from other parts.
3. Condenser from grid of 6SQ7 to volume control should be kept as far away from power switch as possible.

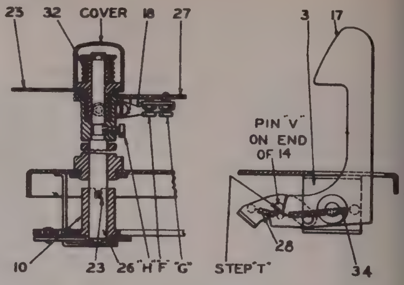
MODELS WR-473,
WR-474
MODELS WR-172,
WR-470, WR-373Y,

WESTINGHOUSE ELEC. SUPPLY CO. INC.

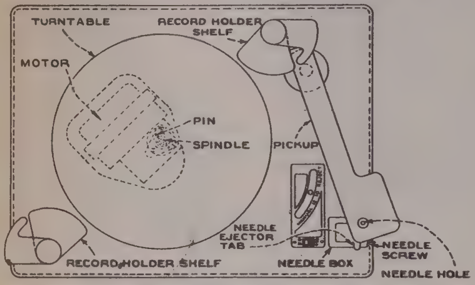
Automatic Record Changer



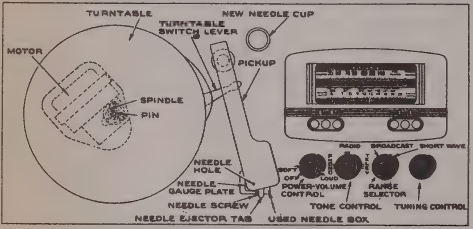
Top View of Automatic Record Changer



Details of Record Shelf Posts, and Locating Lever Assemblies



Motorboard and Controls WR-474



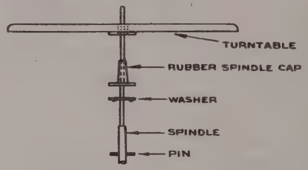
Controls, WR-473

The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

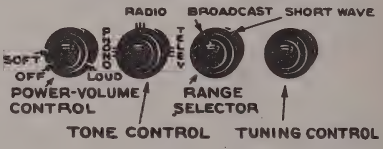
The phonograph motor is a self-starting constant-speed induction type.

Motor Lubrication.—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months. The oil hole is located in the motor casting, adjacent to the spindle bearing, and on Model WR-474 is covered with a screw plug.

The automatic stop (Model WR-473) should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1¾ inches from the center line of the spindle.



Turntable Assembly (All Models)



Controls, WR-474

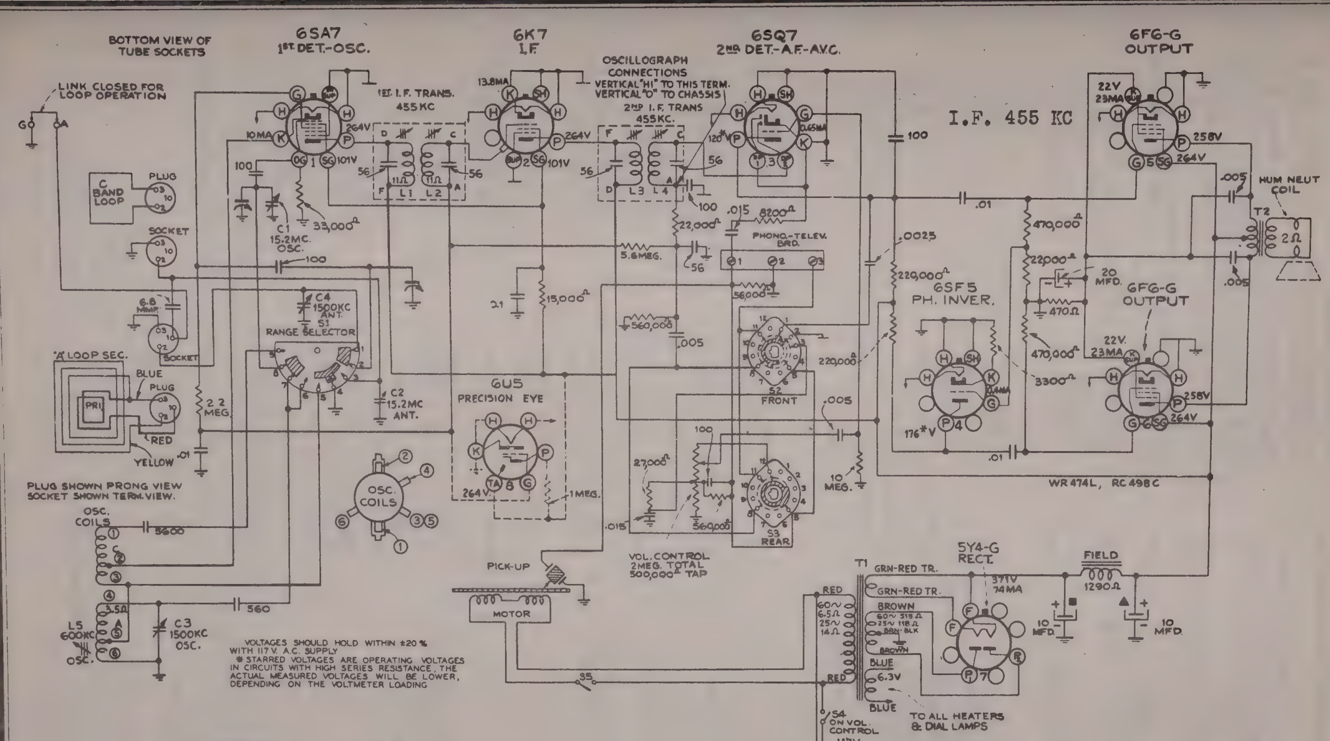
Adjustments for Push-Button Tuning

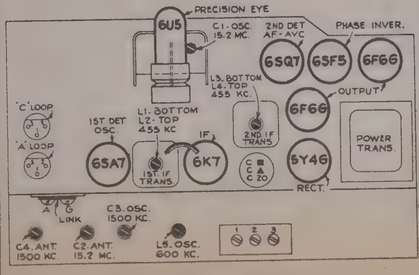
MODELS WR-172, WR-373Y, WR-470, WR-473, WR-474

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push-buttons by turning counter-clockwise about one turn from their tight position so they turn freely.
2. Check to be sure the Phono-Radio switch is in "Radio" position.
3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the button. Do not tighten more than ¼ turn after the screw begins to grip or damage to the mechanism may result.
4. Proceed in a similar manner for the remainder of the push-buttons.
5. Insert the station marker tabs in the recesses above the push-buttons.

WESTINGHOUSE ELEC. SUPPLY CO. INC.





Tube and Trimmer Locations

FREQUENCY RANGE

Standard Broadcast (A).................. 540-1,560 kc

Short-Wave (C).......................... 5.8-18 mc

Intermediate Frequency.................. 455 kc

POWER SUPPLY RATING

Rating A.............. 105-125 volts, 60 cycle, 105 watts

POWER OUTPUT

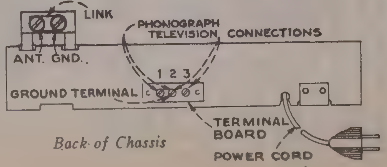
Undistorted................................ 5 watts

Maximum.................................... 6 watts

LOUDSPEAKER (RL-70K4)......... 12-inch electrodynamic

V.C. Impedance.................. 2.2 ohms at 400 cycles

FOR OTHER DATA, SEE INDEX



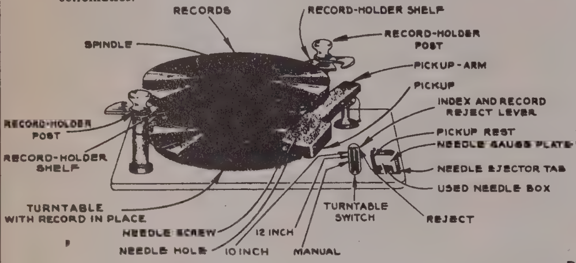
Back of Chassis

Alignment Procedure

Before proceeding with alignment the following lead dress should be carefully checked.

1. Dress AC switch leads away from 6SQ7 tube socket.
2. Do not twist loop leads together or around each other. Spacing between leads from "C" band loop to chassis is important—see alignment step "5" below.
3. "High side" leads from loop sockets, range switch, oscillator coil, and trimmers must be dressed away from chassis and each other.
4. Dress the two 100 mmf. condensers going to the grid and osc. grid of the 6SA7 tube away from each other.
5. Dress the .01 mfd. 6F6-G grid condenser away from power switch.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis schematics.



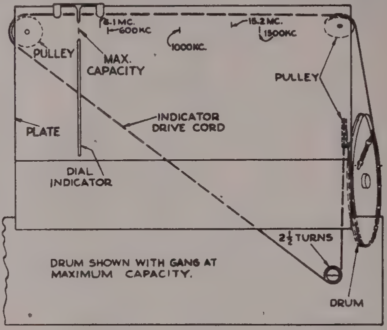
Top View of Automatic Record Changer

Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Marks. — The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore, calibration marks have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.



Dial-Indicator and Drive Mechanism

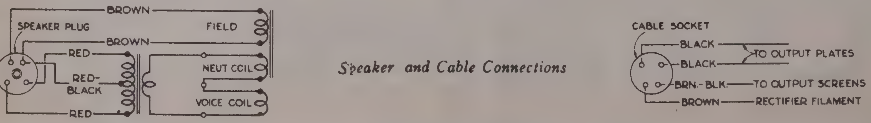
Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing.

Steps	Connect test-osc. output to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid through 0.1 mfd. capacitor and ground	455 kc	"C" band Quiet point	L-3 and L-4 (2nd I-F trans.)
2	1st det. grid through 0.1 mfd. capacitor and ground			L-1 and L-2 (1st I-F trans.)
3		15.2 mc	15.2 mc	C-1 oscillator*
4	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	15.2 mc	Rock at 15.2 mc	C-2 antenna† while rocking
5		6.1 mc	6.1 mc	Spacing between leads from "C" band loop to chassis
6		15.2 mc	Rock at 15.2 mc	C-2 antenna† while rocking
7		1,500 kc	1,500 kc	C-4 antenna C-3 oscillator
8		600 kc	Rock at 600 kc	L-5 oscillator while rocking
9		1,500 kc	1,500 kc	C-4 antenna C-3 oscillator

When making adjustments 4 to 9 inclusive the chassis must be in the cabinet, both loops connected, and all leads in their normal positions. When mounting chassis in cabinet if calibration marks on dial plate do not line up with dial scale mounted on cabinet move pointer to agree with dial scale on cabinet.

* Oscillator should track on high frequency side of signal. If two peaks are obtained use high frequency (minimum capacity) peak.

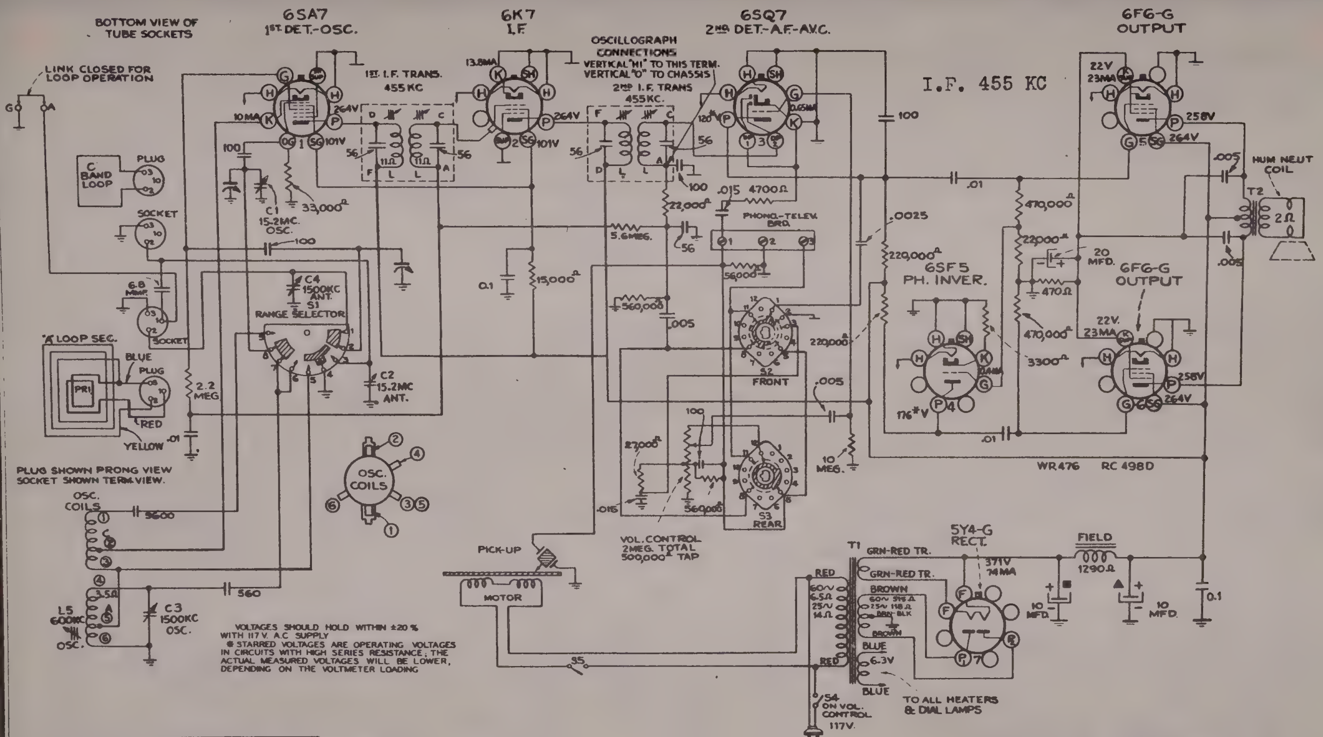
† If two peaks can be obtained use low frequency (maximum capacity) peak.



Speaker and Cable Connections

WESTINGHOUSE ELEC. SUPPLY CO. INC.

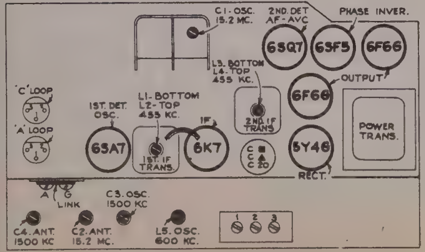
MODEL WR-476



VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

I.F. 455 KC

FOR OTHER DATA, SEE INDEX

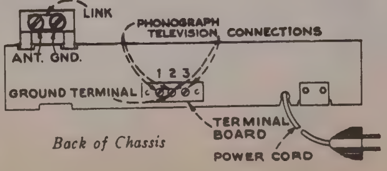


Tube and Trimmer Locations

Frequency Range
Standard Broadcast (A) .... 540-1,560 kc
Short-Wave (C) .... 5.8-18 mc
Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 5 watts
Maximum .... 6 watts

Loudspeaker (RL-70K1) .... 12-inch electrodynamic
V.C. Impedance .... 2.2 ohms at 400 cycles

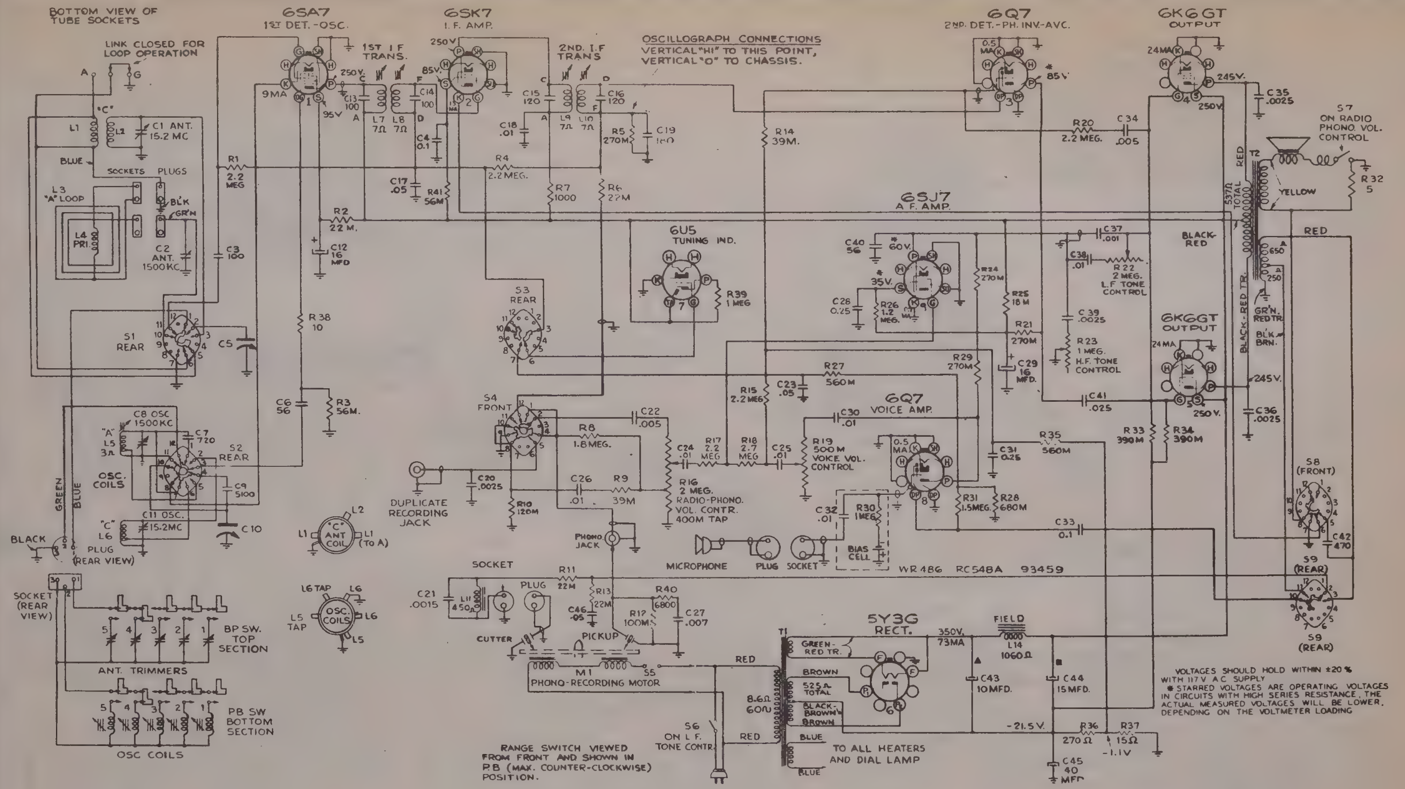


Back of Chassis

©John F. Rider, Publisher

MODEL WR-486

WESTINGHOUSE ELEC. SUPPLY CO. INC.



VOLTAGES SHOULD HOLD WITHIN ±20%
WITH 117V AC SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

FREQUENCY RANGES

Broadcast "A" Band	540-1,600 kc
Short Wave "C" Band	5,800-18,000 kc

INTERMEDIATE FREQUENCY	455 kc

LOUDSPEAKER (RL-70M-6)

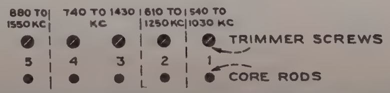
Type	12-inch Electrodynamic
V-C Impedance	2.2 ohms at 400 cycles

POWER OUTPUT

Undistorted	5 watts
Maximum	5.5 watts

POWER SUPPLY RATING

105-125 volts, 60 cycles	140 watts



-1940-

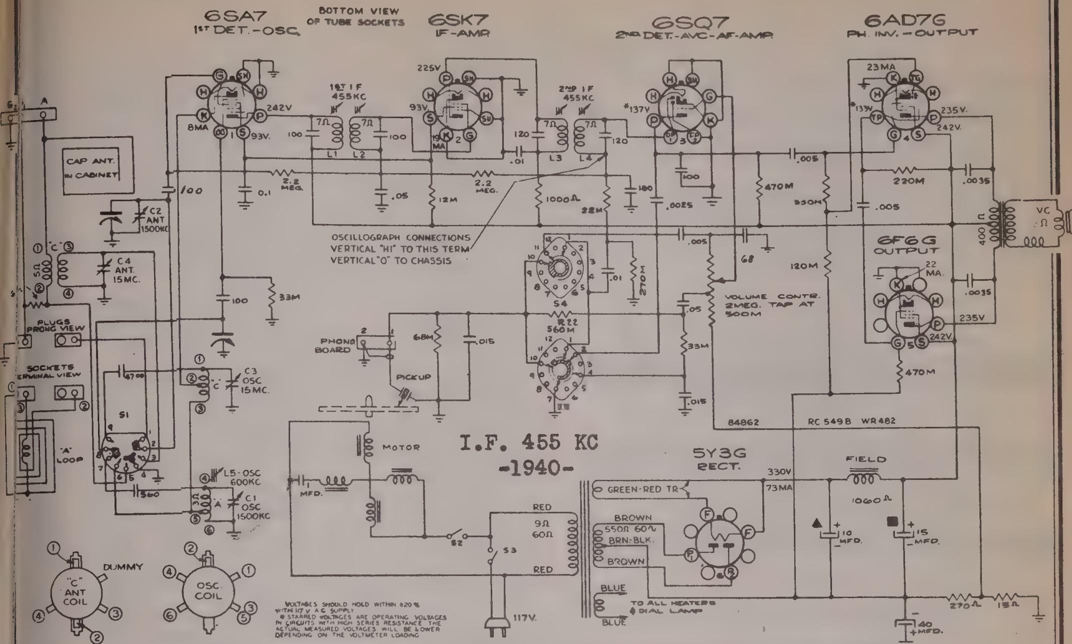
FOR OTHER DATA

SEE INDEX

©John F. Rider, Publisher

WESTINGHOUSE ELEC. SUPPLY CO. INC.

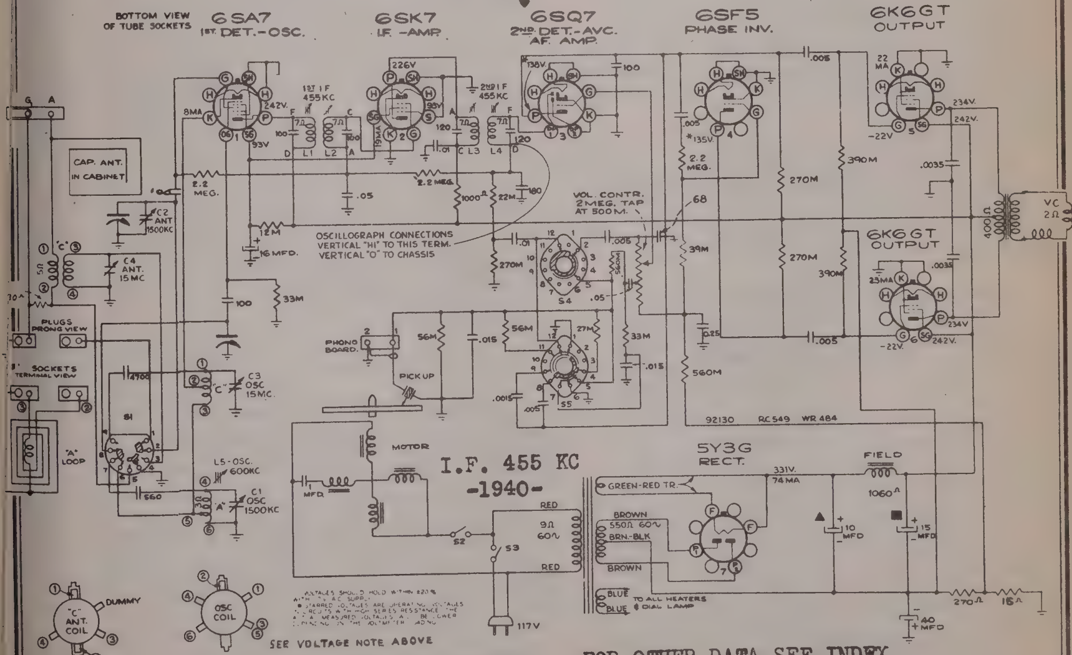
MODEL WR-482
MODEL WR-484



VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V A C SUPPLY
● STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE THE ACTUAL MEASURED VOLTAGES WILL BE LOWER DEPENDING ON THE VOLTMETER LOADING

POWER CONSUMPTION 110 WATTS FOR OTHER DATA SEE INDEX

Schematic Circuit Diagram—Model WR-482



SEE VOLTAGE NOTE ABOVE

POWER CONSUMPTION 110 WATTS FOR OTHER DATA SEE INDEX

Schematic Circuit Diagram—Model WR-484

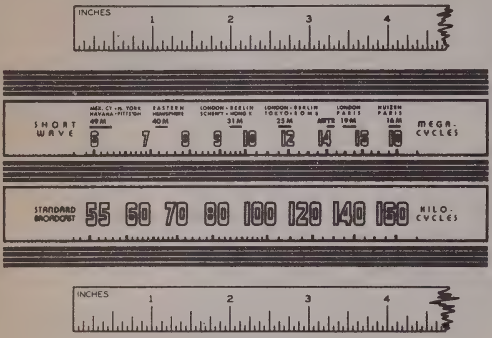
Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.



Calibration Scale

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

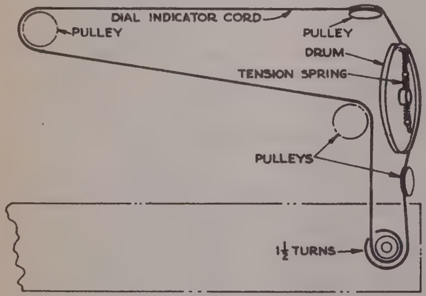
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at top and bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale.



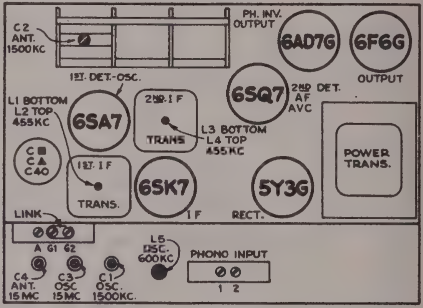
Dial Indicator and Drive Mechanism

Dial-Pointer adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

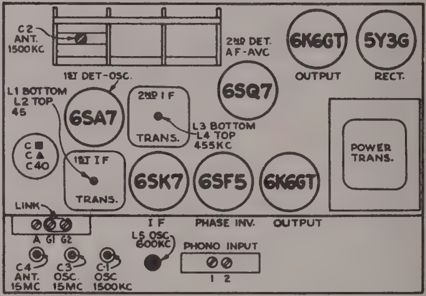
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 grid in series with .01 mfd.	455 kc	"A" band Quiet point between 550-750 kc	L3 and L4 (2nd I-F trans.)
2	6SA7 grid in series with .01 mfd.			L1 and L2 (1st I-F trans.)
3	Ant. terminal (open link) in series with 200 mmfd.	1,500 kc	1,500 kc "A" band	C1 (osc.) C2 (ant.)
4		600 kc	600 kc "A" band	L5 (osc.) Rock gang
5	Ant. terminal (open link) in series with 47 mmfd.	15 mc	15 mc "C" band	C3 (osc.)* C4 (ant.) Rock gang

* Use minimum capacity peak if two peaks can be obtained.
The oscillator tracks above the signal frequency on all bands.

Note: C2 omitted on some production—adjust grid lead (6SA7) for resonance.



Tube and Trimmer Locations—Model WR-482



Tube and Trimmer Locations—Model WR-484

Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button screw with a small screwdriver.

2. Set the radio-phono switch to "radio" position and the range switch to "Broadcast" position, now accurately tune in the station for which the first button is to be set.

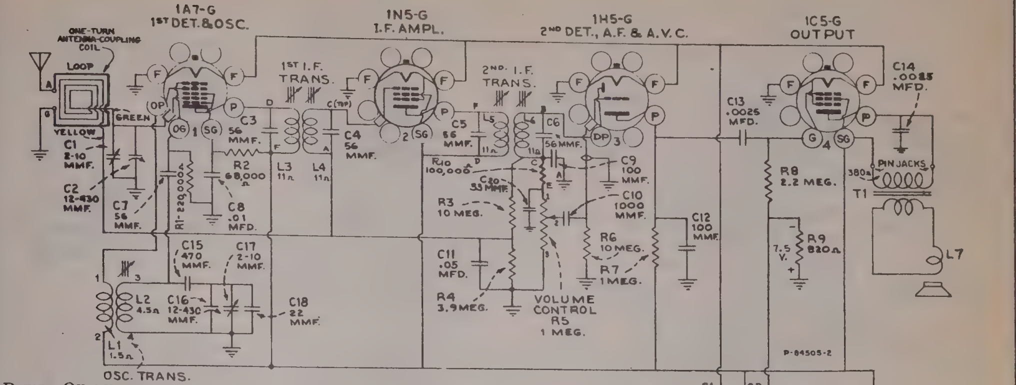
3. Press in push-button rod No. 1 as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the screw. Do not tighten more than ¼ turn after the screw begins to grip or damage to the mechanism may result.

4. Replace the push-button on its shaft.

5. Proceed in a similar manner for the remainder of the push-buttons.

6. Moisten and insert the station marker tabs in the recesses in the push-buttons.

WESTINGHOUSE ELEC. SUPPLY CO. INC. MODEL WR-674



POWER OUTPUT

Undistorted.. 0.10 watt
Maximum.. 0.21 watt

LOUDSPEAKER

Type...................... 5-inch permanent-magnet dynamic
Voice-coil Impedance.................... 2.2 ohms at 400 cycles

BATTERIES REQUIRED

"A," one 1.5 volt dry plug-type "A," 2½-in. x 2½-in. x 4-in. (Eveready No. 742 or equivalent)

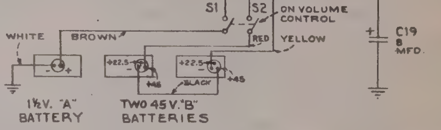
"B," two 45 volt dry plug-type "B," 2½-in. x 4-in. x 5¼-in. (Eveready No. 732 or equivalent)

CURRENT CONSUMPTION

"A" 0.24 ampere—"B," 9.0 milliamperes

Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages.

Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.



Frequency Range.............................. 540-1,560 kc
Intermediate Frequency.............................. 455 kc

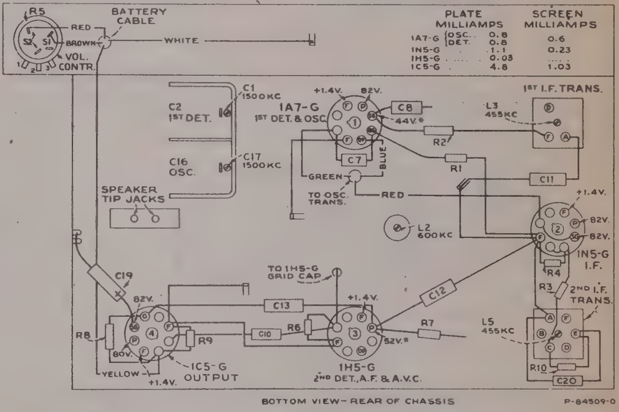
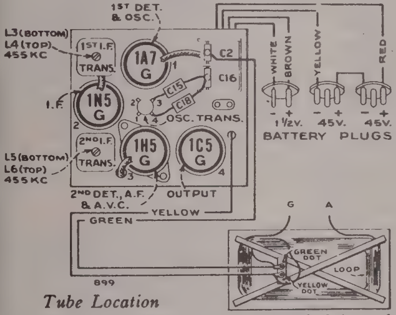


		PLATE MILLIAMPS	SCREEN MILLIAMPS
1A7-G	OSC.	0.8	0.6
	DET.	0.8	
1N5-G		1.1	0.23
1H5-G		0.03	....
1C5-G		4.8	1.03

R-F Wiring Diagram and Socket Voltages



Tube Location

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Precautionary Lead Dress.—

1. Dress speaker leads down to chassis.
2. The green lead from the loop to the antenna section of the gang should be dressed between the output and detector tube shields and pulled toward the far corner of the loop by means of the rubber band.
3. The spiral shield on the 1st-A.F. grid lead should be brought as close as possible to the grid cap.
4. Leads to the high side and tap of the volume control should be dressed down to the chassis and away from the output tube plate lead.

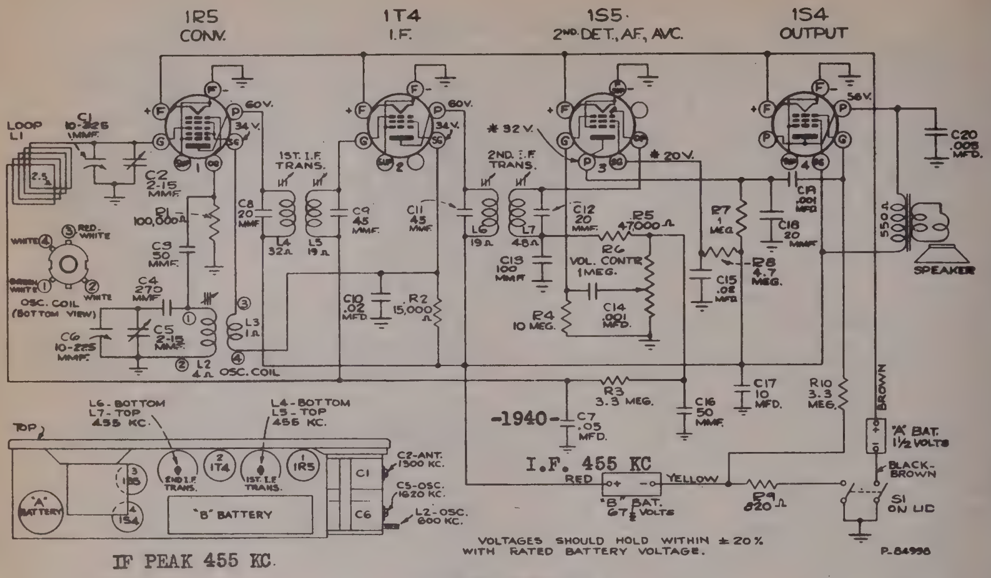
Antenna.—An antenna and ground may be connected to "A" and "G" at bottom of cabinet. If total length of antenna and lead-in is more than 150 feet, connect a 300 mmf capacitor in series with lead-in.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1N5-G grid cap, in series with .001 mfd.	455 kc	Quiet point between 550-750 kc	L5 and L6 (2nd I-F transformer)
2	1A7-G grid cap, in series with .001 mfd.	455 kc		L3 and L4 (1st I-F transformer)
3	Assemble chassis and batteries in correct position in cabinet, and fasten rear cover (loop) in place while making the following adjustments, which are accessible through holes in the bottom of the cabinet.			
4	Antenna terminal, in series with 200 mfd. Connect low side of test-osc. to "G" term.	1500 kc	1500 kc*	C17 (osc.) C1 (ant.)
5		600 kc	600 kc*	L2 (osc.) Rock in
6	Repeat steps 4 and 5.			

* Use bottom of "1" in "1500" for 1500 kc calibration point, and use center of the last "0" in "600" for 600 kc calibration point.

MODELS WR-682, WR-682A

WESTINGHOUSE ELEC. SUPPLY CO.INC.

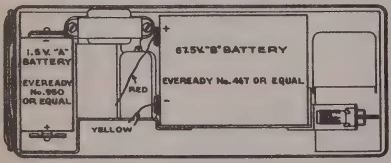


Schematic Circuit Diagram

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.



Back View—Cover removed

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (ant.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	L7, L6, L5, L4 (2nd and 1st I-F transformers)
2	Radiated signal 1,620 kc	1,620 kc	Full clockwise (out of mesh)	C5 (oscillator)
3	Radiated signal 1,300 kc	1,300 kc	1,300 kc signal	C2 (antenna)
4	Radiated signal 600 kc	600 kc	600 kc	L2 (osc.)
5	Repeat steps 2, 3 and 4.			

Replacing Lid or Front Panel:

When the molded lid (which contains the loop antenna), or the chrome front panel requires replacement, it is not necessary to replace the complete assembly of lid and front panel, as either one may be replaced separately in a few minutes by taking out the hinge pins as described below.

The following parts are available for this purpose:

PART No.	
37806	Lid and antenna (type without lid support)
37812	Chrome front panel (type without lid support)
37809	Lid and antenna (type with lid support)
37813	Front chrome panel, (type with lid support)
37857	Two hinge pins and two hinge springs

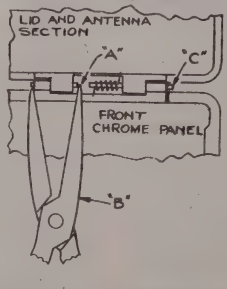
Installation Instructions:

First remove the three self-tapping screws that hold the chassis in the center case, and remove the case. Unsolder the leads from the loop lugs.

(a) With lid closed, cut hinge pins at point "A" with sharp cutters.

(b) Start removal of pin sections as shown, using long-nose pliers.

(c) Grasp end of pin section with long-nose pliers and pull out of hinge.



Replacing Lid or Chrome Panel

(d) Install new lid, or new front panel, using the replacement hinge pins and springs that are provided with replacement lids and panels. Arrange springs as shown. Apply a small amount of "Thermoplastic Cement" (G.E. ZV 5057) near outer end of each pin to insure tight and permanent fit.

Loose Control Knobs:

If for any reason either the tuning or volume control knob should become loose on its shaft, it may be rigidly mounted in the following manner:

(a) Remove the loose control knob from its shaft and scrape off the old cement from both shaft and control knob.

(b) Apply a generous even coating of a good cement to the shaft region which is to engage the knob. G.E. Thermoplastic cement, ZV-5057, is excellent for this purpose; it is a green fluid, easily thinned with acetone if necessary.

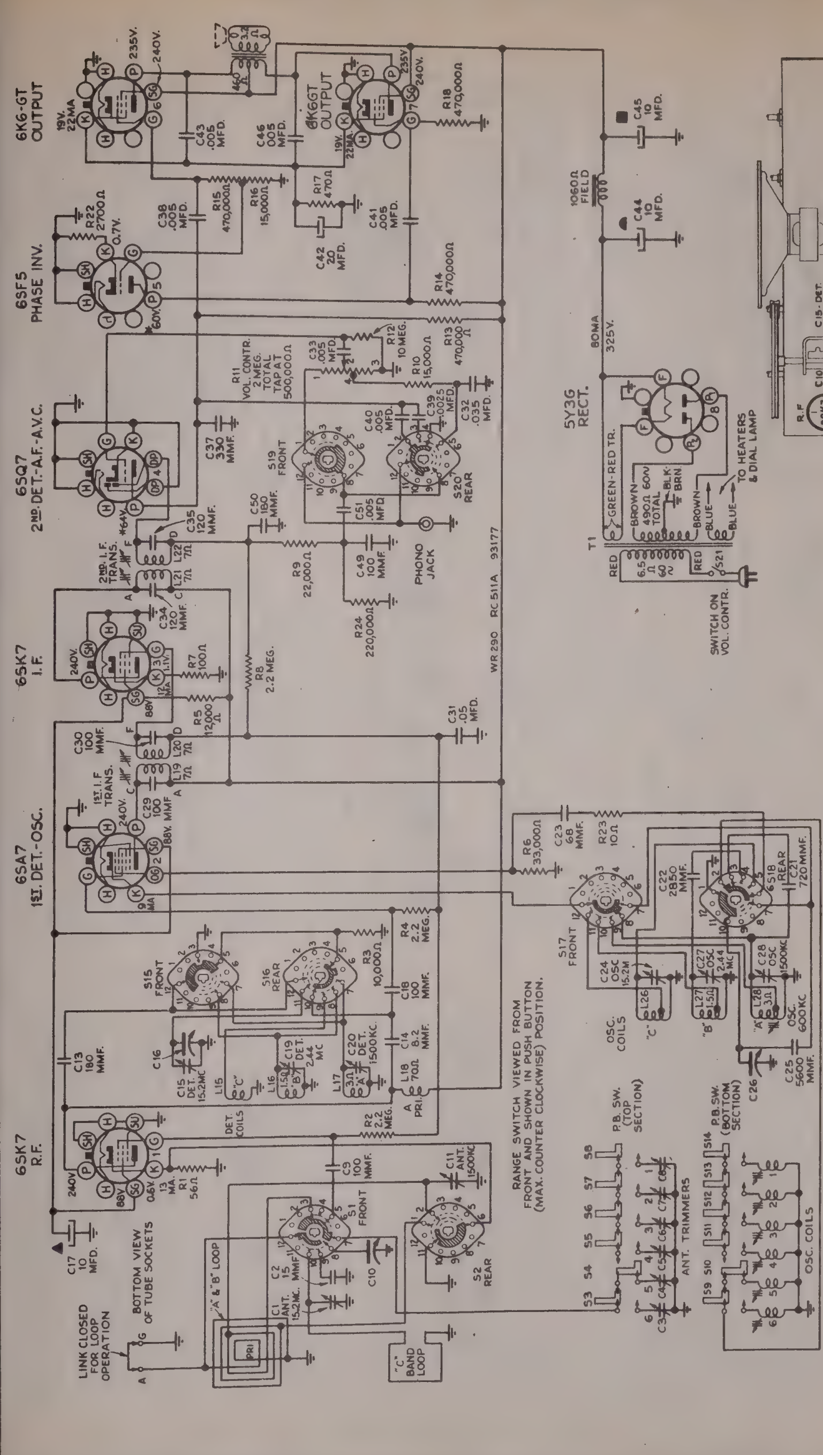
(c) Allow the cement on the shaft to air-dry, to evaporate any acetone present.

(d) Apply a small amount of heat to the shaft, sufficient to soften the cement.

(e) Mount knob on shaft while cement is still soft, and allow a few minutes for drying.

WESTINGHOUSE ELEC. SUPPLY CO. INC.

MODEL WR-290



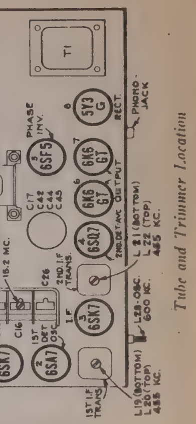
VOICE COIL IMPEDANCE 3.4 OHMS

POWER CONSUMPTION 90 WATTS

I.F. 455 KC

FOR OTHER DATA SEE INDEX

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY.
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING.



Tube and Trimmer Location

MODEL WR-290

WESTINGHOUSE ELEC. SUPPLY CO. INC.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration for Alignment.—The proper dial calibration for alignment purposes can be set up in two ways:

1. The dial may be removed from the cabinet by sliding out the two spring pieces which clamp it in its mounting position. The condenser plates should then be turned into full mesh, the pointer adjusted to the scratch at the left end of the dial backing plate, and the dial slipped under the pointer so that its extreme left calibration mark coincides with the pointer. The dial may be held in place with scotch tape. In this manner the actual receiver dial is used for alignment. When alignment is finished, the scale should be replaced including the fibre light shields which are folded under the ends of the glass scale.
2. A calibration scale is attached to the tuning drum. The correct setting of the gang, in degrees, for each alignment frequency is given in the alignment table. Check the position of the drum, making sure that the 0 degree scale mark is horizontal with the gang in full mesh.

Pointer for Calibration Scale.—If method (2) is used, improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the 0 degree mark on the calibration scale when the plates are fully meshed.

* Use minimum capacity peak if two can be obtained. Check to determine that C-24 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

Note.—Oscillator tracks **above** signal on all bands

To reduce sensitivity during RF Alignment connect a 15,000 ohm, ½ watt resistor across secondary of 1st IF transformer.

Push Button Adjustment

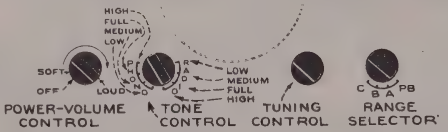
The push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments.

In the event that the receiver is to be used with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across "A" and "G" terminals on back of set. In either case the procedure is as follows:

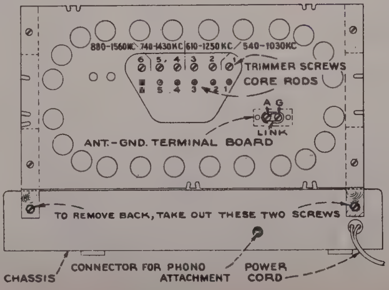
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer for maximum output on this station.
   Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particular station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores.
   Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
5. Adjust for each of the remaining stations in the same manner.
6. After all stations are tuned-in on the buttons, make a final careful adjustment of all core rods until best reception is obtained for each. Outdoor antenna should not be reconnected if used.

Alignment Procedure

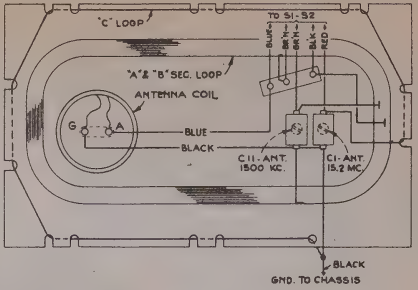
Steps	Connect high side of test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	6SK7 I-F grid in series with 0.01 mfd.	455 kc	"A" band Quiet Point between 550 and 750 kc	L-21 and L-22 (2nd I-F Trans.)
2	6SA7 grid in series with 0.01 mfd.			L-19 and L-20 (1st I-F Trans.)
3	Antenna terminal in series with 300 ohms ("A" antenna trimmer C-11, should be ½ turn out)	15.2 mc	15.2 mc (149°) "C" band	C-24 (Osc.)* C-15 (Det.) Rock gang C-1 (R-F) Rock gang
4	Antenna terminal in series with 200 mmf.	2.44 mc	2.44 mc (91.5°) "B" band	C-27 (Osc.) C-19 (Det.)
5	Antenna terminal in series with 200 mmf. (Preset "A" osc. trimmer C-28 ½ turn out)	600 kc	600 kc (30.5°) "A" band	L-28 Rock gang
6	Antenna terminal in series with 200 mmf.	1,500 kc	1,500 kc (160°) "A" band	C-28 (Osc.) C-20 (Det.) C-11 (R-F)
7	Repeat step 5, then 6			
8	Antenna terminal in series with 300 ohms	15.2 mc	15.2 mc (149°) "C" band	C-1 (R-F) Rock gang



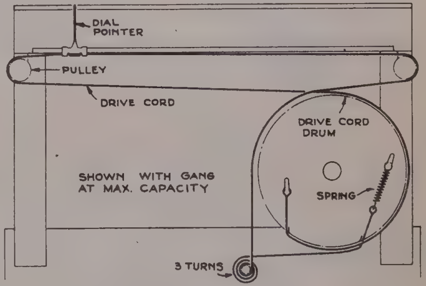
Location of Controls



Back of Chassis



Loop Connections and Trimmers



Dial-Indicator and Drive Mechanism

FREQUENCY RANGES

Broadcast	540-1,600 kc
Medium Wave	1.56-4.0 mc
Short Wave	5.8-18.0 mc

INTERMEDIATE FREQUENCY	455 kc

POWER OUTPUT RATING

Undistorted	5.0 watts
Maximum	5.5 watts

LOUDSPEAKER (RL-79-A5)

Type	6-inch Electrodynamic
V.C. Impedance	3.4 ohms at 400 cycles

POWER SUPPLY RATINGS

105-125 volts, 50-60 cycles, 90 watts
105-125 volts, 25-60 cycles, 90 watts

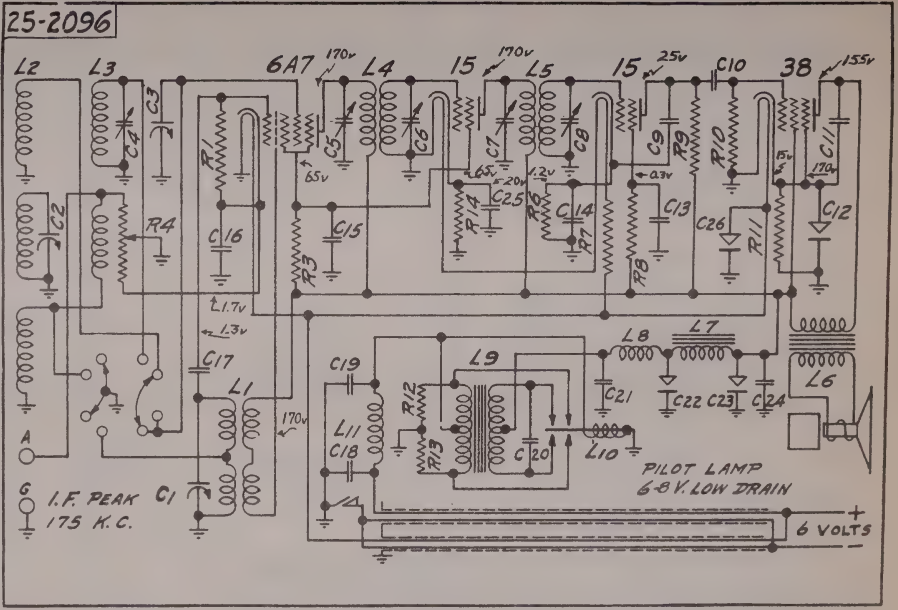
VOLTAGES MEASURED WITH A
1000 ohms-per-volt METER

B+ VOLTAGE 170   BATTERY 6.2 volts

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R3	53-898	50,000 Ohm Osc. & I.F. Screen Resistor
R4	19-1296	10,000 Ohm Volume Control & Off-On Switch
R6	53-898	50,000 Ohm Second Det. Cathode Resistor
R7	53-2012	9.09 Ohm I.F. & Second Det. Filament Res.
R8	53-2008	10 Meg Ohm Second Detector Screen Resistor
R9	53-926	1 Meg Ohm Second Detector Plate Resistor
R10	53-925	500,000 Ohm Output Grid Resistor
R11	53-1065	1,000 Ohm Output Cathode Resistor
R12	53-1061	150 Ohm B Primary Regulator Resistor
R13	53-1061	150 Ohm B Primary Regulator Resistor
R14	53-1063	500 Ohm I.F. Cathode Resistor

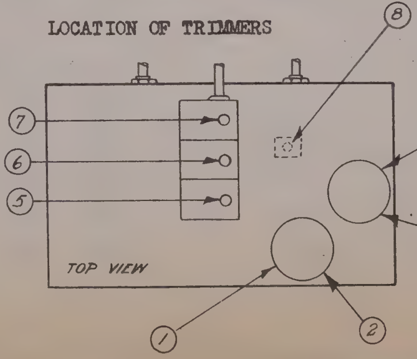
		CONDENSERS
C1	77-833	16-328 MMFD. Osc. Section of 3 Gang Cond.
C2	77-833	16-366 MMFD. Pres. Section of 3 Gang Cond.
C3	77-833	16-366 MMFD. Pres. Section of 3 Gang Cond.
C4	78-2010	3-30 MMFD. Police Band Pres. Trimmer Cond.
C5	78-2011	First I.F. Primary Trimmer Condenser
C6	78-2008	First I.F. Secondary Trimmer Condenser
C7	78-2011	Second I.F. Primary Trimmer Condenser
C8	78-2008	Second I.F. Secondary Trimmer Condenser
C9	76-265	.001 Mfd. Mica Second Det. Plate Filter Cond.
C10	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C11	75-2001	.002 Mfd. 600 V. Paper Output Plate Filter Cond.
C12	18-928	25 Mfd. 25 V. Dry Electrolytic Output Cathode Cond.
C13	75-2005	.1 Mfd. 200 V. Paper Second Det. Screen By-Pass
C14	75-2005	.1 Mfd. 200 V. Paper Second Det. Cathode By-Pass
C15	75-2005	.1 Mfd. 200 V. Paper Osc. & I.F. Screen By-Pass
C16	75-2005	.1 Mfd. 200 V. Paper Osc. Cathode By-Pass
C17	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C18	75-2011	.5 Mfd. 200 V. Paper B Unit Supply Filter Cond.
C19	75-2011	.5 Mfd. 200 V. Paper B Unit Supply Filter Cond.
C20	75-1325	.015 Mfd. 1000 V. Oil B Secondary Wave Form Cond.
C21	75-2007	.1 Mfd. 400 V. Paper B Supply Filter Condenser
C22	18-2006	16 Mfd. 250 W.V. Wet Electrolytic B Filter Cond.
C23	18-2006	16 Mfd. 250 W.V. Wet Electrolytic B Filter Cond.
C24	75-2013	1. Mfd. 400 V. Paper B Supply By-Pass Condenser
C25	75-2005	.1 Mfd. 200 V. I.F. Cathode By-Pass Condenser
C26	18-928	25 Mfd. 25 W.V. Dry Electrolytic Condenser

		INDUCTANCES
L1	17-2101	Oscillator Coil Assembly
L2	17-2109	Broadcast Preselector Coil Assembly
L3	17-2103	Police Band Preselector Coil Assembly
L4	68-2031	First I.F. Transformer Assembly
L5	68-2031	Second I.F. Transformer Assembly
L6	64-2037	Permanent Magnet Dynamic Speaker With Output Transformer for #38 Tube
L7	14-940	20 Henry B Filter Choke
L8	17-2114	5500 Microhenry R.F. Choke
L9	80-2020	B Supply Transformer Assembly
L10	72-2001	Replaceable Plug-In Synchronous Vibrator
L11	17-1434	B Unit Supply Filter Choke



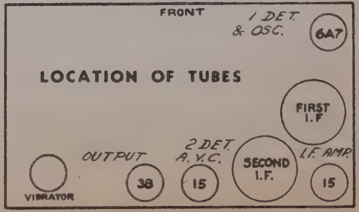
FOR ALIGNMENT, SEE INDEX

LOCATION OF TRIMMERS



CHASSIS
MODEL
6J4

FOR USE ONLY WITH
6 VOLTS D.C.
PILOT LIGHTS 6-8 V. -.15 A.
I. F. PEAK 175 K. C.



©John F. Rider, Publisher

MODELS 6J4,6M6,6P4,
6S12,7C6,7CB6,7D6

WILCOX-GAY CORP.

ALIGNMENT MODEL 6J4

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT[1] SIGNAL
Remove Grid Clip from 6A7					
Control Grid of 6A7	175 K.C.	1400 K.C.	Broadcast (Left)	1	Max.
" " "	" "	" "	" "	2	Max.
" " "	" "	" "	" "	3	Max.
" " "	" "	" "	" "	4	Max.
Connect Grid Clip to 6A7					
*Ant. & Ground Posts	1400 K.C.	1400 K.C.	" "	5	Max.
" " "	" "	" "	" "	6	Max.
" " "	" "	" "	" "	7	Max.
" " "	4.0 M.C.	4.0 M.C.	Police (Right)	8	Max.

Volume Control in "Full-On" position at all times.
(*) Connect a standard dummy antenna between signal generator and receiver.
Note 1: Signal across primary of output transformer to be maintained at approximately 10 volts by adjusting signal generator.

ALIGNMENT MODEL 6P4

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT[1] SIGNAL
Remove Grid Clip from 1C6					
Control Grid of 1C6	175 K.C.	1400 K.C.		1	Max.
" " "	" "	" "		2	Max.
" " "	" "	" "		3	Max.
" " "	" "	" "		4	Max.
" " "	1400 K.C.	" "		5	Max.
" " "	" "	" "		6	Max.
" " "	" "	" "		7	Max.
" " "	1000 K.C.	1000 K.C.		5[2]	Max.
" " "	" "	" "		6[2]	Max.
" " "	" "	" "		7[2]	Max.
" " "	600 K.C.	600 K.C.		5[2]	Max.
" " "	" "	" "		6[2]	Max.
" " "	" "	" "		7[2]	Max.

Volume Control in "Full-On" position at all times.
(*) Connect a standard dummy antenna between signal generator and ground.
Note 1: Signal across primary of the output transformer at no time to exceed 50 volts.
Note 2: Due to formed oscillator plates, set should track. If not, bend slotted plates at this point and recheck at 1400 K.C.

ALIGNMENT MODELS 7C6 - 7CB6 - 7D6

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT[1] SIGNAL
Remove Grid Clip from 6A7					
Control Grid of 6A7	175 K.C.	1400 K.C.	Broadcast (Left)	1	Max.
" " "	" "	" "	" "	2	Max.
" " "	" "	" "	" "	3	Max.
" " "	" "	" "	" "	4	Max.
Connect Grid Clip to 6A7					
*Ant. & Ground Posts	1400 K.C.	1400 K.C.	" "	5	Max.
" " "	" "	" "	" "	6	Max.
" " "	" "	" "	" "	7	Max.
" " "	600 K.C.	600 K.C.	" "	5[2]	Max.
" " "	" "	" "	" "	6[2]	Max.
" " "	" "	" "	" "	7[2]	Max.
" " "	4.0 M.C.	4.0 M.C.	Police (Center)	8	Max.
" " "	14.0 M.C.	14.0 M.C.	Foreign (Right)	9	Max.

Volume Control in "Full-On" position at all times.
(*) Connect a standard dummy antenna between signal generator and receiver.
Note 1: Signal across primary of output transformer to be maintained at approximately 25 volts by adjusting signal generator.
Note 2: Due to formed oscillator plates, set should track. If not, bend slotted plates at this point and recheck at 1400 K.C.

ALIGNMENT MODEL 6M6

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT[1] SIGNAL
Remove Grid Clip from 6A7					
Control Grid of 6A7	115 K.C.	214.3 Meters	Broadcast (Center)	1	Max.
" " "	" "	" "	" "	2	Max.
" " "	" "	" "	" "	3	Max.
" " "	" "	" "	" "	4[2]	Max.
Connect Grid Clip to 6A7					
*Ant. & Chassis (Wht.Lead)	1400 K.C.	" "	" "	5	Max.
" "	600 K.C.	500 "	" "	5[3]	Max.
" "	1400 "	214.3 "	" "	5	Max.
" "	" "	" "	" "	6	Max.
" "	" "	" "	" "	7	Max.
" "	15.0 M.C.	20 "	Foreign (Right)	8	Max.
" "	6.0 "	50 "	" "	8[4]	Max.
" "	353 K.C.	850 "	Long Wave (Left)	9	Max.
" "	150 "	2000 "	" " "	10	Max.
" "	353 "	850 "	" " "	9	Max.
" "	" "	" "	" " "	11	Max.
" "	" "	" "	" " "	12	Max.

Volume Control in "Full-On" position at all times.
(*) Connect a standard dummy antenna between signal generator and receiver.
Note 1: Signal across primary of the output transformer at no time to exceed 50 volts.
Note 2: Repeat above procedure and critically trim each adjustment to absolute resonance to insure perfect alignment.
Note 3: Check ganging and if necessary bend plates and recheck at 1400 K.C.
Note 4: Check ganging at this point.

ALIGNMENT MODEL 6S12

SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	OUTPUT SIGNAL
Remove Grid Clip from 6A8					
Control Grid of 6A8	456 K.C.	1400 K.C.	Broadcast (Right)	1[1]	Max.
" " "	" "	" "	" "	2	Max.
" " "	" "	" "	" "	3	Max.
" " "	" "	" "	" "	4	Max.
" " "	" "	" "	" "	5	Max.
" " "	" "	" "	" "	6[2]	Max.
Connect Grid Clip to 6A8					
*Ant. & Ground Posts	1400 K.C.	1400 K.C.	" "	7	Max.
" " "	" "	" "	" "	8	Max.
" " "	" "	" "	" "	9	Max.
" " "	600 K.C.	600 K.C.	" "	10	Max.
" " "	1400 K.C.	1400 K.C.	" "	7[3]	Max.
" " "	1000 K.C.	1000 K.C.	" "	7[4]	Max.
" " "	" "	" "	" "	8[4]	Max.
" " "	" "	" "	" "	9[4]	Max.
" " "	4.0 M.C.	4.0 M.C.	Police (Center)	11	Max.
" " "	" "	" "	" "	12	Max.
" " "	" "	" "	" "	13	Max.
" " "	1700 K.C.	1700 K.C.	" "	14	Max.
" " "	4.0 M.C.	4.0 M.C.	" "	11	Max.
" " "	14.0 M.C.	14.0 M.C.	Foreign (Left)	15	Max.
" " "	" "	" "	" "	16	Max.
" " "	456 K.C.	1400 K.C.	Broadcast (Right)	17	Min.

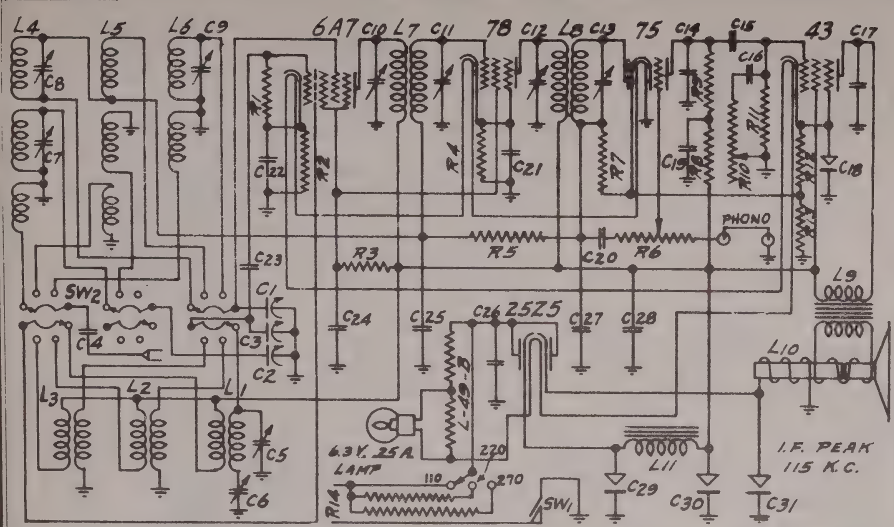
Volume Control in "Full-On" position at all times.
(*) Connect a standard dummy antenna between signal generator and receiver.
Note 1: Tone control must be turned partially toward its bass position, or off the high fidelity position.
Note 2: Repeat above procedure and critically trim each adjustment to absolute resonance to insure perfect alignment. The I.F. sensitivity should be from 2 to 4 microvolts.
Note 3: Repeat above procedure and critically trim each adjustment to absolute resonance.
Note 4: Investigate scale tracking and sensitivity at this point and bend slotted rotor plates if necessary.

WILCOX-GAY CORP.

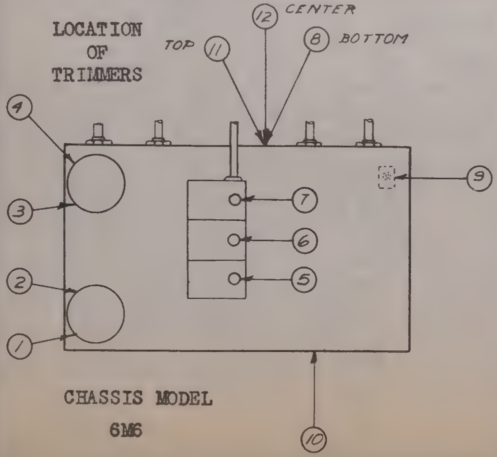
MODEL 6M6

25-2084

FOR ALIGNMENT, SEE INDEX

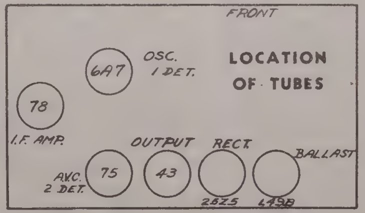


LOCATION OF TRIMMERS



CHASSIS MODEL

6M6



VOLTAGE TABLE

TUBE	PL.	SC.	K	2 PL.	2 GR.
6A7	125	55	1.3	125	- 2.7
78	125	55	2.2		
75	42		1.5		
43	115	125	20		

B+ VOLTAGE ———— 125

SPEAKER FIELD VOLTAGE ———— 125

LINE VOLTAGE WAS 220 V. 60 CYCLE

METER 1000 OHMS - PER-VOLT

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1315	500,000 Ohm Volume Control
R7	53-925	500,000 Ohm Diode Resistor
R8	53-898	50,000 Ohm 75 Plate Hum Resistor
R9	53-924	250,000 Ohm 75 Plate Resistor
R10	19-1317	250,000 Ohm Tone Control
R11	53-925	500,000 Ohm 43 Grid Resistor
R12	53-1062	500 Ohm 43 Cathode Resistor
R13	53-1122	40 Ohm 75 Cathode Resistor
R14	20-2004	Line Power Cord Assembly

CONDENSERS

C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	75-2003	.01 Mfd. 400 V. Paper Antenna Series Cond.
C5	78-2010	3-30 MMFD. Long Wave Osc. Parallel Trimmer
C6	78-2006	Long Wave Oscillator Series Trimmer
C7	78-1588	3-30 MMFD. Long Wave Preselector Trimmer
C8	78-1588	3-30 MMFD. Long Wave Preselector Trimmer
C9	78-1588	3-30 MMFD. Foreign Band Preselector Trimmer
C10	78-993	First I. F. Primary Trimmer
C11	78-1228	First I. F. Secondary Trimmer
C12	78-993	Second I. F. Primary Trimmer
C13	78-2015	Second I. F. Secondary Trimmer
C14	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C15	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C16	75-2003	.01 Mfd. 400 V. Paper Tone Control Cond.
C17	75-2002	.004 Mfd. 600 V. Paper 43 Plate Filter Cond.
C18	18-[illegible]8	25 Mfd. 25 V. Elect. 43 Cathode By-Pass Cond.
C19	75-2005	.1 Mfd. 200 V. Paper 75 Plate Hum Filter Cond.
C20	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C21	75-2005	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C22	75-2005	.1 Mfd. 200 V. Paper 6A7 Cathode By-Pass Cond.
C23	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C24	75-2005	.1 Mfd. 200 V. Paper 6A7 & 78 Screen By-Pass Cond.
C25	75-2005	.1 Mfd. 200 V. Paper A.V.C. By-Pass Condenser
C26	75-2005	.1 Mfd. 200 V. Paper Line By-Pass Condenser
C27	76-307	.0005 Mfd. Mica Diode Filter Condenser
C28	75-2011	.5 Mfd. 200 V. Paper B Supply By-Pass Condenser
C29	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Condenser
C30	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser
C31	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser

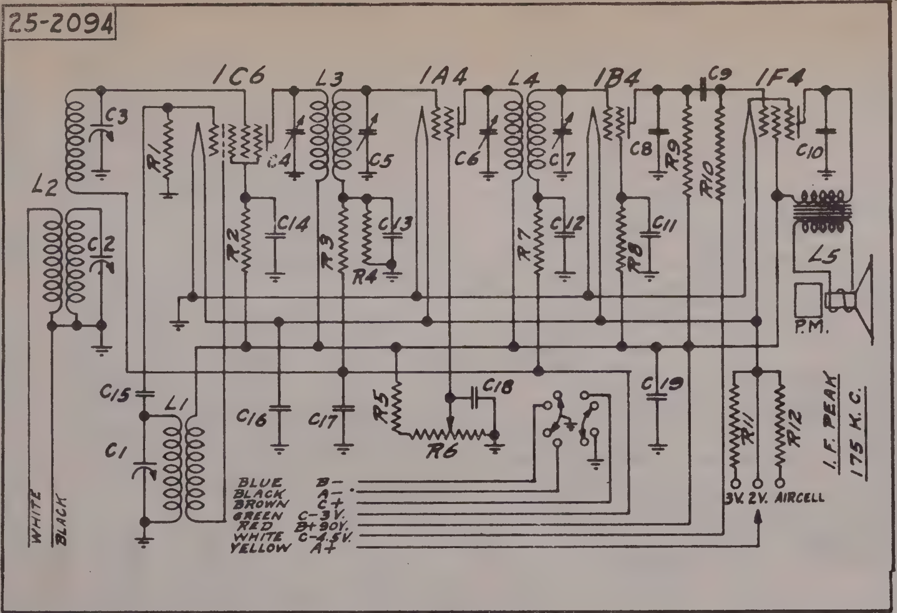
INDUCTANCES

L1	17-2013	Long Wave Oscillator Coil Assembly
L2	17-2013	Broadcast Oscillator Coil Assembly
L3	17-2095	Foreign Band Oscillator Coil Assembly
L4	17-2093	Long Wave Preselector Coil Assembly
L5	17-2093	Broadcast Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2022	First I. F. Transformer Assembly
L8	68-2029	Second I. F. Transformer Assembly
L9	64-1653	43 Output Transformer on L10
L10	64-1653	6½" Speaker 3000 Ohm Field
L11	14-940	20 Henry Filter Choke
SW1	66-2010	Line Power Switch
SW2	66-2009	Wave Band Change Switch

MODEL 6P4

WILCOX-GAY CORP.

25-2094



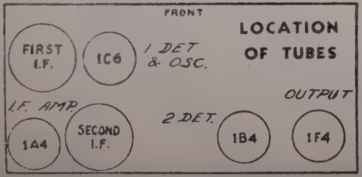
CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-920	10,000 Ohm 1C6 Screen Resistor
R3	53-923	100,000 Ohm 1A4 Grid Isolation Resistor
R4	53-898	50,000 Ohm 1A4 Grid Resistor
R5	53-1042	25,000 Ohm 1A4 Screen Resistor
R6	19-1315	500,000 Ohm Volume Control
R7	53-923	100,000 Ohm 1B4 Grid Isolation Resistor
R8	53-925	500,000 Ohm 1B4 Screen Resistor
R9	53-924	250,000 Ohm 1B4 Plate Resistor
R10	53-925	500,000 Ohm 1F4 Grid Resistor
R11	53-2010	2.5 Ohm Filament Series Resistor
R12	53-2009	1.0 Ohm Filament Series Resistor

		CONDENSERS
C1	77-833	Oscillator Section of 3 Gang Condenser
C2	77-833	First Preselector Section of 3 Gang Condenser
C3	77-833	Second Preselector Section of 3 Gang Condenser
C4	78-2008	First I.F. Primary Trimmer Condenser
C5	78-2011	First I.F. Secondary Trimmer Condenser
C6	78-2008	Second I.F. Primary Trimmer Condenser
C7	78-2011	Second I.F. Secondary Trimmer Condenser
C8	76-662	.002 Mfd. Mica Second Det. Plate Filter Cond.
C9	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C10	75-2001	.002 Mfd. 600 V. Paper Output Plate Filter Cond.
C11	75-2005	.1 Mfd. 200 V. Paper Second Detector Screen By-Pass
C12	75-2005	.1 Mfd. 200 V. Paper 1B4 Grid Isolation By-Pass
C13	75-2005	.1 Mfd. 200 V. Paper 1A4 Grid Isolation By-Pass
C14	75-2005	.1 Mfd. 200 V. Paper 1C6 Screen By-Pass Condenser
C15	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C16	75-2013	1. Mfd. 400 V. Paper Filament By-Pass Condenser
C17	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C18	75-2005	.1 Mfd. 200 V. Paper 1A4 Screen By-Pass Cond.
C19	75-2011	.5 Mfd. 200 V. Paper B* By-Pass Condenser

		INDUCTANCES
L1	17-2111	Oscillator Coil Assembly
L2	17-2100	Preselector Coil Assembly
L3	68-2012	First I.F. Transformer Assembly
L4	68-2030	Second I.F. Transformer Assembly
L5	64-2036	Permanent Magnet Dynamic Speaker - Output Trans. 1F4 Tube

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	GRID TO GROUND	2 PL. TO GROUND	2 GRID TO GROUND
1C6	1ST DET. & OSC.	90	60	- 3 V.	90	- 7
1A4	I.F. AMPLIFIER	90	NOTE	- .3		
1B4	2ND DETECTOR	30	25	- .3		
1F4	POWER OUTPUT	85	90			

NOTE FOR 1A4
SCREEN WITH VOLUME CONTROL OFF IS 0 VOLTS
SCREEN WITH VOLUME CONTROL ON IS 50 VOLTS



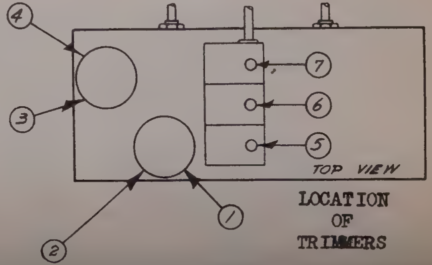
FOR USE ONLY WITH
"B" 90-135 V. D.C.
"A" 2-3 V. D.C.

I. F. PEAK 175 K. C.

CHASSIS MODEL
6P4

BLUE	B−
BLACK	A−
BROWN	C−
GREEN	C− 3 V.
RED	B+ 90 V.
YELLOW	A+ 2 V.
WHITE	C− 4.5 V.

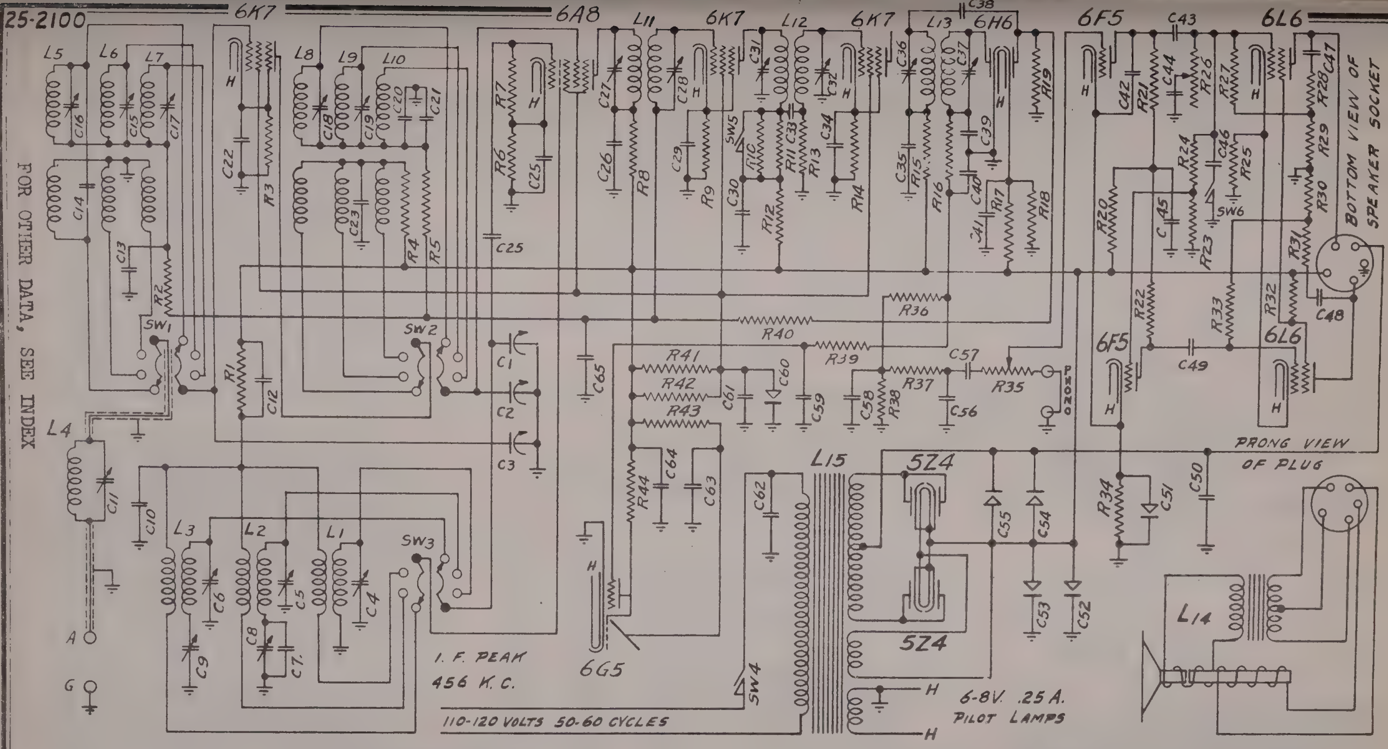
FOR ALIGNMENT, SEE INDEX



LOCATION
OF
TRIMMERS

WILCOX-GAY CORP.

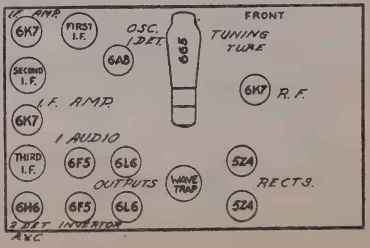
MODEL 6S12



FOR OTHER DATA, SEE INDEX

VOLTAGE TABLE

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND	2ND PLATE TO GROUND	2ND GRID TO GROUND
6K7	R.F. AMPLIFIER	265	90	3.4		
6A8	OSC. & 1ST DETECTOR	320	90	3.4	212	- 18
6K7	I.F. AMPLIFIER	260	90	3.4		
6K7	I.F. AMPLIFIER	265	90	3.0		
6H6	2ND DETECTOR & AVC			50 - AVC CATHODE		
6F5	1ST AUDIO AMPLIFIER	100		1.8		
6F5	INVERTER	100				
6L6	OUTPUT	390	275	18		
6L6	OUTPUT	390	275	18		
6G5	TUNING	20			TARGET 265	



PILOT LIGHTS 6-8 V.
I. F. PEAK 456 K. C.

FOR USE ONLY WITH
110-120 V . 50-60 CYCLE

MODEL 6S12

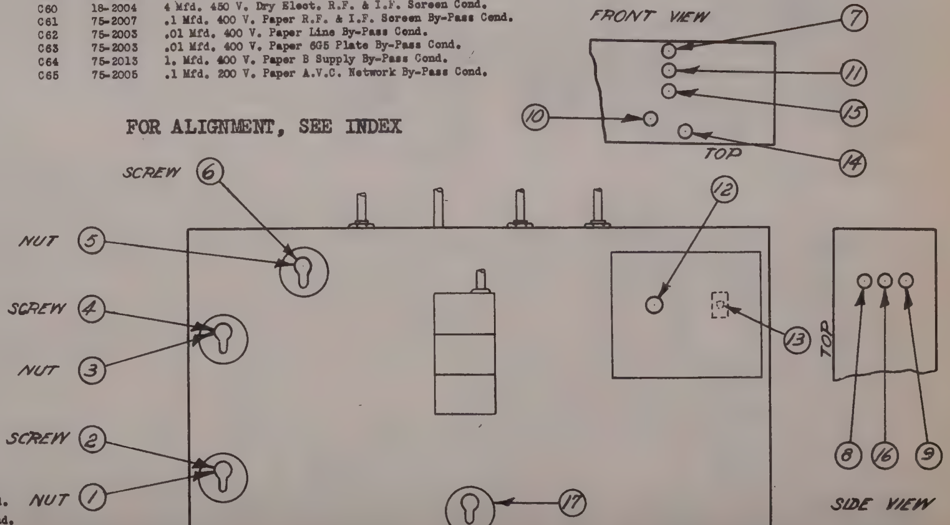
WILCOX-GAY CORP.

CODE	PART NO.	NAME
	RESISTOR	
R1	53-195	25,000 Ohm Type J Osc. Plate Resistor
R2	53-923	100,000 Ohm Type M A.V.C. Network Resistor
R3	53-1063	500 Ohm R.F. Amp. Cathode Resistor
R4	53-195	25,000 Ohm Type J R.F. Amp. Plate Resistor
R5	53-923	100,000 Ohm Type M A.V.C. Network Resistor
R6	53-1062	250 Ohm 6A8 Cathode Resistor
R7	53-941	20,000 Ohm Type M Osc. Grid Resistor
R8	53-195	25,000 Ohm Type J 6A8 Plate Isolation Resistor
R9	53-1063	500 Ohm First I.F. Cathode Resistor
R10	53-922	75,000 Ohm First I.F. Plate Isolation Resistor
R11	53-898	50,000 Ohm First I.F. Plate Isolation Resistor
R12	53-195	25,000 Ohm Type J First I.F. Plate Isolation Resistor
R13	53-919	5,000 Ohm Type M High Fidelity Coupling Resistor
R14	53-1063	500 Ohm Second I.F. Cathode Resistor
R15	53-195	25,000 Ohm Type J Second I.F. Plate Isolation Resistor
R16	53-898	50,000 Ohm Detector Diode Filter Resistor
R17	53-924	250,000 Ohm A.V.C. Cathode Resistor
R18	53-898	50,000 Ohm A.V.C. Cathode Resistor
R19	53-926	500,000 Ohm A.V.C. Diode Load Resistor
R20	53-923	100,000 Ohm 6F5's Plate Hum Resistor
R21	53-924	250,000 Ohm First Audio Plate Resistor
R22	53-924	250,000 Ohm Invertor Plate Resistor
R23	53-941	20,000 Ohm Invertor Grid Resistor
R24	53-926	1 Meg Ohm Invertor Network Resistor
R25	53-1061	150 Ohm 6L6's Cathode Resistor
R26	19-2004	250,000 Ohm Tone Control
R27	53-926	1 Meg Ohm 6L6 Grid Resistor
R28	53-925	500,000 Ohm Audio Degeneration Network Resistor
R29	53-921	40,000 Ohm Audio Degeneration Network Resistor
R30	53-921	40,000 Ohm Audio Degeneration Network Resistor
R31	53-925	500,000 Ohm Audio Degeneration Network Resistor
R32	53-278	20,000 Ohm Type J 6L6 Screen Resistor
R33	53-925	500,000 Ohm 6L6 Grid Resistor
R34	53-2003	2,000 Ohm 6F5's Cathode Resistor
R35	19-2005	500,000 Ohm Volume Control & Line Switch
R36	53-925	500,000 Ohm Detector Diode Load Resistor
R37	53-920	10,000 Ohm Audio Filter Network Resistor
R38	53-923	100,000 Ohm Detector Diode Load Resistor
R39	53-926	1 Meg Ohm 6G5 Grid Resistor
R40	53-925	500,000 Ohm A.V.C. Network Resistor
R41	53-922	75,000 Ohm R.F. & I.F. Screen Resistor
R42	53-922	75,000 Ohm R.F. & I.F. Screen Resistor
R43	53-923	100,000 Ohm 6G5 Plate Resistor
R44	53-926	1 Meg Ohm 6G5 Triode Plate Resistor
	CONDENSERS	
C1	77-1581	Oscillator Section of 3 Gang Condenser
C2	77-1581	Second Preselector Section of 3 Gang Cond.
C3	77-1581	First Preselector Section of 3 Gang Cond.
C4	78-1588	3-30 MMFD. Foreign Band Oscillator Trimmer
C5	78-1588	3-30 MMFD. Police Band Osc. Parallel Trimmer
C6	78-1588	3-30 MMFD. Broadcast Band Osc. Parallel Trimmer
C7	76-265	.001 Mfd. Mica Police Band Osc. Series Cond.
C8	78-1572	1600 MMFD. Police Band Osc. Series Trimmer
C9	78-1572	600 MMFD. Broadcast Oscillator Series Trimmer
C10	75-2003	.01 Mfd. 400 V. Paper Osc. Plate Isolation Cond.
C11	78-2016	Wave Trap Trimmer Condenser
C12	76-662	.002 Mfd. Mica Osc. Plate Filter Condenser
C13	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C14		Broadcast Antenna Coil Coupling Capacitor
C15	78-2010	3-30 MMFD. Police Band Antenna Trimmer Cond.
C16	78-1588	3-30 MMFD. Broadcast Antenna Trimmer Cond.
C17	78-1588	3-30 MMFD. Foreign Band Antenna Trimmer Cond.
C18	78-1588	3-30 MMFD. Broadcast R.F. Trimmer Condenser
C19	78-2010	3-30 MMFD. Police Band R.F. Trimmer Condenser
C20	76-662	.002 Mfd. Mica A.V.C. Network R.F. Filter Cond.
C21	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C22	75-2005	.1 Mfd. 200 V. Paper R.F. Amp. Cathode By-Pass Cond.
C23	75-2003	.01 Mfd. 400 V. Paper R.F. Amp. Plate Isolation Cond.
C24	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C25	75-2005	.1 Mfd. 200 V. Paper 6A8 Cathode Condenser
C26	75-2003	.01 Mfd. 400 V. Paper 6A8 Plate Isolation Cond.
C27	78-2016	50-150 MMFD. First I.F. Primary Trimmer Cond.
C28	78-2016	50-150 MMFD. First I.F. Secondary Trimmer Cond.
C29	75-2005	.1 Mfd. 200 V. Paper First I.F. Cathode By-Pass Cond.
C30	75-2003	.01 Mfd. 400 V. Paper First I.F. Plate Isolation Cond.

SCHEMATIC DIAGRAM CODE	PART NO. COND. (Cont.)	NAME
C31	78-2016	50-150 MMFD. Second I.F. Primary Trimmer Condenser
C32	78-2016	50-150 MMFD. Second I.F. Secondary Trimmer Cond.
C33	75-2003	.01 Mfd. 400 V. Paper High Fidelity Coupling Cond.
C34	75-2005	.1 Mfd. 200 V. Paper Cathode By-Pass Cond.
C35	75-2003	.01 Mfd. 400 V. Paper Plate Isolation Cond.
C36	78-2016	50-150 MMFD. Third I.F. Primary Trimmer Cond.
C37	78-2016	50-150 MMFD. Third I.F. Secondary Trimmer Cond.
C38	76-2001	.0001 Mfd. Mica A.V.C. Coupling Condenser
C39	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C40	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C41	75-2005	.1 Mfd. 200 V. Paper A.V.C. Cathode By-Pass Cond.
C42	76-307	.0005 Mfd. Mica First Audio Plate Filter Cond.
C43	75-2007	.1 Mfd. 400 V. Paper Audio Feed Condenser
C44	75-2003	.01 Mfd. 400 V. Paper Tone Control Cond.
C45	75-2012	.5 Mfd. 400 V. Paper 6F5's Plate Hum Filter Cond.
C46	76-662	.002 Mfd. Mica High Fidelity Condenser
C47	75-2007	.1 Mfd. 400 V. Paper Audio Degeneration Network Cond.
C48	75-2007	.1 Mfd. 400 V. Paper Audio Degeneration Network Cond.
C49	75-2007	.1 Mfd. 400 V. Paper Audio Feed Condenser
C50	75-2008	.2 Mfd. 200 V. Paper Field By-Pass Cond.
C51	18-928	25 Mfd. 25 V. Dry Electrolytic 6F5's Cathode
C52	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Cond.
C53	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Cond.
C54	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Cond.
C55	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Cond.
C56	76-268	.00025 Mfd. Mica Audio Filter Cond.
C57	75-2005	.1 Mfd. 200 V. Paper Audio Feed Cond.
C58	76-2001	.0001 Mfd. Mica Audio Filter Cond.
C59	75-2005	.1 Mfd. 200 V. Paper 6G5 Grid By-Pass Cond.
C60	18-2004	4 Mfd. 450 V. Dry Elect. R.F. & I.F. Screen Cond.
C61	75-2007	.1 Mfd. 400 V. Paper R.F. & I.F. Screen By-Pass Cond.
C62	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Cond.
C63	75-2003	.01 Mfd. 400 V. Paper 6G5 Plate By-Pass Cond.
C64	75-2013	1. Mfd. 400 V. Paper B Supply By-Pass Cond.
C65	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
	INDUCTANCES	
L1	17-2095	Foreign Band Oscillator Coil Assembly
L2	17-2119	Police Band Oscillator Coil Assembly
L3	17-2118	Broadcast Oscillator Coil Assembly
L4	37-2003	Wave Trap Assembly
L5	17-2123	Broadcast Antenna Coil Assembly
L6	17-2120	Police Band Antenna Coil Assembly
L7	17-2125	Foreign Band Antenna Coil Assembly
L8	17-2124	Broadcast R.F. Coil Assembly
L9	17-2121	Police Band R.F. Coil Assembly
L10	17-2126	Foreign Band R.F. Coil Assembly
L11	68-2033	First I.F. Transformer Assembly
L12	68-2036	Second I.F. Transformer Assembly
L13	68-2032	Third I.F. Transformer Assembly
L14	64-2033	12" Speaker, 500 Ohm Field, PP 6L6 Output Trans.
L15	80-2016	Power Transformer
SW1	66-2009	Rear Panel of Wave Band Switch
SW2	66-2009	Center Panel of Wave Band Switch
SW3	66-2009	Front Panel of Wave Band Switch
SW4		"Off-On" Switch on Volume Control
SW5		High Fidelity Switch on Tone Control
SW6		High Fidelity Switch on Tone Control

CHASSIS MODEL 6S12

FOR ALIGNMENT, SEE INDEX



LOCATION OF TRIMMERS

WILCOX-GAY CORP.

25-2118

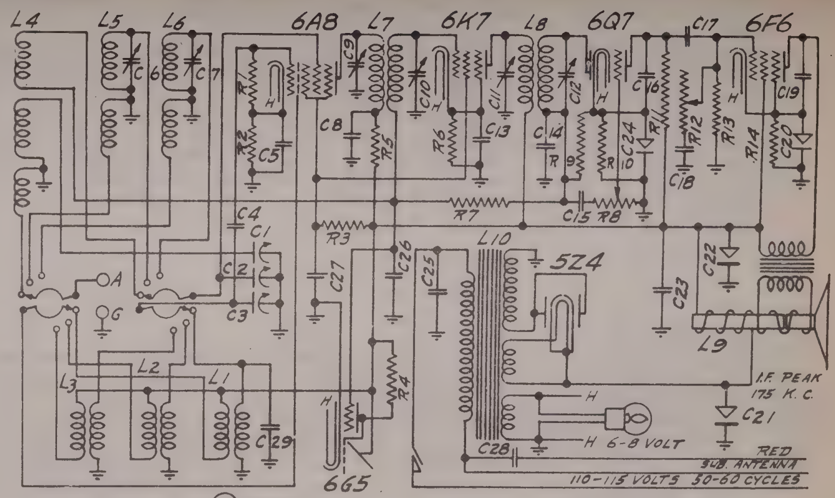
CODE	PART NO.	RESISTORS
R1	53-941	20,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-898	50,000 Ohm R.F. & I.F. Screen Resistor
R4	53-926	1 Meg Ohm 6G5 Triode Plate Resistor
R5	53-919	5,000 Ohm 6A8 Plate Isolation Resistor
R6	53-1063	500 Ohm I.F. Cathode Resistor
R7	53-926	1 Meg Ohm A.V.C. Network Resistor
R8	19-1315	500,000 Ohm Volume Control 19-2006 on 7CB6
R9	53-925	500,000 Ohm Diode Load Resistor
R10	53-919	5,000 Ohm 6Q7 Cathode Resistor
R11	53-924	250,000 Ohm 6Q7 Plate Resistor
R12	19-1317	250,000 Ohm Tone Control
R13	53-925	500,000 Ohm 6F6 Grid Resistor
R14	53-1063	500 Ohm 6F6 Cathode Resistor
		INDUCTANCES
L1	17-2111	Broadcast Oscillator Coil Assembly
L2	17-2105	Police Band Oscillator Coil Assembly
L3	17-2127	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Transformer Assembly
L8	68-2024	Second I.F. Transformer Assembly
L9	64-2030	12" Speaker 1500 Ohm Field 6F6 Trans. for 7C6
L10	80-2017	Power Transformer
L9	64-2022	8" Speaker 1500 Ohm Field 6F6 Trans. for 7CB6
		CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C5	75-2005	.1 Mfd. 200 Volt Paper 6A8 Cathode Condenser
C6	78-1587	3-30 MMFD. Police Band Preselector Trimmer Cond.
C7	78-1587	3-30 MMFD. Foreign Band Preselector Trimmer Cond.
C8	75-2003	.01 Mfd. 400 V. Paper 6A8 Plate Isolation By-Pass
C9	78-2008	First I.F. Primary Trimmer Condenser
C10	78-2011	First I.F. Secondary Trimmer Condenser
C11	78-2008	Second I.F. Primary Trimmer Condenser
C12	78-2013	Second I.F. Secondary Trimmer Condenser
C13	75-2005	.1 Mfd. 200 V. Paper 6K7 Cathode Condenser
C14	76-307	.0005 Mfd. Diode Filter Condenser
C15	75-2005	.1 Mfd. 200 V. Paper Audio Feed Condenser
C16	76-265	.001 Mfd. Mica 6Q7 Plate Filter Condenser
C17	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Condenser
C18	75-2003	.01 Mfd. 400 V. Tone Control Condenser
C19	75-2001	.002 Mfd. 600 V. Paper 6F6 Plate Filter Cond.
C20	18-928	25 Mfd. 25 V. Dry Electrolytic Condenser
C21	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser
C22	18-2006	16 Mfd. 250 W.V.Electrolytic Condenser
C23	75-2012	.5 Mfd. 400 V; Paper B Supply By-Pass Condenser
C24	18-928	25 Mfd. 25 V. Electrolytic 6Q7 Cathode By-Pass
C25	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Condenser
C26	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C27	75-2005	.1 Mfd. 200 V. Paper R.F. & I.F. Screen By-Pass
C28	75-2003	.01 Mfd. 400 V. Paper Sub. Antenna Condenser
C29	76-2003	.00001 Mfd. Mica Condenser

FOR

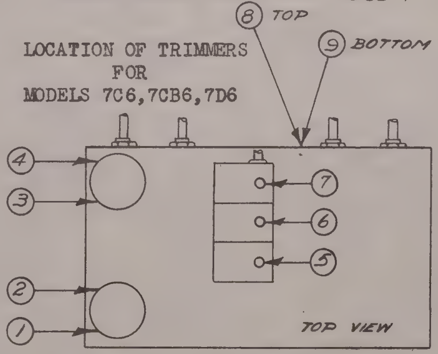
ALIGNMENT

SEE

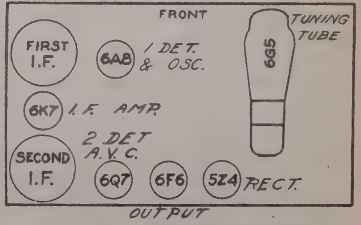
INDEX



LOCATION OF TRIMMERS
FOR
MODELS 7C6,7CB6,7D6



LOCATION OF TUBES



FOR USE ONLY WITH

CHASSIS MODELS 110-120 V . 50-60 CYCLE

7C6 7CB6

PILOT LIGHTS 6-8 V.
I. F. PEAK 175 K.C.

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND	2 PL. TO GROUND	2 GRID TO GROUND
6A8	1st DET. & OSC.	230	70	3.4	235	- 25
6K7	I.F. AMPLIFIER	235	70	4		
6Q7	2nd DET. & AVC	75		1.5		
6F6	POWER OUTPUT	225	235		TARGET	
6G5	TUNING	20			230	

B+ VOLTAGE ____ 235

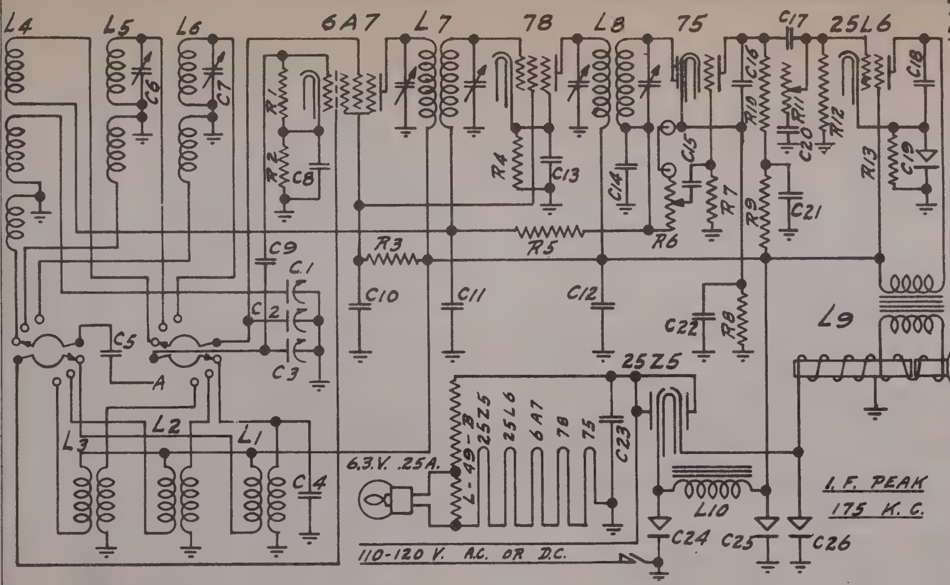
SPEAKER FIELD VOLTAGE ____ 95

METER 1000 OHMS PER VOLT

MODEL 7D6

WILCOX-GAY CORP.

25-2122



CONDENSERS

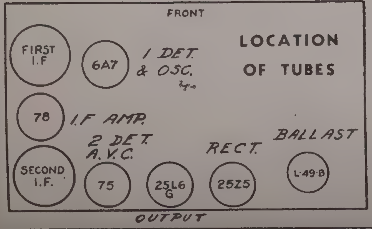
C1	77-833	366 MMFD. Pres. Sect. of Variable Cond.
C2	77-833	366 MMFD. Pres. Sect. of Variable Cond.
C3	77-833	326 MMFD. Osc. Sect. of Variable Cond.
C4	76-2003	,00001 Mfd. Mica Condenser
C5	75-2003	.01 Mfd. 400 Volt Paper Condenser
C6	78-1587	3-30 MMFD. Trimmer Condenser
C7	78-1587	3-30 MMFD. Trimmer Condenser
C8	75-2005	.1 Mfd. 200 Volt Paper Condenser
C9	76-2002	.00005 Mfd. Mica Condenser
C10	75-2005	.1 Mfd. 200 Volt Paper Condenser
C11	75-2005	.1 Mfd. 200 Volt Paper Condenser
C12	75-2011	.5 Mfd. 200 Volt Paper Condenser
C13	75-2005	.1 Mfd. 200 Volt Paper Condenser
C14	76-307	.0005 Mfd. Mica Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Condenser
C16	76-265	.001 Mfd. Mica Condenser
C17	75-2003	.01 Mfd. 400 Volt Paper Condenser
C18	75-2002	.004 Mfd. 600 Volt Paper Condenser
C19	18-928	25 Mfd. 25 Volt Electrolytic Cond.
C20	75-2003	.01 Mfd. 400 Volt Paper Condenser
C21	75-2005	.1 Mfd. 200 Volt Paper Condenser
C22	75-2005	.1 Mfd. 200 Volt Paper Condenser
C23	75-2005	.1 Mfd. 200 Volt Paper Condenser
C24	18-2003	11 Mfd. 150 W.V. Electrolytic Cond.
C25	18-2003	4 Mfd. 150 W.V. Electrolytic Cond.
C26	18-2003	4 Mfd. 150 W.V. Electrolytic Cond.

INDUCTANCES

L1	17-2106	Broadcast Oscillator Coil Assembly
L2	17-2105	Police Band Oscillator Coil Assembly
L3	17-2127	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2012	First I.F. Transformer Assembly
L8	68-2024	Second I.F. Transformer Assembly
L9	64-2044	6½" Speaker 3000 Ohm Field 25L6 Trans.
L10	14-940	20 Henry Filter Choke

CODE	PART NO.	RESISTORS
R1	53-941	20,000 Ohm Type M Resistor
R2	53-1062	250 Ohm Wirewound Resistor
R3	53-1042	25,000 Ohm Type M Resistor
R4	53-1063	500 Ohm Wirewound Resistor
R5	53-926	1 Meg Ohm Type M Resistor
R6	19-1315	500,000 Ohm Volume Control
R7	53-925	500,000 Ohm Type M Resistor
R8	53-919	5,000 Ohm Type M Resistor
R9	53-898	50,000 Ohm Type M Resistor
R10	53-924	250,000 Ohm Type M Resistor
R11	19-1317	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm Type M Resistor
R13	53-2014	200 Ohm Type M Resistor

TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND	2 PLATE TO GROUND	2 GRID TO GROUND
6A7	1st DET. & OSC.	110	45	1.3	110	- 2.7
78	I.F. AMPLIFIER	110	45	1.6		
75	2nd DET. & AVC	35		0.7		
25L6G	POWER OUTPUT	105	110	10		



FOR USE ONLY WITH
110-120 V. 50-60 CYCLE
OR
110-120 V. D. C.

I. F. PEAK 175 K.C.
PILOT LIGHTS 6-8 V.

CHASSIS MODEL
7D6

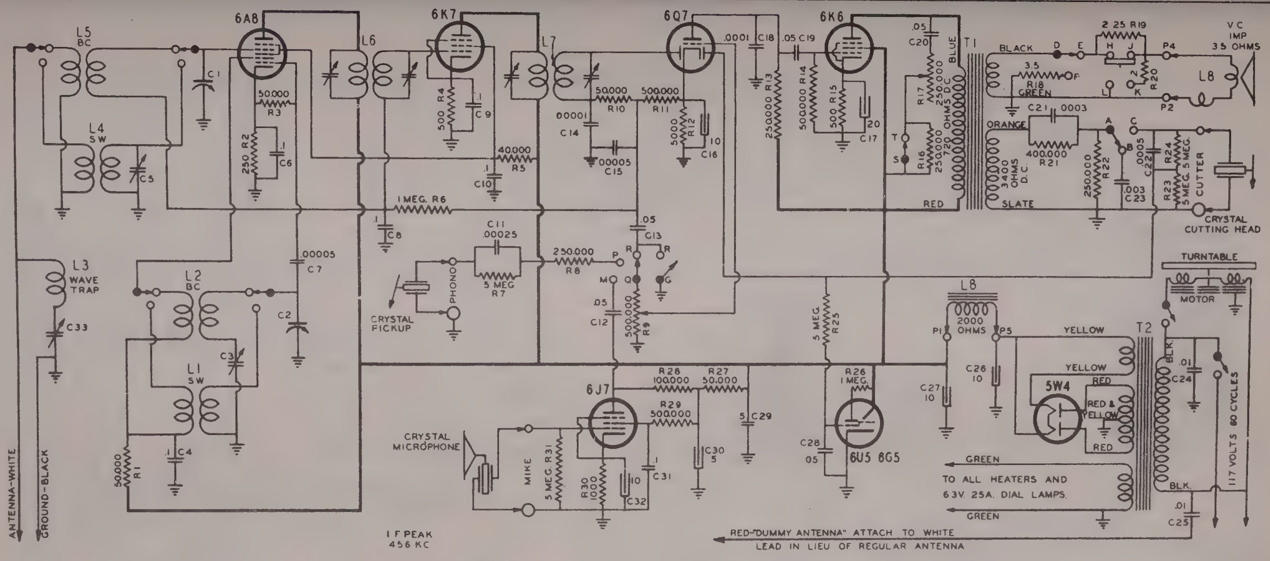
B+ VOLTAGE 110
SPEAKER FIELD VOLTAGE 120
METER 1000 OHMS PER VOLT

FOR OTHER DATA
SEE INDEX

©John F. Rider, Publisher

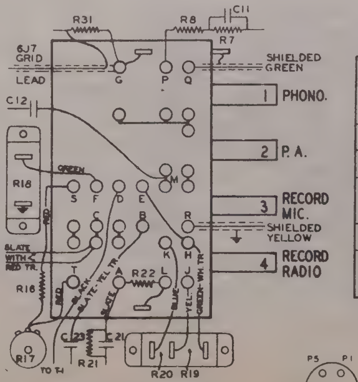
WILCOX-GAY CORP.

MODELS A-85,A-87,
A-88,A-90



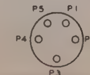
CODE OF SCHEMATIC

PART NO.	CODE	DESCRIPTION
77-2021	C1	DETECTOR SECTION } 2 GANG COND.
	C2	OSCILLATOR SECTION
76-2010	C3	L.F. PADDING COND.
75-2005	C4	.1 MFD. 200 V. PAPER COND.
76-2010	C5	S.W. DETECTOR TRIMMER
75-2005	C6	.1 MFD. 200 V. PAPER COND.
76-2011	C7	.00005 MFD. MICA COND.
75-2005	C8	.1 MFD. 200 V. PAPER COND.
75-2005	C9	.1 MFD. 200 V. PAPER COND.
75-2005	C10	.1 MFD. 200 V. PAPER COND.
76-2013	C11	.00025 MFD. MICA COND.
75-2004	C12	.05 MFD. 400 V. PAPER COND.
75-2004	C13	.05 MFD. 400 V. PAPER COND.
76-2010	C14	.00001 MFD. MICA COND.
76-2011	C15	.00005 MFD. MICA COND.
18-2012	C16	10 MFD. 25 V. TUBULAR ELECT.
18-2017	C17	20 MFD. 25 V. } ELECT. COND. IN CAN.
	C26	10 MFD. 450 V.
	C27	10 MFD. 450 V.
	C30	5 MFD. 300 V.
	C18	.0001 MFD. MICA COND.
75-2004	C19	.05 MFD. 400 V. PAPER COND.
75-2004	C20	.05 MFD. 400 V. PAPER COND.
76-2016	C21	.0003 MFD. MICA COND.
76-2014	C22	.0005 MFD. MICA COND.
76-2016	C23	.003 MFD. MICA COND.
75-2017	C24	.01 MFD. 110 V. AC METAL CLAD.
75-2017	C25	.01 MFD. 110 V. AC METAL CLAD.
75-2004	C28	.05 MFD. 400 V. PAPER COND.
75-2012	C29	.5 MFD. 400 V. PAPER COND.
75-2005	C31	.1 MFD. 200 V. PAPER COND.
18-2012	C32	10 MFD. 25 V. TUBULAR ELECT.
	C33	[illegible] L3
53-898	R1	50,000 OHM 1/4 WATT RESISTOR
53-2011	R2	250 OHM 1/2 WATT RESISTOR
53-898	R3	50,000 OHM 1/4 WATT RESISTOR
53-1063	R4	500 OHM 1/2 WATT RESISTOR
53-2032	R5	40,000 OHM 1 WATT RESISTOR
53-926	R6	1 MEGOHM 1/4 WATT RESISTOR
53-2020	R7	5 MEGOHM 1/4 WATT RESISTOR
53-924	R8	250,000 OHM 1/4 WATT RESISTOR
19-2014	R9	500,000 OHM VOL. CON. & LINE SW.
53-898	R10	50,000 OHM 1/4 WATT RESISTOR
53-925	R11	500,000 OHM 1/4 WATT RESISTOR
53-919	R12	5,000 OHM 1/4 WATT RESISTOR
53-924	R13	250,000 OHM 1/4 WATT RESISTOR
53-925	R14	500,000 OHM 1/4 WATT RESISTOR
53-2031	R15	500 OHM 1 WATT RESISTOR
53-924	R16	250,000 OHM 1/4 WATT RESISTOR
19-2009	R17	250,000 OHM TONE CONTROL
53-2037	R18	3.5 OHM 10 WATT CANDOHM RESISTOR
53-2038	R19	2.25 O[illegible] } CANDOHM RESISTOR
	R20	2 OHMS
53-2039	R21	400,000 OHM 1/4 WATT RESISTOR
53-924	R22	250,000 OHM 1/4 WATT RESISTOR
53-2020	R23	5.0 MEGOHM 1/4 WATT RESISTOR
53-2020	R24	5.0 MEGOHM 1/4 WATT RESISTOR
53-2020	R25	5.0 MEGOHM 1/4 WATT RESISTOR
53-898	R27	50,000 OHM 1/4 WATT RESISTOR
53-923	R28	100,000 OHM 1/4 WATT RESISTOR
53-925	R29	500,000 OHM 1/4 WATT RESISTOR
53-2023	R30	1,000 OHM 1/4 WATT RESISTOR
53-2020	R31	5.0 MEGOHM 1/4 WATT RESISTOR
17-2149	L1	SHORT WAVE OSC. COIL ASSEMBLY
17-2254	L2	BROADCAST OSC. COIL ASSEMBLY
37-2004	L3	WAVE TRAP (INCLUDES C33)
17-2242	L4	SHORT WAVE DETECTOR COIL ASSEM.
17-2255	L5	BROADCAST DETECTOR COIL ASSEM.
68-2051	L6	1st. I.F. TRANSFORMER ASSEM.
68-2056	L7	2nd. I.F. TRANSFORMER ASSEM.
64-2075	L8	6½" SPEAKER-2000 OHM FIELD
81-2009	T1	OUTPUT TRANSFORMER
80-2035	T2	POWER TRANSFORMER
64-2076	L8	8" SPEAKER--FOR MODEL A-90 ONLY



PUSH-BUTTON SWITCH
TERMINAL CONNECTIONS

PUSH BUTTON CIRCUIT FUNCTIONS
NORMAL "UP" POSITION OF PUSH BUTTON SWITCHES INDICATED IN SCHEMATIC DIAGRAM
1 OPENS Q-R, CLOSES Q-P, R-G
2 OPENS Q-R, CLOSES Q-M
3 OPENS Q-R, D-E, A-B, T-S CLOSES Q-M, D-F, A-C
4 FIRST POS. OPENS A-B, T-S, CLOSES A-C
4 SECOND POS. OPENS H-J, CLOSES K-L A-C REMAINS CLOSED. T-S REMAINS OPEN



BOTTOM VIEW OF
SPEAKER SOCKET OR
PRONG VIEW OF PLUG.

MODEL No. A-85, A-87,
A-88, A-90.
DATE 6-26-40

MODELS A-85,A-87,
A-88,A-90

WILCOX-GAY CORP.

GANGING INSTRUCTIONS

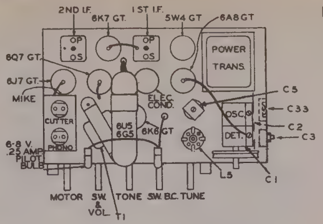
An OUTPUT METER or other indicating device should be used for accuracy in making ganging adjustments.

If an output meter is not available, the magic eye (6U5) may be used as an output indicator as follows:

(a) Depress push-button No. 4 "To Record Radio"

(b) Disconnect cutting-head from chassis.

(c) Adjust volume control to near maximum.



MODEL No. A-85,A-87,
A-88,A-90
DATE 6-26-40

WILCOX
GAY

Connect signal generator to control grid of the 6A8 tube.

SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER
456 K.C.	1500 K.C.	Broadcast	2nd. I.F.--S
" "	" "	"	" " P
" "	" "	"	1st. I.F.--S
" "	" "	"	" " P
" "	550 K.C.	"	C-33 °

Connect signal generator to ANT. and GND. leads.
Turn condenser gang to full maximum capacity and check position of dial pointer with reference line on the scale, which is the last graduation below the 550 K.C. calibration.

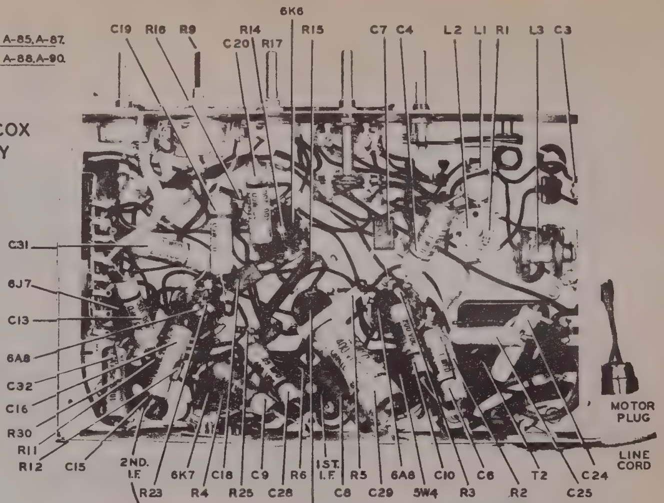
600 K.C.	600 K.C.	Broadcast	L.F.Pad (C-3)
1400 K.C.	1400 K.C.	"	Osc.(C-2)
" "	" "	"	Det.(C-1)
Not used °°	15-16 M.C.	Short Wave	Ant.(C-5)

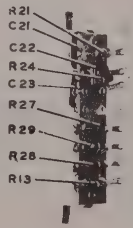
The entire alignment procedure should be repeated to obtain greatest accuracy in the adjustment of the trimming condensers.

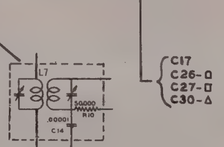
° Adjust C-33 trimmer for MINIMUM signal.

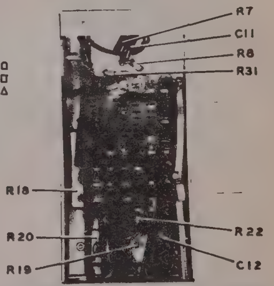
°° Connect antenna to receiver, and adjust dial so that no station is received. Advance volume control until a fair volume of noise is received. Adjust trimmer for greatest noise.

Tube	Position	VOLTAGE Plate	Screen	Cathode
6A8	1st. Det. Osc.	230	75	2.2
6K7	I.F.	230	75	3.0
6Q7	2nd. Det.	90*		1.5
6J7	Mike Amp.	45 to 65*	30*	.8
6K6	Output	215	235	13.5









Aerial disconnected.
All voltage measurements made against ground (chassis) except as noted.

Line Voltage------------118
P5 or C26 to GND.-------350
P1 or C27 to GND.-------240
P5 to P1 (sp'kr field)--110
C30 to GND.-------------150

NOTE: This is a typical voltage analysis made by use of standard 1000 ohm per volt voltmeter, using the 300 volt scale for plate and screen voltage readings.

* Not actual voltages due to large values of resistance in circuit between supply voltage and point of measurement. These voltage values may vary considerably, depending upon the resistance of voltmeter used.

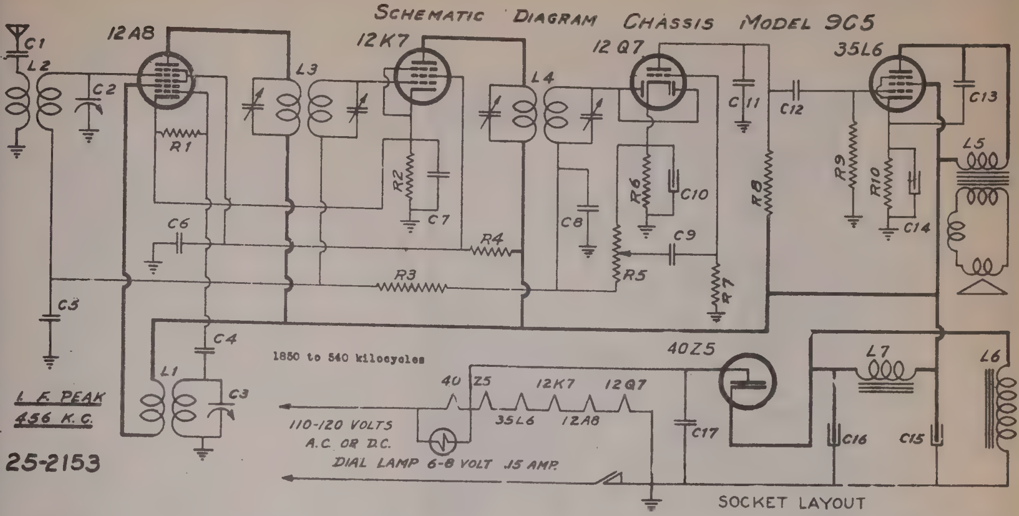
The above voltages should be considered as being approximate, as difference in line voltage, type of testing equipment used, normal tolerance limits of component parts in the chassis, all have an effect upon these readings. A tolerance of 10% is usually considered permissible.

MODEL A-53 (1939)
"Thin Man"

WILCOX-GAY CORP.

MODELS 8K2,A-56,A-60
Record-Player

SCHEMATIC DIAGRAM CHASSIS MODEL 9C5



25-2153

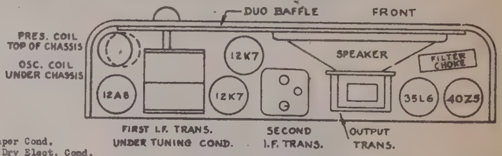
MODEL A-53

"THIN MAN"

1939

R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-1062	250 Ohm 1/2 Watt Resistor
R3	53-926	1 Meg Ohm 1/4 Watt Resistor
R4	53-1042	25,000 Ohm 1/4 Watt Resistor
R5	19-2012	500,000 Ohm Volume Cont. & Switch
R6	53-919	5,000 Ohm 1/4 Watt Resistor
R7	53-925	500,000 Ohm 1/4 Watt Resistor
R8	53-924	250,000 Ohm 1/4 Watt Resistor
R9	53-925	500,000 Ohm 1/4 Watt Resistor
R10	53-2014	200 Ohm 1/4 Watt Resistor

SOCKET LAYOUT

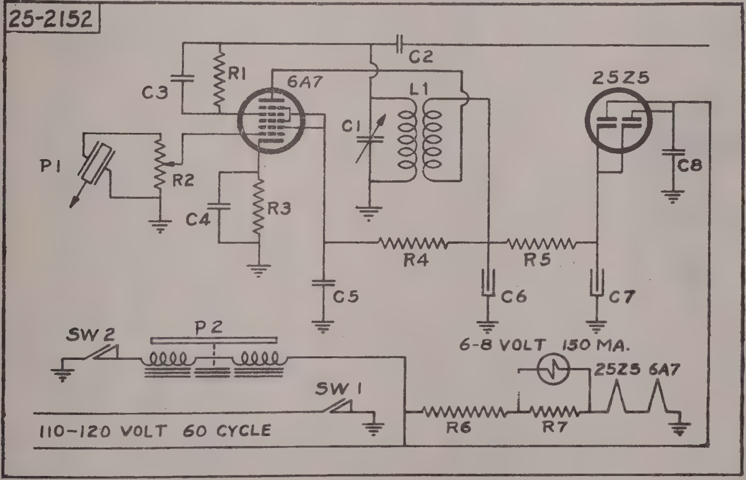


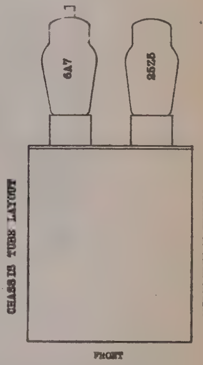
C1	75-2003	.01 Mfd 400 V. Paper Cond.
C2, C3	77-2015	Two Gang Variable Condenser
C4	76-2002	.00005 Mfd Mica Condenser
C5	75-2005	.1 Mfd 200 V. Paper Cond.
C6	75-2005	.1 Mfd 200 V. Paper Cond.
C7	75-2005	.1 Mfd 200 V. Paper Cond.
C8	76-307	.0005 Mfd Mica Condenser
C9	75-2003	.01 Mfd 400 V. Paper Cond.
C10	18-2012	10 Mfd 25 W. V. Dry Elect. Cond.
C11	75-2014	.001 Mfd 600 V. Paper Cond.
C12	75-2003	.01 Mfd 400 V. Paper Cond.
C13	75-2001	.002 Mfd 600 V. Paper Cond.
C14	18-2012	10 Mfd 25 W.V. Dry Elect. Cond.
C15	18-2011	8 Mfd 150 W.V. Dry Elect. Cond.
C16	18-2010	16 Mfd 150 W.V. Dry Elect. Cond.
C17	75-2005	.1 Mfd 200 V. Paper Condenser

L1	17-2232	Oscillator Coil Assembly
L2	17-2230	Preselector Coil Assembly
L3	68-2055	First I.F. Trans. Assembly
L4	68-2052	Second I.F. Trans. Assembly
L5	64-2043	5" Speaker, Output Trans. for 35L6 Tube
L6	64-2043	3000 Ohm Field on L5
L7	14-2002	18 Henry Filter Choke

86-2207

25-2152





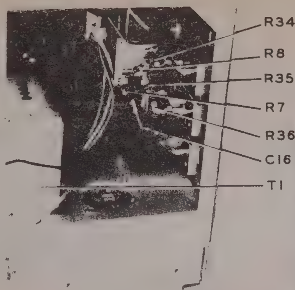
MODELS A-56, A-60 & 8K2

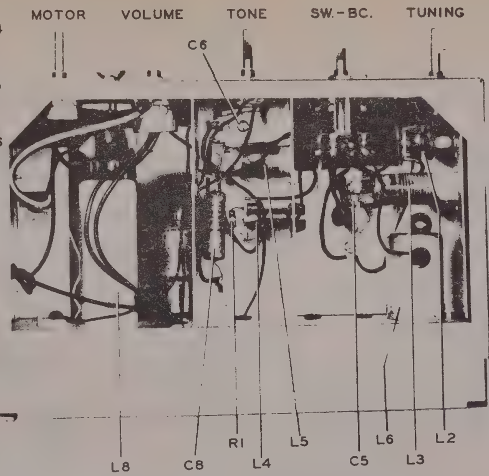
CODE	PART NO.	NAME
L1	17-2223	Coil Assembly, Oscillator
C1	78-2034	Condenser, Trimmer, 40-240 Mmfd.
C2	76-2003	Condenser, Mica, .00001 Mfd.
C3	76-2002	Condenser, Mica, .00005 Mfd.
C4	75-2005	Condenser, Paper, .1 Mfd. 200 Volt
C5	75-2005	Condenser, Paper, .1 Mfd. 200 Volt
C6	18-2011	Condenser, Electrolytic, 8 Mfd. 150 W.V.
C7	18-2010	Condenser, Electrolytic, 16 Mfd. 150 W.V.
C8	75-2005	Condenser, Paper, .1 Mfd. 200 Volt
P1	52-2080	Phono Pick-up Arm Assembly
P2	52-2081	Phono Motor Assembly, 60 Cycle AC 110-120 Volt with 9" Turn Table
	45-349	Lamp, Pilot Mazda
R1	53-920	Resistor, 10,000 Ohm 1/4 Watt
R2	19-2013	Volume Control
R3	53-2023	Resistor, 1,000 Ohm 1/4 Watt
R4	53-919	Resistor, 5,000 Ohm 1/4 Watt
R5	53-919	Resistor, 5,000 Ohm 1/4 Watt
R6	53-2021	Resistor, 278 Ohm 25 Watt
R7	53-2021	Resistor, 26 Ohm 2.34 Watt
SW1		Switch, Line "Off-On" (On R2)
SW2	66-2023	Switch, Motor "Off-On"

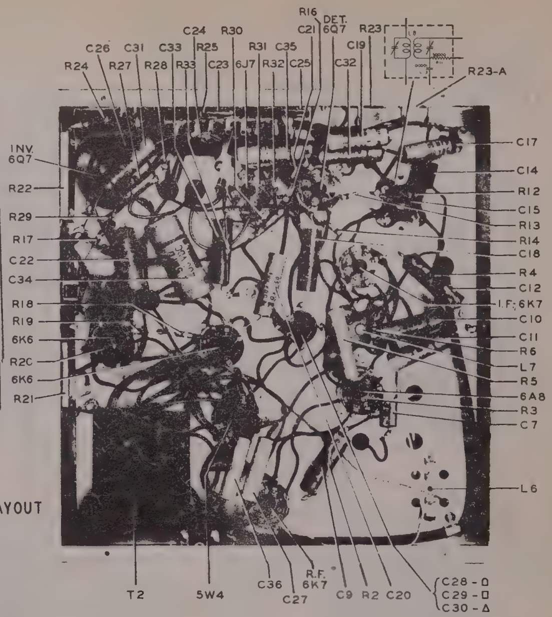
86-2204

MODELS A-89,A-91,A-92,
A-93,A-94,A-101

WILCOX-GAY CORP.







MODEL No. A89, A91, A92, A93, A94
DATE 11-27-40.

PARTS LAYOUT

VOLTAGE DATA
Line Voltage----115
C28 to GND.-----360
C29 to GND.-----250
C30 to GND.-----175
Speaker Field---110

Aerial disconnected.
Volume control at minimum.
All voltage measurements
made against ground (chassis)
except as noted.

Tube	Position	Plate	Screen	Cathode
6K7	R.F.	250	83	2.8
6A8	1st. Det. Osc.	250 112	83	2.8
6K7	I.F.	250	83	3.3
6Q7	2nd. Det.	80*	--	1.5
6Q7	Inverter	85*	--	1.5
6J7	Mike Amp.	40 to 65*	35*	1.1
6K6	Output	245	250	17.0

NOTE: This is a typical voltage analysis made by use of standard 1000 ohm per volt voltmeter, using the 300 volt scale for plate and screen voltage readings.

* Not actual voltages due to large values of resistance in circuit between supply voltage and point of measurement. These voltage values may vary considerably, depending upon the resistance of voltmeter used.

The above voltages should be considered as being approximate, as difference in line voltage, type of testing equipment used, normal tolerance limits of component parts in the chassis, all have an effect upon these readings. A tolerance of 10% is usually considered permissible.

MODELS A-89, A-91, A-92. A-93, A-94, A-101.

CORRECTION FOR HIGH HUM LEVEL

In the operation of Recordio Models A-89, A-91, A-92, A-93, A-94 and A-101, bearing serial numbers prior to No. 624060, if the residual hum, noted with the volume control turned to minimum position, appears to be abnormally high or objectionable, a correction may be effected by a rearrangement of the ground connections to the volume control and cathode by-pass condenser C18.

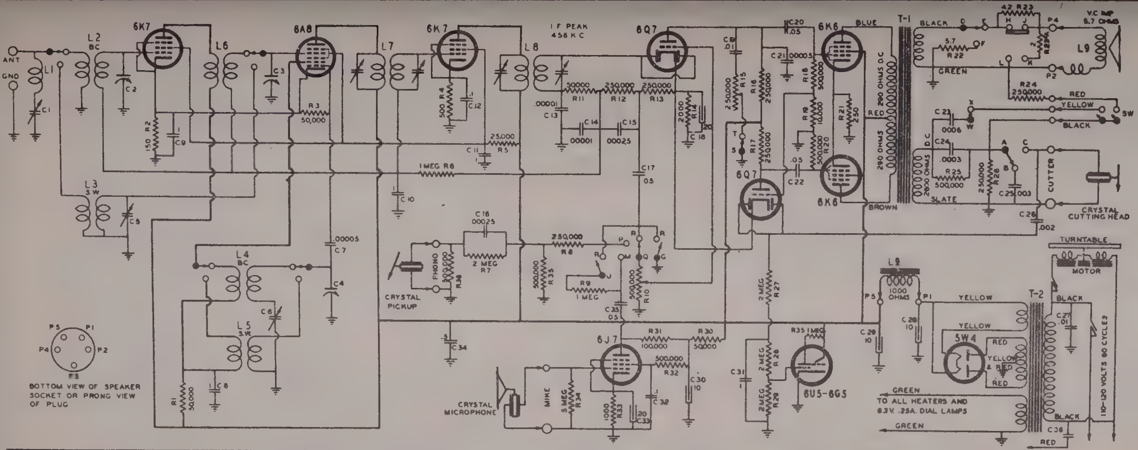
These connections should be changed as follows:

1. Disconnect the spiral shield covering of the volume control leads, from the volume control terminal and solder the shielding directly to the volume control switch cover.
2. Remove the wire placed through the rubber grommet in the vertical shield fin, which connects the ground terminal of the volume control to chassis.
3. Run a wire from the ground terminal of the volume control through the fibre grommet in the chassis base directly below the volume control, to the ground lug located near the electrolytic condenser in the approximate center of the underside of the chassis. (Note: R33 and C33 are already connected to this lug.) Do not permit the volume control ground terminal to contact the chassis through any other medium.
4. Move the ground connection of the 6Q7 cathode by-pass condenser, C18, from its present location on the assembly lug of the electrolytic condenser, to the chassis ground lug to which the volume control has been grounded.

WILCOX-GAY CORP.

MODELS A-51, 8C4
MODELS A-89, A-91, A-92
A-93, A-94

SCHEMATIC DIAGRAM
MODEL No. A-89 A-91 A-92 A-93 A-94
DATE 10-22-40

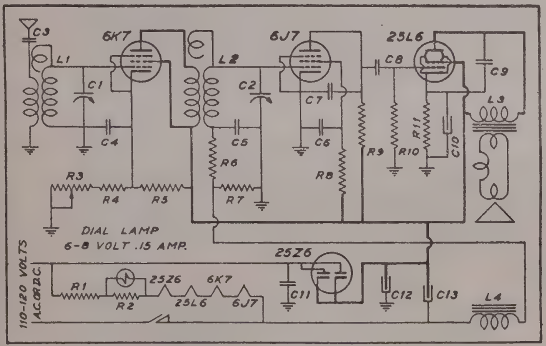


EQUALIZER SWITCH POSITIONS

REFER TO "SW" IN DIAGRAM

SPEED SHIFT LEVER	EQUALIZER SWITCH
SLOW	CLOSED
FAST	OPEN

This receiver is designed for operation on 110-120 volts AC or DC

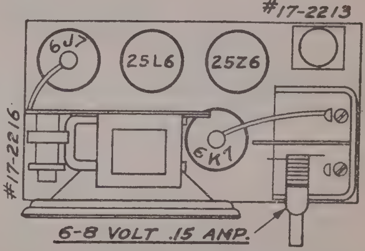


Code	Part No.	Description
R1	20-2010	175 Ohm Resis. in Power Cord
R2	53-2018	26 Ohm 2.34 Watt Resistor
R3	19-2011	15,000 Ohm Vol. Cont. & Switch
R4	53-2014	200 Ohm ¼ Watt Resistor
R5	53-1042	25,000 Ohm ¼ Watt Resistor
R6	53-926	1 Meg Ohm ¼ Watt Resistor
R7	53-2017	20 Ohm ½ Watt Resistor
R8	53-2020	5 Meg Ohm ¼ Watt Resistor
R9	53-925	500,000 Ohm ¼ Watt Resistor
R10	53-925	500,000 Ohm ¼ Watt Resistor
R11	53-1061	150 Ohm ½ Watt Resistor
C1, C2	77-2013	Two Gang Variable Cond.
C3	75-2001	.002 Mfd. 600 V. Paper Cond.

C4	75-2005	.1 Mfd. 200 V. Paper Cond.
C5	75-2005	.1 Mfd. 200 V. Paper Cond.
C6	75-2003	.01 Mfd. 400 V. Paper Cond.
C7	75-2014	.001 Mfd. 600 V. Paper Cond.
C8	75-2003	.01 Mfd. 400 V. Paper Cond.
C9	75-2001	.002 Mfd. 600 V. Paper Cond.
C10	18-2012	10 Mfd. 25 W.V. Elect. Cond.
C11	75-2005	.1 Mfd. 200 V. Paper Cond.
C12	18-2011	8 Mfd. 150 W.V. Elect. Cond.
C13	18-2010	16 Mfd. 150 W.V. Elect. Cond.
L1	17-2213	Antenna Coil Assembly
L2	17-2216	Detector Coil Assembly
L3	81-2004	Output Trans. for 25L6 Tube
L4	64-2056	4" Speaker 450 Ohm Field

Model
8C4 A51

R. F. Amplifier	1	#6K7
Detector Tube	1	#6J7
Output Tube	1	#25L6
Rectifier Tube	1	#25Z6



TUBE	CIRCUIT	PLATE TO GROUND	SCREEN TO GROUND	CATHODE TO GROUND
6K7	R. F. Amplifier	108	108	2.8
6J7	**Detector**	24	.2	0
25L6	Power Output	100	108	6.2

Speaker Field Drop 22 B + Voltage 108

Line Voltage Was 120 V. 60 cycle Meter 1000 ohms per volt

MODEL No. A89-A91
DATE 8-22-40. A92 ,A93,A94

GANGING INSTRUCTIONS

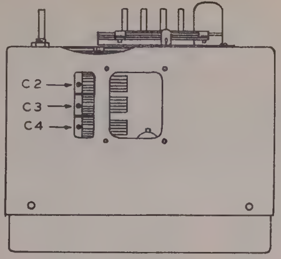


FIG. 11

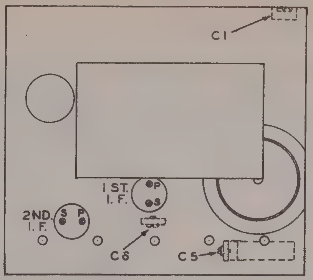


FIG. 12

An OUTPUT METER or other indicating device should be used for accuracy in making ganging adjustments. If an output meter is not available, the magic eye (6U5) may be used as an output indicator as follows:

(a) Depress push-button No. 4 "To Record Radio".
(b) Disconnect cutting head from chassis.
(c) Adjust volume control to near maximum.

Connect signal generator to control grid of 6A8 tube. Make connection to side of middle section, (C3) of condenser gang. (FIG. 11)

SIGNAL GENERATOR FREQUENCY	DIAL POSITION	WAVE BAND SWITCH POSITION	TRIMMER NUMBER	FIGURE NUMBER
456 K.C.	1500 K.C.	Broadcast	2nd I.F.-S	12
" "	" "	"	" " -P	12
" "	" "	"	1st I.F.-S	12
" "	" "	"	" " -P	12
Connect signal generator to ANT. and GND. terminals.				
456 K.C.	550 K.C.	Broadcast	Wave Trap (C-1)*	12
600 K.C.	600 K.C.	"	L.F. Pad. (C-6)**	12
1400 K.C.	1400 K.C.	"	Osc. (C-4)	11
1400 K.C.	1400 K.C.	"	Det. (C-3)	11
1400 K.C.	1400 K.C.	"	R.F. (C-2)	11
Not Used***	15-16 M.C.	Short Wave	Pre-Sel. (C-5)	12

As resonance is approached by adjustment of the trimmers, the signal generator attenuator should be adjusted for a minimum signal that will provide a low reading on the output indicator.

It is advisable to repeat the entire alignment procedure to correct the slight effect one adjustment may have upon the other.

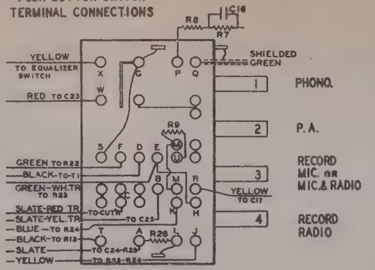
* Adjust C-1 for MINIMUM signal.

** First note the position of the dial pointer with the condenser gang turned to full maximum capacity. The left edge of the pointer should be slightly to the right of the last dial graduation.

In adjusting the L.F. Pad. (C-6) rock the condenser gang back and forth across the 600 K.C. signal and note that maximum output meter reading coincides with the 600 K.C. dial graduation. If the dial reading is other than 600 K.C., reset the dial pointer on the dial cord, to read 600 K.C. at maximum output meter indication.

*** Connect antenna to receiver, and adjust dial so that no station is received. Advance volume control until a fair volume of noise is received. Adjust trimmer C-5 for greatest noise.

PUSH BUTTON SWITCH
TERMINAL CONNECTIONS



PUSH BUTTON CIRCUIT FUNCTIONS NORMAL "UP" POSITION OF PUSH BUTTON SWITCHES INDICATED IN SCHEMATIC DIAGRAM	
1	OPENS Q-R, W-X, CLOSES Q-P, R-G
2	OPENS Q-R, CLOSES Q-M
3	FIRST POS. OPENS A-B, T-S, CLOSES U-R SECOND POS. OPENS Q-R, A-B, D-E, T-S CLOSES Q-M, A-C, D-F
4	FIRST POS. OPENS A-B, T-S, CLOSES A-C SECOND POS. OPENS A-B, T-S, H-J CLOSES A-C, K-L
NOTE - ALL OTHER CONTACT POSITIONS INDICATED IN DIAGRAM	

MODEL No. A93-A94

TURNTABLE SPEED VARIATION

In order to satisfactorily correct any variation in the speed of the turntable, which is usually evidenced by "wow" or a waver in the pitch of musical tones during the playing of records or home recordings, it is first necessary to determine the kind of speed variation encountered.

As the various types of turntable speed variation usually fall under two distinct classifications--INTERMITTENT VARIATION and VARIATION SYNCHRONIZED WITH TURNTABLE ROTATION, the matter of diagnosis in any particular case of trouble is simplified.

Intermittent Variation

It is important that the rubber rimmed intermediate drive wheels be kept clean and free from oil, to avoid slipping or irregular operation of the wheels. The drive wheel bearings are of Oilite Bronze and require no oiling to prevent wear, however, ONE drop of light lubricating oil may be applied to each drive wheel bearing if desired to "quiet" their operation.

All record shavings and other dirt particles that may have gotten under the turntable should be removed, as such foreign material may seriously interfere with the smooth operation of the mechanism.

If the drive wheels appear to slip, although the rubber rims and the turntable rim are free from oil, the tension of the drive wheel tension spring should be increased.

The round movable disc on which the dual drive wheel assembly is mounted, should be adjusted to a degree of tightness that affords minimum looseness of the assembly, at the same time maintaining entire freedom of movement. If the drive wheel assembly is allowed to tip while in motion, resulting in the drive wheels rotating out of the horizontal plane, the rim of the top wheel may ride high and intermittently touch the underneath side of the turntable.

The wire leads connected to the cutting head inside the recording arm should not be permitted to drag on the record or turntable, as this produces an intermittent braking effect causing the turntable to be slowed down, or to rotate with varying speed. Intermittent variation in turntable speed may also be due to a binding of the lateral feed screw bearing. An adjustment is provided on the gear housing of the feed screw assembly, to take up end play in the feed screw. When this adjustment is correctly made, only a very slight amount of end play should be perceptible, however, it should be determined that this end play exists throughout the complete rotation of the feed screw.

CONTINUED ON NEXT PAGE

Variation Synchronized With Turntable Rotation

If "wow" resulting from variation in the speed of the turntable is evidenced to be in the order of four times per turntable revolution, this would indicate a defect in the rubber rimmed drive wheel. The wheel may be out of round, or warped, or may have a flat spot or bump on the rubber rim.

If the "wow" is noticed to be once per turntable revolution, however, this would indicate some irregularity in the rim of the turntable. In handling, avoid bumping or dropping the turntable, as any pronounced dent in the rim of the table to throw it out of round will result in a very noticeable variation in turntable speed.

Running the finger tips lightly over the inside surface of the turntable rim will show up any irregularity sufficiently pronounced to produce "wow" in the recording or record reproduction. The bearing surface of the turntable rim does not necessarily have to be perfectly smooth, as the effect of minute irregularities of the surface are absorbed by the rubber rim of the drive wheel.

A badly warped record, either a home recording or commercial record, or one in which the center hole is worn or oversize, will tend to produce "wow" during its reproduction, and it is suggested that this be taken into consideration in investigating a complaint pertaining to waver or "wow" in record reproduction.

Ordinarily, recordings made on record blanks which are only slightly warped, will prove to be satisfactory. However, "wows" may be cut into the recording if the cutting head damper is incorrectly adjusted so that the felt damper bears against the cutting head with too much pressure.

To correctly adjust the Cutting Head Damper, proceed as follows:

1. Turn the adjusting screw to the RIGHT so that no pressure is exerted on the cutting head by the felt damper.
2. Raise the recording arm to a near vertical position so that the stylus screw is midway in the slot in the front end of the arm. Observe that when the stylus screw is moved to one end of the slot and released, it will move back and forth a few times, before coming to rest in the center of the slot.
3. Turn the damper adjusting screw to the LEFT until, when the stylus screw is moved to one end of the slot and released, it will return to a midway position and stop. The tendency to continue moving back and forth has been eliminated.

In order to determine if "wow" is actually "cut" into a home recording, or if a variation in turntable speed exists during all functions of the turntable, first play an especially selected regular phonograph record, known to be entirely free from "wow". If the record plays satisfactorily, but "wow" is noticed in playing home recordings made on the same instrument, this gives evidence of the existence of some mechanical fault in the recording mechanism. As previously pointed out, the cutting head leads may be dragging on the record or turntable, during recording, or the rubber rimmed drive wheel may slip at the point of contact with the motor pulley or the turntable rim. Although the drive wheel tension may be sufficient to provide unvarying speed of the turntable during the playing of records, the greater power demand placed upon the power source during recording, due to the work involved in cutting the record groove, may cause the drive wheel to slip.

MOTORS

Dynamic Balance

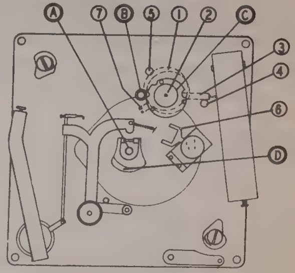
All Recordio motors employed in dual-speed models are now dynamically balanced by the motor manufacturer, and such motors have an identifying red dot on the bottom of the motor rotor. Thorough investigation indicates that the use of dynamically balanced motors eliminates all possibility of recorded flutter due to motor vibration. Prior to the use of dynamically balanced motors, all motors were passed through a very rigid vibration test to insure satisfactory performance from this standpoint.

Motor Shaft Sticks

In some of the early production units, sufficient vertical end play in the motor shaft existed to allow the lower end of the shaft to enter the motor bearing if the unit were subjected to rough handling during transportation. This sometimes caused the shaft to stick in the bearing, resulting in failure of the motor to operate when turned on. In the event a tight shaft is encountered, it may be freed in the bearing by lightly tapping the end of the motor shaft.

In motors of more recent production, a fibre washer is placed on the motor shaft to take up a sufficient amount of end play so that the shaft cannot become stuck in the bearing.

Oiling



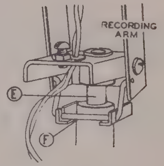
When the RECORDIO leaves the factory, the equipment is properly lubricated and requires no immediate attention.

Frequent oiling of the recording mechanism is not required, although the use of a small amount of oil judiciously applied about once a year, in accord with the following directions, will suffice to maintain the equipment in good order.

Remove the turntable by applying upward pressure at the rim of the table, at the same time lightly tapping the top of the turntable spindle with a small tool.

Lift the dual drive wheel assembly from its mounting.

Lubricate the oiling positions indicated in the accompanying drawings, using only two or three drops of electric motor oil at each position, unless otherwise specified.



A. Turntable shaft bearing.

B. Upper motor bearing.

C. Between drive wheel mounting disc and bed plate.

D. Place a coating of petroleum jelly on the lip of the master cam.

E. Recording arm pivot post.

F. Pivot post straddle plate slot.

Carefully apply one or two drops of oil to each drive wheel bearing, so that the oil will not run out on to the rubber rims of the wheels.

The lower motor bearing may be lubricated by application of oil to the felt wick surrounding the lower end of the motor shaft.

Replace dual drive wheel and turntable as follows:

Place the dual drive wheel assembly (1) on the pin in the center of the movable mounting plate (2). The shift lever (3) of the wheel assembly should be positioned against the stop pin (4) as shown in the drawing. Likewise, the switch arm (6) should be positioned as shown so that the switch actuating finger (7) will engage in the wide slot of the switch arm (6) as the shift lever (3) is moved between the stop pins (4) and (5).

Place the shift lever (3) against stop pin (5) so that the switch arm (6) is moved to the position opposite that shown in the drawing.

Carefully lower the turntable on the spindle. It will be observed that one of the rubber rimmed drive wheels protrudes beyond the rim of the turntable. With the finger tips, press the drive wheel into position so that the rubber rim of the wheel bears against the inside surface of the turntable rim.

Rotate the turntable by hand, permitting the key pin of the turntable spindle to engage the key slot in the turntable hub.

AUTOMATIC RECORD CHANGER ADJUSTMENTS

MODEL No. A93,A94,A96.

DESCRIPTION OF TRIP MECHANISM

(1) In order to automatically change records, the record changer mechanism must first be put in motion. The trigger which accomplishes this purpose is the trip mechanism. The trip mechanism is actuated by the trip grooves at the end of the music grooves in all standard records.

(2) All commercial records manufactured in recent years have either an eccentric (oscillating), or spiral (run-in) type of trip groove.

(3) This record changer will trip on any standard eccentric trip groove. It will also trip on any spiral trip groove provided that the spiral does not terminate at a larger diameter than that for which the trip mechanism is adjusted.

(4) To observe the operation of the trip mechanism, it is necessary to first remove the turntable and then move lever (A) to either the 10 or 12 inch position.

(5) To follow the action of the trip mechanism on eccentric trip groove records, it will be seen that as the pickup arm (M) swings inwardly, the trip rod (K) moves toward the pickup base until the serrations on the trip rod seen at (K) are in contact with the knife edge of the trip latch (X). If the pickup arm (M) is now moved outwardly, the serrations at (K) will engage with the trip latch (X) permitting the trip cam lift lever (C) to be released so that it will drop in and engage the trip cam (P).

(6) To observe the action of the trip mechanism on spiral trip groove records, swing the pickup arm (M) inwardly until the trip dog (G) comes in contact with the trip latch (X) and releases trip cam lift lever (C).

(7) The reject button (R) it will be noted also operates to trip the mechanism by imparting motion to latch (X).

(8) After trip cam lift lever (C) has been released so that it can engage trip cam (P) the forces required to operate the balance of the trip mechanism are derived from the motor.

(9) As trip cam (P) engages trip cam lift lever (C), cam (P) is hinged upwards so that it engages the change mechanism drive wheel control lever (I) and forces the drive wheel (L) into positive frictional engagement with the inside of the turntable rim.

(10) To keep wheel (L) in engagement with the turntable rim after lever (I) carries past cam (P), lever (I) is engaged by latch (Y) and the tripping operation is complete.

DESCRIPTION OF SPEED REDUCER AND CAM SHAFT

(11) Driven by the wheel (L) through a double worm and gear reduction, the cam shaft (S) carries cams which control the pickup arm movements, the dropping of records, and at the conclusion of the change cycle, the release of latch (Y).

(12) Cam (T) which is mounted on the lower end of cam shaft (S) raises and lowers the pickup arm (M) through a rocker arm and push rod.

(13) The positioning of the pickup arm (M) for 10 or 12 inch records is controlled by two cams just above the lower cam shaft bearing. The lower of these cams (with short throw) positions the pickup for 12 inch records and the upper cam (with long throw) positions the pickup for 10 inch records.

(14) An examination of the pickup positioning cams will reveal spring fingers at the termination of the cam rise. These spring fingers are provided to urge the pickup needle into the starting groove on records which do not have lead in grooves.

(15) When lever (A) is set in the 10 or 12 inch position, the pickup positioning cam follower is shifted up or down so as to engage the proper cam. The pickup positioning cam follower can easily be distinguished by the coil spring mounted thereon and linking the cam follower to its extension. This coil spring will extend, preventing damage, if for any reason the pickup arm (M) becomes obstructed while the pickup positioning cam is forcing the pickup arm (M) inwardly.

(16) Just above the pickup positioning cams is the pickup removal cam which has the function of swinging the pickup arm (M) outwardly when the mechanism has been tripped.

(17) The last and uppermost cam operates through cam follower (Z) to release the wheel latch (Y) thus disengaging wheel (L) from the turntable rim at the completion of the change cycle.

(18) On the upper side of the latch control cam is mounted a roller which engages lever (Q) and actuates the record handling fingers (D) through the connecting links provided.

ADJUSTMENT OF SPIRAL TRIP MECHANISM

(19) To adjust the spiral trip to operate farther from the center of the record, loosen the set screw holding dog (G) and move the dog (G) away from the end of the trip rod (K). (Read paragraph 20 before making adjustment.)

(20) Dog (G) is set at the factory to trip when the pickup needle is 1 3/4" from the edge of the hole in the record center. This standard setting is correct for all late recordings and all but a very few of the older ones. To facilitate the location of dog (G) it is best to hold a scale with the end touching the turntable pin (E) and in such a manner that the pickup needle will swing directly above the scale graduations. As noted above, the trip should release when the pickup needle reaches the 1 3/4" graduation. NOTE: If for any reason the position of the pickup arm (M) with relation to the pickup base becomes changed, the trip dog (G) may require resetting. For this reason always check to see that the pickup is being lowered correctly onto the edge of the record before adjusting dog (G). (This pickup adjustment is covered in paragraph 34.)

MECHANISM FAILS TO TRIP

(21) If the mechanism fails to trip always examine the trip grooves on the record first before attempting to make any adjustments. The record grooves may be worn or scratched in such a manner as to cause the pickup needle to jump the grooves. Also try a new pickup needle as the needle may have been damaged.

(22) The trip rod (K) is held in contact with the trip latch (X) by the trip rod tension spring (F). If the eccentric trip fails to operate, it may be necessary to increase the pressure of spring (F) against trip rod (K) but before changing the adjustment, observe the following:

(1) Make sure that the trip rod does not bind in the bearing where it is linked to the pickup base.

(2) Be sure that the trip rod floats freely.

(3) Examine the serrations at (K) to be certain that the sharp edges have not been damaged.

(4) Remove any dirt which may be embedded in the serrations and which would prevent the trip latch (X) from being engaged.

(5) Examine the knife edge of trip latch (X) to see if it has become damaged.

NOTE: Do not increase the pressure of spring (F) against trip rod (K) any more than is necessary to insure operation of the eccentric trip because excessive spring pressure will cause:

(1) Jumping of the pickup needle out of spiral trip grooves at the tripping point.

(2) The eccentric tripping action will require more power and the needle may jump the grooves and fail to trip altogether.

(23) If the trip mechanism still works in a faulty manner after the foregoing precautions have been taken, next check the trip latch (X) and the trip cam lift lever (C) to make sure that they work freely and do not bind on the studs on which they are mounted. If either of these levers are scraping on the base plate, make sure that the studs which carry them have not worked loose.

(24) If the lever (C) moves freely when it clears the trip latch (X) but does not swing into the path of the trip cam (P) then the spring which connects to lever (C) is either stretched or missing. If lever (C) makes a loud click when it drops in, the rubber bumper, against which it should strike, has worked up and should be pressed back into place.

CHANGE MECHANISM DRIVE WHEEL FAILS TO ENGAGE

(25) If the trip mechanism functions in a satisfactory manner and wheel (L) is latched in position to engage the turntable rim but does not contact the turntable rim with sufficient pressure to insure operation, loosen screws at (H) and move the wheel control lever extension outwardly a distance which will bring wheel (L) into positive contact with the turntable rim. CAUTION: This adjustment is very critical and should be carefully made. If wheel (L) is forced too tightly against the turntable rim, the latch (Y) will stick at the completion of the change cycle and prevent the wheel from becoming disengaged from the turntable rim. As an aid in making this adjustment, it is well to scribe a line on the wheel control lever at the end of the wheel control lever extension, so that it can be seen how far the extension is being moved each time. Before making any adjustment, it is also advisable to check the set screw in wheel (L) to make sure that wheel (L) is tight and not turning on the shaft which carries it.

(26) If latch (Y) fails to hold wheel (L) in position:

(1) Lever (I) may not be following through completely on cam (P), due to either lever (C) being bent down, or lever (I) bent up too far.

(2) At the end of lever (I) in vicinity of wheel (L) is noted a dog (W) which is meant to engage in latch (Y). This dog may have been bent outward so that it does not completely enter latch (Y), when lever (I) has completed its travel on cam (P).

(3) The adjustment of fingers on latch lever (Y) is such that the clearance for the dog (W) should be approximately .010". This can be determined by moving lever (I) outward from the center so that the dog (W) will move into latch (Y) and a feeler gauge inserted between the dog and finger to establish this clearance. To adjust for proper clearance, the finger on latch (Y) may be bent in or out.

(4) Check the spring on lever (Z) to make sure that the spring is not defective or missing.

MECHANISM REPEATS

(27) If the mechanism repeats (continues to change records without playing them), the wheel (L) may not be disengaging from the turntable rim. This failure to disengage may be due to the following:

(1) Faulty action of the latch (Y). (See "Caution" in paragraph 25.)

(2) A defective or missing return spring on wheel control lever (I).

(3) A defective or missing spring on lever (Z).

(4) Lever (Z) may be bent so that it is not contacting the wheel release cam. (See paragraph 17.)

(28) If wheel (L) disengages at the completion of the change cycle and immediately re-engages, the trip mechanism is at fault and it is suggested that the following be checked:

(1) Reject button (R) may be sticking in the depressed position.

(2) The trip cam (P) may be sticking in the raised position.

(3) The reset spring on trip latch (X) may be defective or missing.

(4) The stud on which wheel control lever (I) is mounted may have worked loose and should be tightened.

MECHANISM TRIPS DURING PLAYING CYCLE

(29) If the mechanism trips during the playing of a record and before the pickup arm has swung inwardly to the point where the trip is adjusted to operate on spiral trip groove records, the following conditions should be checked:

(1) Weak or missing reset spring on latch (X). Tension of spring may be increased by turning the spring anchor lug.

(2) Defective shoulder or trip latch (X) or rounded corner on cam lift lever (C), permitting lever (C) to slip off of the shoulder on trip latch (X).

(3) Rubber bumper (B), against which wheel control lever (I) strikes, may have worked up away from the base plate, permitting lever (I) to over-travel and lock trip rod (K) against trip latch (X). NOTE: Where over-travel of lever (I) due to lever (I) not striking bumper (B) causes tripping during the playing cycle, it is possible that either a weak reset spring on latch (X) or a damaged shoulder on latch (X) is a contributing factor.

PICKUP ARM STICKS OR JAMS

(30) If during normal operation of the unit the pickup arm acts as though it were jammed in any manner, the following procedure should be followed:

First, stop the motor, next remove the turntable, and trip the mechanism. The pickup arm (M) should now be capable of free motion between the normal limits of its travel. (From edge of base plate into within approximately 1" of the center pin (E) depending on the adjustment of trip dog (G).

If trip dog (G) will not slip by the lug against which it strikes on trip latch (X), or the serrations at (K) on trip rod (K) hang up on trip latch (X) and prevent trip rod (K) from sliding by trip latch (X) then investigate the following:

(1) Rubber bumper (B) pushed upwards away from base plate and permitting lever (I) to over-travel.

(2) Excessive pressure exerted against trip rod (K) by spring (F).

(3) Trip rod (K) bent.

(4) An extension on trip latch (X), which extends rearwardly along trip rod (K), may be bent or broken. The function of this extension is to swing trip rod (K) clear of trip latch (X) as soon as tripping takes place.

RECORD SUPPORT ADJUSTMENT

(31) An examination of the unit will disclose the rear record support (front support on A-96) has fixed positions determined by dedents which are located by lever (A). The opposite record support (O) however, is adjustable by means of an overlapping connecting link between the two support bases, underneath the changer unit.

The record support posts should be equidistant from the center of the turntable, so that the opposite sides of the record will be released at nearly the same instant, and so that only one record at a time will be dropped to the turntable. The correct adjustment may best be determined by placing a 10 inch record on the supports, with the support posts in the 10 inch position, and making the adjustment by loosening the screws shown at (V) and moving the record support post (O) to a position so that the entering edges of both separating fingers (N) are equidistant from the edge of the record. (NOTE: The record selected for making this adjustment must be flat and the center hole must fit the center post (E) without excessive looseness.) CAUTION: Before making this adjustment always make sure that lever (A) is firmly located in the proper dedent, and the three feed screw assembly mounting screws are tight. (Vertical alignment of the record centering pin (E) is dependent upon correct feed screw mounting.)

After the adjustment has been made, and the two screws tightened, turn on the motor and observe that the record is released from both support fingers at nearly the same instant. Then place a full stack of records on the supports and observe the dropping of each record. It will be noticed that the combined weight of ten or twelve records resting on the supports, will cause the support posts to spring outward slightly as the change mechanism goes through cycle; and the degree to which the posts swing outward is lessened with a decrease of total record weight. It will also be observed that one post may spring out more than the other during the change cycle, and this should be taken into consideration in making an adjustment of the support posts, so that the degree of unevenness with which the records are released from the support fingers will be "averaged" for the entire stack of records.

RECORD SUPPORT AND SEPARATING FINGERS

(32) As there is a difference in thickness between 10 inch and 12 inch records, and the equipment is designed to accommodate both sizes, the separating fingers (N) must be in correct adjustment so that they will slide in between the two lower records of the stack, and have no tendency to strike the edge of either record. The record supports (D) and the record

MODELS A-93,A-94,A-96

WILCOX-GAY CORP.

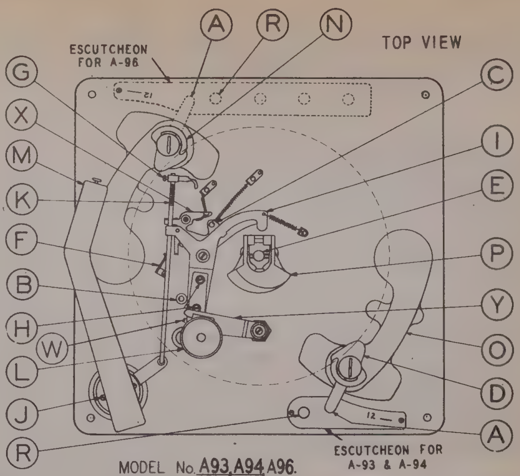
separating fingers (N) are so designed that, when in proper alignment, no chipping of standard records will take place. If, however, the separating finger should strike the edge of a record, due to a warped record, or one having chipped edges, fingers (N) may be sprung out of alignment. For proper operation, the fingers (N) must be perfectly flat. As the fingers are usually found to be bent upwards, rather than downwards, when out of correct alignment, it is necessary to remove the fingers from the support posts to straighten them. A heavy screw driver will be required to loosen the large screw at the top of the post, and the order of placement of the fingers and spacers should be noted in removing these parts so that they may be replaced in correct order. Ordinarily, straightening can be accomplished by holding the main part of the finger (N) through which the clamping screw passes, with one hand, and then taking hold of the sickle shaped part of (N) with the fingers of the other hand, bending the sickle shaped part until it is lined up with the main body. DO NOT USE PLIERS NOR ATTEMPT TO STRAIGHTEN THE FINGER (N) IN A VISE. After bending, lay the finger (N) on a flat surface to make sure the straightening has been properly done.

PICKUP ARM LIFT ADJUSTMENT

(33) The height to which pickup arm (M) is lifted during the change cycle may be adjusted by the screw (U). In making this adjustment, make sure that the pickup arm will not lift high enough to strike the bottom record on the record supports. Also make sure that the pickup needle drops low enough to rest properly on one record on the turntable. (Recommended needle length 5/8") If the timing of the pickup lift is not correct, loosen the set screw holding lift cam (T) on shaft (S) and relocate the cam. (The relative position of the remaining cams is fixed.)

ADJUSTMENT OF PICKUP LOWERING POINT

(34) To adjust the pickup arm (M) so that it will be lowered to the correct point on the outside of the record, first shift the lever (A) to the 10" position, and then stop the mechanism with the pickup positioning cam follower at the point of maximum rise of the pickup positioning cam. (See paragraphs 13, 14, and 15.) Now raise the pickup arm to the vertical position and loosen screws at (J) so that the arm (M) can be moved with relation to the pickup base but not too freely. Next holding the pickup base so that it will not turn, force the pickup arm (M) toward the record centering pin (E). Next, carefully pull the pickup arm (M) outwardly until the pickup needle is 4-45/64" from the pin (E). Raise the pickup arm (M) and tighten the locking screws at (J) being careful not to move arm (M) outwardly past the correct setting before tightening the screws. This adjustment will automatically take care of 12" records as well as 10" as will be seen by moving lever (A) to the 12" position and running the unit through its cycle. If the pickup arm (M) always lowers in the 12" position regardless of the position of the lever (A) the pickup positioning cam follower is sticking in the down position.



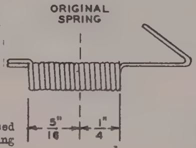
MODEL No. A93,A94,A96.
DATE 12-11-40

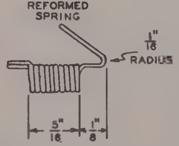
CONCERNING RECORDED "WOW" IN MODELS A-93 AND A-94 INCORPORATING #55-2020 AUTOMATIC RECORD CHANGER AND RECORDER UNIT

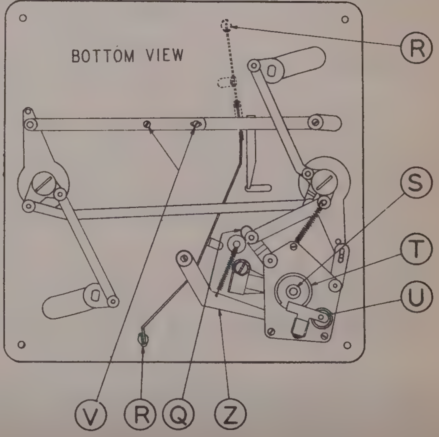
If recorded "wow" is encountered in dual-speed recorder units of the automatic record changer type used in equipment bearing serial numbers prior to 624010, a correction may usually be effected by increasing the tension of the intermediate drive wheel spring.

To accomplish this, proceed as follows:

1. Remove turntable and intermediate drive wheel assembly. (See Operating Instructions.)
2. Remove recorder-changer unit by removing the four mounting screws, and disconnecting cables with plugs, from Recordio chassis.
3. Place recorder-changer unit on the work bench, tilted to a position that provides easy access to the under side of the unit. DO NOT PLACE UNIT IN AN UPSIDE-DOWN POSITION, as the record spindle may be sprung or bent.
4. Remove the intermediate drive wheel spring, and make alterations to the spring in accord with the specifications given below.
5. Remove twelve turns at the hook end of the spring. Straighten out three turns of the coiled spring, and--
6. form a new hook so that the bend in the hook is only 1/8" from the coiled spring. DO NOT MAKE A SHARP BEND IN FORMING THE HOOK. Instead, form a 1/16" radius as shown in the drawing.
7. Before replacing the spring in the unit, remove the burred or ragged edge of the hole in the base plate, through which the pin protrudes for attachment of the loop end of the spring.
8. After the spring has been installed, and the unit restored to the cabinet, the intermediate drive wheel assembly and turntable should be replaced in accord with the directions given on Page 6 of the Operating Instructions.





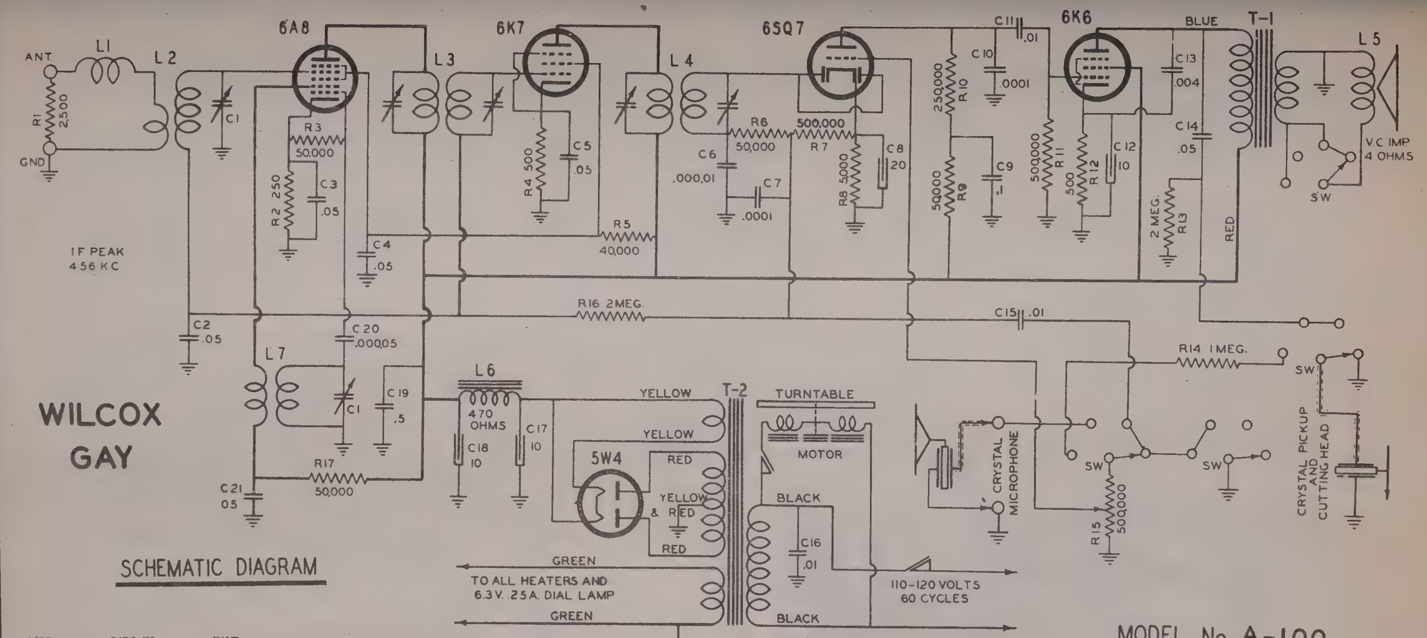


MODEL No. A-93,A-94
DATE 2-7-41

WILCOX-GAY CORP.

MODEL A-100

SCHEMATIC DIAGRAM



MODEL No. A-100
DATE 12-24-40

SWITCH POSITIONS
1—PHONOGRAPH
2—RECORD MICROPHONE
3—RECORD RADIO
4—RADIO

SWITCHES ARE SHOWN IN NUMBER 4 POSITION

CODE	PART NO.	NAME
C1-A C1-B	77-2023	ANT. SECTION OSC. SECTION VARIABLE CONL
C2	75-2004	.05 MFD. 400 V. PAPER COND.
C3	75-2004	.05 MFD. 400 V. PAPER COND.
C4	75-2004	.05 MFD. 400 V. PAPER COND.
C5	75-2004	.05 MFD. 400 V. PAPER COND.
C6	76-2010	.00001 MFD. MICA COND.
C7	76-2012	.0001 MFD. MICA COND.
C8	18-2021	20 MFD. 25 W.V. ELECT. COND.
C9	75-2007	.1 MFD. 400 V. PAPER COND.
C10	76-2012	.0001 MFD. MICA COND.
C11	75-2003	.01 MFD. 400 V. PAPER COND.
C12 C17 C18	18-2020	10 MFD. 350 V. 10 MFD. 450 V. 10 MFD. 450 V. ELECT. COND. IN CAN
C13	75-2002	.004 MFD. 600 V. PAPER COND.
C14	75-2004	.05 MFD. 400 V. PAPER COND.
C15	75-2003	.01 MFD. 400 V. PAPER COND.
C16	75-2003	.01 MFD. 400 V. PAPER COND.
C19	75-2012	.5 MFD. 400 V. PAPER COND.
C20	76-2011	.00005 MFD. MICA COND.
C21	75-2004	.05 MFD. 400 V. PAPER COND.
R1	53-2002	2,500 OHM 1/4 WATT RESISTOR
R2	53-1062	250 OHM WIREWOUND RESISTOR
R3	53-898	50,000 OHM 1/4 WATT RESISTOR
R4	53-1063	500 OHM WIREWOUND RESISTOR

CODE	PART NO.	NAME
R5	53-2032	40,000 OHM 1 WATT RESISTOR
R6	53-898	50,000 OHM 1/4 WATT RESISTOR
R7	53-925	500,000 OHM 1/4 WATT RESISTOR
R8	53-919	5,000 OHM 1/4 WATT RESISTOR
R9	53-898	50,000 OHM 1/4 WATT RESISTOR
R10	53-924	250,000 OHM 1/4 WATT RESISTOR
R11	53-925	500,000 OHM 1/4 WATT RESISTOR
R12	53-2031	500 OHM 1 WATT RESISTOR
R13	53-2024	2 MEGOHM 1/4 WATT RESISTOR
R14	53-926	1 MEGOHM 1/4 WATT RESISTOR
R15	19-2018	500,000 OHM VOL. CONTROL & SWITCH
R16	53-2024	2 MEGOHM 1/4 WATT RESISTOR
R17	53-898	50,000 OHM 1/4 WATT RESISTOR
L1	17-2269	ANTENNA LOADING COIL
L2	17-2272	LOOP ANTENNA ASSEM. (INCLUDES L1)
L3	68-2061	1ST. I.F. TRANSFORMER
L4	68-2056	2ND. I.F. TRANSFORMER (INCLUDES C6 AND R6)
L5	64-2079	SPEAKER, 4" P.M. DYNAMIC
L6	14-2002	FILTER CHOKE
L7	17-2271	OSCILLATOR COIL

SW	66-2043	SWITCH, 4 POLE 4 POS.
T1	81-2011	OUTPUT TRANSFORMER
T2	80-2059	POWER TRANSFORMER

MODEL A-100

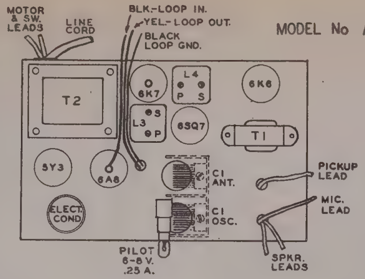
WILCOX-GAY CORP.

GANGING INSTRUCTIONS

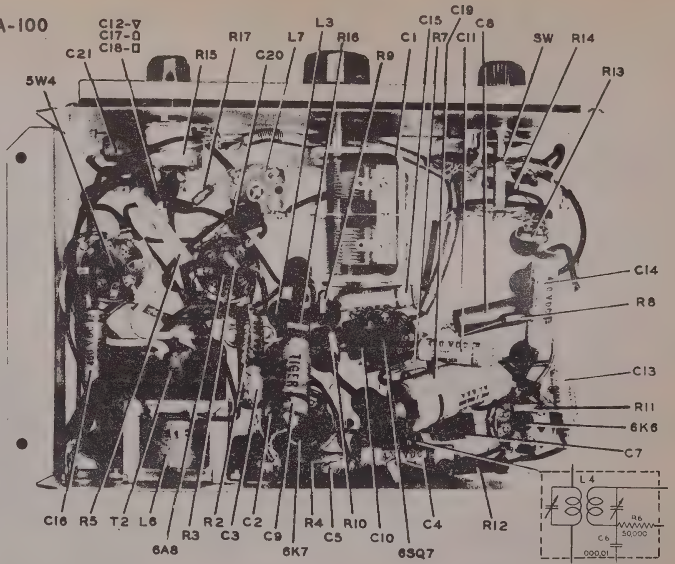
An OUTPUT METER, connected to the speaker voice coil terminals, should be used for accuracy in making ganging adjustments.

The voice coil terminals, as well as the I.F. trimmers, may be made accessible by removing the screws by which the motor panel is mounted in the cabinet. Before lifting off the phono-recorder unit, MOVE THE PHONO. ARM TO THE CENTER OF THE TURNTABLE, and permit the arm to maintain this position until after the unit has been restored to the cabinet. In this way, the follower arm which engages the lateral feed screw will be protected against damage.

The R.F. trimmers may be reached through the opening provided in the bottom of the cabinet.



MODEL No A-100



Connect signal generator to control grid of 6A8 tube.*

SIGNAL GENERATOR FREQUENCY	DIAL POSITION	TRIMMER
456 K.C.	1700 K.C.	L3-S**
" "	" "	L3-P**
" "	" "	L4-S**
" "	" "	L4-P**

Connect signal generator to ANT. and GND. terminals.

1400 K.C.	1400 K.C.	C1-OSC.
" "	" "	C1-ANT.

* Check the alignment of pointer with reference line below 550 K.C. on the scale. The pointer may be slipped on the shaft to correct for misalignment.

** In ganging the I.F. amplifier, use a low signal input to avoid setting up of oscillation in the amplifier.

NOTE: In the event of loop antenna replacement, the R.F. alignment should be checked at 600 K.C., and if necessary, inductance of the loop may be adjusted to bring about correct alignment of the dial at 600 K.C., by dressing the end of the inside loop turn to provide more or less inductance as required.

An adjustment of loop inductance should be followed by re-alignment of the R.F. trimmers at 1400 K.C.

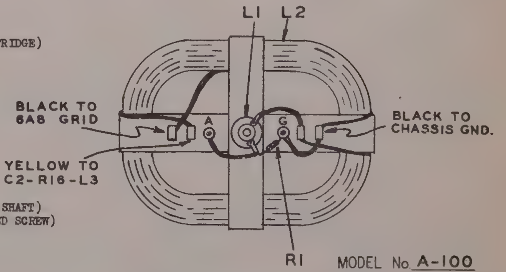
VOLTAGE DATA

Line Voltage---117
C17 to GND.----270
C18 to GND.----250
C21 to GND.----115

All voltage measurements made against ground (chassis) by use of a 1000 ohm per volt voltmeter.

Tube	Position	Plate	Screen	Cathode
6A8	1st. Det. Osc.	250 115	80	2.5
6K7	I.F.	250	80	3.7
6SQ7	2nd. Det.	80*	--	1.3
6K6	Output	225	250	17.0

* Not actual voltage due to large value of resistance in circuit between supply voltage and point of measurement.



MODEL No. A-100
DATE 1-10-41
12-30-40
12-24-40

MODEL A-100
RECORDIO JR. PARTS LIST

55-2027	RECORDER UNIT--COMPLETE
2-2041	RECORDER PICKUP ARM ASSEM. (WITH CARTRIDGE)
2-2040	ARM CHANNEL ONLY
16-2002	CORD RETAINER CLIP
23-2035	CRYSTAL CARTRIDGE (L-26)
51-2117	CARTRIDGE CLAMP PLATE
57-2083	CARTRIDGE MTG. SCREW
57-2119	CONE POINT PIVOT SCREW
48-2016	CONE POINT SCREW LOCKNUT
2-2043	FOLLOWER ARM ASSEMBLY
5-2376	FOLLOWER ARM STOP BRACKET
79-2010	INTERMEDIATE DRIVE WHEEL
16-2005	DRIVE WHEEL STUD CLIP
57-2118	LATERAL FEED SCREW ASSEM. (WITH T.T. SHAFT)
47-2029	MOTOR & PLATE ASSEM. (LESS T.T. & FEED SCREW)
66-2042	MOTOR SWITCH
40-2053	MOTOR SWITCH KNOB
57-2100	MOTOR MTG. SCREWS
52-2165	NEEDLE RECEPTACLE
57-2056	NEEDLE SCREW
58-2045	PIVOT POST SHAFT ASSEMBLY
5-2374	PIVOT POST LOCK SPRING ASSEMBLY
6-2029	PIVOT POST BUSHING
73-2066	PIVOT POST BUSHING MTG WASHER 2 1/32" DIA. ST. BRONZE
73-2067	PIVOT POST BUSHING MTG WASHER 2 1/32" DIA. PLAIN
73-2036	PIVOT POST BUSHING MTG LOCKWASHER
48-2009	PIVOT POST BUSHING MTG NUT
5-2371	PICKUP ARM REST
70-2022	TURNTABLE (WITH PIN MOUNTED)
52-2133	TURNTABLE DRAG PIN
67-2050	TURNTABLE DRAG PIN SPRING
57-1669	TURNTABLE DRAG PIN SPRING MTG. SCREW
73-1642	TURNTABLE DRAG PIN SPRING MTG. LOCKWASHER

ZENITH RADIO CORP.

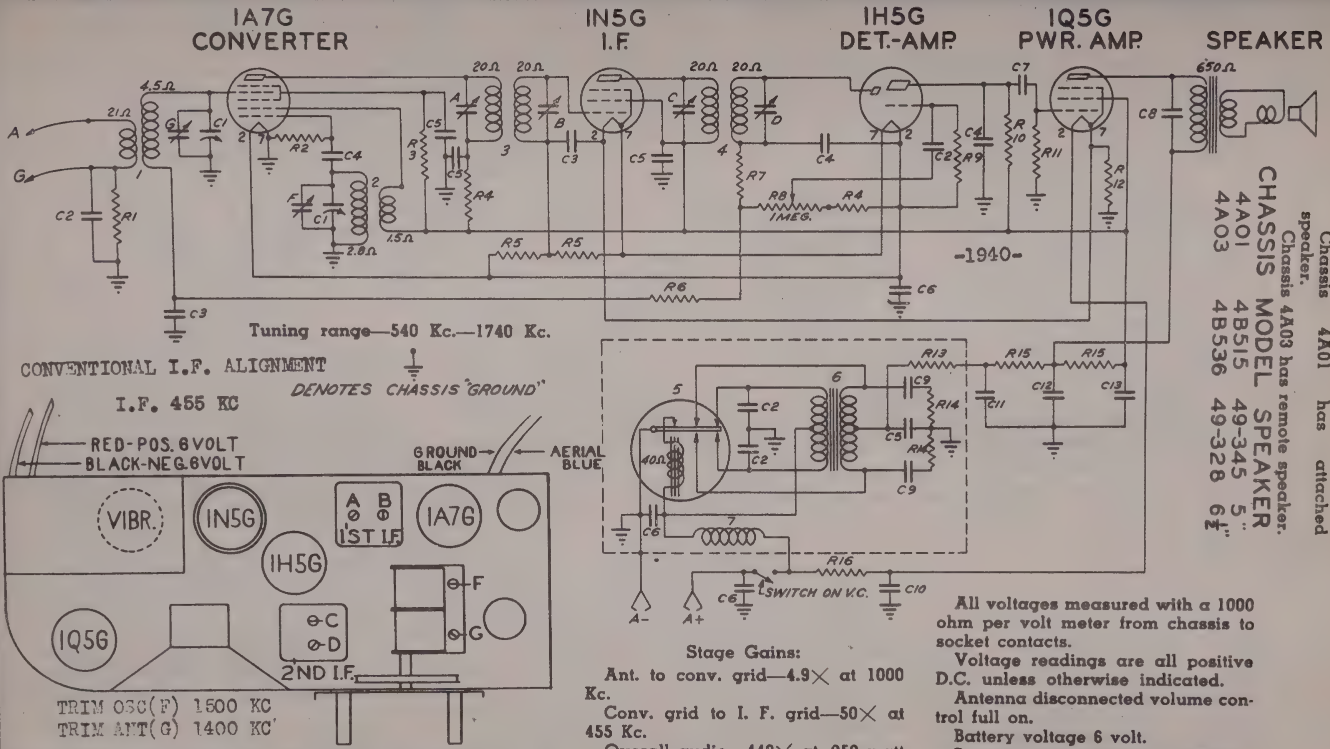
MODEL 4B515, Ch. 4A01
MODEL 4B536, Ch. 4A03

NOTE

Chassis 4A01 has attached speaker.

Chassis 4A03 has remote speaker.

CHASSIS	MODEL	SPEAKER	
4A01	4B515	49-345	5"
4A03	4B536	49-328	6½"



Tuning range—540 Kc.—1740 Kc.

CONVENTIONAL I.F. ALIGNMENT

DENOTES CHASSIS "GROUND"

I.F. 455 KC

TRIM OSC(F) 1500 KC
TRIM ANT(G) 1400 KC

Stage Gains:

Ant. to conv. grid—4.9× at 1000 Kc.

Conv. grid to I. F. grid—50× at 455 Kc.

Overall audio—448× at .050 watt —400 cycles.

All voltages measured with a 1000 ohm per volt meter from chassis to socket contacts.

Voltage readings are all positive D.C. unless otherwise indicated.

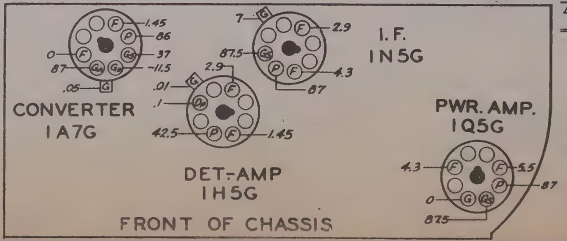
Antenna disconnected volume control full on.

Battery voltage 6 volt.

Battery consumption—.4 ampere.

Power Output—370 milliwatts.

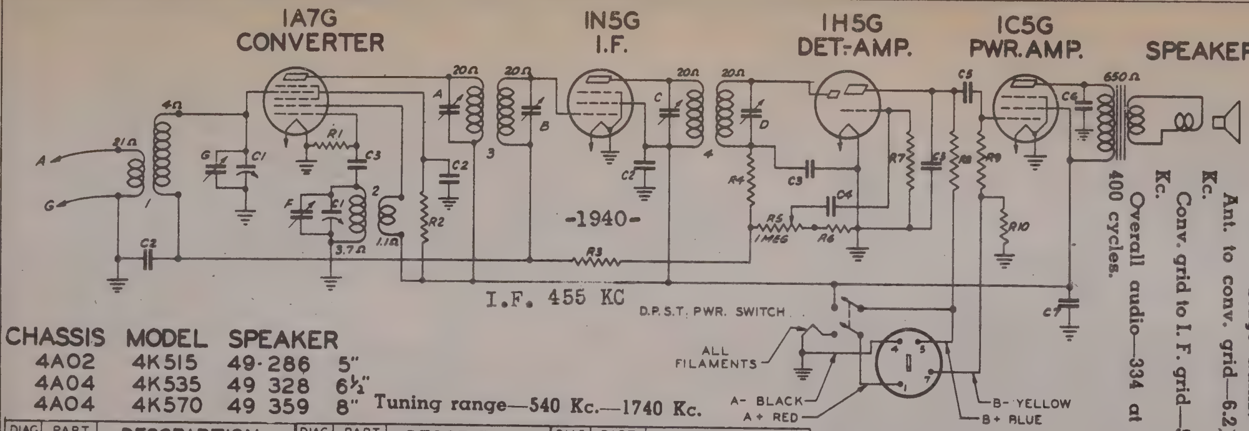
DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-695	TWO GANG VARIABLE		R2	63-595	100M OHM	¼W.
C2	22-826	.01 MFD.	200V.	R3	63-594	68M OHM	¼W.
C3	22-829	.05 MFD.	200V.	R4	63-583	1000 OHM	⅛W.
C4	22-162	.0001 MFD.	600V.	R5	63-296	220M OHM	¼W.
C5	22-828	.05 MFD.	400V.	R6	63-669	3.9 MEGOHM	¼W.
C6	22-199	.5 MFD.	200V.	R7	63-593	47M OHM	¼W.
C7	22-243	.01 MFD.	400V.	R8	63-1079	VOLUME CONTROL	
C8	22-448	.004 MFD.	600V.	R9	63-976	15 MEGOHM	¼W.
C9	22-966	.04 MFD.	600V.	R10	63-271	1 MEGOHM	¼W.
C10	22-961	500MFD. ELECTROLYTIC	15V.	R11	63-600	2.2 MEGOHM	¼W.
C11	22-742	15MFD. ELECTROLYTIC	250V.	R12	63-1060	90 OHM WIREWOUND	1W.
C12		15MFD. ELECTROLYTIC	250V.	R13	63-577	100 OHM	¼W.
C13		10MFD ELECTROLYTIC	250V.	R14	63-697	100 OHM	¼W.
				R15	63-605	1000 OHM	½W.
				R16	63-1061	7 OHM	½W.
R1	63-597	470M OHM	¼W.				



DIAG. Nº	PART Nº	DESCRIPTION
1	22-208	ANTENNA COIL
2	S6381	OSCILLATOR COIL ASSEM.
3	95-589	1ST. I.F. TRANS.
4	95-590	2ND. I.F. TRANS.
5	190-17	VIBRATOR
6	95-635	POWER TRANSFORMER
7	S5043	CHOKE ASSEMBLY
A		1ST. I.F. TRANS. PRI.
B		1ST. I.F. TRANS. SEC.
C		2ND. I.F. TRANS. PRI.
D		2ND. I.F. TRANS. SEC.
F		B'DCAST OSC. (ON GANG)
G		ANT. B'DCAST (ON GANG)

MODEL 4K515, Ch. 4A02
MODELS 4K535, 4K570,
Ch. 4A04

ZENITH RADIO CORP.



Stage Gains:

Ant. to conv. grid—6.2× at 1000 Kc.

Conv. grid to I. F. grid—56× at 455 Kc.

Overall audio—334 at .050 watt, 400 cycles.

CHASSIS	MODEL	SPEAKER	
4A02	4K515	49-286	5"
4A04	4K535	49 328	6½"
4A04	4K570	49 359	8"

Tuning range—540 Kc.—1740 Kc.

DIAG. Nº	PART. Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-695	TWO GANG VARIABLE		R4	63-593	47M OHM	¼ W.	4	95-590	2ND I.F. TRANS. ASSEM.
C2	22-829	.05 MFD.	200 V.	R5	63-1072	VOLUME CONTROL		A		1ST I.F. TRANS. PRI.
C3	22-162	.0001 MFD.	600 V.	R6	63-587	4700 OHM	¼ W.	B		1ST I.F. TRANS. SEC.
C4	22-826	.01 MFD.	200 V.	R7	63-976	15 MEGOHM	¼ W.	C		2ND I.F. TRANS. PRI.
C5	22-243	.01 MFD.	400 V.	R8	63-271	1 MEGOHM	¼ W.	D		2ND I.F. TRANS. SEC.
C6	22-448	.004 MFD.	600 V.	R9	63-600	2.2 MEGOHM	¼ W.	F		B'DCAST OSC. (ON GANG)
C7	22-684	8 MFD. ELECTROLYTIC	150 V.	R10	63-238	1000 OHM	¼ W.	G		ANT. B'DCAST (ON GANG)
R1	63-654	180M OHM	¼ W.	1	20-208	ANTENNA COIL				
R2	63-594	68M OHM	¼ W.	2	S-7815	OSCILLATOR COIL ASSEM.				
R3	63-669	3.9 MEGOHM	¼ W.	3	95-589	1ST I.F. TRANS. ASSEM.				

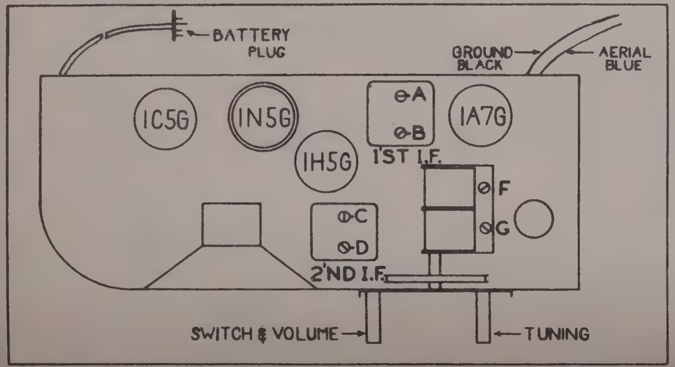
NOTE

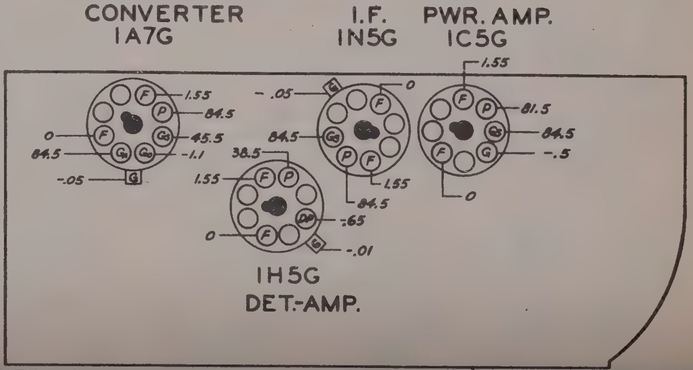
Chassis 4A02—attached speaker.
Chassis 4A04—remote speaker.

All voltages measured with a 1000 ohm per volt meter from chassis to socket contacts using a fresh Z28 battery pack.

I.F. ALIGNMENT CONVENTIONAL

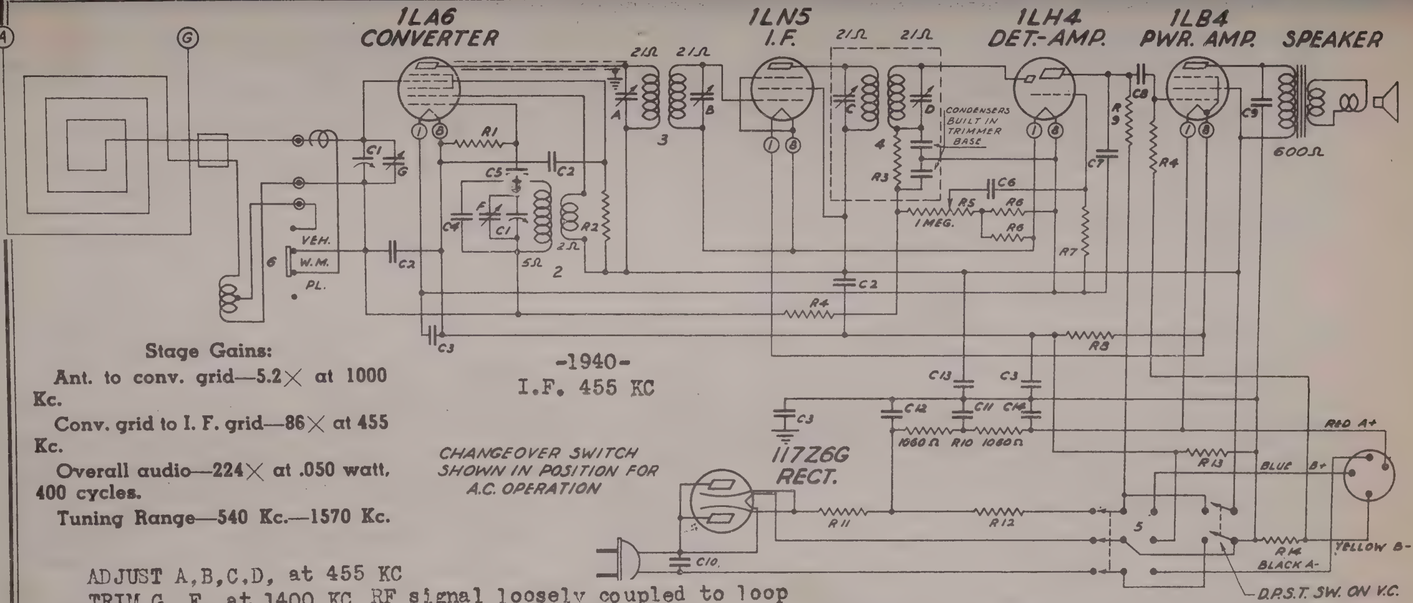
TRIM OSC(F)1500 KC
TRIM ANT(G)1400 KC





ZENITH RADIO CORP.

MODELS 5G500, 5G500L
Ch. 5A01



Stage Gains:

Ant. to conv. grid—5.2× at 1000 Kc.

Conv. grid to I. F. grid—86× at 455 Kc.

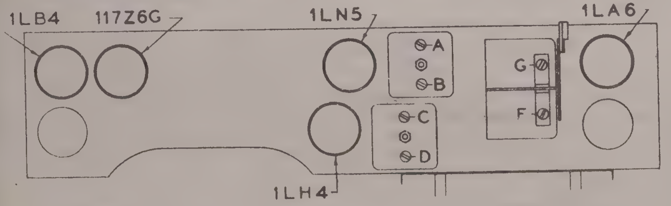
Overall audio—224× at .050 watt, 400 cycles.

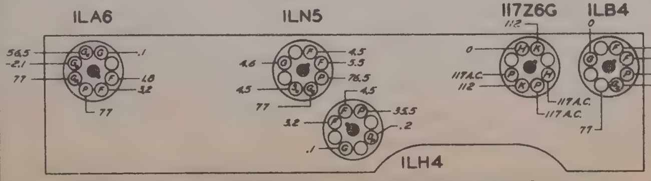
Tuning Range—540 Kc.—1570 Kc.

-1940-
I.F. 455 KC

CHANGEOVER SWITCH SHOWN IN POSITION FOR A.C. OPERATION

ADJUST A, B, C, D, at 455 KC
TRIM G, F, at 1400 KC RF signal loosely coupled to loop





VOLTAGES MEASURED FROM SOCKET TERMINALS TO A.C. LINE AT CHANGEOVER SWITCH.

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1024	TWO GANG VARIABLE		R1	63-773	180 M OHM	¼ W.
C2	22-829	.05 MFD.	200 V.	R2	63-590	15 M OHM	¼ W.
C3	22-827	.1 MFD.	200 V.	R3	63-713	47 M OHM	½ W.
C4	22-988	20 MMFD.	600 V.	R4	63-722	2.2 MEGOHM	¼ W.
C5	22-162	.0001 MFD.	600 V.	R5	63-1121	VOLUME CONTROL	
C6	22-492	.002 MFD.	600 V.	R6	63-587	4700 OHM	¼ W.
C7	22-470	.00015 MFD.	600 V.	R7	63-1093	15 MEGOHM	¼ W.
C8	22-243	.01 MFD.	400 V.	R8	63-1097	870 OHM WIREWOUND	1 W.
C9	22-448	.004 MFD.	600 V.	R9	63-271	1 MEGOHM	¼ W.
C10	22-869	.05 MFD.	400 V.	R10	63-1120	2-SECTION CANDOHM	
C11	22-1026	20 MFD. ELECTROLYTIC	150 V.	R11	63-1096	140 OHM WIREWOUND	2 W.
C12		40 MFD. "	150 V.	R12	63-439	2700 OHM	¼ W.
C13	22-1027	20 MFD. "	150 V.	R13	63-1099	33 OHM WIREWOUND	½ W.
C14		30 MFD. "	25 V.	R14	63-742	180 OHM	¼ W.

All voltages measured from point indicated to Neg. B. using 20000 ohm per volt meter.

Line voltage—117 v. A.C.

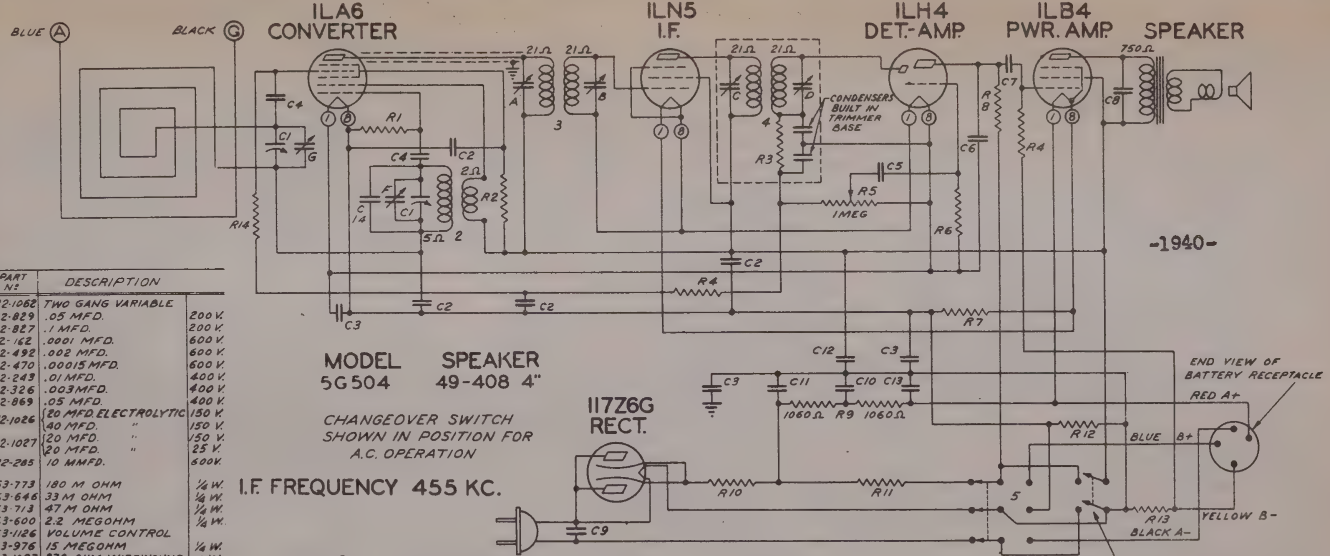
Power consumption—117 v.—20 watts.

Power consumption, battery—1.02 watts.

MODEL	SPEAKER
5G500	49-386 5½"
5G500L	49-386 5½"

MODEL 5G504
Ch. 5A03

ZENITH RADIO CORP.

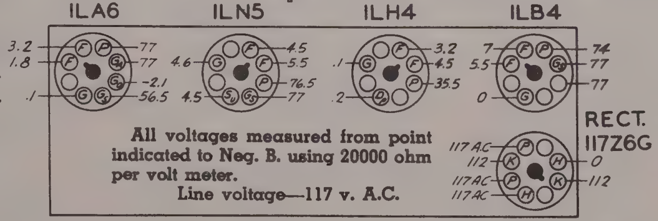


MODEL 5G504 SPEAKER 49-408 4"

CHANGEOVER SWITCH SHOWN IN POSITION FOR A.C. OPERATION

I.F. FREQUENCY 455 KC.

DIAG Nº	PART Nº	DESCRIPTION	
C1	22-1062	TWO GANG VARIABLE	
C2	22-829	.05 MFD.	200 V.
C3	22-827	.1 MFD.	200 V.
C4	22-162	.0001 MFD.	600 V.
C5	22-492	.002 MFD.	600 V.
C6	22-470	.00015 MFD.	600 V.
C7	22-243	.01 MFD.	400 V.
C8	22-326	.003 MFD.	400 V.
C9	22-869	.05 MFD.	400 V.
C10	22-1026	20 MFD. ELECTROLYTIC	150 V.
C11		40 MFD. "	150 V.
C12	22-1027	20 MFD. "	150 V.
C13		20 MFD. "	25 V.
C14	22-285	10 MMFD.	600 V.
R1	63-773	180 M OHM	¼ W.
R2	63-646	33 M OHM	¼ W.
R3	63-713	47 M OHM	¼ W.
R4	63-600	2.2 MEGOHM	¼ W.
R5	63-1126	VOLUME CONTROL	
R6	63-976	15 MEGOHM	¼ W.
R7	63-1097	870 OHM WIREWOUND	1 W.
R8	63-271	1 MEGOHM	¼ W.
R9	63-1137	2-SECTION CANDOHM	
R10	63-1096	140 OHM WIREWOUND	2 W.
R11	63-439	2700 OHM	¼ W.
R12	63-1099	33 OHM WIREWOUND	½ W.
R13	63-742	180 OHM	¼ W.
R14	63-296	220 M OHM	¼ W.
1	S8742	WAVEMAGNET ASSEMBLY	
2	S8730	OSC. COIL ASSEMBLY	
3	95-720	1ST I.F. TRANSFORMER	
4	95-721	2ND I.F. TRANSFORMER	
5	85-242	CHANGEOVER SWITCH	
A		1ST I.F. TRANS. PRI.	
B		1ST I.F. " SEC.	
C		2ND I.F. " PRI.	
D		2ND I.F. " SEC.	
F		BROADCAST OSC. (ON GANG)	
G		BROADCAST ANT. (ON GANG)	



All voltages measured from point indicated to Neg. B. using 20000 ohm per volt meter.
Line voltage—117 v. A.C.

Power consumption—117 v.—20 watts.

Power consumption, battery—1.02 watts.

Power output—170 milliwatts.

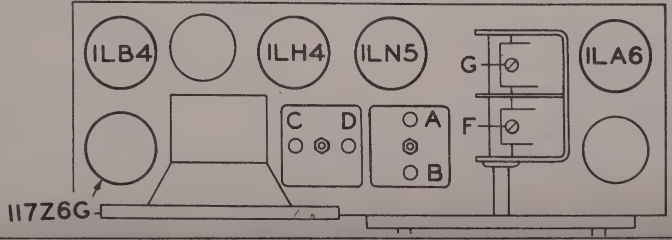
Stage Gains:

Ant. to conv. grid—4.9× at 1000 Kc.

Conv. grid to I. F. grid—53× at 455 Kc.

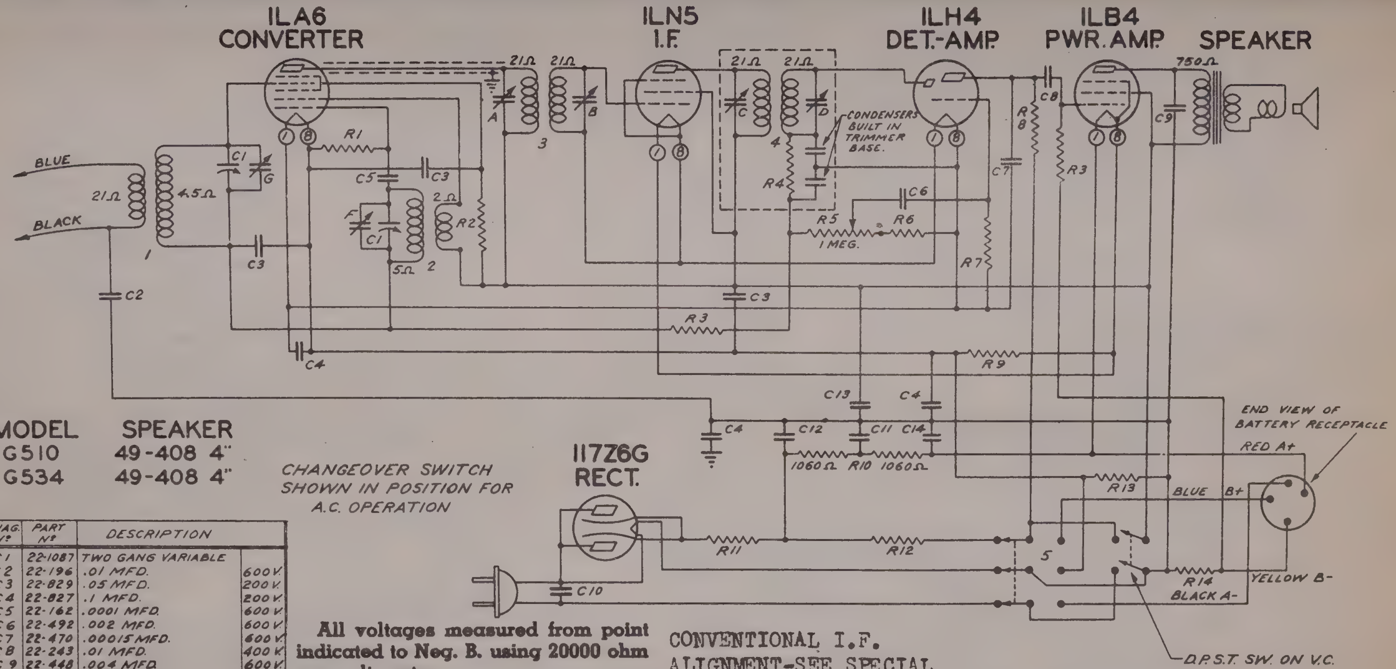
Overall audio—280× at .050 watt, 400 cycles.

Tuning Range—540 Kc.—1600 Kc.



I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII

I.F. TRIMMERS A,B,C,D
For R.F. Alignment
Couple test oscillator
thru single turn loop
to "Wavemagnet
TRIM OSC,ANT (F,G) 1400 KC



MODEL	SPEAKER
5G510	49-408 4"
5G534	49-408 4"

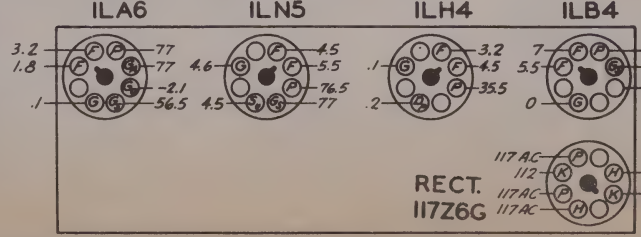
DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1087	TWO GANG VARIABLE	
C2	22-196	.01 MFD.	600 V.
C3	22-829	.05 MFD.	200 V.
C4	22-827	.1 MFD.	200 V.
C5	22-162	.0001 MFD.	600 V.
C6	22-492	.002 MFD.	600 V.
C7	22-470	.00015 MFD.	600 V.
C8	22-243	.01 MFD.	400 V.
C9	22-448	.004 MFD.	600 V.
C10	22-869	.05 MFD.	400 V.
C11	22-1026	20 MFD. ELECTROLYTIC	150 V.
C12		40 MFD. "	150 V.
C13	22-1027	20 MFD. "	150 V.
C14		20 MFD. "	25 V.
R1	63-654	180 M OHM	¼ W.
R2	63-646	33 M OHM	¼ W.
R3	63-600	2.2 MEGOHM	¼ W.
R4	63-713	47 M OHM	¼ W.
R5	63-1144	VOLUME CONTROL	
R6	63-587	4700 OHM	¼ W.
R7	63-1093	15 MEGOHM	¼ W.
R8	63-271	1 MEGOHM	¼ W.
R9	63-1097	870 OHM WIREWOUND	1 W.
R10	63-1137	2 SECTION CANDOHM	
R11	63-1096	140 OHM WIREWOUND	2 W.
R12	63-439	2700 OHM	¼ W.
R13	63-1099	33 OHM WIREWOUND	½ W.
R14	63-627	180 OHM	¼ W.

All voltages measured from point indicated to Neg. B. using 20000 ohm per volt meter.

Antenna disconnected — volume control at minimum and condenser plates in full mesh.

Line voltage—117 v. A.C.

CONVENTIONAL I.F.
ALIGNMENT-SEE SPECIAL
SECTION VOL. VIII
I.F. 455 KC
TRIM ANT-OSC 1400 KC



Power consumption—117 v.—18.5 watts.

Power consumption, battery—1.02 watts.

Power output—160 milliwatts.

Stage Gains:

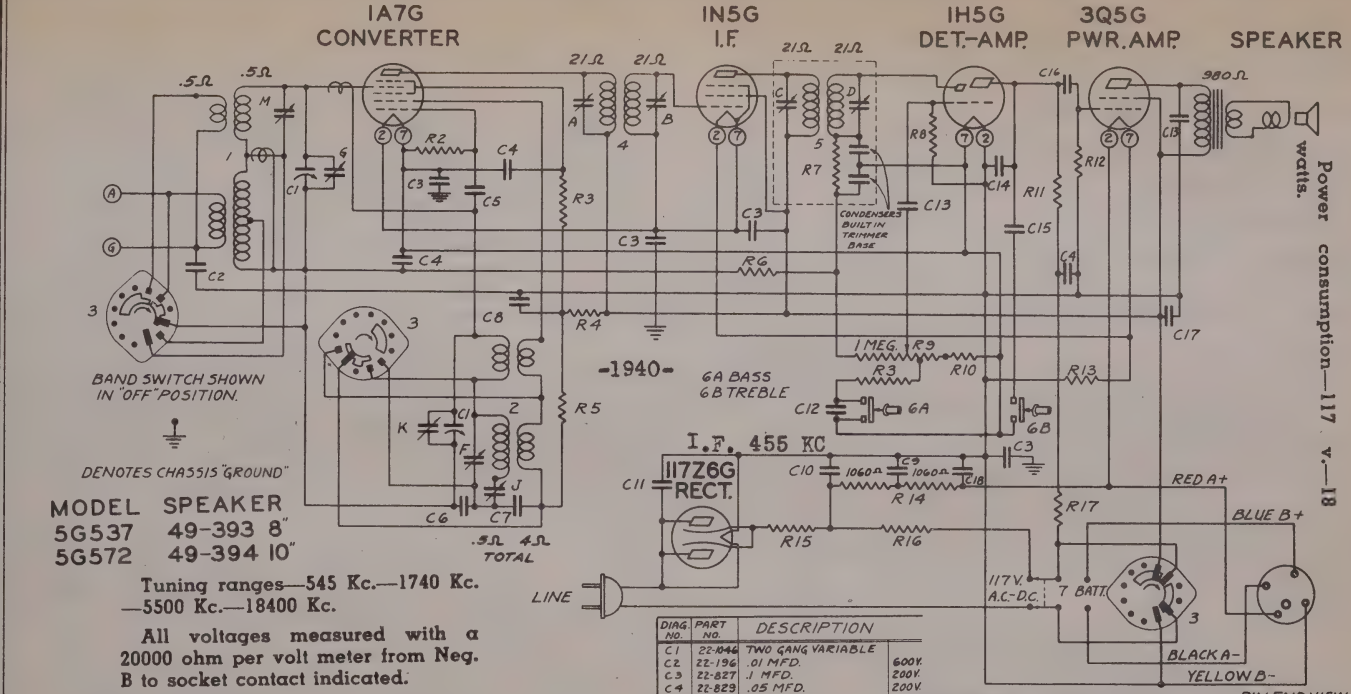
Ant. to conv. grid—3.8× at 1000 Kc.

Conv. grid to I. F. grid—65× at 455 Kc.

Overall audio—260× at .050 watt, 400 cycles.

Tuning Range—540 Kc.—1600 Kc.

ZENITH RADIO CORP.

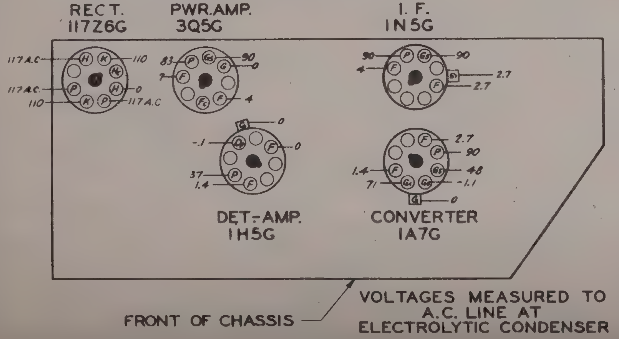


Power consumption—117 v.—18 watts.

MODEL	SPEAKER
5G537	49-393 8"
5G572	49-394 10"

Tuning ranges—545 Kc.—1740 Kc.
—5500 Kc.—18400 Kc.

All voltages measured with a 20000 ohm per volt meter from Neg. B to socket contact indicated.



DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-1046	TWO GANG VARIABLE	
C2	22-196	.01 MFD.	600V.
C3	22-827	.1 MFD.	200V.
C4	22-829	.05 MFD.	200V.
C5	22-289	50 MMFD.	600V.
C6	22-1022	.005 MFD.	600V.
C7	22-182	.00025 MFD.	600V.
C8	22-1047	10 MFD. ELECTROLYTIC	150V.
C9		20 MFD. ELECTROLYTIC	150V.
C10		30 MFD. ELECTROLYTIC	150V.
C11	22-869	.05 MFD.	400V.
C12	22-826	.01 MFD.	200V.
C13	22-492	.002 MFD.	600V.
C14	22-470	.00015 MFD.	600V.
C15	22-887	.001 MFD.	600V.
C16	22-243	.01 MFD.	400V.
C17	22-1027	20 MFD. ELECTROLYTIC	150V.
C18		20 MFD. ELECTROLYTIC	25V.
R2	63-654	180M OHM	¼W.
R3	63-593	47M OHM	¼W.
R4	63-635	3300 OHM	¼W.
R5	63-640	8200 OHM	¼W.
R6	63-669	3.9 MEGOHM	¼W.
R7	63-713	47M OHM	¼W.
R8	63-976	15 MEGOHM	¼W.
R9	63-1124	VOLUME CONTROL	
R10	63-587	4700 OHM	¼W.
R11	63-271	1 MEGOHM	¼W.

DIAG. NO.	PART NO.	DESCRIPTION	
R12	63-600	2.2 MEGOHM	¼W.
R13	63-1097	870 OHM WIREWOUND	1 W.
R14	63-1120	2-SECTION CANDOHM	
R15	63-1096	140 OHM WIREWOUND	2 W.
R16	63-605	1000 OHM	½W.
R17	63-597	470M OHM	¼W.
1	5-8509	ANT. COIL ASSEMBLY	
2	5-8510	OSC. COIL ASSEMBLY	
3	85-232	BAND SELECTOR SWITCH	
4	95-711	1ST I.F. TRANSFORMER	
5	95-712	2ND I.F. TRANSFORMER	
6	5-8531	TONE CONTROL SWITCH ASSEM.	
7	85-171	POWER SWITCH	

FOR ALIGNMENT SEE INDEX

Stage Gains:

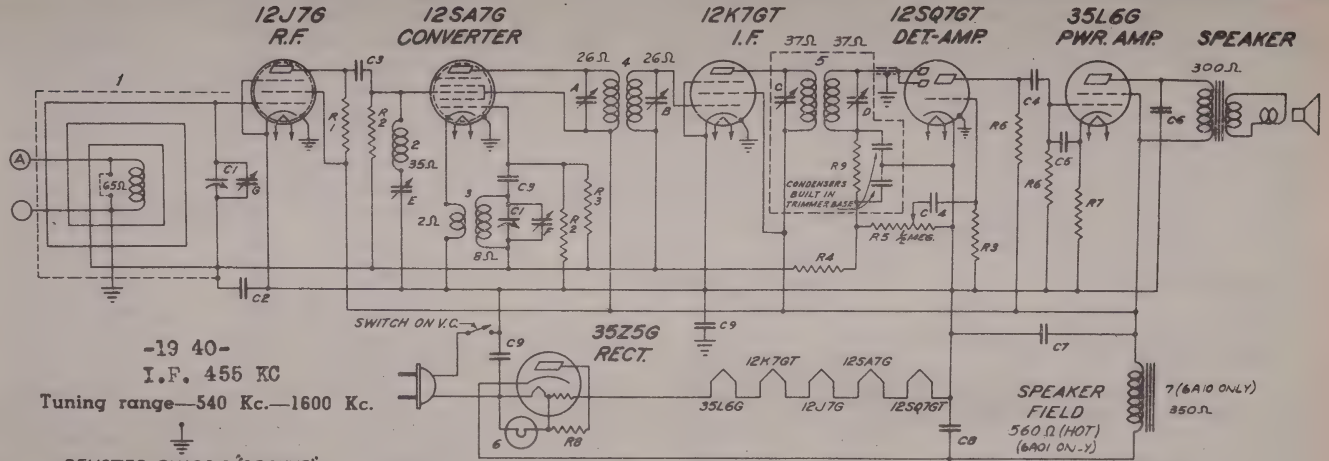
Ant. to conv. grid—4× at 1000 Kc.

Conv. grid to I. F. grid—129× at 455 Kc.

Overall audio—476× at .050 watt. 400 cycles.

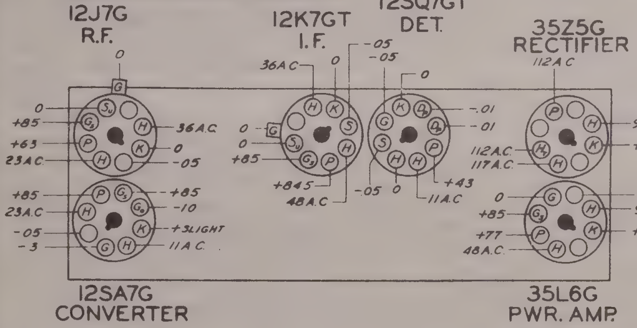
ZENITH RADIO CORP.

MODEL 6D510, Ch. 6A01
MODELS 6D525, 6D526,
Ch. 6A10



-19 40-
I.F. 455 KC
Tuning range—540 Kc.—1600 Kc.

DENOTES CHASSIS "GROUND"



DIAG. No.	PART No.	DESCRIPTION	
C1	22-1006	TWO-GANG VARIABLE	
C2	22-829	.05 MFD.	200V.
C3	22-162	.0001 MFD.	600V.
C4	22-243	.01 MFD.	400V.
C5	22-854	.0005 MFD.	600V.
C6	22-1049	.03 MFD.	400V.
C7	22-1014	20 MFD. ELECTROLYTIC	150V.
C8		20 MFD. ELECTROLYTIC	150V.
C9	22-1017	.05 MFD.	200V.
R1	63-589	10M OHM	½ W.
R2	63-591	22M OHM	½ W.
R3	63-1093	15 MEGOHM	½ W.
R4	63-600	2.2 MEGOHM	½ W.
R5	63-1112	VOLUME CONTROL	
R6	63-597	470M OHM	½ W.
R7	63-686	150 OHM WIREWOUND	½ W.
R8	63-1023	22 OHM WIREWOUND	½ W.
R9	63-713	47M OHM	½ W.

DIAG. No.	PART No.	DESCRIPTION
1		WAVEMAGNET ASSEMBLY
2	S8326	WAVE TRAP COIL ASSEMBLY
3	S8336	OSC. COIL ASSEMBLY
4	95-696	1ST I.F. TRANS.
5	95-697	2ND I.F. TRANS.
6	100-67	PILOT LIGHT 6.3V .15A.
7	95-713	FILTER CHOKE (300Ω RES.)
A		1ST I.F. TRANS. PRI.
B		1ST I.F. TRANS. SEC.
C		2ND I.F. TRANS. PRI.
D		2ND I.F. TRANS. SEC.
E	22-1015	WAVE TRAP
F		BROADCAST OSC. (ON GANG)
G		BROADCAST ANT. (ON GANG)

CHASSIS	MODEL	SPKR.
6A01	6D510	49-385 4
6A10	6D525	49-403 4
6A10	6D526	49-403 4

All voltages measured with a 20,000 ohm per volt meter from Neg. B to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control on full.

Line voltage 117 v. A.C.

Stage Gains:

Ant. to R.F. grid—5.5× at 1000 Kc.

R.F. grid to conv. grid—6.2× at 1000 Kc.

Conv. grid to I.F. grid—51× at 455 Kc.

Overall audio—289× at .25 watt, 400 cycles.

FOR OTHER DATA SEE INDEX

6A01 uses dynamic speaker.

6A08 has phono connections

6A08 and 6A10 use P.M. speaker with choke to replace field winding.

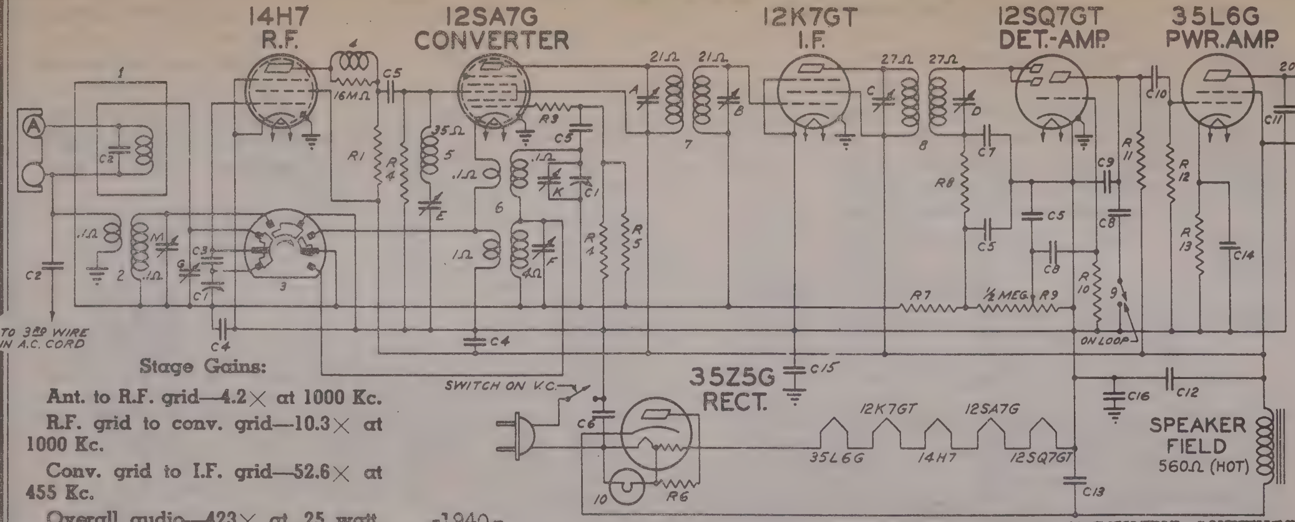
Power consumption—6A01-6A10—25.5 watts.

Power consumption—6A08—40.5 watts.

Power output—1. watt.

MODELS 6D512, 6D512W,
6D539, Ch. 6A16

ZENITH RADIO CORP.



MODEL	SPEAKER	
6D512	49-414	5"
6D512W	49-414	5"
6D539	49-414	5"

Stage Gains:

Ant. to R.F. grid—4.2× at 1000 Kc.

R.F. grid to conv. grid—10.3× at 1000 Kc.

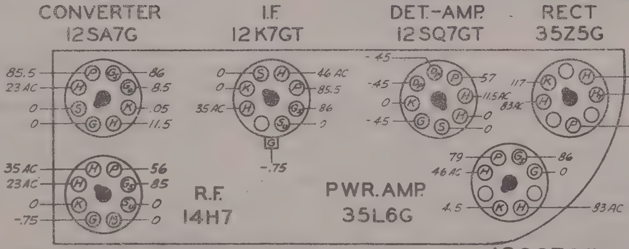
Conv. grid to I.F. grid—52.6× at 455 Kc.

Overall audio—423× at .25 watt. 400 cycles.

-1940-

8-22-40	C16 ADDED & 22-1157 WAS 22-467
8-16-40	C15 ADDED
8-14-40	C5 AT V.C. ADDED

DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1071	TWO-GANG VARIABLE	
C2	22-289	50 MMFD.	600 V.
C3	22-1090	.00083 MFD.	600 V.
C4	22-829	.05 MFD.	200 V.
C5	22-162	.0001 MFD.	600 V.
C6	22-1017	.05 MFD.	200 V.
C7	22-182	.00025 MFD.	600 V.
C8	22-492	.002 MFD.	600 V.
C9	22-716	.0005 MFD.	600 V.
C10	22-243	.01 MFD.	400 V.
C11	22-1100	.06 MFD.	400 V.
C12	22-1079	15 MFD. ELECTROLYTIC	150 V.
C13		30 MFD. ELECTROLYTIC	150 V.
C14		20 MFD. ELECTROLYTIC	25 V.
C15	22-1157	.03 MFD.	200 V.
C16	22-1158	.05 MFD.	200 V.
R1	63-587	4700 OHM	¼ W.
R3	63-576	68 OHM	¼ W.
R4	63-591	22M OHM	¼ W.
R5	63-1093	15 MEGOHM	¼ W.
R6	63-1023	22 OHM WIREWOUND	½ W.
R7	63-599	1.5 MEGOHM	¼ W.
R8	63-593	47 M OHM	¼ W.
R9	63-1130	VOLUME CONTROL	
R10	63-976	15 MEGOHM	¼ W.
R11	63-296	220 M OHM	¼ W.
R12	63-597	470 M OHM	¼ W.
R13	63-686	150 OHM WIREWOUND	½ W.



All voltages measured with a 20000 ohm per volt meter from Neg. B to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

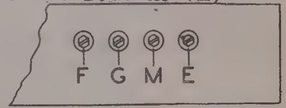
Volume control on full.

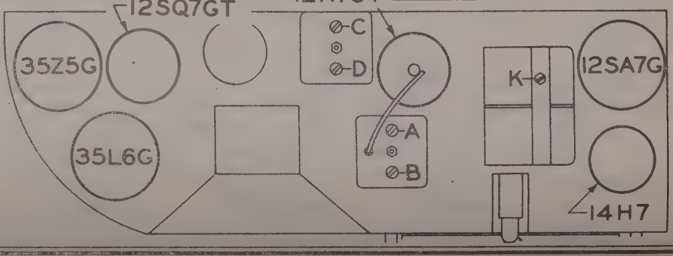
Line voltage 117 v. A.C.

Power consumption—27 watts.

Tuning Range—540 Kc.—1600 Kc. 5600 Kc.—16000 Kc.

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
I.F. TRIMMERS A,B,C,D. ALIGN AT
455 KC. ADJUST WAVETRAP E FOR
MIN. SIGNAL AT 455 KC, SIG. FED
TO 14H7 GRID. TRIM SW (F,G) 15 MC
TRIM BC OSC 1500 KC (H)





SERVICE NOTES

All chassis

Weak short wave—Open R.F. choke in plate circuit of 1232 tube.

Noisy—Dial rubbing against escutcheon. Stator lugs on braid of gang condenser rubbing against side of opening in chassis. Make sure all loktal type tubes are firmly seated in sockets.

Cannot be aligned—Check for open or rosin connection on primary winding of wavemagnet.

Overloads—Usually due to open resistor in A.V.C. circuit of first detector.

Phono Models

Distortion—Check for broken crystal in pickup.

Low Volume—Check for poor contact in phono switch and plug contacts—check shield on lead from crystal for poor ground.

6A02-6A04

Noisy—right hand pilot light wiring may be pinched by automatic bracket.

Check for poor contact on manual push button.

Check for loose or poor contacts on pilot lights.

Oscillation on short wave band—Push black lead of automatic away from automatic adjustments. Keep white and green leads of automatic away from 7L7-7H7 socket.

7A02-7A04

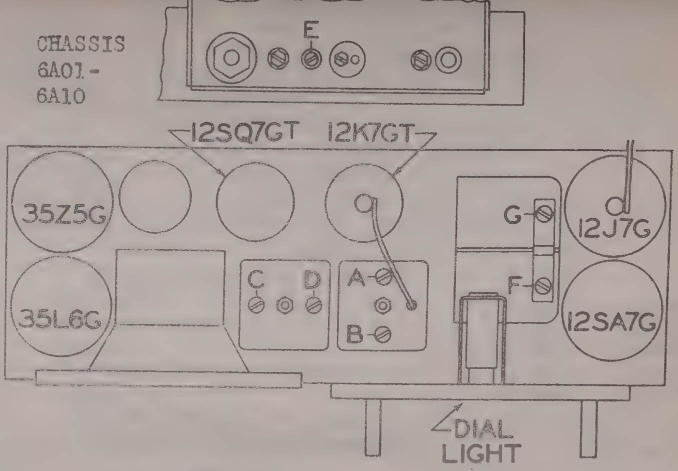
Dead—480 mmfd. condenser on automatic may be grounded against automatic frame or latch bar.

Oscillation—Push leads of wave trap close to chassis keeping them away from antenna coil.

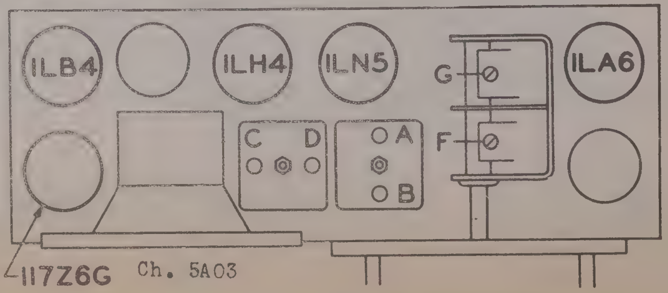
12A3

Hum—Change 6J5 in first audio socket.

ALIGNMENT-CHASSIS 6A01-6A10
PEAK I.F. TRIMMERS A B C D
AT 455 KC. FEED 455-KC SIGNAL
TO R-F GRID AND ADJUST WAVE-
TRAP TRIMMER E FOR MINIMUM
RESPONSE.
TRIM F AT 1600 KC
TRIM G AT 1400 KC

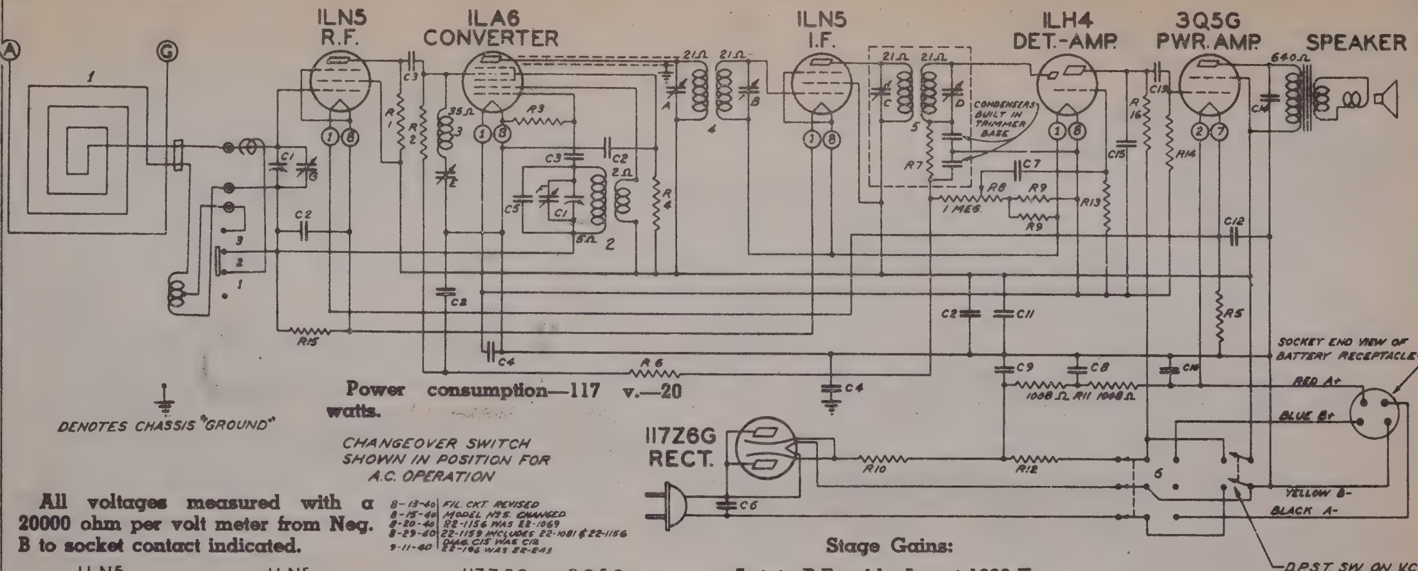


ALIGNMENT-CHASSIS 5A03
PEAK I.F. TRIMMERS A B C D
AT 455 KC. COUPLE TEST OSC-
ILLATOR VIA SINGLE TURN
LOOP LOOSELY TO WAVEMAGNET
AND TRIM F AND G AT 1400 KC



MODELS 6G501F, 6G501M,
6G501L, 6G505,
Ch. 6A19

ZENITH RADIO CORP.

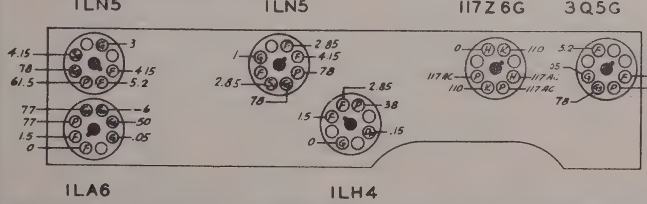


Power consumption—117 v.—20 watts.

CHANGEOVER SWITCH SHOWN IN POSITION FOR A.C. OPERATION

All voltages measured with a 20000 ohm per volt meter from Neg. B to socket contact indicated.

8-13-40 FIL. CKT. REVISED
8-15-40 MODEL NOS. CHANGED
8-20-40 22-1156 WAS 22-1069
8-29-40 22-1159 INCLUDES 22-1081 & 22-1156
DIAG. C15 WAS C12
9-11-40 22-196 WAS 22-243



Stage Gains:

Ant. to R.F. grid—5× at 1000 Kc.

R.F. grid to conv. grid.—6.5× at 1000 Kc.

Conv. grid to I.F. grid—49.1× at 455 Kc.

Overall audio—322× at .05 watt, 400 cycles.

Tuning Range—540 Kc. to 1570 Kc.

MODEL	SPEAKER
6G501F	49-420 5½
6G501M	49-420 5½
6G501L	49-420 5½
6G505	49-420 5½

DIAG. NO	PART NO	DESCRIPTION		DIAG. NO	PART NO	DESCRIPTION		DIAG. NO	PART NO	DESCRIPTION
C1	22-1024	TWO GANG VARIABLE		R2	63-595	100 M OHM	½ W.	2	S8874	OSCILLATOR ASSEMBLY
C2	22-829	.05 MFD.	200 V.	R3	63-773	180 M OHM	½ W.	3	S8326	WAVE TRAP ASSEMBLY
C3	22-162	.0001 MFD.	600 V.	R4	63-592	33 M OHM	½ W.	4	95-739	1ST I.F. TRANSFORMER
C4	22-827	.1 MFD.	200 V.	R5	63-1097	870 OHM WIREWOUND	1 W.	5	95-740	2ND I.F. TRANSFORMER
C5	22-988	20 MMFD.	600 V.	R6	63-600	2.2 MEGOHM	½ W.	6	85-224	CHANGEOVER SWITCH
C6	22-869	.05 MFD.	400 V.	R7	63-713	47 M OHM	½ W.	7	85-225	WAVEMAGNET SWITCH
C7	22-492	.002 MFD.	600 V.	R8	63-1121	VOLUME CONTROL				
C8	22-1026	20 MFD. ELECTROLYTIC	150 V.	R9	63-587	4700 OHM	½ W.			
C9		40 MFD. ELECTROLYTIC	150 V.	R10	63-1096	140 OHM WIREWOUND	2 W.			
C10	22-1159	20 MFD. ELECTROLYTIC	25 V.	R11	63-1132	2-SECTION CANDOHM		A		1ST I.F. TRANS. PRI
C11		40 MFD. ELECTROLYTIC	150 V.	R12	63-1156	1800 OHM	½ W.	B		1ST I.F. TRANS. SEC.
C12		40 MFD. ELECTROLYTIC	25 V.	R13	63-1093	15 MEGOHM	½ W.	C		2ND I.F. TRANS. PRI.
C13	22-196	.01 MFD.	600 V.	R14	63-722	2.2 MEGOHM	½ W.	D		2ND I.F. TRANS. SEC.
C14	22-468	.004 MFD.	600 V.	R15	63-325	150M OHM	½ W.	E	22-1086	WAVE TRAP
C15	22-470	.00015 MFD.	600 V.	R16	63-271	1 MEGOHM	½ W.	F		BROADCAST OSC. (ON GANG)
								G		BROADCAST ANT. (ON GANG)
R1	63-590	15M OHM	½ W.	1	S8984	WAVEMAGNET ASSEM.				

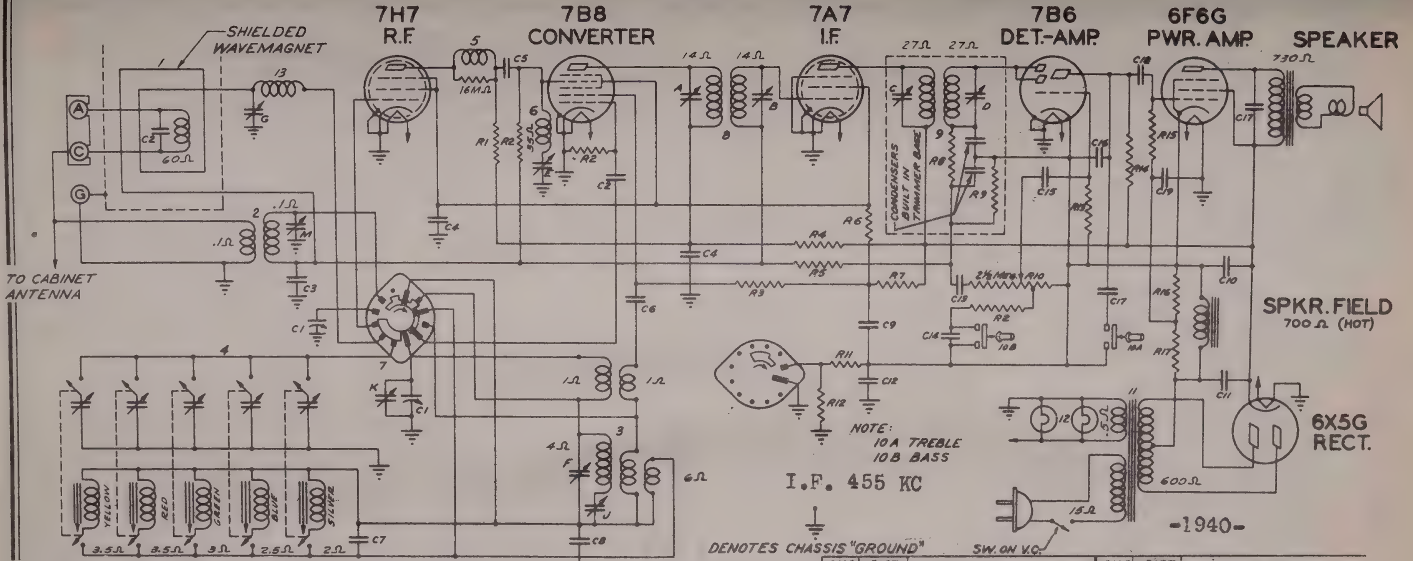
ALIGNMENT

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
WAVETRAP (E)
ADJUST FOR MINIMUM RESPONSE
FEEDING 455 KC SIGNAL TO
MIXER GRID
TRIM OSC-ANT AT 1400 KC

110V. A.C.-D.C.-BATTERY PACK
UNIVERSAL PORTABLE
I.F. FREQUENCY 455KC.

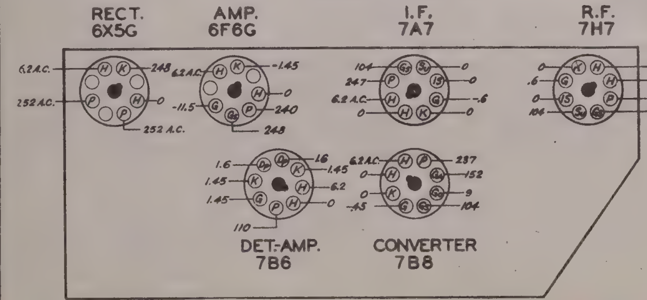
ZENITH RADIO CORP.

MODELS 6S546, 6S556
Ch. 6A05



FOR OTHER DATA SEE INDEX

BAND SWITCH SHOWN IN AUTOMATIC POSITION



Power consumption—60 watts.

Power output—6 watts.

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

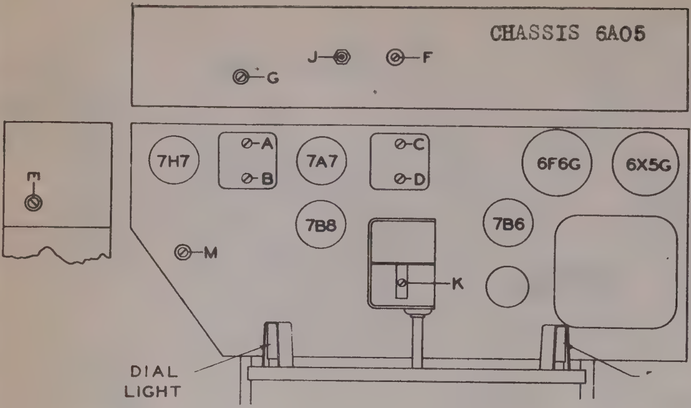
Line voltage 117 A.C.

DIAG. No.	PART No.	DESCRIPTION		DIAG. No.	PART No.	DESCRIPTION	
C1	22-1044	TWO GANG VARIABLE		C19	22-138	.2 MFD.	200 V.
C2	22-289	50 MMFD.	600 V.				
C3	22-829	.05 MFD.	200 V.				
C4	22-828	.05 MFD.	400 V.				
C5	22-162	.0001 MFD.	600 V.	R1	63-637	4700 OHM	¼ W.
C6	22-182	.00025 MFD.	600 V.	R2	63-593	47M OHM	¼ W.
C7	22-868	COMPENSATING COND.		R3	63-150	10M OHM	½ W.
C8	22-1022	.005 MFD.	600 V.	R4	63-583	1000 OHM	¼ W.
C9	22-1034	5 MFD. ELECTROLYTIC	450 V.	R5	63-599	1.5 MEGOHM	¼ W.
C10		15 MFD. "	350 V.	R6	63-1102	15M OHM	½ W.
C11	22-1036	14 MFD. "	450 V.	R7	63-1101	8200 OHM	2 W.
C12	22-827	.1 MFD.	200 V.	R8	63-713	47M OHM	¼ W.
C13	22-188	.02 MFD.	400 V.	R9	63-719	470M OHM	¼ W.
C14	22-229	.005 MFD.	600 V.	R10	63-1123	VOLUME CONTROL	
C15	22-492	.002 MFD.	600 V.	R11	63-1098	42 OHM WIREWOUND	¼ W.
C16	22-854	.0005 MFD.	600 V.	R12	63-624	68 OHM	¼ W.
C17	22-448	.004 MFD.	600 V.	R13	63-976	15 MEGOHM	¼ W.
C18	22-830	.02 MFD.	600 V.	R14	63-296	220M OHM	¼ W.
R15	63-597	470M OHM	¼ W.	13	S8474	LOOP LOADING COIL	
R16	63-654	180M OHM	¼ W.	A		1ST I.F. TRANS. PRI.	
R17	63-656	270M OHM	¼ W.	B		1ST I.F. " SEC.	
				C		2ND I.F. " PRI.	
1		WAVEMAGNET ASSEMBLY		D		2ND I.F. " SEC.	
2	S8507	ANTENNA COIL ASSEMBLY		E	22-1015	WAVE TRAP	
3	S8508	OSCILLATOR COIL ASSEMBLY		F	22-1042	BROADCAST OSCILLATOR	
4	S8457	AUTOMATIC TUNING UNIT		G	22-1042	BROADCAST ANTENNA	
5	S8359	R.F. CHOKE & RES. ASSEMBLY		J	22-1025	BROADCAST PADDER	
6	S8326	WAVE TRAP ASSEMBLY		K		SHORT WAVE OSC. (ON GANG)	
7	85-233	BAND SELECTOR SWITCH		M	22-1042	SHORT WAVE ANTENNA	
8	95-708	1ST I.F. TRANSFORMER					
9	95-709	2ND I.F. TRANSFORMER					
10	S8531	TONE CONTROL SWITCH					
11	95-710	POWER TRANS. 50-60 ~ 117 V.					
12	100-36	PILOT LIGHT 6.3 V. .25 A.					

MODEL	SPEAKER
6S546	49-388 6"
6S556	49-390 10"

Ch. 6A05
Ch. 10A3

ZENITH RADIO CORP.



ALIGNMENT
CHASSIS 6A05
I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL VIII
I.F. TRIMMERS A B C D
PEAK AT 455 KC
WITH 455-KC SIGNAL AT R-F
GRID. ADJUST E FOR MINIMUM
RESPONSE.
TRIM K AT 18 MC
TRIM M at 16 MC
TRIM F, G AT 1500 KC
PAD J AT 600 KC

CHASSIS 6A05
Stage Gains

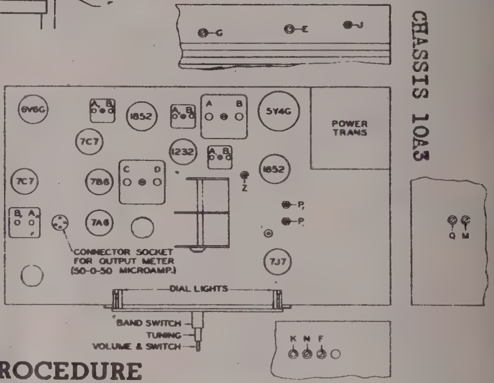
Ant. to R.F. grid—3.8× at 1000 Kc.

R.F. grid to conv. grid—7× at 1000 Kc.

Conv. grid to I.F. grid—92× at 455 Kc.

Overall audio—778× at 1 watt 400 cycles.

Tuning ranges— 545 Kc.— 1570 Kc.
5700 Kc.—18300 Kc.



ALIGNMENT PROCEDURE

CHASSIS 10A3

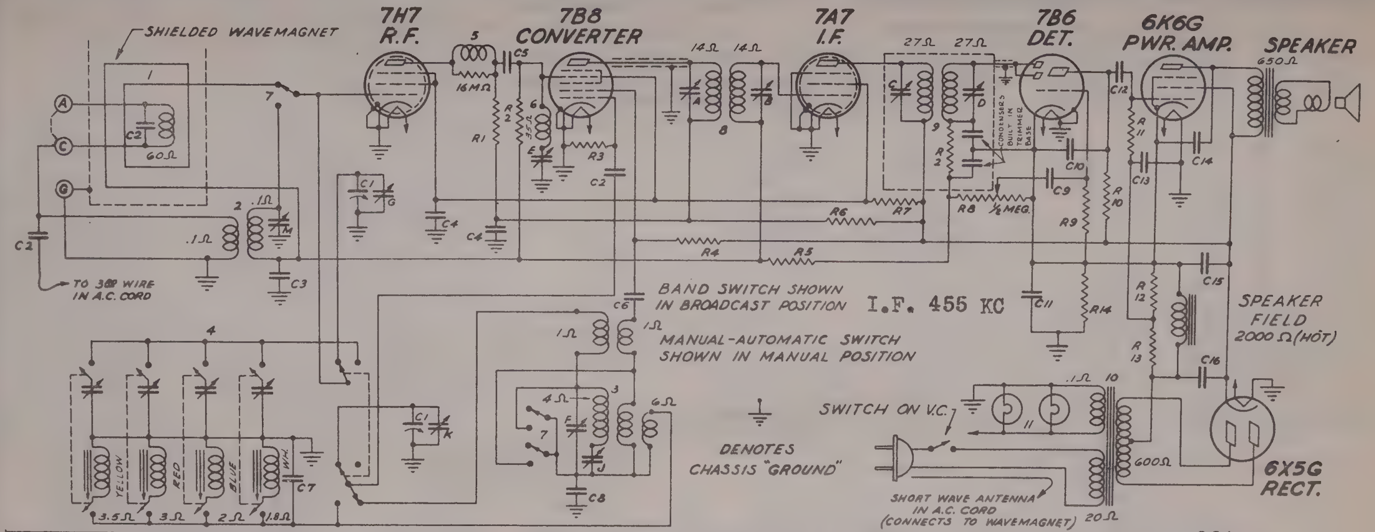
Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Connect Output Meter to	Trimmers	Purpose
1	Con. Grid	0.5 Mfd.	455 Kc.	B.C.	600 Kc.	6V6G Output	A B C D	Align I.F.
2	R.F. Grid	0.5 Mfd.	455 Kc.	B.C.	600 Kc.	6V6G Output	E	I.F. Trap Adjust for Minimum
3	Ant. terminals marked Z and G	400 Ohms	18 Mc.	S.W.	18 Mc.	"	K	Set to Scale
4	"	"	16 Mc.	S.W.	16 Mc.	"	M	Align Ant.
5	"	"	5.0 Mc.	Med.	5.0 Mc.	"	N	Set to Scale
6	"	"	4.5 Mc.	Med.	4.5 Mc.	"	Q	Align Ant.
7	Single turn Loop Loosely coupled to loop		1400 Kc.	B.C.	1400 Kc.	"	F	Set Osc. to Scale
8	"		1400	B.C.	1400 Kc.	"	G	Align Ant.
9	"	"	600 Kc.	B.C.	600 Kc.	"	J (Rock Gang)	Broadcast Padder
10	1852 Grid	0.5 Mfd.	4.3 Mc.	Manual F.M.	4.3 Mc.	F.M. Output Meter Across Full Disc. Load	B4	Align for Zero Deflection
11	"	"	"	"	"	F.M. Output Meter Across Half Disc. Load	A4	Align for Max. Deflection
12	"	"	"	"	"	"	A3B3	"
13	767 1232 Grid	"	"	"	"	"	A2B2	"
14	7J7 Grid	"	"	"	"	"	A B	"
15	F.M. Ant. Terminals	100 Ohms	46.0 Mc.	"	46.0 Mc.	"	Adjust cam on gang shaft for scale	"
16	"	"	42.5 Mc.	"	42.5 Mc.	"	P	"
17	"	"	49 Mc.	"	49 Mc.	"	P2	"
18	"	"	46 Mc.	"	46 Mc.	"	Z	"

During F.M. Alignment keep input low, to obtain max. sensitivity for alignment. This is necessary because with large inputs the limiting action of the limiters masks alignment operations.

NOTE A 10M ohm per volt or higher voltmeter may be used as an F.M. output meter.

ZENITH RADIO CORP.

MODEL 6S511, Ch. 6A13
MODELS 6S527, 6S528, Ch. 6A02
MODEL 6S580, Ch. 6A04



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1007	TWO GANG VARIABLE	
C2	22-289	50 MMFD.	600 V.
C3	22-829	.05 MFD.	200 V.
C4	22-828	.05 MFD.	400 V.
C5	22-162	.0001 MFD.	600 V.
C6	22-182	.00025 MFD.	600 V.
C7	22-868	COMPENSATING COND.	
C8	22-1022	.005 MFD.	600 V.
C9	22-492	.002 MFD.	600 V.
C10	22-716	.0005 MFD.	600 V.
C11	22-827	.1 MFD.	200 V.
C12	22-830	.02 MFD.	600 V.
C13	22-219	.03 MFD.	200 V.
C14	22-448	.004 MFD.	600 V.
C15	22-1029	10 MFD. ELECTROLYTIC	250 V.
C16		15 MFD. "	350 V.

DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-757	4700 OHM	¼ W
R2	63-713	47 M OHM	¼ W.
R3	63-593	47 M OHM	¼ W.
R4	63-1054	10 M OHM	½ W.
R5	63-599	1.5 MEGOHM	¼ W.
R6	63-703	1000 OHM	¼ W.
R7	63-151	15 M OHM	1 W.
R8	63-1118	VOLUME CONTROL	
R9	63-976	15 MEGOHM	¼ W.
R10	63-296	220 M OHM	¼ W.
R11	63-597	470 M OHM	¼ W.
R12	63-260	100 M OHM	¼ W

DIAG. Nº	PART Nº	DESCRIPTION	
R13	63-659	470 M OHM	¼ W.
R14	63-1098	42 OHM WIREWOUND	½ W.
1	S8376	WAVEMAGNET ASSEMBLY	
2	S 8347	ANTENNA COIL ASSEM.	
3	S 8348	OSCILLATOR COIL ASSEM.	
4	S8384	AUTOMATIC TUNING ASSEM.	
5	S8359	R.F. CHOKE & RES. ASSEM.	
6	S 8326	WAVETRAP COIL ASSEM.	
7	85-223	BAND SELECTOR SWITCH	
8	95-698	1ST I.F. TRANSFORMER	
9	95-699	2ND I.F. TRANSFORMER	
10	95-700	PWR. TRANS. 50-60~ 117 V.	
11	100-67	PILOT LIGHT 6.3 V. .15 A.	

DIAG. Nº	PART Nº	DESCRIPTION
A		1ST I.F. TRANS. PRI.
B		1ST I.F. " SEC.
C		2ND I.F. " PRI.
D		2ND I.F. " SEC.
E	22-1015	WAVETRAP
F	22-1011	BROADCAST OSC.
G		B'DCAST ANT. (ON GANG)
J	22-1023	B'DCAST PADDER
K		SHORT WAVE OSC. (ON GANG)
M	22-1011	SHORT WAVE ANTENNA

-1940-

MODEL	SPEAKER	
6S511	49-384	5"
6S527	49-384	5"
6S528	49-384	5"

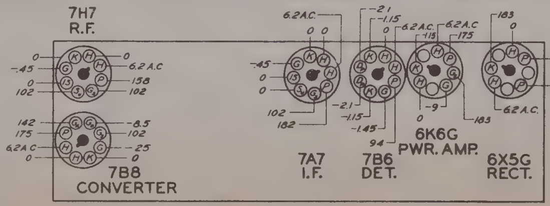
Stage Gains:

Ant. to R.F. grid—3.8× at 1000 Kc.

R.F. grid to conv. grid—10× at 1000 Kc.

Conv. grid to I.F. grid—71× at 455 Kc.

Overall audio—594× at .25 watt, 400 cycles.



All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

Line voltage 117 A.C.

Power consumption 6A02-6A13-6A14—40 watts.

Power consumption 6A04 — 55 watts.

Power output—2.6 watts.

Tuning ranges—545 Kc.—1570 Kc.
—5400 Kc.—18500 Kc.

FOR ALIGNMENT, TRIMMERS, P.B. DATA SEE INDEX

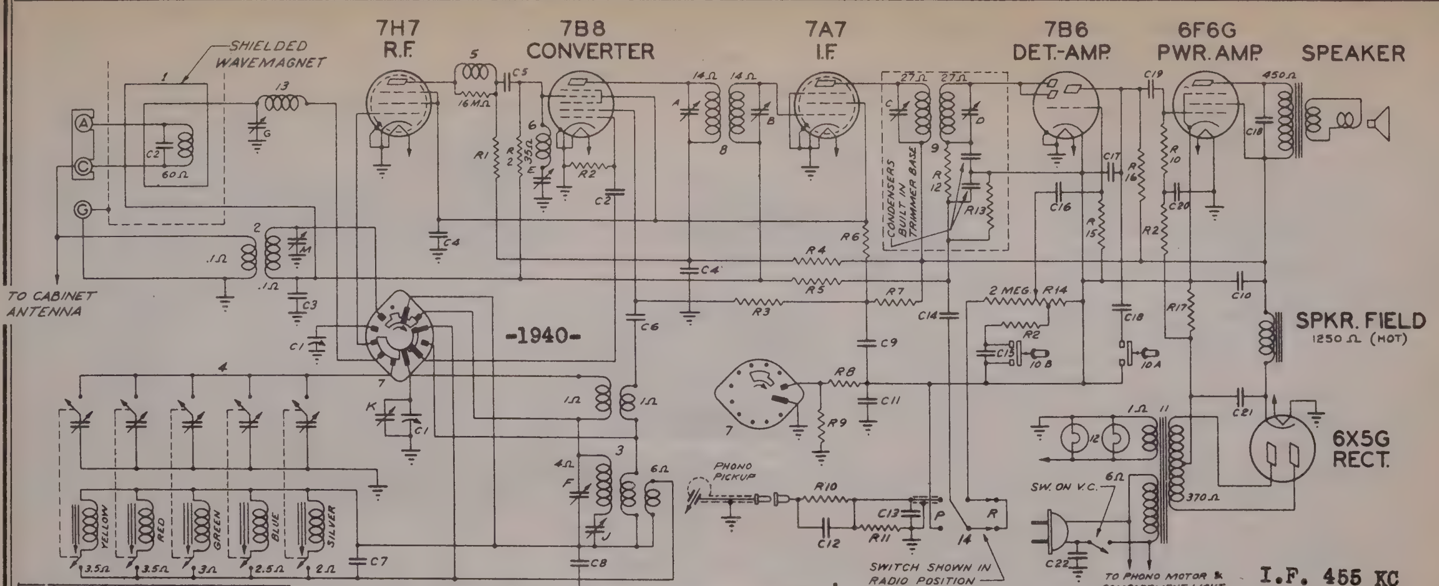
NOTE

Chassis 6A04 has phono connections added

Chassis 6A13 and 6A14 are identical with 6A02 except for color of automatic knobs.

MODELS 6S596, 6S597
Ch. 6A20

ZENITH RADIO CORP.



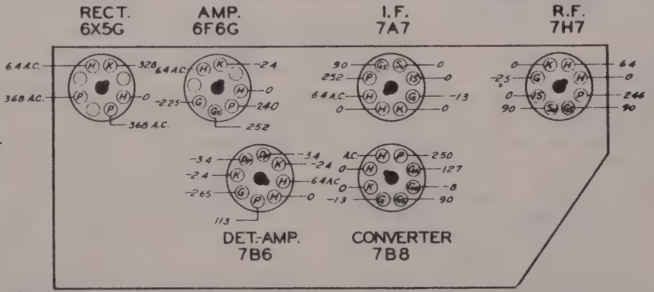
I.F. 455 KC

NOTE: 10A TREBLE 10B BASS

FOR ALIGNMENT SEE INDEX

BAND SWITCH SHOWN IN AUTOMATIC POSITION

DENOTES CHASSIS "GROUND"



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1044	TWO GANG VARIABLE	
C2	22-289	50 MMFD.	600V.
C3	22-829	.05 MFD.	200V.
C4	22-828	.05 MFD.	400V.
C5	22-162	.0001 MFD.	600V.
C6	22-182	.00025 MFD.	600V
C7	22-868	COMPENSATING COND.	
C8	22-1022	.005 MFD.	600V.
C9	22-1034	5 MFD. ELECTROLYTIC	450V.
C10		15 MFD. "	350V.
C11	22-827	.1 MFD.	200V.
C12	22-470	.00015 MFD.	600V.
C13	22-147	.0005 MFD.	600V.
C14	22-188	.02 MFD.	400V.
C15	22-229	.005 MFD.	600V.
C16	22-492	.002 MFD.	600V.
C17	22-854	.0005 MFD	600V.
C18	22-448	.004 MFD.	600V.
C19	22-830	.02 MFD.	600V.
C20	22-219	.03 MFD	200V.
C21	22-1036	14 MFD. ELECTROLYTIC	450V.
C22	22-1041	.005 MFD.	600V.
R1	63-637	4700 OHM	¼W.
R2	63-593	47 M OHM	¼W.
R3	63-150	10 M OHM	½W.
R4	63-583	1000 OHM	¼W
R5	63-599	1.5 MEGOHM	¼W.
R6	63-1102	15 M OHM	½W.
R7	63-1101	8200 OHM	2W
R8	63-1098	42 OHM WIREWOUND	½W.
R9	63-624	68 OHM	¼W.
R10	63-597	470 M OHM	¼W.
R11	63-596	330 M OHM	¼W.
R12	63-713	47 M OHM	¼W.
R13	63-719	470 M OHM	¼W.

DIAG. Nº	PART Nº	DESCRIPTION	
R14	63-1123	VOLUME CONTROL	
R15	63-976	15 MEGOHM	¼W.
R16	63-296	220 M OHM	¼W.
R17	63-1056	280 OHM WIREWOUND	1½W
1		WAVEMAGNET ASSEMBLY	
2	S8507	ANTENNA COIL ASSEMBLY	
3	S8508	OSCILLATOR COIL ASSEMBLY	
4	S8457	AUTOMATIC TUNING UNIT	
5	S8359	R.F. CHOKE & RES. ASSEMBLY	
6	S8326	WAVE TRAP ASSEMBLY	
7	85-255	BAND SELECTOR SWITCH	
8	95-708	1ST I.F. TRANSFORMER	
9	95-709	2ND I.F. TRANSFORMER	
10	S8531	TONE CONTROL SWITCH	
11	95-705	POWER TRANS 50-60~ 117 V.	
12	100-36	PILOT LIGHT 6.3 V. .25 A.	
13	S8474	LOOP LOADING COIL	
14	85-171	PHONO-RADIO SWITCH	
A		1ST I.F TRANS. PRI.	
B		1ST I.F " SEC.	
C		2ND I.F " PRI.	
D		2ND I.F " SEC.	
E	22-1015	WAVE TRAP	
F	22-1042	BROADCAST OSCILLATOR	
G	22-1042	BROADCAST ANTENNA	
J	22-1023	BROADCAST PADDER	
K		SHORT WAVE OSC. (ON GANG)	
M	22-1042	SHORT WAVE ANTENNA.	

Stage Gains:

Ant. to R.F. grid—5.2× at 1000 Kc.

R.F. grid to conv. grid—5.9× at 1000 Kc.

Conv. grid to I.F. grid—57.5× at 455 Kc.

Overall audio—735× at 1 watt, 400 cycles.

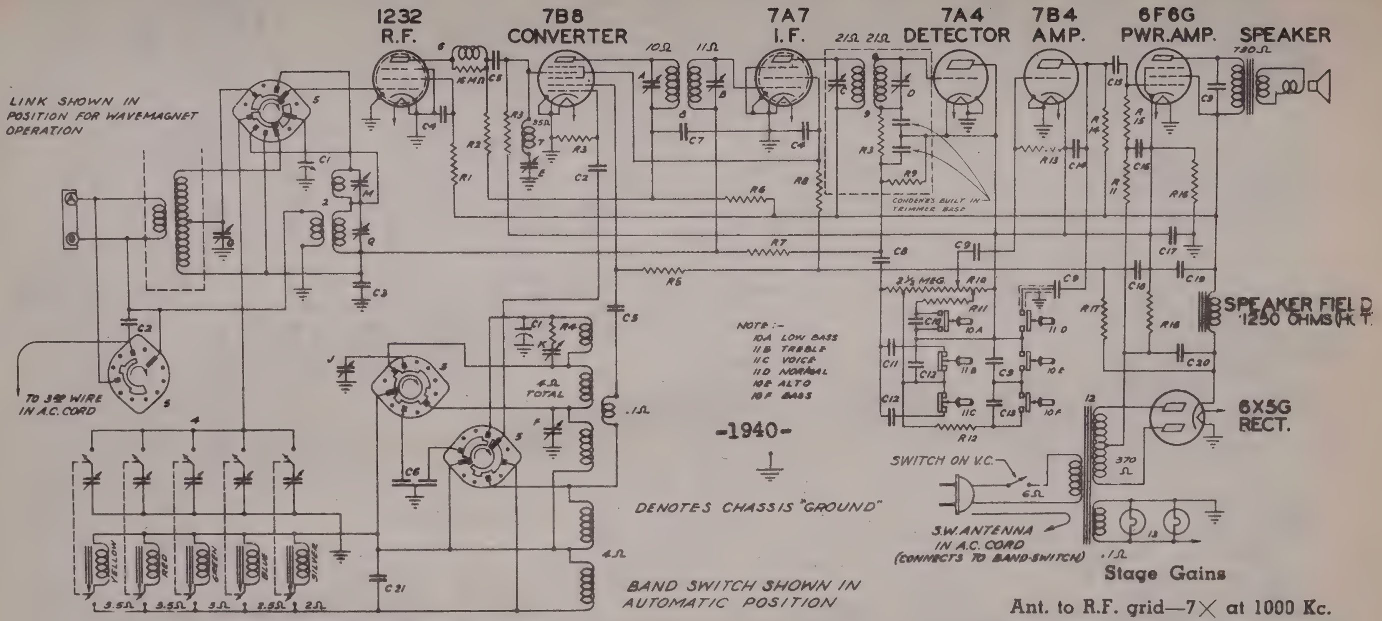
MODEL	SPEAKER
6 S 596	49-396 10"
6 S 597	49-380 10"

Power consumption—55 watts.
Power output—6 watts.

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.
Volume control on full.
Line voltage 117 v. A.C.

ZENITH RADIO CORP.

MODELS 7S529, 7S530, 7S547, 7S557, 7S558, 7S559, Ch. 7A02



FOR OTHER DATA SEE INDEX

Stage Gains

Ant. to R.F. grid—7× at 1000 Kc.

R.F. grid to conv. grid—10.7× at 1000 Kc.

Conv. grid to I.F. grid—66× at 455 Kc.

Overall audio—923× at 1 watt 400 cycles.

I.F. FREQUENCY 455 K C.

Power consumption—7A02—60 watts.

Power consumption—7A04—80 watts.

Power output—6.5 watts.

DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-1080	TWO GANG VARIABLE		C21	22-868	COMPENSATING COND.		R17	63-972	15 M OHM 1 W	A		1ST I.F. TRANS. PRI.
C2	22-289	50 MMFD.	600 V.					R18	63-1056	200 OHM WIREWOUND 1½ W	B		1ST I.F. " SEC.
C3	22-829	.05 MFD.	200 V.								C		2ND I.F. " PRI.
C4	22-828	.05 MFD.	400 V.								D		2ND I.F. " SEC.
C5	22-182	.00025 MFD.	600 V.	R1	63-280	100 M OHM	½ W.				E	22-1015	WAVETRAP
C6	22-1037	DUAL PADDER	600 V.	R2	63-587	4700 OHM	½ W.	1		WAVEMAGNET ASSEMBLY	F		BROADCAST OSC. (NOTE 1)
C7	22-825	.1 MFD.	400 V.	R3	63-713	47 M OHM	⅓ W.	2	S8404	ANTENNA COIL ASSEMBLY	G		" ANT (NOTE 2)
C8	22-327	.02 MFD.	200 V.	R4	63-621	39 OHM	[illegible] W.	3	S8403	OSCILLATOR COIL ASSEM.	J		" PADDER (NOTE 2)
C9	22-448	.004 MFD.	600 V.	R5	63-589	10 M OHM	½ W.	4	S8457	AUTOMATIC TUNING ASSEM.	K		SHORT WAVE OSC. (NOTE 1)
C10	22-229	.005 MFD.	600 V.	R6	63-605	1000 OHM	⅓ W.	5	85-226	BAND SELECTOR SWITCH	M		" " ANT. (NOTE 2)
C11	22-954	.00035 MFD.	600 V.	R7	63-599	1.5 MEGOHM	½ W.	6	S8359	R.F. CHOKE & RES. ASSEM.	Q		POLICE BAND ANT. (NOTE 2)
C12	22-470	.00015 MFD.	600 V.	R8	63-960	68 M OHM	⅓ W.	7	S8326	WAVE TRAP COIL ASSEM.			
C13	22-492	.002 MFD.	600 V.	R9	63-719	470 M OHM	½ W.	8	95-703	1ST I.F. TRANSFORMER			NOTES:
C14	22-854	.0005 MFD.	600 V.	R10	63-1122	VOLUME CONTROL		9	95-704	2ND I.F. TRANSFORMER			(1) TRIMMERS F & K ARE
C15	22-830	.02 MFD.	600 V.	R11	63-593	47 M OHM	½ W.	10	S8449	TONE CONTROL ASSEM. (LEFT)			MOUNTED ON STRIP #22-1033
C16	22-219	.03 MFD.	200 V.	R12	63-594	68 M OHM	½ W.	11	S8449	TONE CONTROL ASSEM. (RIGHT)			(2) TRIMMERS G, J, M & Q ARE
C17	22-827	.1 MFD.	200 V.	R13	63-976	15 MEGOHM	½ W.	12	95-705	PWR. TRANS. 50-60~ 117 V.			MOUNTED ON STRIP #22-1031
C18	22-1034	5 MFD. ELECTROLYTIC	450 V.	R14	63-296	220 M OHM	½ W.	13	100-36	PILOT LIGHT 6.3V. .25A.			
C19		15 MFD. "	350 V.	R15	63-597	470 M OHM	½ W.						
C20	22-1036	14 MFD. "	450 V.	R16	63-975	82 OHM WIREWOUND	⅓ W.						

Ch. 7A02, 7A04
Ch. 8A02, 8A03
Ch. 12A3, 12A4

ZENITH RADIO CORP.

SOCKET VOLTAGES AND ALIGNMENT CHASSIS 7A02-7A04

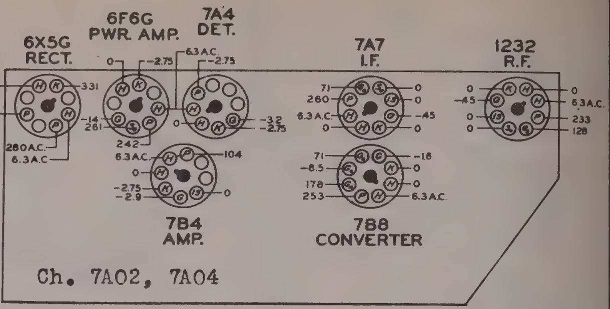
All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

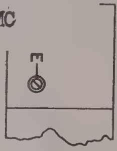
All voltages are positive D.C. unless marked otherwise.

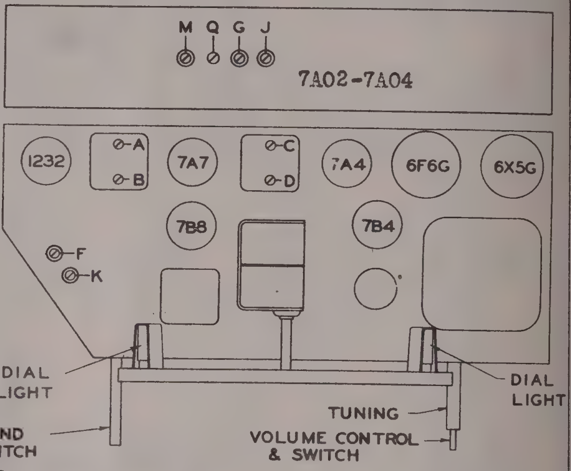
Volume control full on.

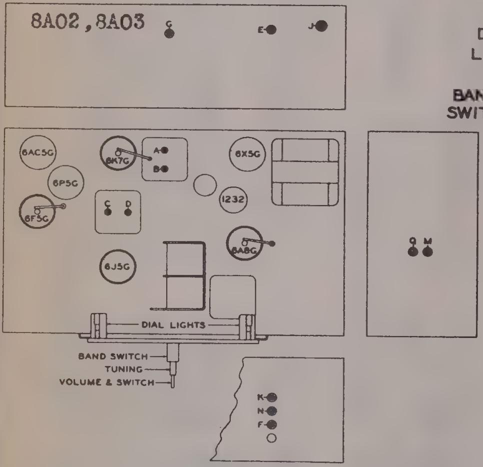
Line voltage 117 A.C.

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
I.F. 455 KC. ADJUST A B C D
ADJUST WAVETRAP E FOR MIN. SIGNAL AT 455 KC; SIGNAL FED TO RF GRID
TRIM K AT 18 MC; M AT 16 MC
TRIM Q AT 4.5 MC
TRIM F AT 15))
TRIM F AT 1500 KC
TRIM G AT 1400 KC
PAD J AT 600 KC









ALIGNMENT-CHASSIS 8A02, 8A03

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
I.F. 455 KC -ADJUST A B C D
WAVETRAP E-ADJUST FOR MINIMUM SIGNAL at 455 KC
TRIM K AT 18 MC
TRIM M AT 16 MC
TRIM N,Q AT 4.5 MC
TRIM F AT 1500 KC
TRIM G AT 1400 KC
PAD J AT 600 KC

Models 12S550-12S568-12S569-12S595

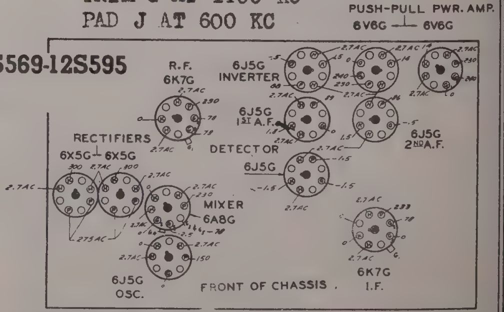
Chassis 12A3-12A4

All voltages measured with a 1000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

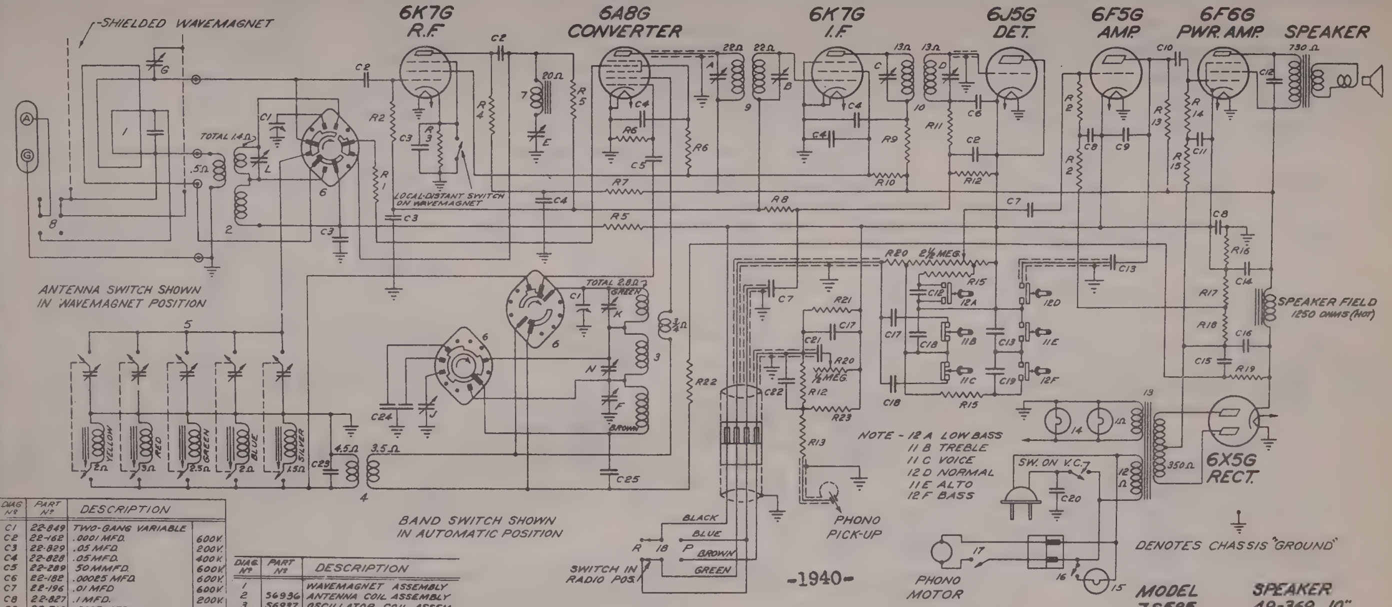
Volume control full on.

Line voltage 117 v.



ZENITH RADIO CORP.

MODEL 7S585
Ch. 7A01



ANTENNA SWITCH SHOWN IN WAVEMAGNET POSITION

BAND SWITCH SHOWN IN AUTOMATIC POSITION

NOTE - 12 A LOW BASS
11 B TREBLE
11 C VOICE
12 D NORMAL
11 E ALTO
12 F BASS

DENOTES CHASSIS "GROUND"

-1940-

MODEL 7S585

SPEAKER 49-369 10"

DIAG Nº	PART Nº	DESCRIPTION	
C1	22-849	TWO-GANG VARIABLE	
C2	22-162	.0001 MFD.	600V.
C3	22-829	.05 MFD.	200V.
C4	22-828	.05 MFD.	400V.
C5	22-289	50 MMFD.	600V.
C6	22-182	.00025 MFD.	600V.
C7	22-196	.01 MFD.	600V.
C8	22-827	.1 MFD.	200V.
C9	22-716	.0005 MFD.	600V.
C10	22-830	.02 MFD.	600V.
C11	22-219	.03 MFD.	200V.
C12	22-229	.005 MFD.	600V.
C13	22-448	.004 MFD.	600V.
C14	22-719	16 MFD. ELECTROLYTIC	350V.
C15	22-941	5 MFD. "	450V.
C16		15 MFD. "	450V.
C17	22-954	.00035 MFD.	600V.
C18	22-470	.00015 MFD.	600V.
C19	22-492	.002 MFD.	600V.
C20	22-525	.005 MFD.	1000V.
C21	22-326	.003 MFD.	400V.
C22	22-953	.0002 MFD.	600V.
C23	22-868	COMPENSATING COND.	
C24	22-853	DUAL OSC. PADDER	
C25	22-358	.002 MFD.	600V.
R1	63-577	100 OHM	¼W.
R2	63-271	1 MEGOHM	¼W.
R3	63-588	6800 OHM	¼W.
R4	63-607	15M OHM	¼W.
R5	63-595	100M OHM	¼W.
R6	63-592	33M OHM	¼W.
R7	63-705	2200 OHM	¼W.
R8	63-599	1.5 MEGOHM	¼W.
R9	63-583	1000 OHM	¼W.
R10	63-676	27M OHM	1W.
R11	63-713	47M OHM	¼W.
R12	63-719	470M OHM	¼W.
R13	63-296	220M OHM	¼W.
R14	63-597	470M OHM	¼W.
R15	63-593	47M OHM	¼W.
R16	63-1057	47 OHM WIREWOUND	½W.
R17	63-1066	18 OHM "	½W.
R18	63-1056	280 OHM "	1½W.
R19	63-1055	22M OHM	1W.
R20	63-1115	VOLUME CONTROL	
R21	63-464	1 MEGOHM	¼W.
R22	63-1054	10 M OHM	½W.
R23	63-717	220M OHM	¼W.

DIAG. Nº	PART Nº	DESCRIPTION
1		WAVEMAGNET ASSEMBLY
2	S6936	ANTENNA COIL ASSEMBLY
3	S6937	OSCILLATOR COIL ASSEM.
4	S6992	OSC. COUPLER COIL ASSEM.
5	S7044	AUTOMATIC TUNING ASSEM.
6	85-205	BAND SELECTOR SWITCH
7	S7500	WAVE TRAP COIL ASSEM.
8	85-171	WAVEMAGNET SWITCH
9	95-600	1ST I.F. TRANSFORMER
10	95-695	2ND I.F. TRANSFORMER
11	S8132	TONE CONTROL ASSEM. (LEFT)
12	S7422	TONE CONTROL ASSEM. (RIGHT)
13	95-634	PWR. TRANS. 117 V. 50-60~
14	100-36	PILOT LIGHT 6.3 V. .25 A.
15	100-80	PHONO LIGHT 110V. 7W.
16	85-204	DOOR SWITCH
17	85-191	MOTOR SWITCH
18	85-192	PHONO SWITCH
A		1ST I.F. TRANS. PRI.
B		1ST I.F. " SEC.
C		2ND I.F. " PRI.
D		2ND I.F. " SEC.
E	22-940	WAVE TRAP
F		BROADCAST OSC. (SEE NOTE)
G		BROADCAST ANT.
J		B'DCAST PADDER (" ")
K		SHORT WAVE OSC. (" ")
L	22-788	SHORT WAVE DET.
N		POLICE BAND OSC. (" ")

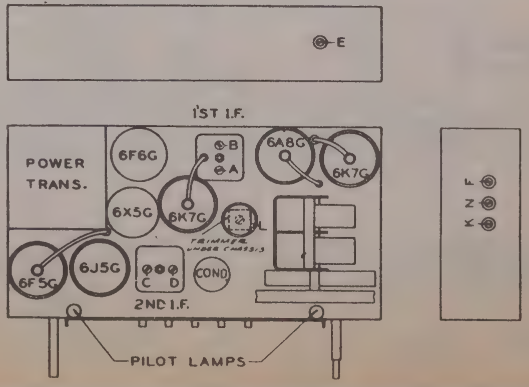
NOTE—
TRIMMERS F, J, K & N ARE MOUNTED ON STRIP #22-881.

Power consumption—80 watts.

Power output—4.5 watts.

Tuning ranges— 545 Kc.— 1570 Kc.
1520 Kc.— 5000 Kc.
5600 Kc.—18300 Kc.

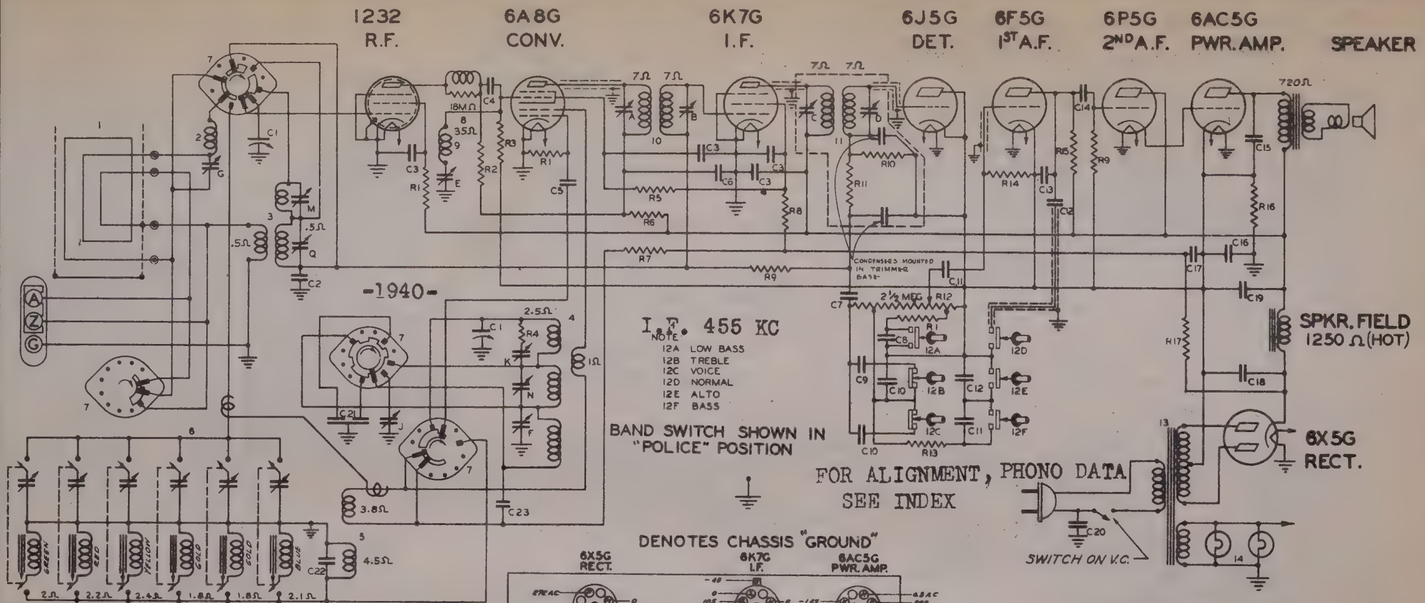
FOR VOLTAGES, P.B. DATA SEE INDEX
I.F. 455 KC
I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL. VIII
I.F. TRIMMERS A,B,C,D.
TRIM SW OSC (K) 18 MC
TRIM SW ANT (L) 16 MC
TRIM POLICE (N) 4500 KC
TRIM BC ANT (G) 1400 KC
TRIM BC OSC (F) 1500 KC



MODELS 8S531, 8S548,
8S563, Ch. 8A02

ZENITH RADIO CORP.

MODELS 8S587, 8S588,
Ch. 8A03



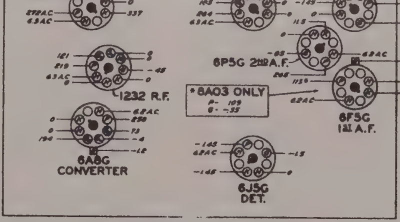
I.F. 455 KC

NOTE
12A LOW BASS
12B TREBLE
12C VOICE
12D NORMAL
12E ALTO
12F BASS

BAND SWITCH SHOWN IN "POLICE" POSITION

FOR ALIGNMENT, PHONO DATA SEE INDEX

DENOTES CHASSIS "GROUND"



C1	22-927	2-GANG VARIABLE	
C2	22-829	.05 MFD.	200 V.
C3	22-828	.05 MFD.	400 V.
C4	22-147	.0005 MFD.	600 V.
C5	22-127	25 MMFD.	600 V.
C6	22-825	.1 MFD.	400 V.
C7	22-327	.02 MFD.	200 V.
C8	22-229	.005 MFD.	600 V.
C9	22-954	.00035 MFD.	600 V.
C10	22-470	.00015 MFD.	600 V.
C11	22-482	.002 MFD.	600 V.
C12	22-448	.004 MFD.	600 V.
C13	22-854	.0005 MFD.	600 V.
C14	22-830	.02 MFD.	600 V.
C15	22-1016	.005 MFD.	1000 V.
C16	22-827	.1 MFD.	200 V.
C17	22-1035	5 MFD. ELECTROLYTIC	450 V.
C18		15 MFD. ELECTROLYTIC	450 V.
C19		15 MFD. ELECTROLYTIC	350 V.
C20	22-1041	.005 MFD.	600 V.
C21	22-1039	DUAL OSC. PADDER	
C22	22-868	COMPENSATING COND.	
C23	22-358	.002 MFD	600 V.
R1	63-593	47M OHM	¼ W
R2	63-587	4700 OHM	¼ W
R3	63-590	15M OHM	¼ W
R4	63-576	68 OHM	¼ W
R5	63-643	18M OHM	¼ W
R6	63-605	1000 OHM	½ W
R7	63-796	10M OHM	½ W
R8	63-677	33M OHM	1 W
R9	63-271	1 MEGOHM	¼ W
R10	63-717	220M OHM	¼ W
R11	63-711	22M OHM	¼ W
R12	63-1075	VOLUME CONTROL	
R13	63-594	68M OHM	¼ W
R14	63-976	1.5 MEGOHM	¼ W
R15	63-296	220M OHM	¼ W
R16	63-1100	52 OHMS WIREWN'D	½ W
R17	63-151	15M OHM	1 W

1		WAVEMAGNET ASSEMBLY
2	S-8142	LOOP LOADING COIL ASSEM.
3	S-8430	ANTENNA COIL ASSEM.
4	3-7505	OSCILLATOR COIL ASSEM.
5	S-8466	OSC. COUPLER COIL ASSEM
6		AUTOMATIC TUN. ASSEM.
7	85-229	BAND SELECTOR SWITCH
8	S-8496	R.F. CHOKE & RES. ASSEM.
9	S-8326	WAVE TRAP ASSEM.
10	95-625	1ST I. F. TRANS.
11	95-563	2ND I. F. TRANS.
12	S-8491	TONE CONTROL
13	95-627	PWR. TRANS. 60~ 117 V.
14	100-36	PILOT LIGHT 6.3 V .25A.
A		1ST I.F TRANS. PRI.
B		1ST I.F. " SEC
C		2ND I.F " PRI.
D		2ND I.F " SEC.
E	22-1015	WAVE TRAP
F		BROADCAST OSC. (SEE NOTE 1)
G	22-1042	BROADCAST ANTENNA
J	22-688	BROADCAST PADDER
K		SHORT WAVE OSC (SEE NOTE 1)
M		SHORT WAVE ANT. (SEE NOTE 2)
N		POLICE BAND OSC. (SEE NOTE 1)
Q		POLICE BAND ANT. (SEE NOTE 2)

NOTES—
(1) TRIMMERS F, K & N ARE MOUNTED ON STRIP 22-850
(2) TRIMMERS M & Q ARE MOUNTED ON STRIP 22-1045

MODEL	SPEAKER
8S 531	49-377 8"
8S 548	49-377 8"
8S 563	49-367 10"

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

Line voltage 117 v.

Stage Gains

Ant. to R.F. grid—4.9× at 1000 Kc.

R.F. grid to conv. grid—12× at 1000 Kc.

Conv. grid to I.F. grid—66× at 455 Kc.

Overall audio—743× at 1 watt 400 cycles.

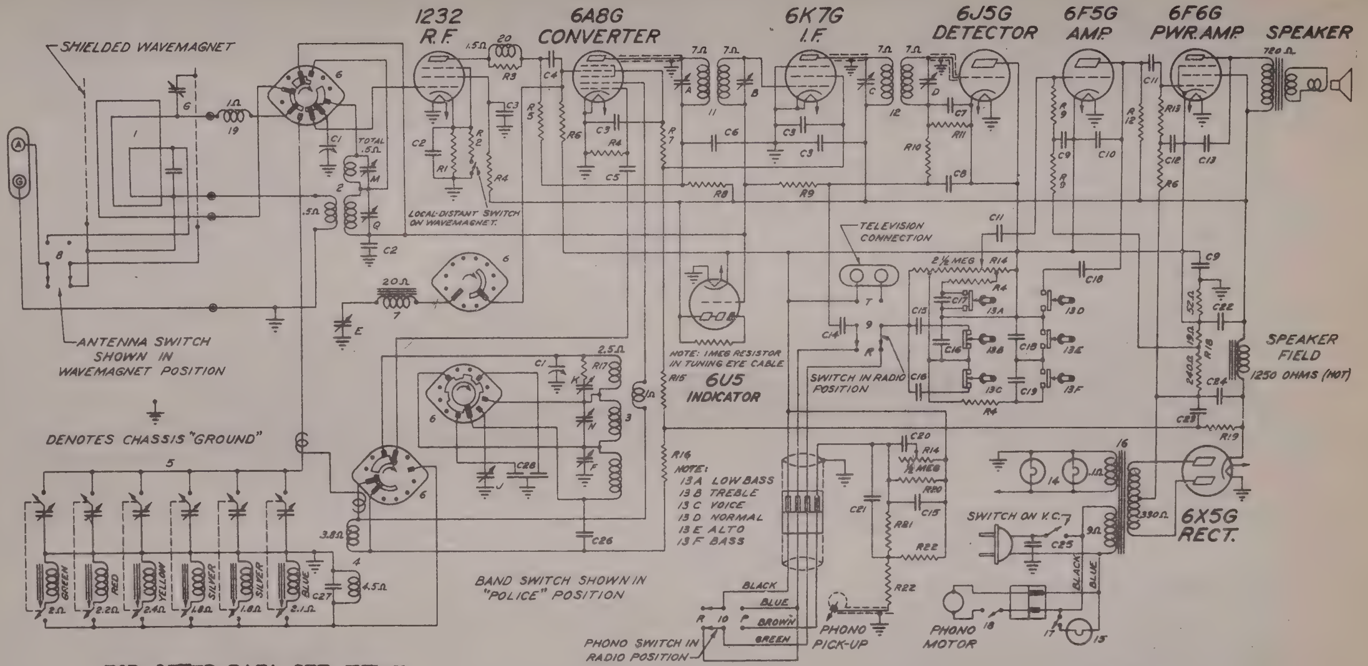
Chassis 8A03 has phono connections added (see page 31).

Tuning ranges— 540 Kc.— 1600 Kc.
1500 Kc.— 5200 Kc.
5700 Kc.—18300 Kc.

Power consumption—8A02—65 watts. —8A03—85 watts.

ZENITH RADIO CORP.

MODEL 8S586
Ch. 8A01



-1940-

MODEL 8S586

SPEAKER 49-366 12"

I.F. FREQUENCY 455 KC.
8 TUBE SUPERHETERODYNE
CHASSIS Nº 8A01 3BAND PHONO

FOR OTHER DATA SEE INDEX

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-927	TWO-GANG VARIABLE		C25	22-525	.005 MFD.	1000V.	R18	63-992	3-SECTION CANDOHM		17	85-203	DOOR SWITCH
C2	22-829	.05 MFD.	200V.	C26	22-358	.002 MFD.	600V.	R19	63-151	15M OHM	1 W.	18	85-191	MOTOR SWITCH
C3	22-828	.05 MFD.	400V.	C27	22-868	COMPENSATING COND.		R20	63-464	1 MEGOHM	¼ W.	19	S8142	LOOP LOADING COIL ASSEM.
C4	22-716	.0005 MFD.	600V.	C28	22-930	DUAL OSC. PADDER		R21	63-719	470M OHM	¼ W.	20	S7526	R.F. CHOKE
C5	22-127	25 MMFD.	600V.					R22	63-717	220M OHM	¼ W.			
C6	22-825	.1 MFD.	400V.											
C7	22-132	.00025 MFD.	600V.											
C8	22-162	.0001 MFD.	600V.	R1	63-589	10M OHM	¼ W.					A		1ST I.F. TRANS. PRI.
C9	22-827	.1 MFD.	200V.	R2	63-574	53 OHM	¼ W.	1		WAVEMAGNET ASSEMBLY		B		1ST I.F. " SEC.
C10	22-854	.0005 MFD.	600V.	R3	63-1077	18M OHM	1 W.	2	S7504	ANTENNA COIL ASSEMBLY		C		2ND I.F. " PRI.
C11	22-830	.02 MFD.	600V.	R4	63-593	47M OHM	¼ W.	3	S7505	OSCILLATOR COIL ASSEM.		D		2ND I.F. " SEC.
C12	22-219	.03 MFD.	200V.	R5	63-587	4700 OHM	¼ W.	4	S7507	OSC. COUPLER COIL ASSEM.		E	22-958	WAVE TRAP
C13	22-1016	.005 MFD.	1000V.	R6	63-595	100M OHM	¼ W.	5	S7649	AUTOMATIC TUNING ASSEM.		F		BROADCAST OSC. (SEE NOTE 1)
C14	22-327	.02 MFD.	200V.	R7	63-643	18M OHM	¼ W.	6	85-202	BAND SELECTOR SWITCH		G		BROADCAST ANTENNA
C15	22-954	.00035 MFD.	600V.	R8	63-605	1000 OHM	½ W.	7	S7559	WAVE TRAP COIL ASSEM.		J	22-463	BROADCAST PADDER
C16	22-470	.00015 MFD.	600V.	R9	63-271	1 MEGOHM	½ W.	8	85-171	WAVEMAGNET SWITCH		K		SHORT WAVE OSC. (SEE NOTE 1)
C17	22-229	.005 MFD.	600V.	R10	63-711	22M OHM	¼ W.	9	85-171	TELEVISION SWITCH		M		SHORT WAVE ANT. (SEE NOTE 2)
C18	22-448	.004 MFD.	600V.	R11	63-717	220M OHM	¼ W.	10	85-192	PHONO SWITCH		N		POLICE BAND OSC. (SEE NOTE 1)
C19	22-492	.002 MFD.	600V.	R12	63-296	220M OHM	¼ W.	11	95-625	1ST I.F. TRANS.		Q		POLICE BAND ANT. (SEE NOTE 2)
C20	22-326	.003 MFD.	400V.	R13	63-597	470M OHM	¼ W.	12	95-663	2ND I.F. TRANS.		NOTES—		
C21	22-953	.0002 MFD.	600V.	R14	63-1117	VOLUME CONTROL		13	S7642	TONE CONTROL SW. ASSEM.		(1) TRIMMERS F, K & N ARE		
C22	22-719	16 MFD. ELECTROLYTIC	350V.	R15	63-677	33M OHM	1 W.	14	100-36	PILOT LIGHT 6.3V. .25A.		MOUNTED ON STRIP #22-850		
C23	22-933	6 MFD. "	450V.	R16	63-796	10M OHM	½ W.	15	100-80	PHONO-LIGHT 110V. 7W.		(2) TRIMMERS M & Q ARE		
C24		16 MFD. "	450V.	R17	63-576	68 OHM	¼ W.	16	95-627	POWER TRANS. 50-60~ 117V.		MOUNTED ON STRIP #22-982		

Model 8S586

Chassis 8A01

All voltages measured with a 1000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Sensitivity switch in distance position.

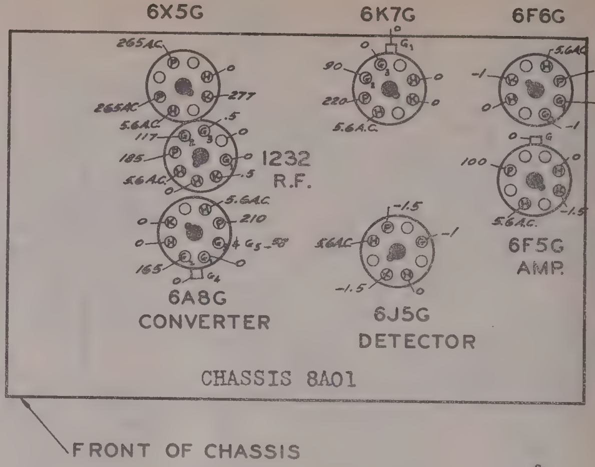
Volume control full on.

Line voltage 112 A.C.

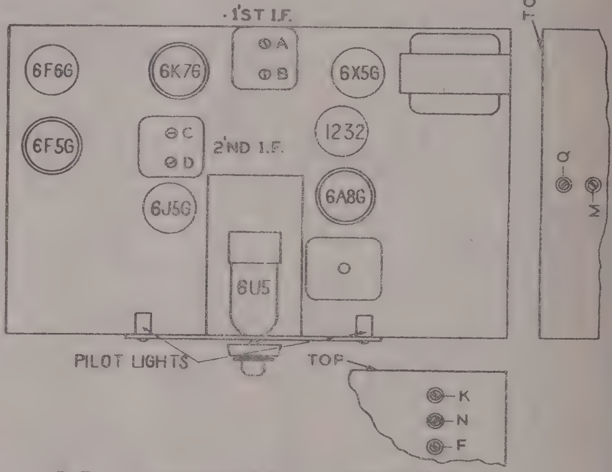
Power consumption—85 watts.

Power output—6 watts.

Tuning ranges—	540 Kc.—	1600 Kc.
	1505 Kc.—	5200 Kc.
	5600 Kc.—	18500 Kc.



```
ALIGNMENT-CHASSIS 8A01
I.F. 455 KC-PEAK A,B,C,D
SW- TRIM K 18 MC
    TRIM M 16 MC
POLICE-
    TRIM N,Q 4.5 MC
BROADCAST
   TRIM F 1400 KC
   TRIM G (on loop)
   AT 1400 KC WITH
   WAVEMAGNET SWITCH
   FOR LOOP OPERATION
```



MODEL 7S585

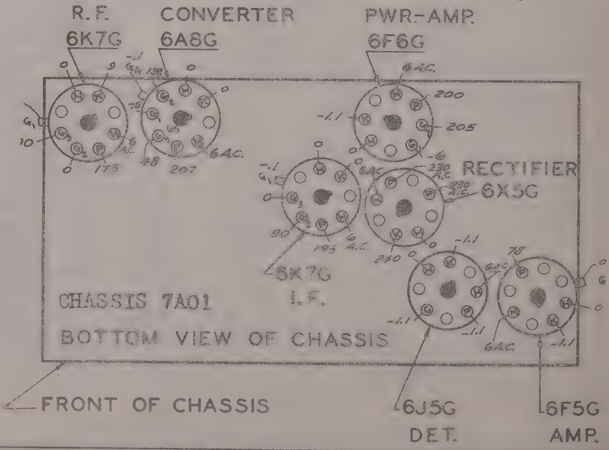
SOCKET LAYOUT
VOLTAGE DATA
CHASSIS 7A01

All voltages measured with a 1000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

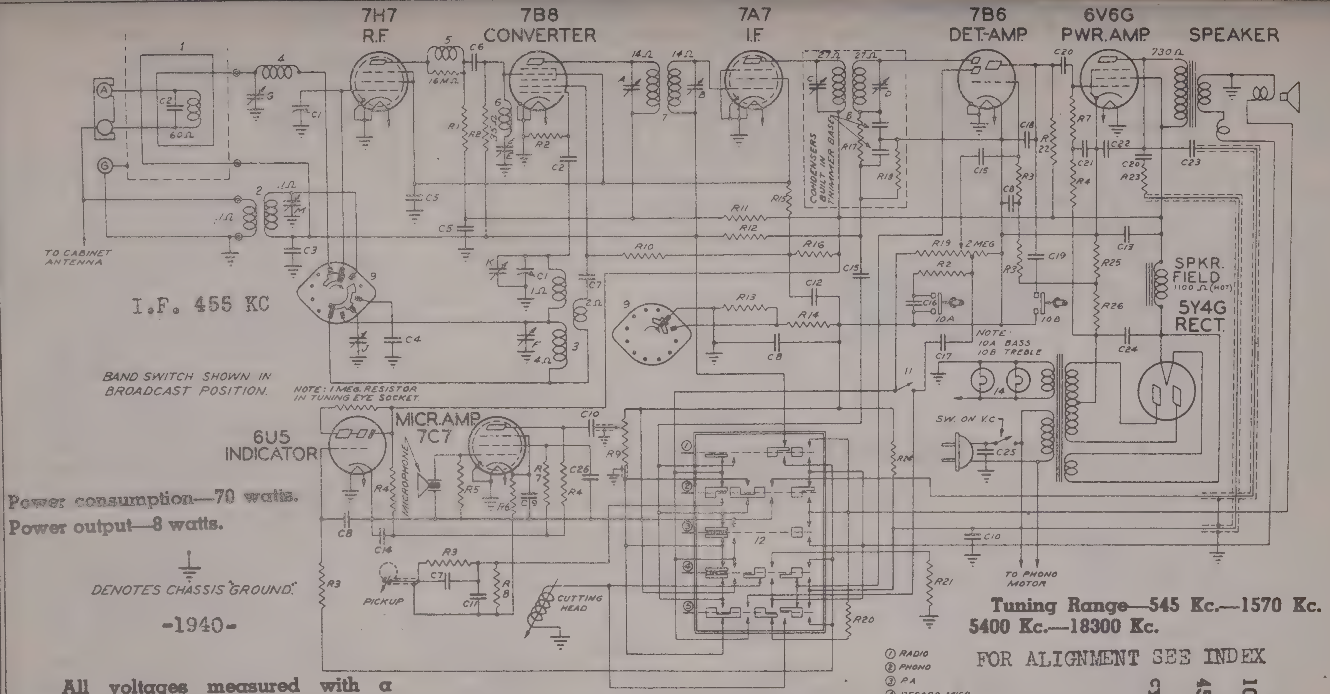
Volume control full on.

Line voltage 112 A.C.



ZENITH RADIO CORP.

MODELS 8S593, 8S594
Ch. 8A04



I.F. 455 KC

Power consumption—70 watts.
Power output—8 watts.

-1940-

Tuning Range—545 Kc.—1570 Kc.
5400 Kc.—18300 Kc.

FOR ALIGNMENT SEE INDEX

Stage Gains:

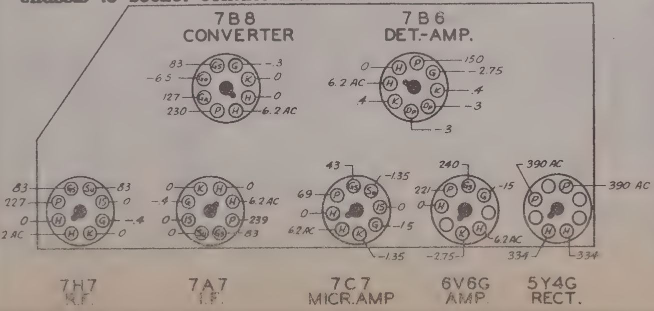
Ant. to R.F. grid—5× at 1000 Kc.

R.F. grid to conv. grid—4.2× at 1000 Kc.

Conv. grid to I.F. grid—76.6× at 455 Kc.

Overall audio—865× at 1 watt, 400 cycles.

All voltages measured with a 20000 ohm per volt meter from chassis to socket contact indicated.

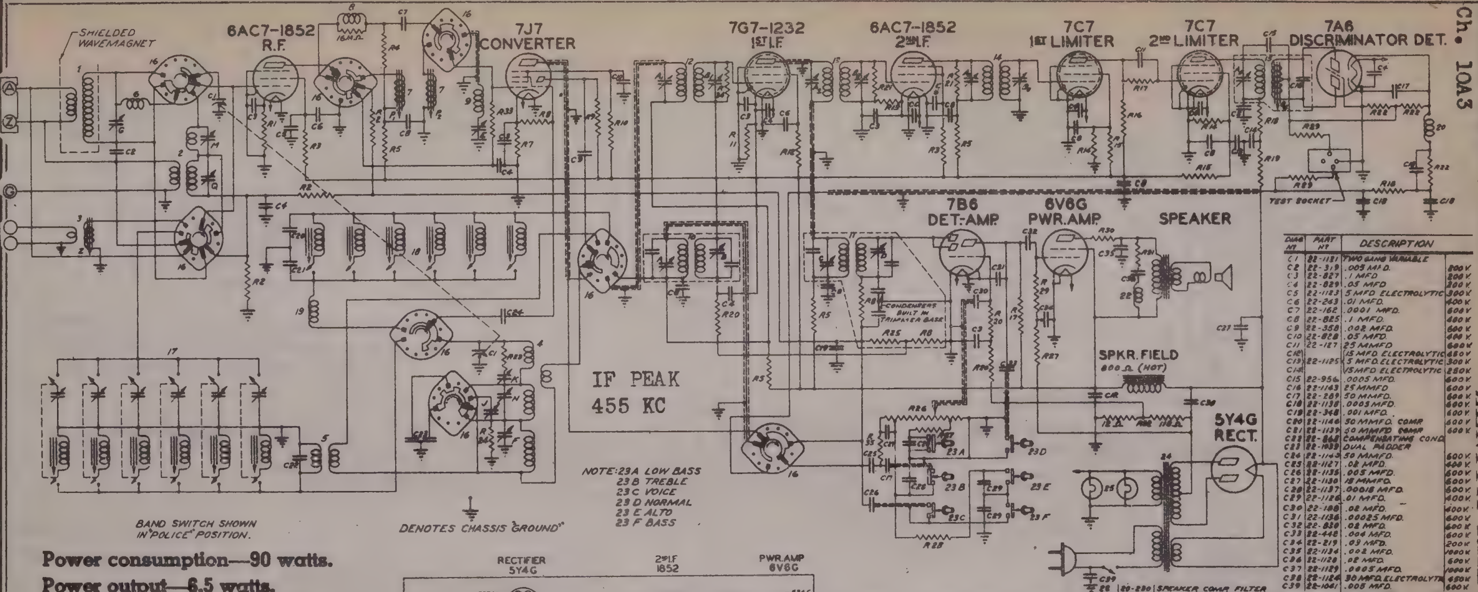


DIAG Nº	PART Nº	DESCRIPTION	
C1	22-1044	TWO GANG VARIABLE	
C2	22-684	50MMFD.	600V.
C3	22-829	.05 MFD.	200V.
C4	22-1022	.005 MFD.	600V.
C5	22-828	.05 MFD	400V.
C6	22-162	.0001 MFD.	600V.
C7	22-182	.00025 MFD.	600V.
C8	22-827	.1 MFD.	200V.
C9	22-1069	20 MFD. ELECTROLYTIC	25V.
C10	22-492	.002 MFD.	600V.
C11	22-887	.001 MFD	600V.
C12	22-1099	5 MFD. ELECTROLYTIC	450V.
C13		20 MFD. "	450V.
C14		5 MFD. "	250V.
C15	22-188	.02 MFD.	400V.
C16	22-1118	.005 MFD.	600V.
C17	22-954	.00035 MFD.	600V.
C18	22-854	.0005 MFD	600V.
C19	22-448	.004 MFD.	600V.
C20	22-830	.02 MFD.	600V.
C21	22-327	.02 MFD	200V.
C22	22-790	.004 MFD	1000V.
C23	22-1119	.005 MFD.	1000V.
C24	22-1036	14 MFD ELECTROLYTIC	450V.
C25	22-1041	.005 MFD.	600V
C26	22-825	.1 MFD.	400V.

DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-637	4700 OHM	¼W.
R2	63-593	47M OHM	¼W.
R3	63-271	1 MEGOHM	¼W.
R4	63-595	100M OHM	¼W
R5	63-602	4.7 MEGOHM	¼W
R6	63-238	1000 OHM	¼W.
R7	63-597	470M OHM	¼W
R8	63-650	68M OHM	¼W.
R9	63-1146	VOLUME CONTROL	
R10	63-150	10M OHM	½W.
R11	63-583	1000 OHM	¼W
R12	63-599	1.5 MEGOHM	¼W.
R13	63-624	68 OHM	¼W
R14	63-1098	42 OHM WIREWOUND	½W
R15	63-1102	15M OHM	½W
R16	63-1101	8200 OHM	2W
R17	63-713	47M OHM	¼W
R18	63-719	470M OHM	¼W
R19	63-1123	VOLUME CONTROL	
R20	63-1108	6 OHM WIREWOUND	2W
R21	63-1139	8 OHM "	5W
R22	63-296	220M OHM	¼W
R23	63-778	470M OHM	¼W
R24	63-790	4.7 MEGOHM	¼W
R25	63-1066	18 OHM WIREWOUND	½W
R26	63-1063	140 OHM	1W

MODELS 10H551, 10H571
Ch. 10A3

ZENITH RADIO CORP.



NOTE: 23A LOW BASS
23B TREBLE
23C VOICE
23D NORMAL
23E ALTO
23F BASS

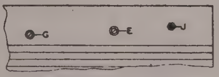
DIAG NO	PART NO	DESCRIPTION	
C1	22-1131	TWO GANG VARIABLE	
C2	22-319	.005 MFD.	800 V.
C3	22-827	.1 MFD	200 V.
C4	22-829	.05 MFD	200 V.
C5	22-1123	5 MFD ELECTROLYTIC	300 V.
C6	22-263	.01 MFD.	400 V.
C7	22-162	.0001 MFD.	600 V.
C8	22-825	.1 MFD.	400 V.
C9	22-358	.002 MFD.	600 V.
C10	22-828	.05 MFD.	400 V.
C11	22-127	25 MMFD	600 V.
C12	22-1125	15 MFD. ELECTROLYTIC	450 V.
C13		5 MFD. ELECTROLYTIC	300 V.
C14		15 MFD ELECTROLYTIC	250 V.
C15	22-956	.0005 MFD.	600 V.
C16	22-1143	25 MMFD	600 V.
C17	22-289	50 MMFD.	600 V.
C18	22-1138	.0005 MFD.	600 V.
C19	22-348	.001 MFD.	600 V.
C20	22-1146	50 MMFD. COMP.	600 V.
C21	22-1139	50 MMFD. COMP.	600 V.
C22	22-868	COMPENSATING COND.	
C23	22-1039	DUAL PADDER	
C24	22-1143	50 MMFD.	600 V.
C25	22-1127	.02 MFD.	400 V.
C26	22-1135	.005 MFD.	600 V.
C27	22-1130	15 MMFD.	600 V.
C28	22-1137	.00015 MFD.	600 V.
C29	22-1126	.01 MFD.	400 V.
C30	22-188	.02 MFD.	400 V.
C31	22-1136	.00025 MFD.	600 V.
C32	22-830	.02 MFD.	600 V.
C33	22-448	.004 MFD.	600 V.
C34	22-219	.09 MFD.	200 V.
C35	22-1134	.002 MFD.	1000 V.
C36	22-1128	.02 MFD.	600 V.
C37	22-1129	.0005 MFD.	1000 V.
C38	22-1124	30 MFD. ELECTROLYTIC	450 V.
C39	22-1061	.005 MFD.	600 V.
22	20-280	SPEAKER COMP. FILTER	
23	S8490	TONE CONTROL SW. ASSEM.	
24	95-771 95-773	POWER TRANS. 50-60 ~ 25 ~	
25	100-36	PILOT LIGHT 6.3 V. .25A.	
A		1ST I.F. TRANS. PRI. (A.M.)	
B		1ST I.F. " SEC. (A.M.)	
C		2ND I.F. " PRI. (A.M.)	
D		2ND I.F. " SEC. (A.M.)	
A_1		1ST I.F. " PRI. (F.M.)	
B_1		1ST I.F. " SEC. (F.M.)	
A_2		2ND I.F. " PRI. (F.M.)	
B_2		2ND I.F. " SEC. (F.M.)	
A_3		3RD I.F. " PRI. (F.M.)	
B_3		3RD I.F. " SEC. (F.M.)	
A_4		4TH I.F. TRANS. PRI. (F.M.)	
B_4		4TH I.F. " SEC. (F.M.)	
E	22-1015	WAVE TRAP	
F		BROADCAST OSC. NOTE 1	
G	22-1042	BROADCAST ANTENNA	
J	22-686	BROADCAST PADDER	
K		SHORTWAVE OSC. NOTE 1	
M		SHORTWAVE ANT. NOTE 2	
N		POLICE BAND OSC. NOTE 1	
P		ULTRA HIGH FREQ. DET. (PLATE)	
[illegible]		ULTRA HIGH FREQ. DET. (GRID)	
Q		POLICE BAND ANT. NOTE 2	
Z		ULTRA HIGH FREQ. ANTENNA	
R1	63-741	180 OHM	½ W.
R2	63-600	2.2 MEGOHM	½ W.
R3	63-1159	39M OHM	1 W.
R4	63-1163	2200 OHM	½ W.
R5	63-605	1000 OHM	½ W.
R6	63-595	100 M OHM	½ W.
R7	63-1164	300 OHM	½ W.
R8	63-713	47M OHM	½ W.
R9	63-608	15M OHM	1 W.
R10	63-1160	56M OHM	1 W.
R11	63-1161	270 OHM	½ W.
R12	63-1109	75M OHM	1 W.
R13	63-246	150 OHM	½ W.
R14	63-607	15M OHM	½ W.
R15	63-1162	33M OHM	1 W.
R16	63-961	47M OHM	1 W.
R17	63-296	220 M OHM	½ W.
R18	63-583	1000 OHM	½ W.
R19	63-679	82 M OHM	1 W.
R20	63-271	1 MEGOHM	½ W.
R21	63-652	120M OHM	½ W.
R22	63-160	100 M OHM	½ W.
R23	63-576	68 OHM	½ W.
R24	63-572	15 OHM	½ W.
R25	63-773	180 M OHM	½ W.
R26	63-1074	VOLUME CONTROL	
R27	63-593	47M OHM	½ W.
R28	63-594	68M OHM	½ W.
R29	63-597	470 M OHM	½ W.
R30	63-1158	100 OHM	½ W.
R31	63-156	10M OHM	1 W.
R32	63-1142	2 SECTION CANDOHM	
R33	63-715	100M OHM	½ W.
R34	63-589	10M OHM	½ W.
R35	63-701	470 OHM	¼ W.
1		WAVEMAGNET ASSEMBLY	
2	S9075	ANTENNA COIL - (S.W.)	
3	S9065	ANTENNA COIL - (F.M.)	
4	S9074	OSCILLATOR COIL -	
5	S8466	OSCILLATOR COUPLING COIL	
6	S9044	LOOP LOADING COIL	
7	S9066	DETECTOR COIL ASSEM. (F.M.)	
8	S8369	COIL & RES. ASSEMBLY	
9	S8326	WAVETRAP -	
10	95-765	1ST I.F. TRANSFORMER (A.M.)	
11	95-766	2ND I.F. TRANSFORMER (A.M.)	
12	95-767	1ST I.F. - (F.M.)	
13	95-768	2ND I.F. - (F.M.)	
14	95-769	3RD I.F. - (F.M.)	
15	95-772	4TH I.F. - (F.M.)	
16	85-234	BAND SELECTOR SWITCH	
17		AUTOMATIC TUNING UNIT (BC)	
18		AUTOMATIC TUNING UNIT (F.M.)	
19	S8350	PEAKING COIL	
20	[illegible]	F.M. I.F. WAVETRAP	

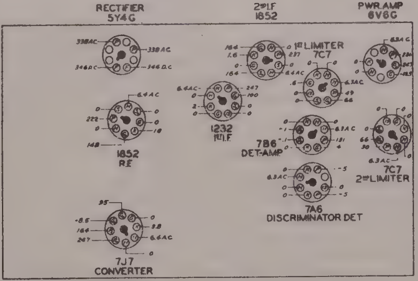
Power consumption—90 watts.

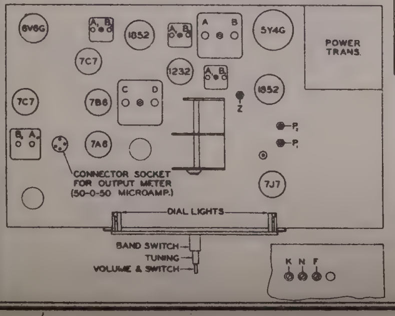
Power output—6.5 watts.

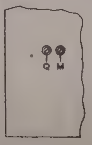
Tuning Range—540 Kc.—1600 Kc. 1.5 Mc.—5.2 Mc. 5.7 Mc.—18.5 Mc. 41.5 Mc.—50.5 Mc.

NOTE:
(1) TRIMMERS F, K & N ARE MOUNTED ON STRIP # 22-880
(2) TRIMMERS M & Q ARE MOUNTED ON STRIP # 22-1065









Models 10H551-10H571

Chassis No. 10A3

MODEL	SPEAKER
10H551	49-424 12"
10H571	49-424 12"

AMP. MOD. I.F. FREQUENCY 455 KC.
FREQ. MOD. I.F. FREQUENCY 4.3 MC.
10 TUBE SUPERHETERODYNE
CHASSIS Nº 10A3-A.C.-4 BAND
ZENITH RADIO CORPORATION
CHICAGO, ILL.

Stage Gains:

Bc. and 455 Kc.—I.F.

Ant. to R.F. grid—6.5× at 1000 Kc.

R.F. grid to conv. grid—28.1× at 1000 Kc.

Conv. grid to I.F. grid—31.3× at 455 Kc.

Overall audio—1640× at 1 watt. 400 cycles.

F.M. and 4.3 Mc.—I.F.

Ant. to R.F. grid—1.8× at 46 Mc.

R.F. grid to conv. grid—7.9× at 46 Mc.

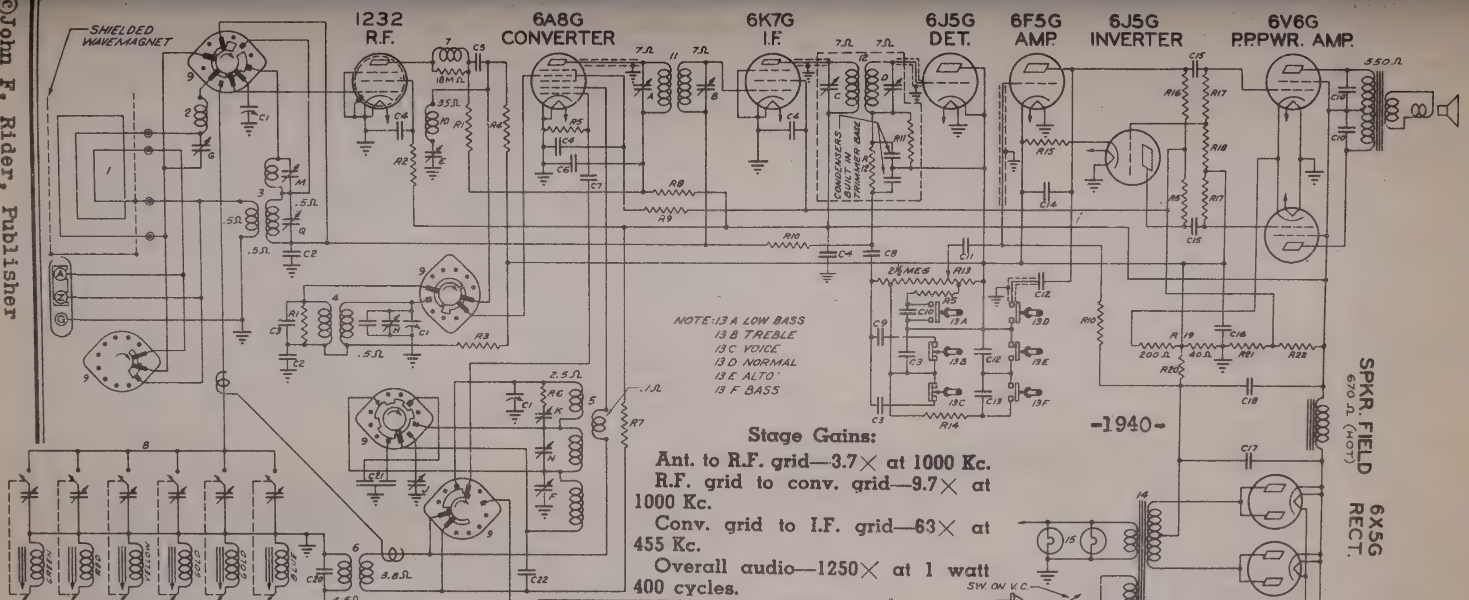
Conv. grid to 1st I.F. grid—2.7× at 4.3 Mc.

1st I.F. grid to 2nd I.F. grid—80× at 4.3 Mc.

2nd I.F. grid to LIMITER grid—25× at 4.3 Mc.

ZENITH RADIO CORP.

MODELS 10S531, 10S549, 10S566, Ch. 10A1
MODELS 10S589, 10S590, Ch. 10A2



-1940-

Stage Gains:

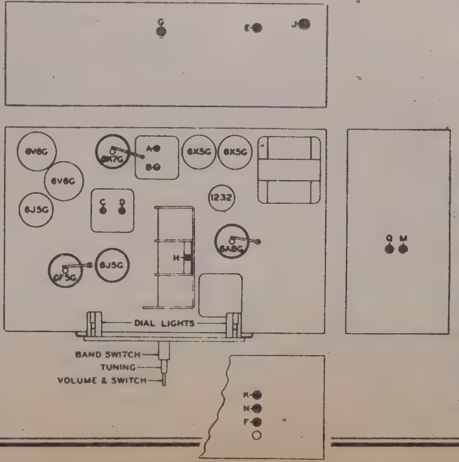
Ant. to R.F. grid—3.7× at 1000 Kc.

R.F. grid to conv. grid—9.7× at 1000 Kc.

Conv. grid to I.F. grid—63× at 455 Kc.

Overall audio—1250× at 1 watt 400 cycles.

BAND SWITCH SHOWN IN "POLICE" POSITION



FOR VOLTAGES SEE INDEX

I.F. 455 KC

I.F. ALIGNMENT CONVENTIONAL
SEE SPECIAL SECTION VOL VIII
I.F. TRIMMERS A,B,C,D
WAVETRAP E, ADJUST FOR MINIMUM
SIGNAL RESPONSE WITH SIGNAL
FED TO ANT. 455 KC

SW OSC (K)	TRIM AT 18 MC	
SW ANT (M)	TRIM AT 16 MC	
POL. (Q)	TRIM AT 4.5 MC	
BC OSC (F)	TRIM AT 1500 KC	
BC (G-H)	TRIM AT 1400 KC	
BC (J)	PAD At 600 KC	

Power consumption—10A1—95 watts.

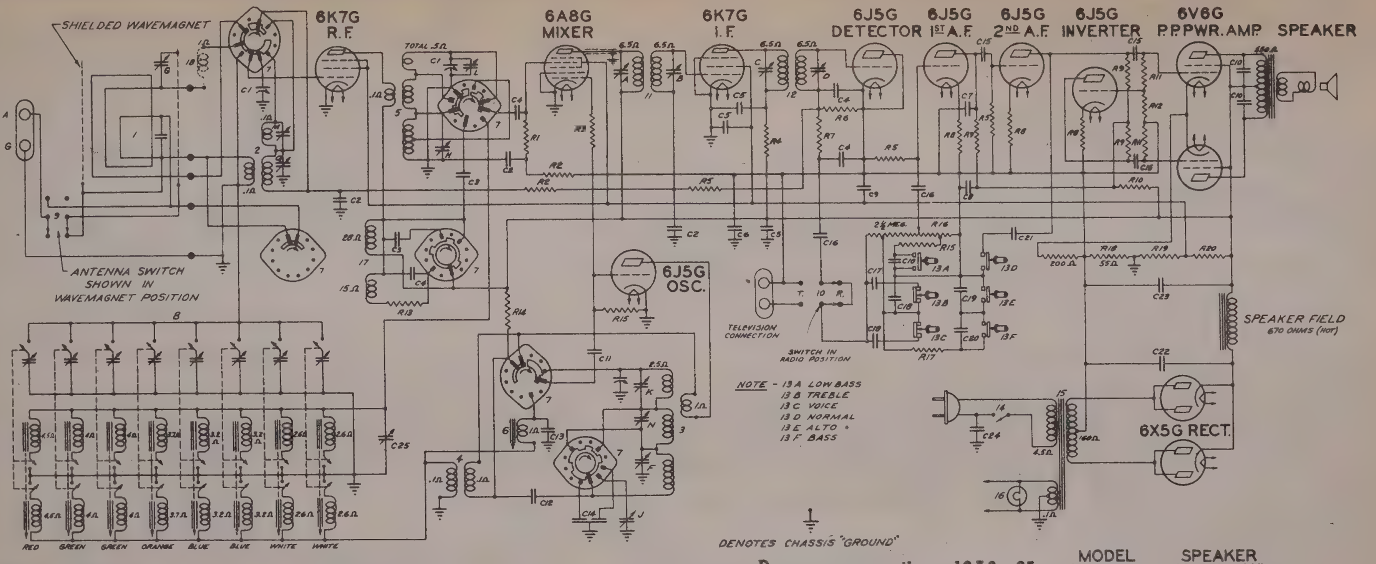
Power consumption—10A2—120 watts.

DIAG. Nº	PART Nº	DESCRIPTION	
C 1	22-1043	THREE GANG VARIABLE	
C 2	22-829	.05 MFD.	200V.
C 3	22-470	.00015 MFD.	600 V.
C 4	22-828	.05 MFD.	400 V.
C 5	22-147	.0005 MFD.	600 V.
C 6	22-825	.1 MFD.	400 V.
C 7	22-127	25 MMFD.	600 V.
C 8	22-327	.02 MFD.	200 V.
C 9	22-954	.00035 MFD.	600 V.
C 10	22-229	.005 MFD.	600 V.
C 11	22-830	.02 MFD.	600 V.
C 12	22-448	.004 MFD.	600 V.
C 13	22-492	.002 MFD.	600 V.
C 14	22-854	.0005 MFD	600 V.
C 15	22-171	.05 MFD	600 V.
C 16	22-827	.1 MFD.	200 V.
C 17	22-934	20 MFD. ELECTROLYTIC	450 V.
C 18		20 MFD ELECTROLYTIC	350 V.
C 19	22-1041	.005 MFD.	600 V.
C 20	22-868	COMPENSATING COND	
C 21	22-1039	DUAL OSCILLATOR PADDER	
C 22	22-358	.002 MFD.	600 V.

DIAG. Nº	PART Nº	DESCRIPTION	
R 1	63-587	4700 OHM	¼ W.
R 2	63-595	100 M OHM	¼ W.
R 3	63-589	10 M OHM	¼ W.
R 4	63-590	15 M OHM	¼ W.
R 5	63-593	47 M OHM	¼ W.
R 6	63-576	68 OHM	¼ W.
R 7	63-151	15 M OHM	1 W.
R 8	63-605	1000 OHM	½ W.
R 9	63-643	18 M OHM	¼ W.
R 10	63-271	1 MEGOHM	¼ W.
R 11	63-717	220 M OHM	¼ W
R 12	63-711	22 M OHM	¼ W.
R 13	63-1074	VOLUME CONTROL	
R 14	63-594	68 M OHM	¼ W.
R 15	63-585	2200 OHM	¼ W.
R 16	63-296	220 M OHM	¼ W.
R 17	63-657	330 M OHM	¼ W.
R 18	63-648	47 M OHM	¼ W.
R 19	63-1048	TWO SECTION CANDOHM	
R 20	63-1061	7 OHM WIREWOUND	½ W.
R 21	63-676	27 M OHM	1 W.
R 22	63-1056	22 M OHM	2 W.

MODELS 12S550, 12S568,
12S569, 12S595, Ch. 12A3

ZENITH RADIO CORP.



BAND SWITCH SHOWN IN "POLICE" POSITION

DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-951	THREE GANG VARIABLE	
C2	22-829	.05 MFD	200V.
C3	22-289	50 MMFD	600V.
C4	22-162	.0001 MFD.	600V.
C5	22-828	.05 MFD	400V.
C6	22-827	.1 MFD.	200V.
C7	22-854	.0005 MFD.	600V.
C8	22-991	16 MFD ELECTROLYTIC	350V.
C9		16 MFD. ELECTROLYTIC	200V.
C10	22-229	.005 MFD	600V.
C11	22-127	25 MMFD.	600V.
C12	22-358	.002 MFD	600V.
C13	22-944	COMPENSATING COND.	
C14	22-930	DUAL OSC PADDER	
C15	22-171	.05 MFD.	600V.
C16	22-327	.02 MFD.	200V.
C17	22-954	.00035 MFD	600V.
C18	22-470	.00015 MFD.	600V.
C19	22-448	.004 MFD.	600V.
C20	22-492	.002 MFD.	600V.
C21	22-196	.01 MFD	600V.
C22	22-970	20 MFD. ELECTROLYTIC	450V.
C23		20 MFD. ELECTROLYTIC	350V.
C24	22-992	.02 MFD.	[illegible]V.
C25		TRIMMER COND. (SEE NOTE 1)	
R1	63-597	470 M OHM	¼ W.
R2	63-595	100 M OHM	¼ W.
R3	63-581	470 OHM	¼ W.
R4	63-605	1000 OHM	½ W
R5	63-271	1 MEGOHM	¼ W
R6	63-655	220 M OHM	¼ W.
R7	63-591	22 M OHM	¼ W.
R8	63-282	2200 OHM	¼ W.
R9	63-648	47 M OHM	¼ W
R10	63-680	10 M OHM	1 W.
R11	63-657	330 M OHM	¼ W.
R12	63-647	39 M OHM	¼ W.
R13	63-586	3300 OHM	¼ W.
R14	63-1065	15 M OHM	1 W.
R15	63-593	47 M OHM	¼ W.
R16	63-1078	VOLUME CONTROL	
R17	63-594	68 M OHM	¼ W.
R18	63-1052	2 SECTION CANDOHM	
R19	63-676	27 M OHM	1 W
R20	63-1058	22 M OHM	2 W

DIAG. Nº	PART Nº	DESCRIPTION
7	85-209	BAND SELECTOR SWITCH
8		AUTOMATIC TUNING UNIT
9	85-171	WAVEMAGNET SWITCH
10	85-171	TELEVISION SWITCH
11	95-637	1ST I.F. TRANSFORMER
12	95-638	2ND I.F. TRANSFORMER
13	S8595	TONE CONTROL SW. ASSEM.
14	85-148	A.C. SWITCH
15	95-639	POWER TRANS. 60~ 117V.
16	100-36	PILOT LIGHT 6.3V. .25A.
17	20-216	PLATE CHOKE COIL
18	S8142	LOOP LOADING COIL ASSEM (NOTE: USED ON SOME MODELS)
A		1ST I.F. TRANS. PRI
B		1ST I.F. " SEC.
C		2ND I.F. " PRI.
D		2ND I.F. " SEC.
F		BROADCAST OSC. (SEE NOTE)
G		ANTENNA BROADCAST
H	22-959	DETECTOR BROADCAST
K		SHORT WAVE OSC (SEE NOTE)
L		SHORT WAVE DET (ON GANG)
M		SHORT WAVE ANTENNA
N		POLICE BAND OSC. (SEE NOTE)
Q		POLICE BAND ANTENNA
J	22-463	BROADCAST PADDER

NOTE:
(1) TRIMMERS F, K, N & C25 ARE MOUNTED ON STRIP #22-881

(2) TRIMMERS M & Q ARE MOUNTED ON STRIP #22-982

I.F. FREQUENCY 455 KC.
12 TUBE SUPERHETERODYNE
CHASSIS Nº 12A3 3 BAND A.C.

Stage Gains

Ant. to R.F. grid—2.08× at 1000 Kc.

R.F. grid to conv. grid—7.5× at 1000 Kc.

Conv. grid to I.F. grid—43× at 455 Kc.

Overall audio—2127× at 1 watt 400 cycles.

NOTE

Chassis 12A4 has phono connections added

Tuning ranges— 540 Kc.— 1600 Kc.
1500 Kc.— 5200 Kc.
5700 Kc.—18300 Kc.

Power consumption—12A3—95 watts.

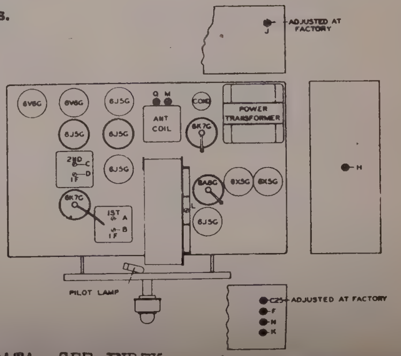
Power consumption—12A4—120 watts.

Power output—15 watts.

MODEL	SPEAKER	
12S550	49-351	10"
12S568	49-351	10"
12S569	49-404	15"

CONVENTIONAL
I.F. ALIGNMENT
SEE SPECIAL
SECTION VOL.VIII

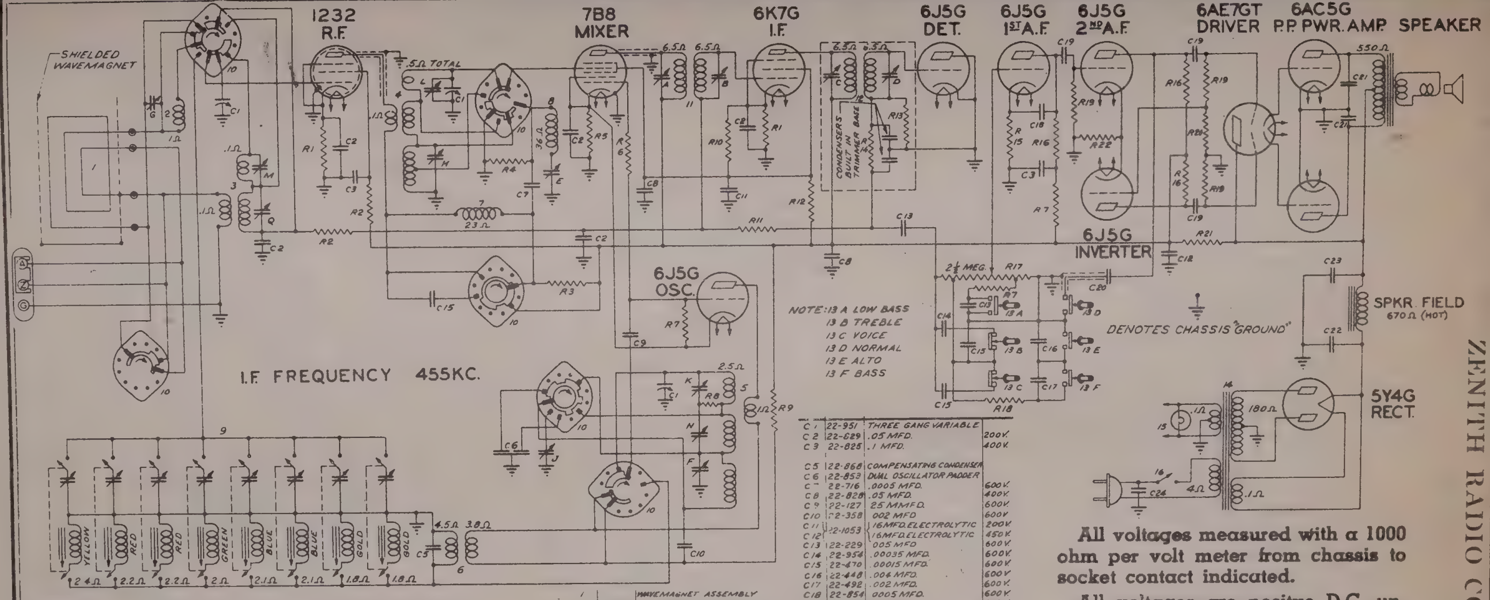
SHORT WAVE
TRIM (K) 18000KC
TRIM L-M 16000KC
POLICE
TRIM N-Q 4500KC
BROADCAST
TRIM F-H-G 1400KC
PAD J 600KC



FOR VOLTAGES, P.B. DATA, SEE INDEX

ZENITH RADIO CORP.

MODELS 12S550Z, 12S568E,
12S568Z, 12S569E, 12S569Z
12S595Z, Ch. 12A1



I.F. FREQUENCY 455KC.

NOTE: 13 A LOW BASS
13 B TREBLE
13 C VOICE
13 D NORMAL
13 E ALTO
13 F BASS

C 1	22-951	THREE GANG VARIABLE	
C 2	22-829	.05 MFD.	200V.
C 3	22-825	.1 MFD.	400V.
C 5	22-868	COMPENSATING CONDENSER	
C 6	22-853	DUAL OSCILLATOR PADDER	
C 7	22-716	.0005 MFD.	600V.
C 8	22-828	.05 MFD.	400V.
C 9	22-127	25 MMFD.	600V.
C 10	22-358	.002 MFD	600V
C 11	22-1053	16 MFD. ELECTROLYTIC	200V.
C 12		16 MFD. ELECTROLYTIC	450V.
C 13	22-229	.005 MFD	600V.
C 14	22-954	.00035 MFD.	600V.
C 15	22-470	.00015 MFD.	600V.
C 16	22-448	.004 MFD.	600V
C 17	22-492	.002 MFD.	600V.
C 18	22-854	.0005 MFD.	600V.
C 19	22-839	.02 MFD	600V.
C 20	22-176	.01 MFD	600V.
C 21	22-[illegible]	.005 MFD.	1000V
C 22	22-1108	20 MFD ELECTROLYTIC	450V.
C 23		20 MFD ELECTROLYTIC	450V
	22-392	.02 MFD	600V.
R 1	63-627	180 OHM	¼ W.
R 2	63-595	100M OHM	¼ W.
R 3	63-587	4700 OHM	¼ W.
R 4	63-591	22M OHM	¼ W.
R 5	63-580	330 OHM	¼ W.
R 6	63-701	470 OHM	¼ W.
R 7	63-593	47M OHM	¼ W.
R 8	63-621	39 OHM	¼ W.
R 9	63-1055	22 M OHM	1 W.
R 10	63-676	27 M OHM	1 W
R 11	63-271	1 MEGOHM	¼ W
R 12	63-1058	22M OHM	2 W
R 13	63-717	220 M OHM	¼ W.
R 14	63-711	22 M OHM	¼ W
R 15	63-439	2700 OHM	¼ W.
R 16	63-592	33 M OHM	¼ W.
R 17	63-1078	VOLUME CONTROL	
R 18	63-594	68 M OHM	¼ W
R 19	63-657	330 M OHM	¼ W
R 20	63-645	27M OHM	¼ W.
R 21	63-1105	1000 OHM	2 W.
R 22	63-584	1500 OHM	¼ W.
A		1ST I.F. TRANS PRI.	
B		1ST I.F. TRANS. SEC.	
C		2ND I.F. TRANS PRI.	
D		2ND I.F. TRANS. SEC.	
E	22-1015	WAVE TRAP	
F		BROADCAST OSC. (NOTE 1)	
G	22-1042	BROADCAST ANTENNA	
H		BROADCAST DET. (NOTE 1)	
J	22-686	BROADCAST PADDER	
K		SHORTWAVE OSC (NOTE 1)	
L		SHORTWAVE DET. (ON GANG)	
M		SHORTWAVE ANT. (NOTE 2)	
N		POLICE OSC (NOTE 1)	
Q		POLICE ANT. (NOTE 2)	

1		WAVEMAGNET ASSEMBLY
2	S8142	LOOP LOADING COIL ASSEMBLY
3	S8749	ANTENNA COIL ASSEMBLY
4	S8751	DETECTOR COIL ASSEMBLY
5	S8750	OSCILLATOR COIL ASSEMBLY
6	S8466	OSCILLATOR CPLG. COIL ASSEM.
7	S9389	RF COIL ASSEMBLY
8	S8326	WAVE TRAP COIL ASSEMBLY
9		AUTOMATIC TUNING UNIT
10	85-235	BAND SELECTOR SWITCH
11	95-637	1ST I.F. TRANSFORMER
12	95-715	2ND I.F. TRANSFORMER
13	S8593	TONE CONTROL SW. ASSEMBLY
14	95-714	PWR. TRANS. 60 ~ 117 V.
15	100-36	PILOT LIGHT 6.3 V. .25 A.
16	85-148	A.C. SWITCH

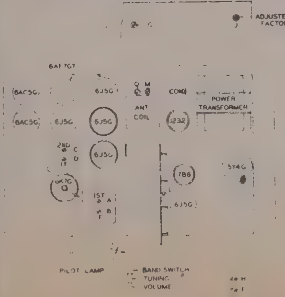
7-31-40 | 1ST A.F. BYPASS CHANGED
22-1108 WAS 22-970

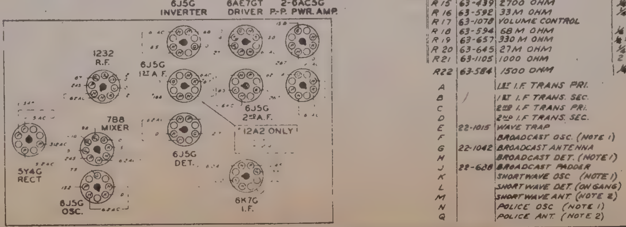
BAND SWITCH SHOWN
IN "POLICE" POSITION

MODEL	SPEAKER	
12S550Z	49-351	10"
12S568Z	49-351	10"
12S569Z	49-404	15"
12S568E	49-416	14"

12 TUBE SUPERHETERODYNE
CHASSIS Nº 12A1 3 BAND A.C.
ZENITH RADIO CORPORATION
CHICAGO, ILL.

NOTE:
(1) TRIMMERS F, H, K & N ARE MOUNTED ON STRIP # 22-1052.
(2) TRIMMERS M & Q ARE MOUNTED ON STRIP # 22-982.





All voltages measured with a 1000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positve D.C. unless marked otherwise.

Volume control on full.

Line voltage 117 v.

Power consumption—100 watts.

Power output—14 watts.

Stage Gains:

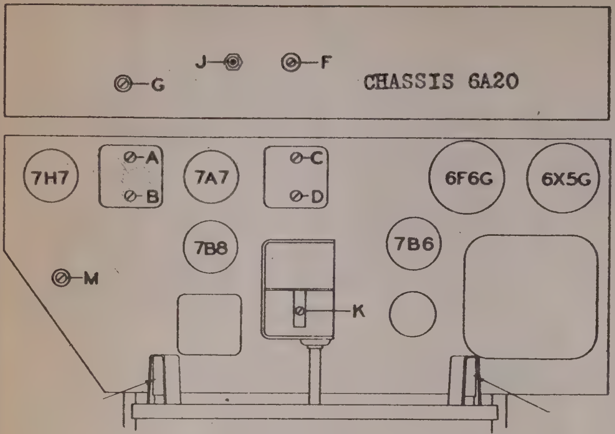
Ant. to R.F. grid—10.7× at 1000 Kc.

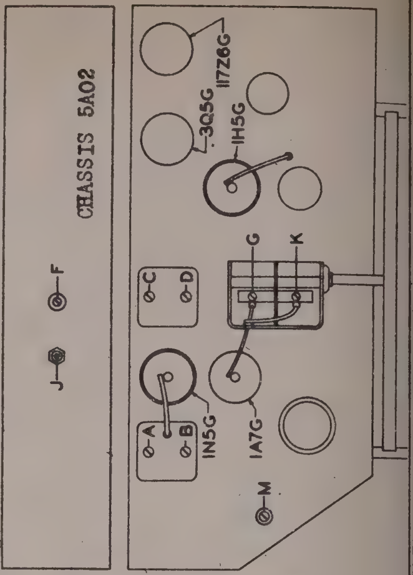
R.F. grid to conv. grid—6.75× at 1000 Kc.

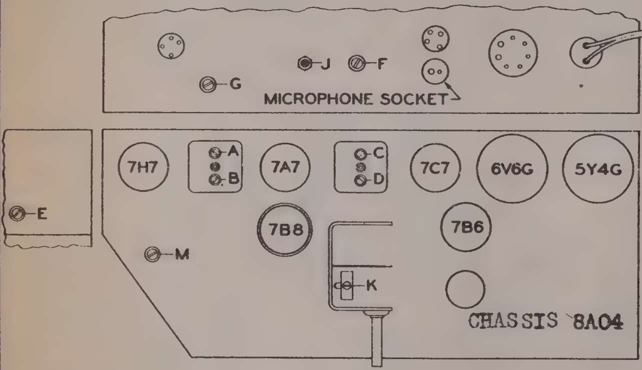
Conv. grid to I.F. grid—31-3× at 455 Kc.

Overall audio—1640× at 1 watt, 400 cycles.

NOTE—The letter E after model number designates the use of a 14 inch speaker.







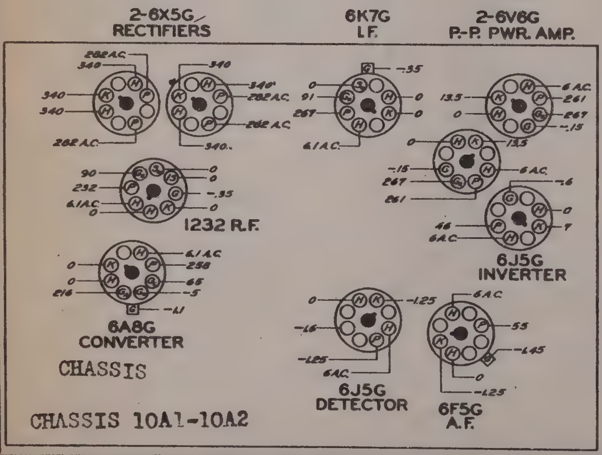
ALIGNMENT-CHASSIS 5A02.
I.F. ALIGNMENT CONVENTIONAL
ADJUST TRIMMERS A B C D-455 KC
TRIM K 18 MC
TRIM F,G 1700 KC
PAD J AT 600 KC
TRIM M AT 18 MC

ALIGNMENT-CHASSIS 6A20
I.F. SAME AS CHASSIS 5A02
TRIM K AT 18 MC
TRIM M AT 16 MC
TRIM F,G AT 1500 KC
PAD J AT 600 KC
WITH 455-KC SIGNAL FED TO RF GRID, ADJUST WAVETRAP E FOR MINIMUM RESPONSE.

ALIGNMENT -CHASSIS 8A04
SAME AS FOR CHASSIS 6A20

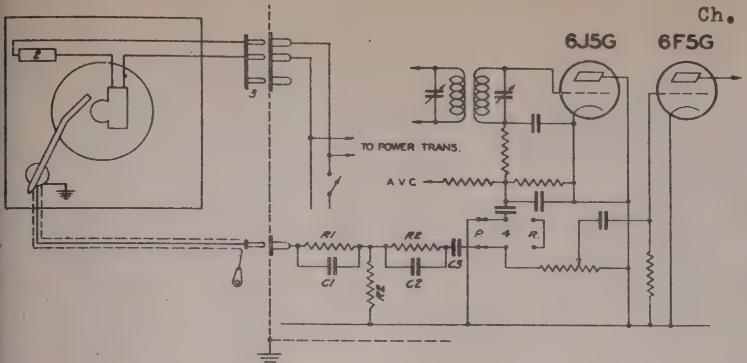
VOLTAGE DATA
CHASSIS 10A1-10A2

ALL VOLTAGES MEASURED WITH 20,000 OHMS-PER-VOLT METER FROM CHASSIS TO POINT INDICATED.



ZENITH RADIO CORP.

Ch. 6A02, 6A04, 6A13, 6A14
Ch. 10A2
Ch. 12A2
Ch. 12A4

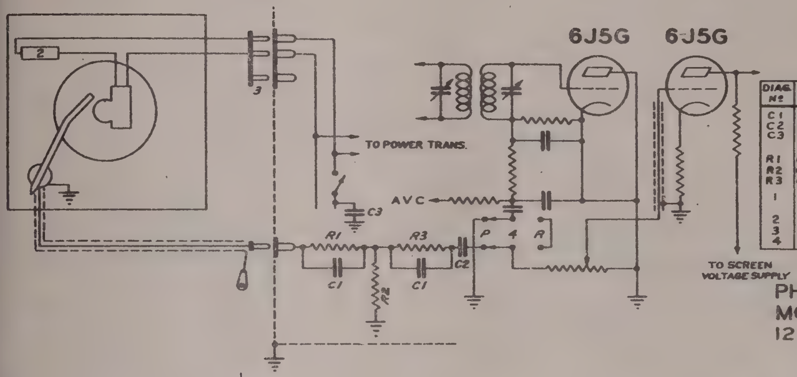


DIAG Nº	PART Nº	DESCRIPTION	
C1	22-1048	.00085 MFD.	600 V.
C2	22-954	.00035 MFD,	600 V.
C3	22-887	.001 MFD.	600 V.
R1	63-597	470 M OHM	¼ W.
R2	63-271	1 MEGOHM	¼ W.
1	169-42	WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191	A.C. SWITCH	
3	58-85	A.C. PLUG	
4	85-228	PHONO-RADIO SW.	

PHONO CIRCUIT DATA

MODEL	SPEAKER
10S589	49-400 15"
10S590	49-402 12"

CHASSIS Nº 10A2

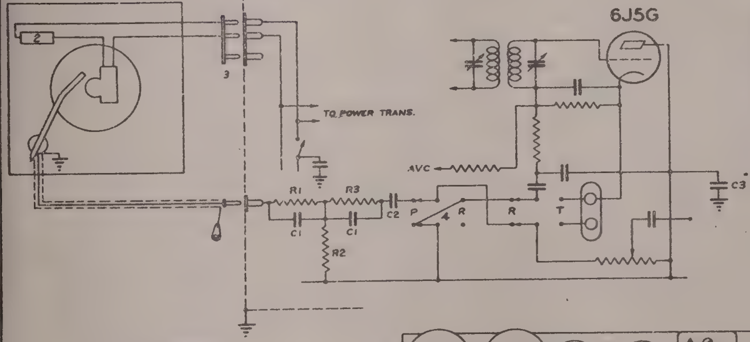


DIAG Nº	PART Nº	DESCRIPTION	
C1	22-954	.00035 MFD.	600 V.
C2	22-887	.001 MFD.	600 V.
C3	22-1065	.0025 MFD.	600 V.
R1	63-597	470 M OHM	¼ W.
R2	63-657	330 M OHM	¼ W.
R3	63-271	1 MEGOHM	¼ W.
1	169-42	WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191	A.C. SWITCH	
3	58-85	A.C. PLUG	
4	85-228	PHONO-RADIO SW.	

PHONO CIRCUIT DATA

MODEL	SPEAKER
12S595Z	49-401 15"

CHASSIS Nº 12A2



DIAG Nº	PART Nº	DESCRIPTION	
C1	22-954	.00035 MFD.	600 V.
C2	22-887	.001 MFD.	600 V.
C3	22-684	8 MFD. ELECTROLYTIC	150 V.
R1	63-597	470M OHM	¼ W.
R2	63-596	330M OHM	¼ W.
R3	63-271	1 MEGOHM	¼ W.
1	169-42	WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191	A.C. SWITCH	
3	58-85	A.C. PLUG	
4	85-228	PHONO RADIO SWITCH	

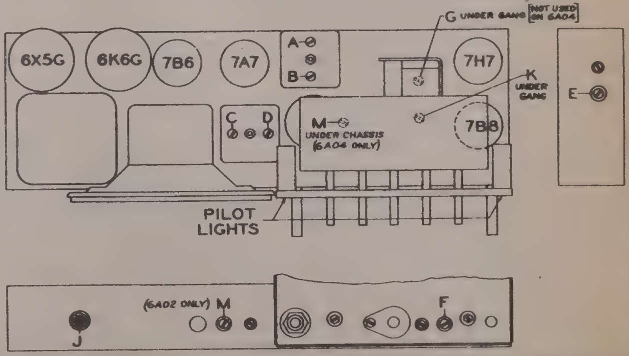
PHONO CIRCUIT DATA

MODEL	SPEAKER
12S595	49-401 15"

CHASSIS Nº 12A4

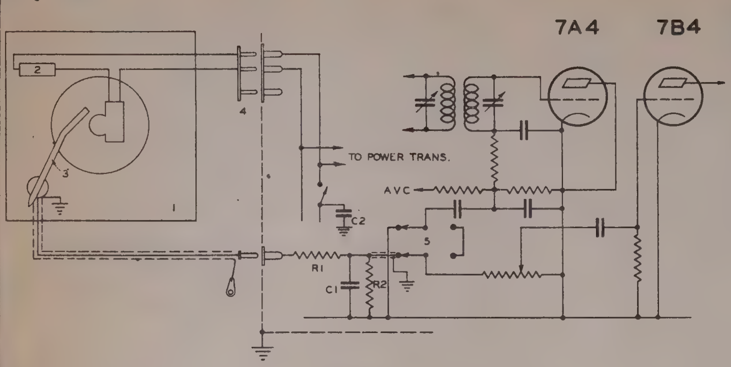
ALIGNMENT

CHASSIS 6A02,6A04.6A13,6A14
I.F.TRIMMERS A B C D
PEAK AT 455 KC
WAVETRAP E-ADJUST FOR
MIN. SIGNAL RESPONSE
AT 455 KC SIGNAL AT
R-F GRID.
TRIM K 18 MC
TRIM F.G 1500 KC
PAD J 600 KC
TRIM M 16 MC



Ch. 7A04
Ch. 6A04
Ch. 8A03
Ch. 12A2

ZENITH RADIO CORP.



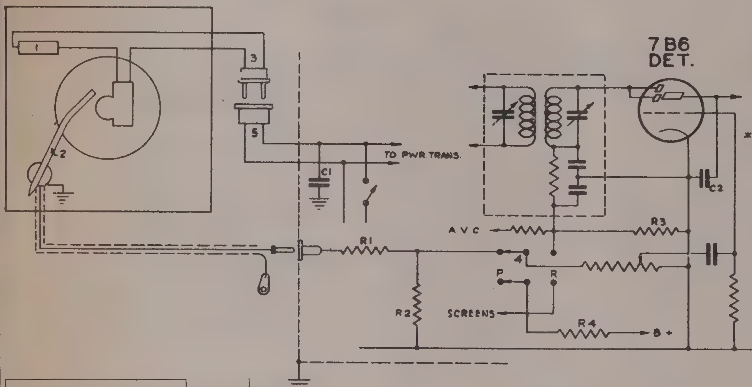
DIAG Nº	PART Nº		DESCRIPTION	
C1	22-887		.001 MFD.	600 V.
C2	22-1041		.005 MFD.	600 V.
R1	63-597		470M OHM	¼ W.
R2	63-855		220M OHM	¼ W
	MODEL 7S582	MODEL 7S581		
1	169-42		WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191		A.C. SWITCH	
3		142-28	PICK-UP	
4	58-85	58-85	A.C. PLUG	
5	85-171	85-171	PHONO-RADIO SW.	

NOTE- BANDSWITCH ON THIS CHASSIS IS PART NO. 85-227.

PHONO CIRCUIT DATA

MODEL	SPEAKER
7S 582	49-369 10"
7S 581	49-396 10"
7S 584	49-397 12"

CHASSIS NO. 7A04



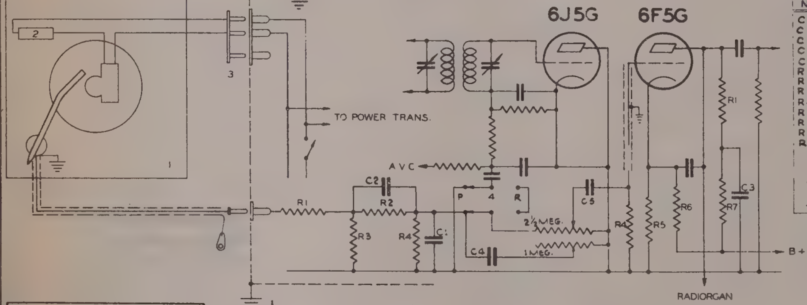
DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1040	.02 MFD.	200 V.
C2	22-82	.001 MFD	600 V
R1	63-597	470M OHM	¼ W
R2	63-595	100M OHM	¼ W
R3	63-604	10 MEGOHM	¼ W
* R4	63-151	15M OHM	1 W
* R4 SAME AS R7 ON 6A02 DIAGRAM			
1	85-181	AUTOMATIC STOP-SWITCH	
2	142-26	PHONO PICK-UP	
3	58-86	A.C. PLUG	
4	85-230	PHONO-RADIO SWITCH	
5	52-188	CABLE & PLUG	

ON THIS CHASSIS, TRIMMER "M" IS PART Nº 22-303 & TRIMMER "G" IS NOT USED

PHONO CIRCUIT DATA

MODEL	SPEAKER
6S 580	49-387 5"

CHASSIS Nº6A04

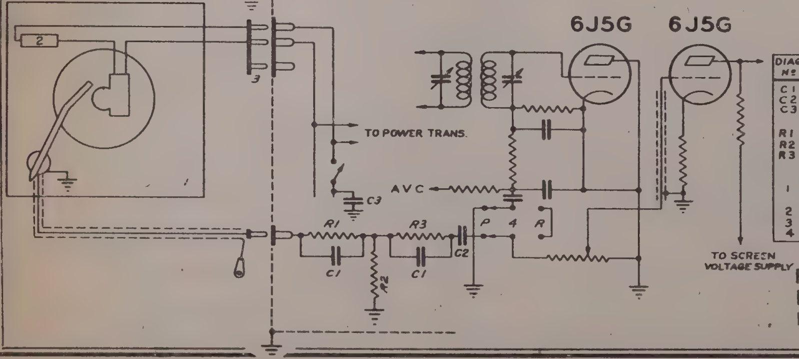


DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-182	.00025 MFD.	600 V.
C2	22-954	.00035 MFD.	600 V.
C3	22-825	.1 MFD.	400 V.
C4	22-326	.003 MFD.	600 V
C5	22-830	.02 MFD.	600 V.
R1	63-296	220 M OHM	¼ W.
R2	63-597	470 M OHM	¼ W.
R3	63-596	330 M OHM	¼ W.
R4	63-271	1 MEG.	¼ W
R5	63-1103	390 OHM WIREW'ND.	½ W.
R6	63-121	100 M OHM	1 W.
R7	63-593	47 M OHM	¼ W.
R8	63-1117	VOLUME CONTROL	
1	169 42	WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191	A.C. SWITCH	
3	58-85	A.C. PLUG	
4	85-228	PHONO.-RADIO SW.	

PHONO CIRCUIT DATA

MODEL	SPEAKER
8S 587	49-397 12"
8S 588	49-397 12"

CHASSIS NO. 8A03



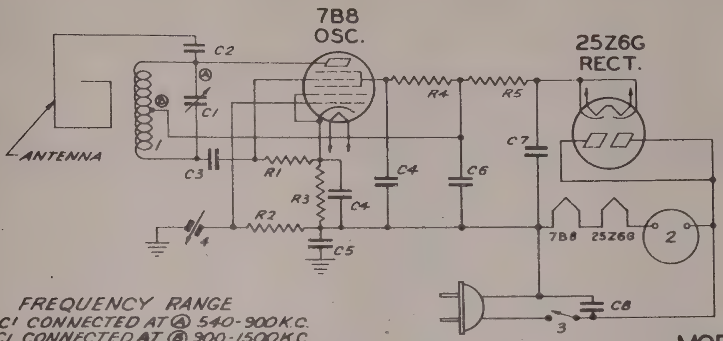
DIAG Nº	PART Nº	DESCRIPTION	
C1	22-954	.00035 MFD.	600 V.
C2	22-887	.001 MFD.	600 V.
C3	22-1065	.0025 MFD.	600 V.
R1	63-597	470M OHM	¼ W.
R2	63-657	330M OHM	¼ W.
R3	63-271	1 MEGOHM	¼ W.
1	169-42	WEBSTER AUTOMATIC RECORD PLAYER	
2	85-191	A.C. SWITCH	
3	58-85	A.C. PLUG	
4	85-228	PHONO-RADIO SW.	

PHONO CIRCUIT DATA

MODEL	SPEAKER
12S595Z	49-401 15"

CHASSIS Nº 12A2

C2 WAS 22-162 | 8-3-40

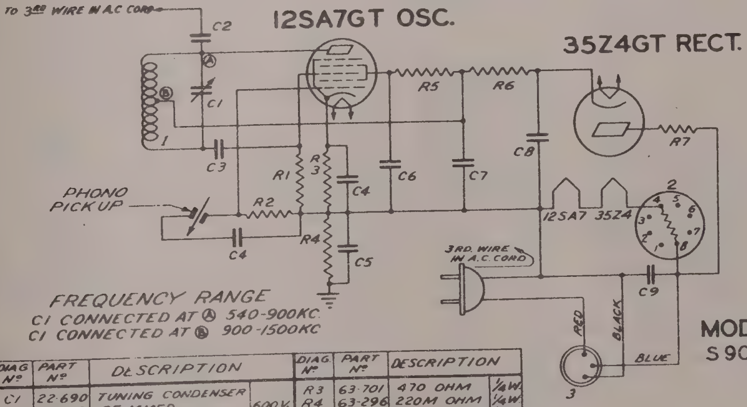


FREQUENCY RANGE
C1 CONNECTED AT Ⓐ 540-900K.C.
C1 CONNECTED AT Ⓑ 900-1500K.C.

MODELS
S8500Z

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-690	TUNING CONDENSER		R2	63-464	1 MEGOHM	¼ W.
C2	22-127	25 MMFD.	600 V.	R3	63-581	470 OHM	¼ W.
C3	22-182	.00025 MFD.	600 V	R4	63-964	4700 OHM	½ W.
C4	22-829	.05 MFD.	200 V.	R5	63-707	4700 OHM	¼ W.
C5	22-827	1 MFD.	200 V.				
C6	22-1061	8 MFD. ELECTROLYTIC	150 V.				
C7		16 MFD. "	150 V	1	S8611	OSC. COIL ASSEM.	
C8	22-869	.05 MFD.	400 V.	2	M1-85	MOTOR (60~)	
				3	85-191	A.C. SWITCH	
				4	M2-30	PICKUP	
R1	63-593	47M OHM	¼ W.				

PHONOGRAPH OSCILLATOR
ZENITH RADIO CORPORATION
CHICAGO ILL.



FREQUENCY RANGE
C1 CONNECTED AT Ⓐ 540-900KC.
C1 CONNECTED AT Ⓑ 900-1500KC

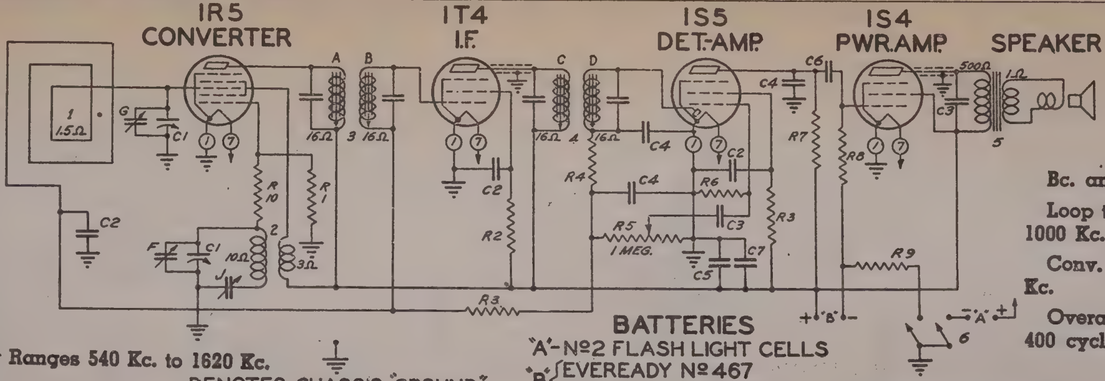
MODEL
S9000

DIAG Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-690	TUNING CONDENSER		R3	63-701	470 OHM	¼ W.
C2	22-127	25 MMFD.	600 V.	R4	63-296	220M OHM	¼ W.
C3	22-182	.00025 MFD.	600 V.	R5	63-964	4700 OHM	½ W.
C4	22-829	.05 MFD.	200 V	R6	63-803	2200 OHM	½ W
C5	22-827	.1 MFD.	200 V.	R7	63-575	47 OHM	¼ W
C6	22-243	.01 MFD.	400 V.				
C7	22-876	8 MFD. ELECTROLYTIC	150 V.				
C8		40 MFD. "	150 V.	1	58611	OSC. COIL ASSEM.	
C9	22-828	.05 MFD	400 V.	2	100-76	BALLAST TUBE	
				3	52-208	3 PRONG RECEPTACLE	
R1	63-591	22 M OHM	¼ W.				
R2	63-271	1 MEGOHM	¼ W.				

PHONOGRAPH OSCILLATOR
ZENITH RADIO CORPORATION
CHICAGO. ILL.

MODEL 4K600, Chassis 4B01

ZENITH RADIO CORP.



Stage Gains:

Bc. and 455 Kc. I.F.

Loop to Conv. grid down 1/3× at 1000 Kc.

Conv. grid to I.F. grid 49× at 455 Kc.

Overall audio 317× at .05 watt, 400 cycles.

Tuning Ranges 540 Kc. to 1620 Kc.

⏚ DENOTES CHASSIS "GROUND"

BATTERIES

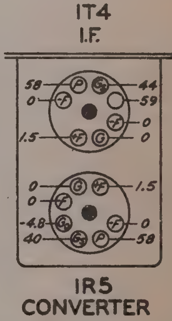
"A"-Nº2 FLASH LIGHT CELLS

"B" {EVEREADY Nº467
BURGESS NºXX46

MODEL 4K600 SPEAKER 49-433 3½"

I.F. FREQUENCY 455 KC.
4 TUBE SUPERHETERODYNE
1½V.-BATTERY-PORTABLE
CHASSIS Nº 4B01

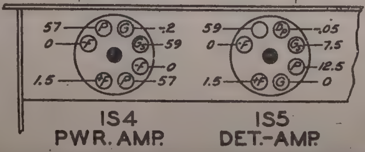
12/9/40



1-29-41 R10 ADDED

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-1167	TWO GANG VARIABLE		R3	63-724	4.7 MEGOHM	¼W.	4	95-781	2ND I.F. TRANS.
C2	22-1174	.01 MFD.	125V.	R4	63-713	47M OHM	¼W.	5	95-779	SPKR. TRANS.
C3	22-1169	.001 MFD.	600V.	R5	63-1176	VOLUME CONTROL		6	85-267	PWR. SWITCH
C4	22-162	.0001 MFD.	600V.	R6	63-1093	15 MEGOHM	¼W.			
C5	22-1176	5 MFD. ELECTROLYTIC	68V.	R7	63-464	1 MEGOHM	¼W.			
C6	22-1175	.005 MFD.	600V.	R8	63-723	3.3 MEGOHM	¼W.			
C7	22-1188	.05 MFD.	200V.	R9	63-749	680 OHM	¼W.	A		1ST I.F.T. PRI.
				R10	63-1234	680 OHM	¼W.	B		1ST I.F.T. SEC.
								C		2ND I.F.T. PRI.
								D		2ND I.F.T. SEC.
				1	S9385	WAVEMAGNET ASSEMBLY		F		B'DCAST OSCILLATOR
R1	63-715	100M OHM	¼W.	2	S9354	OSC. COIL ASSEMBLY		G		B'DCAST ANTENNA
R2	63-765	33M OHM	¼W.	3	95-780	1ST I.F. TRANS.		J	22-1166	B'DCAST PADDER

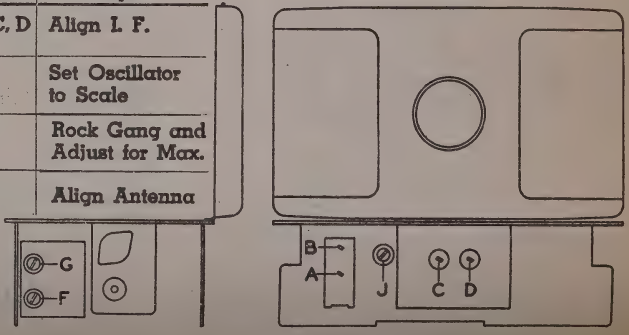
Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.1 mfd.	455 Kc.	—	1600 Kc.	A, B, C, D	Align I. F.
2	1 Turn Loop Made from Generator Leads. Diameter Approx. 10" See Note!	—	1600 Kc.	—	1600 Kc.	F	Set Oscillator to Scale
3		—	600 Kc.	—	600 Kc.	J	Rock Gang and Adjust for Max.
4		—	1400 Kc.	—	1400 Kc.	G	Align Antenna



All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

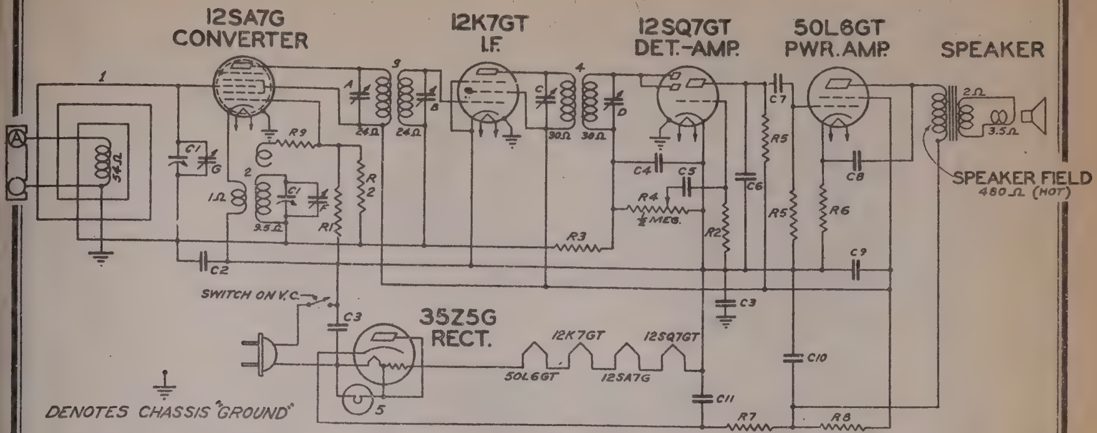
Volume control full on.



TRIMMER LOCATIONS

ZENITH RADIO CORP.

MODELS 5D610,5D610W
5D625,Chassis 5B01



Power output 1.3 watts.

Tuning Ranges 540 Kc to 1620 Kc.

MODEL	SPEAKER
5 D 610	49-439 4"
5 D 625	49-439 4"

I.F. FREQUENCY 455 KC.
5 TUBE SUPERHETERODYNE
CHASSIS № 5B01 A.C.-D.C.

1-8-41 R9 ADDED

DIAG. №	PART №	DESCRIPTION		DIAG. №	PART №	DESCRIPTION		DIAG. №	PART №	DESCRIPTION
C1	22-1185	TWO-GANG VARIABLE						2	S9450	OSC. COIL ASSEMBLY
C2	22-829	.05 MFD.	200 V.	R 1	63-589	10 M OHM	½ W.	3	95-696	1ST I.F. TRANS.
C3	22-1017	.05 MFD.	200 V.	R 2	63-976	15 MEGOHM	¼ W.	4	95-794	2ND I.F. TRANS.
C4	22-953	.0002 MFD.	600 V.	R 3	63-600	2.2 MEGOHM	¼ W.	5	100-67	PILOT LIGHT 6.3V. .15A.
C5	22-492	.002 MFD.	600 V.	R 4	63-1112	VOLUME CONTROL				
C6	22-854	.0005 MFD.	600 V.	R 5	63-597	470 M OHM	¼ W.			
C7	22-243	.01 MFD.	400 V.	R 6	63-1171	75 OHM WIREWOUND	½ W.	A		1ST I.F. TRANS. PRI.
C8	22-1182	.01 MFD.	400 V.	R 7	63-1172	100 OHM WIREWOUND	½ W.	B		1ST I.F. TRANS. SEC.
C9	22-1186	20 MFD. ELECTROLYTIC	150 V.	R 8	63-1173	1500 OHM	1 W.	C		2ND I.F. TRANS. PRI.
C10		20 MFD. ELECTROLYTIC	150 V.	R9	63-579	220 OHM	¼ W.	D		2ND I.F. TRANS. SEC.
C11		30 MFD. ELECTROLYTIC	150 V.					F		BROADCAST OSC. (ON GANG)
								G		BROADCAST ANT. (ON GANG)
					S9452	WAVEMAGNET ASSEMBLY				

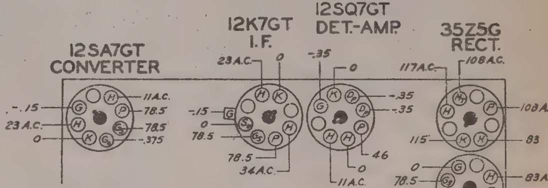
Stage Gains:

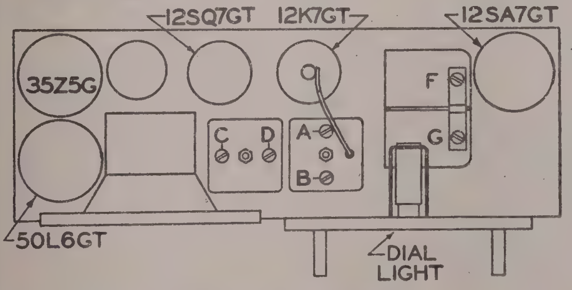
Bc. and 455 Kc. I.F.

Ant. to Conv. grid 7× at 1000 Kc.

Conv. grid to I.F. grid 74× at 455 Kc.

Overall audio 225× at .05 watt, 400 cycles.





TRIMMER LOCATIONS

SOCKET VOLTAGES

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

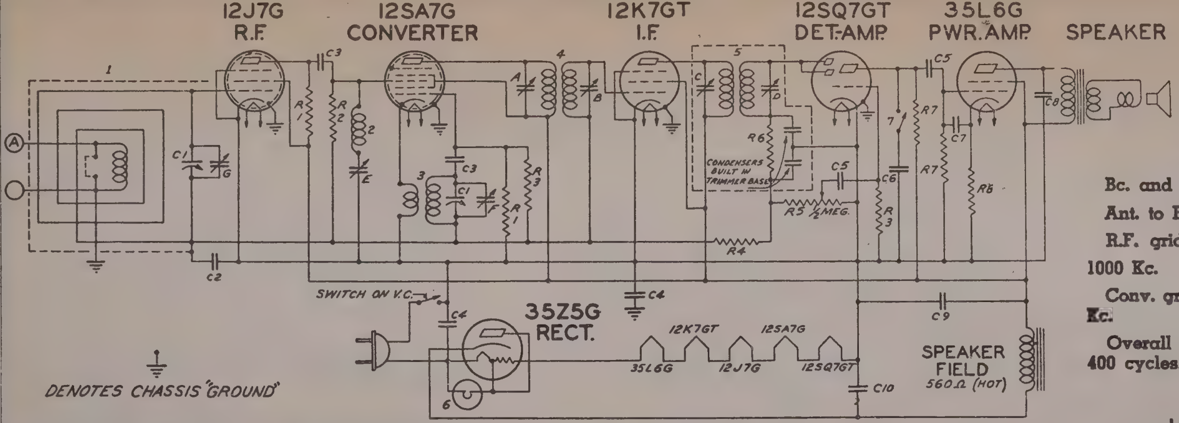
Line voltage 117 A.C.

Power consumption 29 watts.

Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.1 mfd.	455 Kc.	—	600 Kc.	A, B, C, D	Align I. F.
2	1 Turn Loop Made from Generator	—	1500 Kc.	—	1500 Kc.	F	Set Oscillator to Scale
3	Leads. See Note!	—	1500 Kc.	—	1500 Kc.	G	Adjust for Maximum

MODEL 6D516,Chassis 6A24

ZENITH RADIO CORP.



DENOTES CHASSIS "GROUND"

Stage Gains:

Bc. and 455 Kc. I.F.

Ant. to R.F. grid 5.5× at 1000 Kc.

R.F. grid to conv. grid 6.2× at 1000 Kc.

Conv. grid to I.F. grid 51× at 455 Kc.

Overall audio 289× at .25 watt. 400 cycles.

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-1184	TWO-GANG VARIABLE		R2	63-591	22 M OHM	¼W.	4	95-760	1ST I.F. TRANS.
C2	[illegible]	.05 MFD.	200V.	R3	63-976	15 MEGOHM	¼W.	5	95-790	2ND I.F. TRANS.
C3	22-162	.0001 MFD.	600V.	R4	63-600	2.2 MEGOHM	¼W.	6	100-67	PILOT LIGHT 6.3V. .15A.
C4	22-1017	.05 MFD.	200V.	R5	63-1130	VOLUME CONTROL		7	85-270	TONE CONTROL SWITCH
C5	22-243	.01 MFD.	400V.	R6	63-713	47 M OHM	¼W.			
C6	22-492	.002 MFD.	600V.	R7	63-597	470 M OHM	¼W.			
C7	22-854	.0005 MFD.	600V.	R8	63-686	150 OHM WIREWOUND	½W.	A		1ST I.F. TRANS. PRI.
C8	22-1049	.03 MFD.	400V.					B		1ST I.F. TRANS. SEC.
C9	22-1014	20 MFD. ELECTROLYTIC	150V.					C		2ND I.F. TRANS. PRI.
C10		20 MFD. ELECTROLYTIC	150V.					D		2ND I.F. TRANS. SEC.
				1	59465	WAVEMAGNET ASSEMBLY		E	22-1015	WAVE TRAP
				2	58326	WAVE TRAP COIL ASSEMBLY		F		BROADCAST OSC. (ON GANG)
R1	63-589	10M OHM	¼W.	3	59437	OSC. COIL ASSEMBLY		G		BROADCAST ANT. (ON GANG)

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

Line voltage 117 A.C.

Power consumption 25.5 watts.

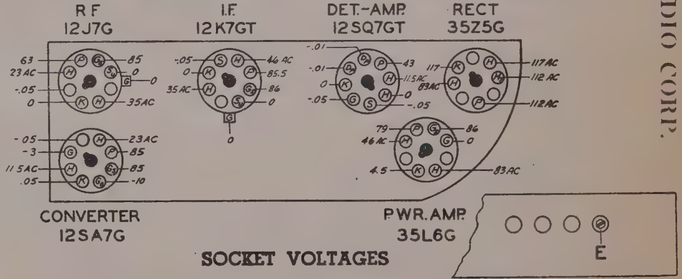
Power output 1. watt.

Tuning Ranges 540 Kc. to 1600 Kc.

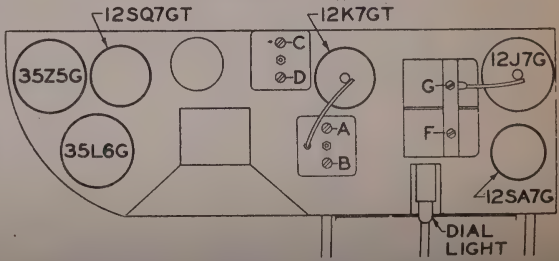
I.F. FREQUENCY 455 KC.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 6A24 A.C.-D.C.

MODEL
6 D 516

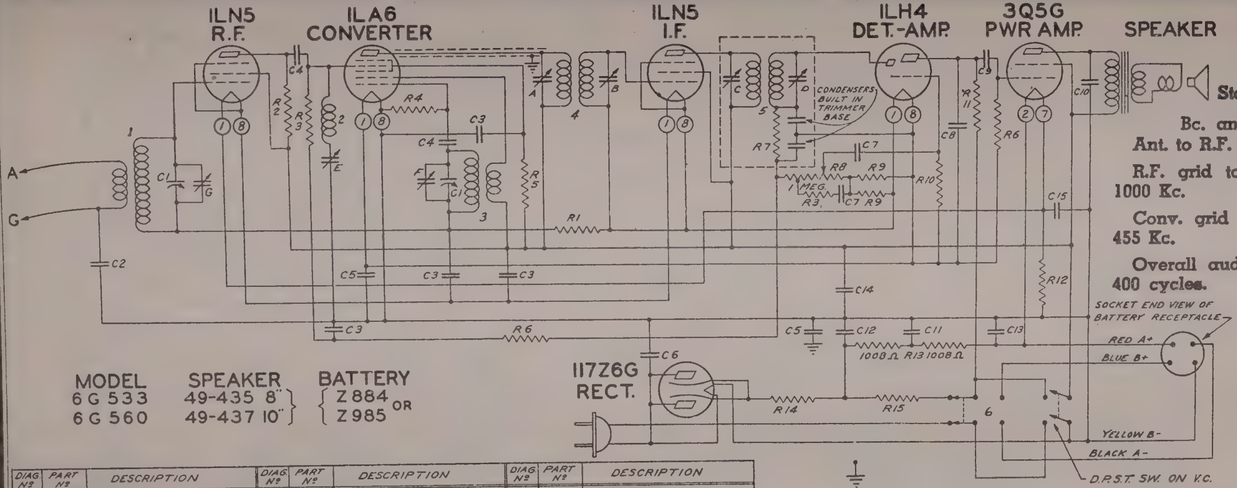
SPEAKER
49-436 5"



SOCKET VOLTAGES



Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D	Align I. F.
2	R. F. Grid	.5 mfd.	455 Kc.	"	600 Kc.	E	Adj. Wave Trap for Minimum
3	1 Turn Loop Made from Generator Leads	——	1600 Kc.	"	1600 Kc.	F	Set Oscillator to Scale
4	See Note!	——	1400 Kc.	"	1400 Kc.	G	Align Antenna



MODEL
6G533
6G560

SPEAKER
49-435 8"
49-437 10"

BATTERY
Z884 OR
Z985

Stage Gains:

Bc. and 455 Kc. I.F.

Ant. to R.F. grid 5× at 1000 Kc.

R.F. grid to conv. grid 6.5× at 1000 Kc.

Conv. grid to I.F. grid 49.1× at 455 Kc.

Overall audio 322× at .05 watt. 400 cycles.

DENOTES CHASSIS "GROUND"

CHANGEOVER SWITCH SHOWN IN POSITION FOR 115V. A.C.-DC. OPERATION.

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-1181	TWO GANG VARIABLE		R1	63-325	150M OHM	¼ W.	1	20-227	ANTENNA COIL
C2	22-1183	.01 MFD.	400 V.	R2	63-590	15M OHM	¼ W.	2	S8326	WAVE TRAP COIL ASSEMBLY
C3	22-829	.05 MFD.	200 V.	R3	63-595	100M OHM	¼ W.	3	S9446	OSCILLATOR COIL ASSEMBLY
C4	22-162	100 MMFD.	600 V.	R4	63-654	180M. OHM	¼ W.	4	95-792	1ST I.F. TRANSFORMER
C5	22-827	.1 MFD.	200 V.	R5	63-592	33M OHM	¼ W.	5	95-793	2ND I.F. TRANSFORMER
C6	22-1017	.05 MFD.	200 V.	R6	63-600	2.2 MEGOHM	¼ W.	6	85-171	CHANGEOVER SWITCH
C7	22-492	.002 MFD.	600 V.	R7	63-713	47M OHM	¼ W.			
C8	22-470	.00015 MFD.	600 V.	R8	63-1178	VOLUME CONTROL				
C9	22-196	.01 MFD.	600 V.	R9	63-585	2200 OHM	¼ W.			
C10	22-448	.004 MFD.	600 V.	R10	63-976	15 MEGOHM	¼ W.	A		1ST I.F. TRANS. PRI.
C11	22-1026	20 MFD. ELECTROLYTIC	150 V.	R11	63-271	1 MEGOHM	¼ W.	B		1ST I.F. TRANS. SEC.
C12		40 MFD. ELECTROLYTIC	150 V.	R12	63-1097	870 OHM WIREWOUND	1 W.	C		2ND I.F. TRANS. PRI.
C13	22-1159	20 MFD. ELECTROLYTIC	25 V.	R13	63-1132	2-SECTION CANDOHM		D		2ND I.F. TRANS. SEC.
C14		40 MFD. ELECTROLYTIC	150 V.	R14	63-1096	140 OHM WIREWOUND	2 W.	E	22-1015	WAVE TRAP
C15		40 MFD. ELECTROLYTIC	25 V.	R15	63-1156	1800 OHM	½ W.	F		BROADCAST OSC. (ON GANG)
								G		BROADCAST ANT. (ON GANG)

I.F. FREQUENCY 455KC.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 6A25
110 VOLT A.C.-D.C.-BATTERY PACK

Power output .360 watts.

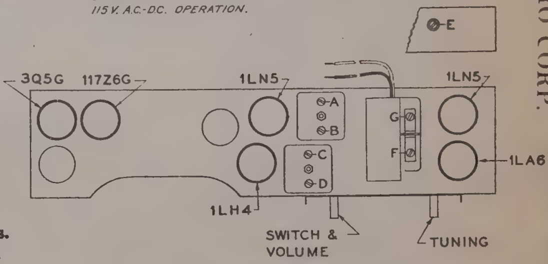
Tuning Ranges 540 Kc. to 1620 Kc.

Volume control full on.

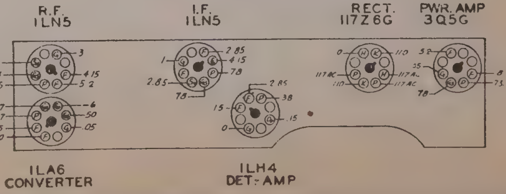
Line voltage 117 A.C.

Power consumption 20 watts.

Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D	Align I. F.
2	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	E	Adj. Wave Trap for Minimum
3	Ant.—Gnd.	200 mmf.	1620 Kc.	BC	1620 Kc.	F	Set Oscillator to Scale
4	Ant.—Gnd.	200 mmf.	1400 Kc.	BC	1400 Kc.	G	Align Antenna

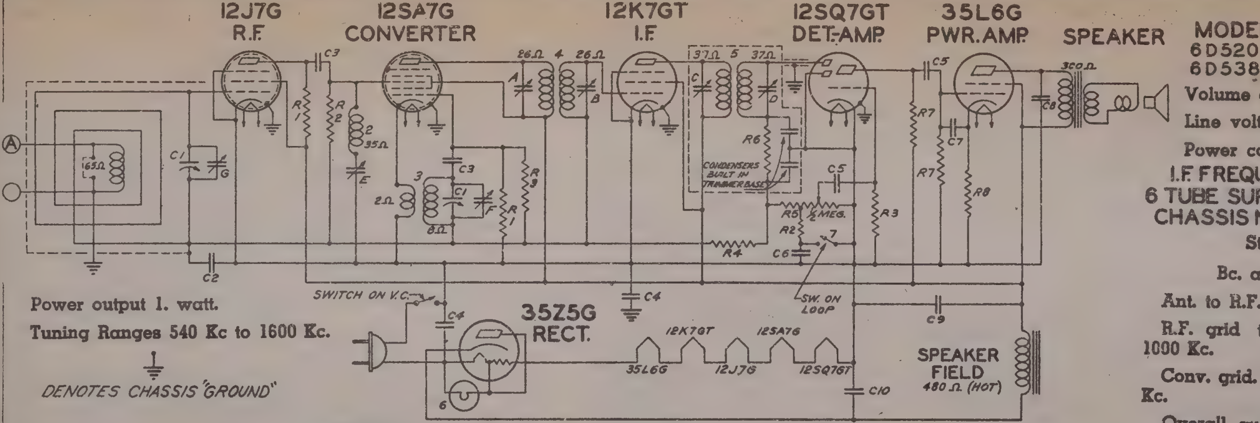


TRIMMER LOCATIONS



MODELS 6D520, 6D520W
6D538, Chassis 6A26

ZENITH RADIO CORP.



Power output 1. watt.

Tuning Ranges 540 Kc to 1600 Kc.

⏚ DENOTES CHASSIS "GROUND"

MODEL	SPEAKER
6D520	49-385 4"
6D538	49-385 4

Volume control full on.

Line voltage 117 A.C.

Power consumption 25.5 watts.

I.F. FREQUENCY 455 KC.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 6A26 A.C.-D.C.

Stage Gains:

Bc. and 455 Kc. I.F.

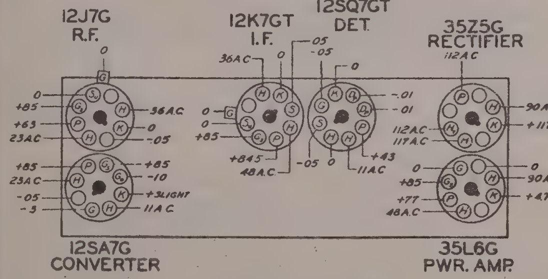
Ant. to R.F. grid 5.5× at 1000 Kc.

R.F. grid to conv. grid 6.2× at 1000 Kc.

Conv. grid. to I.F. grid 51× at 455 Kc.

Overall audio 289× at .25 watt. 400 cycles.

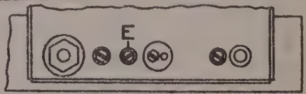
DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1006	TWO-GANG VARIABLE	
C2	22-829	.05 MFD.	200V.
C3	22-162	.0001 MFD.	600V.
C4	22-1017	.05 MFD.	200V.
C5	22-243	.01 MFD.	400V.
C6	22-826	.01 MFD.	200V.
C7	22-854	.0005 MFD.	600V.
C8	22-1182	.01 MFD.	400V.
C9	22-1014	20 MFD. ELECTROLYTIC	150V.
C10		20 MFD. ELECTROLYTIC	150V.
R1	63-589	10M OHM	¼W.
R2	63-591	22M OHM	¼W.
R3	63-1093	15 MEGOHM	½W.
R4	63-600	2.2 MEGOHM	¼W.
R5	63-1149	VOLUME CONTROL	
R6	63-713	47 M OHM	½W.
R7	63-597	470 M OHM	½W.
R8	63-686	150 OHM WIREWOUND	½W.
	1-23-41	R2 AT V.C. ADDED	
	2-6-41	T.C. CIRCUIT CHANGED	
	2-13-41	DIODE PLATE TO CATH.	
1	S8356	WAVEMAGNET ASSEMBLY	
2	S8326	WAVE TRAP COIL ASSEMBLY	
3	S8336	OSC. COIL ASSEMBLY	
4	95-696	1ST I.F. TRANS.	
5	95-697	2ND I.F. TRANS.	
6	100-67	PILOT LIGHT 6.3V. .15A	
7	85-257	TONE CONTROL SWITCH	
A		1ST I.F. TRANS. PRI.	
B		1ST I.F. TRANS. SEC.	
C		2ND I.F. TRANS. PRI.	
D		2ND I.F. TRANS. SEC.	
E	22-1015	WAVE TRAP	
F		BROADCAST OSC. (ON GANG)	
G		BROADCAST ANT. (ON GANG)	



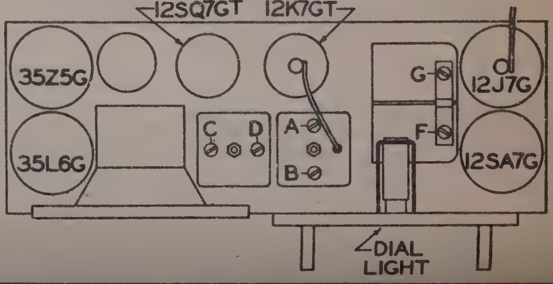
SOCKET VOLTAGES

All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.



Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D	Align I. F.
2	R. F. Grid	.5 mfd.	455 Kc.	BC	600 Kc.	E	Adj. Wave Trap for Minimum
3	1 Turn Loop Made from Generator Leads. See Note!	———	1600 Kc.	BC	1600 Kc.	F	Set Oscillator to Scale
4		———	1400 Kc.	BC	1400 Kc.	G	Align Antenna



ZENITH RADIO CORP.

MODELS 6S546,6S556
6S532
MODELS 10H571R,10H573

Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D	Align I. F.
2	R. F. Grid	.5 mfd.	455 Kc.	BC	600 Kc.	E	Adj. Wave Trap for Minimum
3	1 Turn Loop Made from Generator Leads. See Note!	—	18 Mc.	SW	18 Mc.	K	Set Oscillator to Scale
4		—	1500 Kc.	BC	1500 Kc.	F	Set Oscillator to Scale
5		—	1500 Kc.	BC	1500	G	Align Atenna
6		—	600 Kc.	BC	600 Kc.	J	Rock Gang and Adjust for Max.
7		—	16 Mc.	SW	16 Mc.	M	Align Antenna

ALIGNMENT
AND
TRIMMER
LOCATIONS
FOR
MODELS
6A05
6A05R

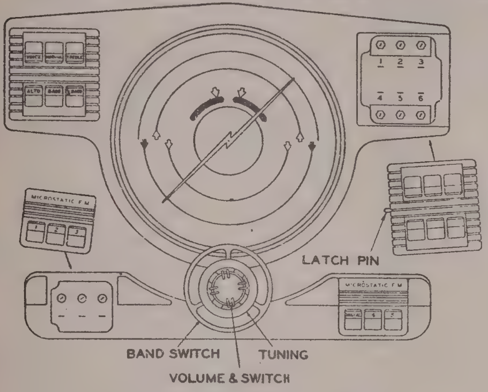
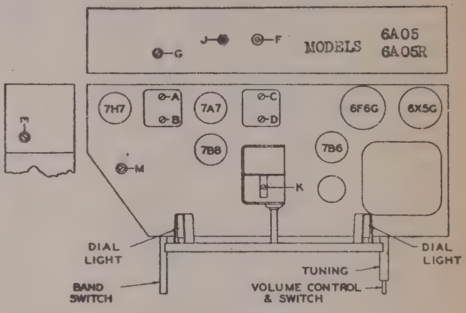


Fig. 2



TRIMMER LOCATIONS

MODELS 10H571R, 10H573

AUTOMATIC

It will be necessary to first set the automatic tuning adjustments to six preselected stations before the automatic tuning can be used.

Each button and its associated tuning adjustment will tune over a portion of the broadcast band, and any station within its tuning range may be selected for automatic tuning on that button.

The tuning ranges are as follows: (See Fig. 2)

No. 1 button—upper left .....545 K.C. to 940 K.C.
No. 2 button—upper center ..600 K.C. to 1050 K.C.
No. 3 button—upper right ....660 K.C. to 1150 K.C.
No. 4 button—lower left .....740 K.C. to 1300 K.C.
No. 5 button—lower center ..880 K.C. to 1550 K.C.
No. 6 button—lower right ....880 K.C. to 1550 K.C.

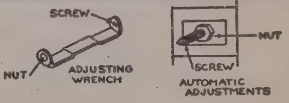


Fig. 4.

To adjust the automatic tuning proceed as follows:

A. Remove the automatic cover plate by pressing on latch pin and lifting away from escutcheon.

B. Select a station within the range of the No. 1 button.

C. Turn the band switch to Broadcast and then tune in the selected station on the dial—then turn band switch to Automatic position.

D. Press the No. 1 button and tune in the same station on the adjacent automatic adjustments by using the special wrench furnished with the receiver. (See Fig. 4.) First, adjust the screw and then the hexagonal nut to the setting which gives the loudest and clearest reception on the desired station. Repeat the operation for greatest accuracy.

AUTOMATIC-FREQUENCY MODULATION BAND

The six push buttons across the lower part of the control panel (See Figure 2) provide means of tuning F.M. stations either manually or automatically. Five of these push buttons may be preset for five F.M. stations as follows:

(1) Select station within range of No. 1 button.

(2) Remove covers from adjusting screws by pulling latch pin and lifting covers.

(3) Turn band switch to F.M., press No. 1 button and tune in desired station on adjacent adjustment, using adjustment wrench.

(4) Follow the same procedure on remaining 4 buttons.

(5) Replace covers.

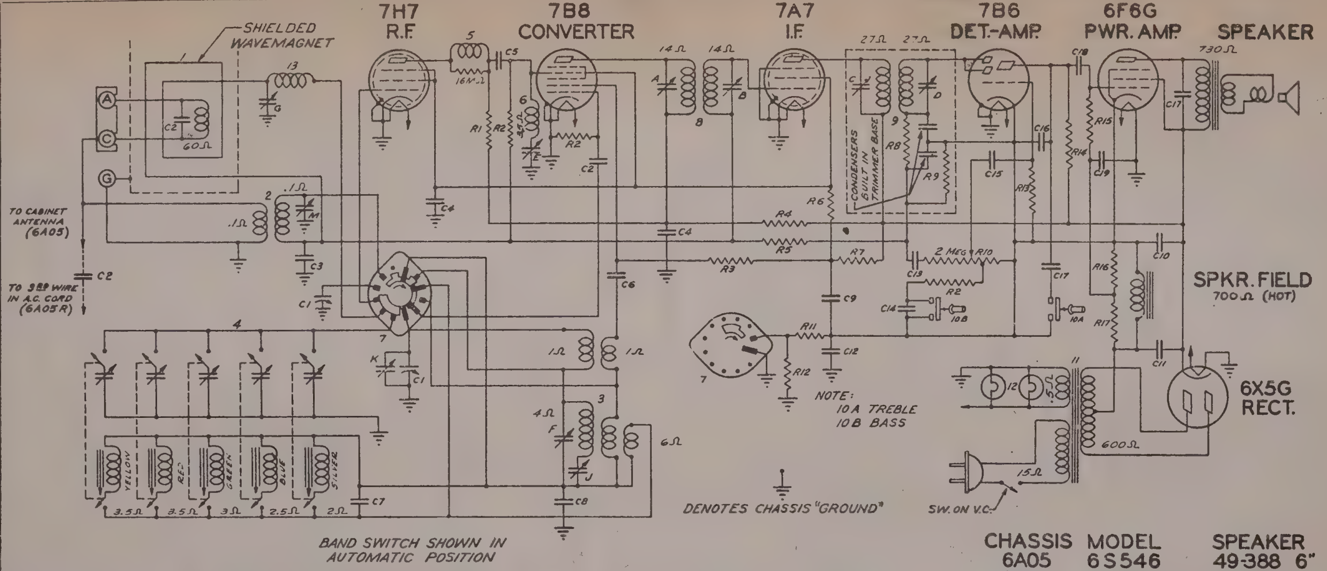
The tuning range covered by each adjusting screw is as follows:

No. 1 Button — 45.5 M.C. to 50.5 M.C.
No. 2 Button — 45 M.C. to 50.5 M.C.
No. 3 Button — 43 M.C. to 49 M.C.
No. 4 Button — 41.5 M.C. to 49.5 M.C.
No. 5 Button — 41.5 M.C. to 48 M.C.

Manual Tuning:

MODELS 6S546, 6S556
Chassis 6A05; 6S532,
Chassis 6A05R

ZENITH RADIO CORP.



BAND SWITCH SHOWN IN AUTOMATIC POSITION

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION			DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION
C1	22-1044	TWO GANG VARIABLE		C19	22-138	.2 MFD.	6A05	200 V.	R15	63-597	470 M OHM	¼ W.	13	58474	LOOP LOADING COIL
C2	22-289	50 MMFD.	600 V		22-827	.1 MFD.	6A05R	200 V.	R16	63-654	180 M OHM	¼ W.			
C3	22-829	.05 MFD.	200 V						R17	63-656	270 M OHM	¼ W.			
C4	22-828	.05 MFD.	400 V.										A		1ST I.F. TRANS. PRI
C5	22-162	.0001 MFD.	600 V	R1	63-637	4700 OHM		¼ W.					B		1ST I.F. " SEC.
C6	22-182	.00025 MFD.	600 V.	R2	63-593	47 M OHM		¼ W.					C		2ND I.F. " PRI.
C7	22-868	COMPENSATING COND.		R3	63-150	10 M OHM		½ W.	1		WAVEMAGNET ASSEMBLY		D		2ND I.F. " SEC.
C8	22-1022	.005 MFD.	600 V.	R4	63-583	1000 OHM		¼ W.	2	S8507	ANTENNA COIL ASSEMBLY		E	22-1015	WAVE TRAP
C9	22-1034	5 MFD. ELECTROLYTIC	450 V	R5	63-599	1.5 MEGOHM		¼ W.	3	S8508	OSCILLATOR COIL ASSEMBLY		F	22-1042	BROADCAST OSCILLATOR
C10		15 MFD. "	350 V	R6	63-1102	15 M OHM		½ W.	4		AUTOMATIC TUNING UNIT		G	22-1042	BROADCAST ANTENNA
C11	22-1036	14 MFD. "	450 V.	R7	63-1101	8200 OHM		2 W.	5	S8359	R.F. CHOKE & RES. ASSEMBLY		J	22-1023	BROADCAST PADDER
C12	22-827	.1 MFD.	200 V.	R8	63-713	47 M OHM		¼ W.	6	S8326	WAVE TRAP ASSEMBLY		K		SHORT WAVE OSC. (ON GANG)
C13	22-188	.02 MFD.	400 V	R9	63-719	470 M OHM		¼ W.	7	85-233	BAND SELECTOR SWITCH		M	22-1042	SHORT WAVE ANTENNA
C14	22-229	.005 MFD.	600 V.	R10	63-1123	VOLUME CONTROL			8	95-708	1ST I.F. TRANSFORMER				
C15	22-492	.002 MFD.	600 V.	R11	63-1098	42 OHM WIREWOUND		½ W.	9	95-709	2ND I.F. TRANSFORMER				
C16	22-854	.0005 MFD.	600 V.	R12	63-624	68 OHM		¼ W	10	S8531	TONE CONTROL SWITCH				
C17	22-448	.004 MFD.	600 V.	R13	63-976	15 MEGOHM		¼ W.	11	95-710	POWER TRANS. 50-60~ 117 V.				
C18	22-830	.02 MFD.	600 V.	R14	63-296	220 M OHM		¼ W	12	100-36	PILOT LIGHT 6.3 V. .25 A.				

CHASSIS	MODEL	SPEAKER
6A05	6S546	49-388 6"
6A05	6S556	49-390 10"
6A05R	6S532	49-438 6"

Power output 6. watts.

Tuning Ranges 545 Kc. to 1570 Kc.
5.7 Mc. to 18.3 Mc.

I.F. FREQUENCY 455 KC.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 6A05 & 6A05R 2 BAND A.C.

Stage Gains:

Bc. and 455 Kc. I.F.

Ant. to R.F. grid 3.8× at 1000 Kc.

R.F. grid to conv. grid 7× at 1000 Kc.

Conv. grid to I.F. grid 92× at 455 Kc.

Overall audio 778× at 1 watt. 400 cycles.

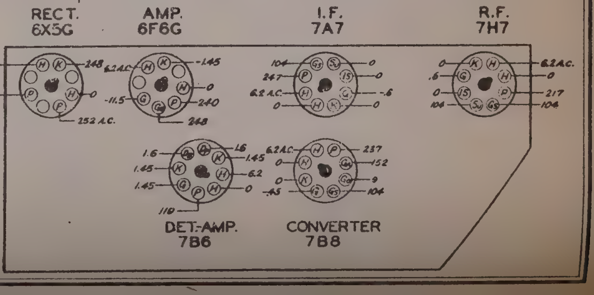
All voltages measured with a 20,000 ohm per volt meter from chassis to socket contact indicated.

All voltages are positive D.C. unless marked otherwise.

Volume control full on.

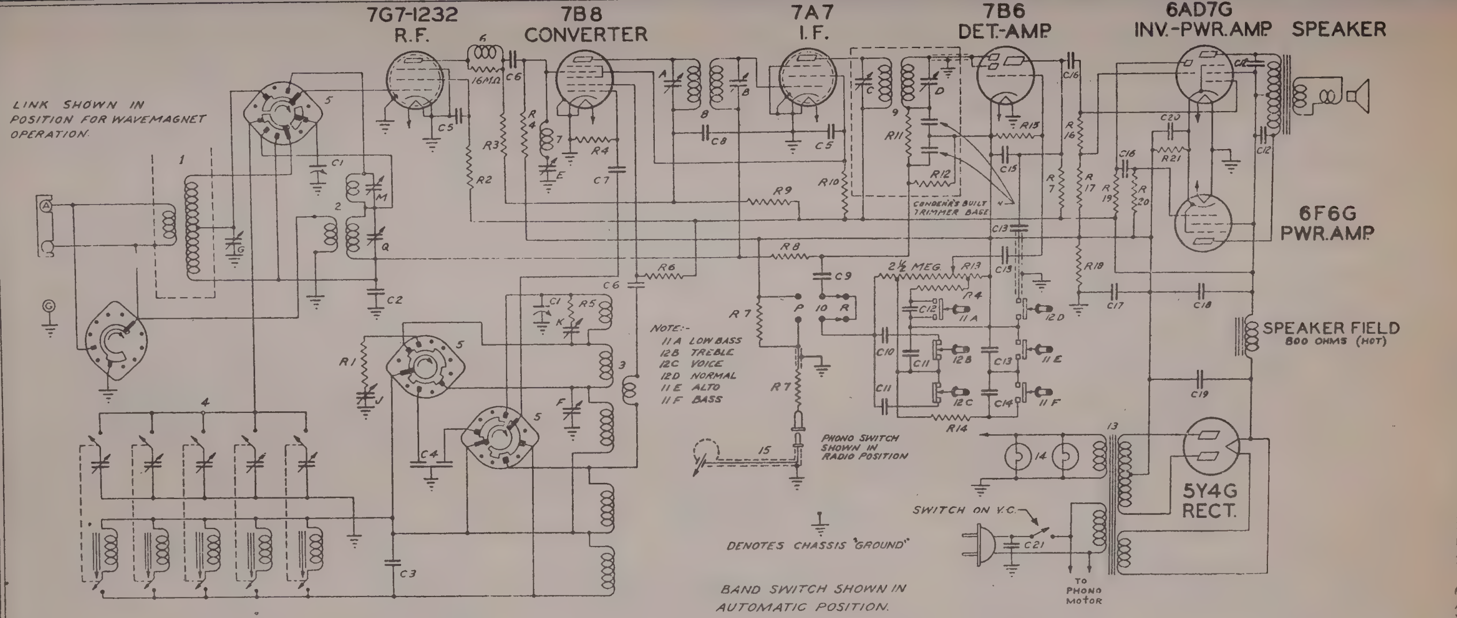
Line voltage 117 A.C.

Power consumption 60 watts.



ZENITH RADIO CORP

MODEL 7S598, Chassis 7A11



I.F. FREQUENCY 455 KC.
7 TUBE SUPERHETERODYNE
CHASSIS Nº 7A11-3 BAND A.C.-PHONO

MODEL
7S598

SPEAKER
49-441 10"

DIAG Nº	PART Nº	DESCRIPTION	
C1	22-1030	TWO GANG VARIABLE	
C2	22-829	.05 MFD.	200V
C3	22-868	COMPENSATING COND	
C4	22-1037	DUAL PADDER	
C5	22-828	.05 MFD.	400V.
C6	22-182	.00025 MFD.	600V.
C7	22-289	50 MMFD.	600V
C8	22-825	.1 MFD	400V
C9	22-327	.02 MFD	200V
C10	22-954	.00035 MFD	600V
C11	22-470	.00015 MFD.	600V
C12	22-229	005 MFD	600V
C13	22-448	.004 MFD.	600V
C14	22-492	.002 MFD.	600V
C15	22-854	0005 MFD.	600V
C16	22-196	.01 MFD.	600V
C17	22-827	.1 MFD	200V.
C18		20 MFD. ELECTROLYTIC	450V
C19	22-1187	20 MFD ELECTROLYTIC	450V.
C20		40 MFD ELECTROLYTIC	35V
C21	22-1041	005 MFD	600V.

DIAG Nº	PART Nº	DESCRIPTION	
R1	63-694	33 OHM	¼W
R2	63-260	100M OHM	¼W
R3	63-587	4700 OHM	¼W.
R4	63-593	47M OHM	¼W.
R5	63-621	39 OHM	¼W.
R6	63-589	10M OHM	¼W
R7	63-296	220M OHM	¼W
R8	63-599	1.5 MEGOHM	¼W
R9	63-605	1000 OHM	½W.
R10	63-960	68M OHM	½W.
R11	63-713	47M OHM	¼W.
R12	63-719	470M OHM	¼W
R13	63-1122	VOLUME CONTROL	
R14	63-594	68M OHM	¼W
R15	63-976	15 MEGOHM	¼W
R16	63-657	330M OHM	¼W.
R17	63-652	120M OHM	¼W
R18	63-975	82 OHM WIREWOUND	½W
R19	63-772	150M OHM	¼W
R20	63-659	470M OHM	¼W

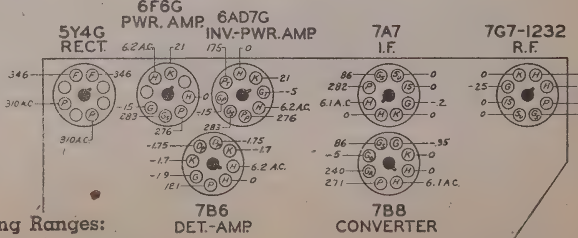
DIAG Nº	PART Nº	DESCRIPTION	
R21	63-1174	420 OHM WIREWOUND	1½W
1		WAVEMAGNET ASSEMBLY	
2	S8404	ANTENNA COIL ASSEMBLY	
3	S8403	OSCILLATOR COIL ASSEM.	
4		AUTOMATIC TUNING ASSEM.	
5	85-237	BAND SELECTOR SWITCH	
6	S8359	R F CHOKE & RES. ASSEM	
7	S8326	WAVE TRAP COIL ASSEM.	
8	95-703	1ST I.F TRANSFORMER	
9	95-761	2ND I.F. TRANSFORMER	
10	85-171	PHONO-RADIO SWITCH	
11	S8449	TONE CONTROL ASSEM (LEFT)	
12	S8449	TONE CONTROL ASSEM (RIGHT)	
13	95-756	PWR. TRANS 50-60~ 117 V.	
14	100-36	PILOT LIGHT 6.3V. .25A.	
15		PICK-UP	

DIAG Nº	PART Nº	DESCRIPTION
A		1ST I.F. TRANS PRI.
B		1ST I.F. TRANS SEC.
C		2ND I.F. TRANS PRI
D		2ND I.F. TRANS SEC.
E	22-1015	WAVETRAP
F		BROADCAST OSC. (NOTE 1)
G		BROADCAST ANT (NOTE 2)
J		BROADCAST PADDER (NOTE 2)
K		SHORT WAVE OSC. (NOTE 1)
M		SHORT WAVE ANT. (NOTE 2)
Q		POLICE BAND ANT (NOTE 2)

NOTES
(1) TRIMMERS F & K ARE MOUNTED ON STRIP #22-1033
(2) TRIMMERS G, J, M & Q ARE MOUNTED ON STRIP #22-1031

7 41 C20 WAS 20MFD C22 OMITTED

Volume control full on.
Line voltage 117 A.C.
Power consumption 77 watts.
Power output 8.4 watts.



Tuning Ranges:
540 Kc. to 1570 Kc.
1.55 Mc. to 4.8 Mc.
5.8 Mc. to 18.3 Mc.

SOCKET VOLTAGES

Model 7S598

Chassis No. 7A11

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D	Align I. F.
2	R. F. Grid	.5 mfd.	455 Kc.	BC	600 Kc.	E	Adj. Wave Trap for Minimum
3	1 Turn Loop Made with Generator Leads to 10" dia. See Note!	—	18 Mc.	SW	18 Mc.	K	Set Oscillator to Scale
4		—	16 Mc.	SW	16 Mc.	M	Align Antenna
5		—	4.5 Mc.	Med.	4.5 Mc.	Q	Rock Gang and Adjust for Max.
6		—	1500 Kc.	BC	1500 Kc.	F	Set Oscillator to Scale
7		—	1400 Kc.	BC	1400 Kc.	G	Align Antenna
8			600 Kc.	BC	600 Kc.	J	Rock Gang and Adjust for Max.
9	Repeat operations 6 - 7 and 3 - 4						

Stage Gains:

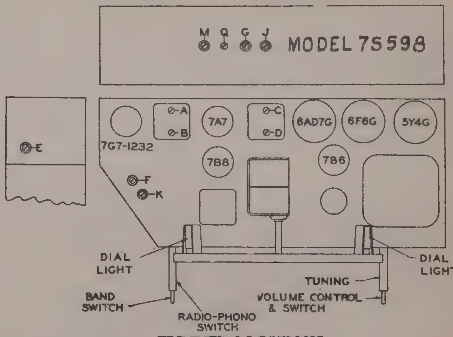
Bc. and 455 Kc. I.F.

Ant. to R.F. grid 3.2× at 1000 Kc.

R.F. grid to conv. grid 8.1× at 1000 Kc.

Conv. grid to I.F. grid 85× at 455 Kc.

Overall audio 1411× at 1 watt. 400 cycles.



TRIMMER LOCATIONS

Models 10H571R, 10H573

Chassis No. 10A3R

Note: Adjust FM I.F. frequency to value designated on I.F. transformer.

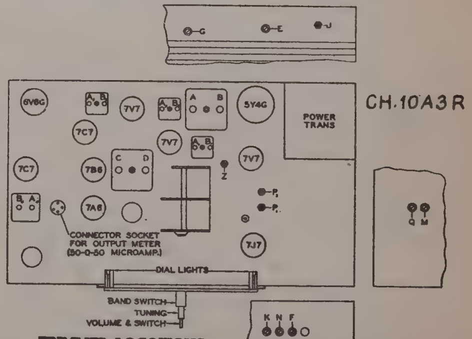
ALIGNMENT PROCEDURE

Opr.	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
1	Converter Grid	.5 mfd.	455 Kc.	BC	600 Kc.	A, B, C, D,	Align I. F.
2	R. F. Grid	"	455 Kc.	BC	600 Kc.	E	Adj. Wave Trap for Minimum
3	Antenna Z and G	400 ohms	18 Mc.	SW	18 Mc.	K	Set Oscillator to Scale
4	"	"	16 Mc.	SW	16 Mc.	M	Align Antenna
5	"	"	5.0 Mc.	Med.	5.0 Mc.	N	Set Oscillator to Scale
6	"	"	4.5 Mc.	Med.	4.5 Mc.	Q	Align Antenna
7	1 Turn Loop Made with Generator Leads to 10" dia. See Note!	——	1400 Kc.	BC	1400 Kc.	F	Set Oscillator to Scale
8		——	1400 Kc.	BC	1400 Kc.	G	Align Antenna
9		——	600 Kc.	BC	600 Kc.	I	Rock Gang to Track BC Padder

F. M. ALIGNMENT — See Pages 126-127

X = FM output meter across full discriminator load. Y = FM output meter across half discriminator load.

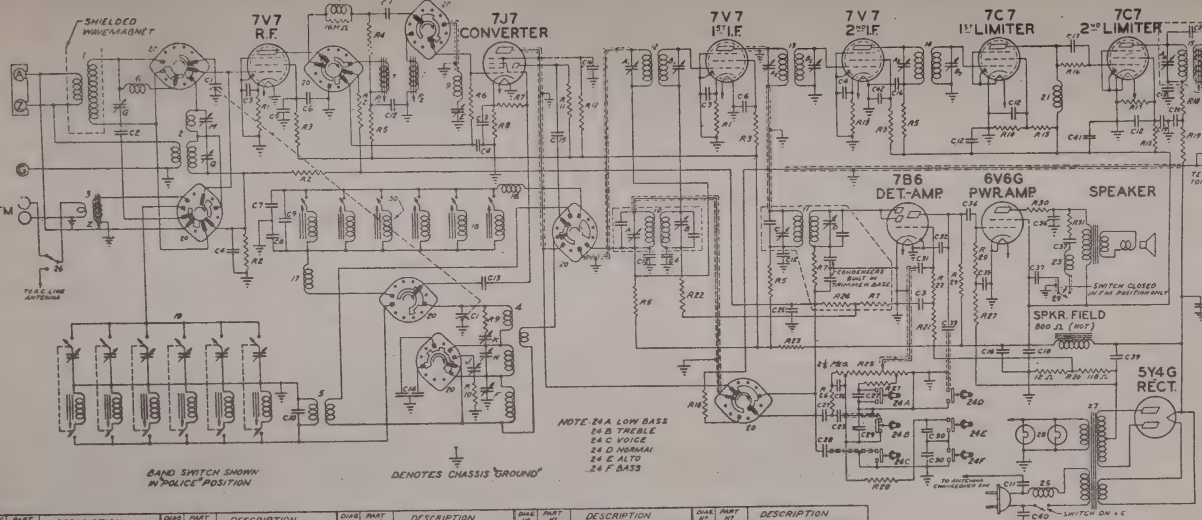
Opr.	Connect Test Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial At	Trimmers	Purpose
10	7V7 2nd I.F. Grid	.5 mfd.	8.6 Mc.	Manual FM	8.6 Mc.	A 4	Align for Maximum deflection—Y
11	"	"	8.6 Mc.	"	8.6 Mc.	B 4	Align for Zero deflection—X
12	"	"	8.6 Mc.	"	8.6 Mc.	A 3 - B 3	Align for Maximum deflection—Y
13	7V7 1st I. F. Grid	"	8.6 Mc.	"	8.6 Mc.	A 2 - B 2	" — Y
14	Converter Grid	"	8.6 Mc.	"	8.6 Mc.	A 1 - B 1	" — Y
15	FM Ant. Terminals	100 ohms	46. Mc.	"	46. Mc.	Adj. Cam on Gang Shaft to Scale Osc.	Align for Zero deflection—X
16	"	"	42.5 Mc.	"	42.5 Mc.	P1	Align for Maximum deflection—Y
17	"	"	49. Mc.	"	49. Mc.	P 2	" — Y
18	"	"	46. Mc.	"	46. Mc.	Z	" — Y



TRIMMER LOCATIONS

ZENITH RADIO CORP.

MODELS 10H571R, 10H573
Chassis 10A3R



Tuning Ranges

540 Kc. to 1600 Kc.
1.5 Mc. to 5.2 Mc.
5.7 Mc. to 18.5 Mc.
41.5 Mc. to 50.5 Mc.

MODEL	SPEAKER
10H571R	49-424 12"
10H573	49-424 12"

AMP. MOD. I.F. FREQUENCY 455 KC.
FREQ. MOD. I.F. FREQUENCY 8.6 MC.
10 TUBE SUPERHETERODYNE
CHASSIS Nº 10A3R-A.C.-4 BAND

DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-1121	TWO GANG VARIABLE	
C2	22-319	.005 MFD	200V
C3	22-827	.1 MFD.	200V
C4	22-829	.05 MFD	200V
C5	22-1133	5 MFD. ELECTROLYTIC	300V
C6	22-243	.01 MFD.	400V
C7	22-1146	50 MMFD COMP.	
C8	22-1139	50 MMFD COMP.	
C9	22-1193	15 MMFD CERAMIC	
C10	22-868	COMPENSATING COND	
C11	22-162	.0001 MFD.	600V
C12	22-825	.1 MFD.	400V
C13	22-1140	50 MMFD.	600V
C14	22-1039	DUAL PADDER	
C15	22-358	.002 MFD.	600V
C16	22-828	.05 MFD.	600V
C17	22-127	25 MMFD.	600V
C18	22-1178	30 MFD. ELECTROLYTIC	450V
C19		5 MFD. "	300V
C20		15 MFD "	250V
C21	22-1196	.0005 MFD.	600V
C22	22-1123	25 MMFD.	600V
C23	22-289	50 MMFD	600V
C24	22-1138	.0005 MFD	600V
C25	22-348	.001 MFD.	600V
C26	22-1130	15 MMFD.	600V
C27	22-1127	.02 MFD.	400V
C28	22-1135	.005 MFD.	600V

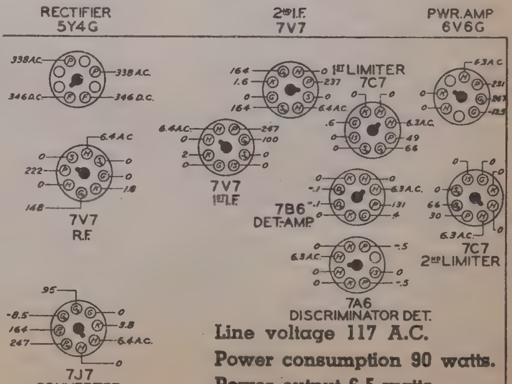
DIAG. Nº	PART Nº	DESCRIPTION	
C29	22-1137	.00015 MFD.	600V.
C30	22-1126	.01 MFD	600V
C31	22-188	.02 MFD.	400V.
C32	22-1136	.00025 MFD.	600V
C33	22-445	.004 MFD.	600V
C34	22-830	.02 MFD.	600V
C35	22-1202	.04 MFD	200V
C36	22-1134	.002 MFD	1000V
C37	22-966	.04 MFD.	600V
C38	22-1129	.0005 MFD	1000V
C39	22-1124	30 MFD. ELECTROLYTIC	450V
C40	22-1041	.005 MFD.	600V
C41	22-229	.005 MFD.	600V
C42	22-492	.002 MFD.	600V
R1	63-741	150 OHM	¼W.
R2	63-600	2.2 MEGOHM	¼W
R3	63-1159	39M OHM	1W
R4	63-1163	2200 OHM	½W.
R5	63-605	1000 OHM	½W
R6	63-715	100M OHM	¼W
R7	63-713	47M OHM	½W
R8	63-1164	300 OHM	½W
R9	63-576	68 OHM	¼W
R10	63-572	15 OHM	¼W.
R11	63-943	4700 OHM	1W.
R12	63-1160	86M OHM	1W.
R13	63-246	150 OHM	¼W

DIAG. Nº	PART Nº	DESCRIPTION	
R14	63-1180	15M OHM	½W.
R15	63-1162	33M OHM	1W.
R16	63-597	470M OHM	¼W.
R17	63-607	15M OHM	½W.
R18	63-583	1000 OHM	¼W
R19	63-679	82M OHM	1W
R20	63-1150	2 SECTION CANDOHM	
R21	63-160	100M OHM	½W
R22	63-271	1 MEGOHM	¼W.
R23	63-1178	1000 OHM	1W.
R24	63-773	180M OHM	¼W
R25	63-1074	VOLUME CONTROL	
R26	63-701	470 OHM	¼W
R27	63-593	47M OHM	¼W.
R28	63-594	68M OHM	¼W
R29	63-296	220M OHM	¼W.
R30	63-1158	100 OHM	¼W
R31	63-156	10M OHM	1W.
1		WAVEMAGNET ASSEMBLY	
2	S9075	ANTENNA COIL - (S.W)	
3	S9065	ANTENNA COIL - (F.M.)	
4	S9074	OSCILLATOR COIL -	
5	S8466	OSCILLATOR COUPLING COIL	
6	S9044	LOOP LOADING COIL	
7	S9066	DETECTOR COIL ASSEM. (F.M.)	

DIAG. Nº	PART Nº	DESCRIPTION
8	S8359	COIL & RES. ASSEMBLY
9	S8326	WAVETRAP -
10	95-765	1ST I.F. TRANSFORMER (A.M.)
11	95-766	2ND I.F. " (A.M.)
12	95-785	1ST I.F. " (F.M.)
13	95-786	2ND I.F. " (F.M.)
14	95-787	3RD I.F. " (F.M.)
15	95-788	DISCRIMINATOR I.F. TRANS. (F.M.)
16	S9535	PLATE PEAKING COIL
17	S9350	GRID " "
18		AUTOMATIC TUNING UNIT (F.M.)
19		AUTOMATIC TUNING UNIT (BC.)
20	85-234	BAND SELECTOR SWITCH
21	S9483	PLATE CHOKE
22	S9503	F.M. I.F. WAVETRAP
23	20-230	SPEAKER COMP FILTER
24	S8490	TONE CONTROL SW. ASSEM.
25	S9504	LINE CHOKE
26	85-238	ANTENNA CHANGEOVER SW.
27	95-771 95-779	POWER TRANS. 50-60~ 25~
28	100-36	PILOT LIGHT 6.3V. .25A.
29	85-273	AUDIO FILTER SWITCH
30	S9562	MANUAL F.M. OSC. COIL
A		1ST I.F. TRANS. PRI. (A.M.)
B		1ST I.F. - SEC. (A.M.)
C		2ND I.F. - PRI. (A.M.)
D		2ND I.F. - SEC. (A.M.)

DIAG. Nº	PART Nº	DESCRIPTION
A1		1ST I.F. TRANS. PRI. (F.M.)
B1		1ST I.F. - SEC. (F.M.)
A2		2ND I.F. - PRI. (F.M.)
B2		2ND I.F. - SEC. (F.M.)
A3		3RD I.F. - PRI. (F.M.)
B3		3RD I.F. - SEC. (F.M.)
A4		DISCRIMINATOR I.F. TRANS. PRI.
B4		DISCRIMINATOR I.F. " SEC.
E	22-1015	WAVETRAP
F		BROADCAST OSC. NOTE 1
G	22-1042	BROADCAST ANTENNA
J	22-688	BROADCAST PADDER
K		SHORTWAVE OSC. NOTE 1
M		SHORT WAVE ANT. NOTE 2
N		POLICE-BAND OSC. NOTE 1
P1		ULTRA HIGH FREQ. DET. (PLATE)
P2		ULTRA HIGH FREQ. DET. (GRID)
Q		POLICE BAND ANT. NOTE 2
Z		ULTRA HIGH FREQ. ANTENNA

NOTE:
(1) TRIMMERS F, K & N ARE MOUNTED ON STRIP #22-250
(2) TRIMMERS M & Q ARE MOUNTED ON STRIP #22-1045



Line voltage 117 A.C.
Power consumption 90 watts.
Power output 6.5 watts.

SOCKET VOLTAGES

Stage Gains:

Bc. and 455 Kc. I.F.

Ant. to R.F. 6.5× at 1000 Kc.

R.F. grid to conv. grid 28.1× at 1000 Kc.

Conv. grid to I.F. grid 31.3× at 455 Kc.

Overall audio 800× at 1 watt, 400 cycles.

Fm. and 8.6 Mc. I.F.

Ant. to R.F. grid — 1.8× at 46. Mc.

R.F. grid to conv. grid — 7.9× at 46. Mc.

Conv. grid to 1st I.F. grid — 2.7× at 8.6 Mc.

1st I.F. grid to 2nd I.F. grid — 80× at 8.6 Mc.

2nd I.F. grid to Limiter grid — 25× at 8.6 Mc.

FREQUENCY MODULATION

Broadcasting by the Frequency Modulation method has already proved to be the most satisfactory means of "Local" radio transmission with reduced noise and high fidelity. It is not generally understood that these two features of FM are due in a great measure to the wide frequency band which this method of modulation employs. The FM receiver must be accurately aligned because much of the FM system's noise reducing ability is lost if the FM IF and discriminator circuits are misaligned.

The alignment of FM receivers differs from the familiar AM receiver alignment procedure where a modulated signal from the generator is used and the output is measured with an A.C. voltmeter across the voice coil.

The signal generator for FM alignment must be capable of supplying an unmodulated signal of at least .5 volt at the IF frequencies (4 to 9 Mc.) and a moderate unmodulated signal at the FM RF frequencies (41.5 to 50.5 Mc.) A 50-0-50 microammeter, such as Triplett #321 or #521, makes an excellent output meter when used with our #S9614 four prong plug and cable assembly and a S.P.D.T. switch. (see fig. 1)

The output meter is connected across HALF the diode load resistor for gain alignment and is connected across the FULL diode load resistor for frequency settings. A polarized socket is provided (near the 7A6 tube) which accommodates the output meter plug to facilitate switching the meter across either FULL or HALF the diode load resistor.

IMPORTANT—The FM IF and discriminator alignment must be followed in a stage-by-stage sequence, beginning at the discriminator and working forward to the converter stage. This differs from the conventional AM IF alignment procedure where the signal is applied to the converter grid and all the IFs are aligned simultaneously.

The signal from the generator must be kept just below the point where the limiter action of the receiver begins. To explain further we should consider the purpose of the limiter. It does what its name implies; it limits the amount of signal applied to the discriminator circuit. When the input signal is strong the limiter cuts off, allowing only a portion of the signal to pass, while at low signal levels the limiter acts as an IF amplifier. Therefore, it is easy to understand why the signal input to the receiver and IFs must be held below the limiter operating range during alignment. The most practical way of determining the proper amount of input signal is to watch the output meter (connected across HALF the diode load) while the signal from the generator is increased. The meter will indicate the increase in signal until limiting action begins, from which point on no appreciable increase can be noted on the meter even though the generator signal has been increased considerably. The desired signal input level (from the generator) is just below the limiting point which may be determined by increasing the generator output while watching the output meter, then reducing the generator output slightly when the limiting point is reached.

IF AND DISCRIMINATOR ALIGNMENT

Holes have been placed at the top of all the FM IF transformer shields so that a signal generator may be connected across the transformer secondaries to facilitate alignment. (see fig. 2) A vey high input signal will be necessary to get an output indication for the discriminator alignment. Should the generator be unable to supply sufficient signal, the Discriminator input stage may be aligned first in order that its gain may be utilized to raise the input signal to the discriminator.

1. Connect the output meter across the FULL discriminator load. (fig. 1)
2. Feed an unmodulated signal, at the IF frequency, through the dummy antenna (fig. 2) to the 3rd IF transformer secondary. (The IF frequency is stamped on the IF transformer shields.) Adjust the slug B4 for resonance. Rotating the slug B4 through the resonance point will cause the output meter to swing through zero from positive to negative or vice versa. A zero reading on the meter indicates the desired resonance point.
3. Switch the output meter to HALF discriminator load (fig. 1). Adjust trimmer A4 for maximum output, keeping the signal input below the point of limiting action.
4. (Meter at HALF load) Connect the generator to the 2nd IF transformer secondary and adjust the 3rd IF trimmers A3 and B3 for maximum output.
5. (Meter at HALF load) Connect the generator across the 1st IF transformer secondary and adjust the 2nd IF transformer trimmers A2 B2 for maximum output.
6. (Meter at HALF load) Connect the generator to the converter grid. A small socket is provided near the converter tube which will accommodate the side pin of the #S9615 Dummy Antenna assembly (fig. 2) to facilitate this generator connection. Adjust the 1st IF transformer trimmers A1 B1 for maximum output.

FM OSCILLATOR AND RF ALIGNMENT

7a. (Meter at FULL load) Connect the generator, through a 100 ohm dummy antenna, to the FM antenna terminals. Set the generator at 50 Mc. and tune in the signal on the receiver. As the pointer passes the 50 Mc. calibration the output meter will swing from negative through zero to a positive reading or vice versa. The resonance point is again at the zero setting. Should the pointer be off calibration more than plus or minus .5 Mc., which is tolerable, the oscillator may be set by adjusting the two flexible green leads between the manual tuning oscillator coil and the band switch. If the pointer is below 50 Mc. it can be raised by bringing the two green leads together and in the same manner the pointer can be lowered by separating the leads.

7b. (Meter still at FULL load) Set the generator at 46 Mc. and check the dial calibration (zero on meter). 46 Mc. should be on scale unless the cam on the condenser shaft has been loosened. If the cam has to be adjusted to scale the oscillator at 46 Mc., the 50 Mc. oscillator adjustment must be repeated. The converter stage is aligned after the receiver has been adjusted to scale within the .5 Mc. limits.

8a. (Meter at FULL load) With generator connected to the FM antenna terminals through 100 ohm dummy, set the generator at 49 Mc. and tune in signal on receiver to get a zero output meter reading. Switch the meter to HALF load and adjust the generator to give an output just below the limiter action point. Adjust slug P1 for maximum output.

8b. (Meter at FULL load) Set generator at 46 Mc. and tune in on receiver. Switch meter to HALF load and adjust "Z" for maximum output.

8c. (Meter at FULL load) Set generator at 42.5 Mc. and tune in on receiver. Switch meter to HALF load and adjust P2 for maximum output.

There are no RF adjustments for the FM push buttons when the push buttons are used on automatic. Button #1 is checked at 50 Mc., buttons #2 and #3 checked at 49 Mc., buttons #5 and #6 checked at 42.5 Mc., and button #4 is the manual switch.

In conclusion we again wish to emphasize the importance of keeping the signal from the generator below the point where limiter action begins, that the output meter is connected across the FULL diode load resistor for frequency and calibration operations, and that the output meter is connected across HALF the diode load resistor for gain checks.

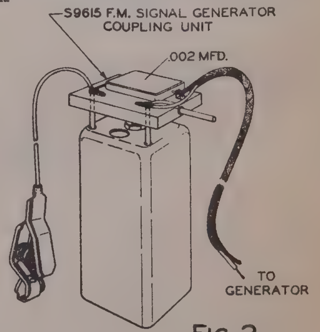


FIG. 2

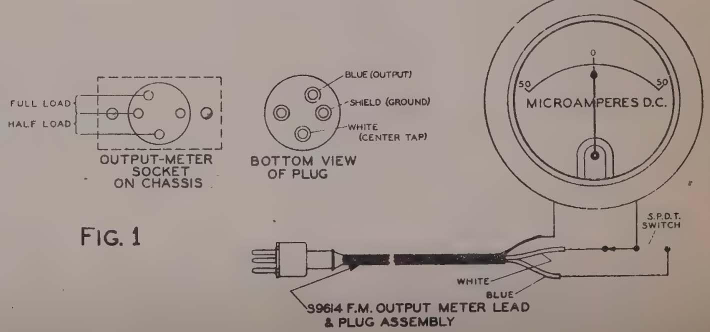
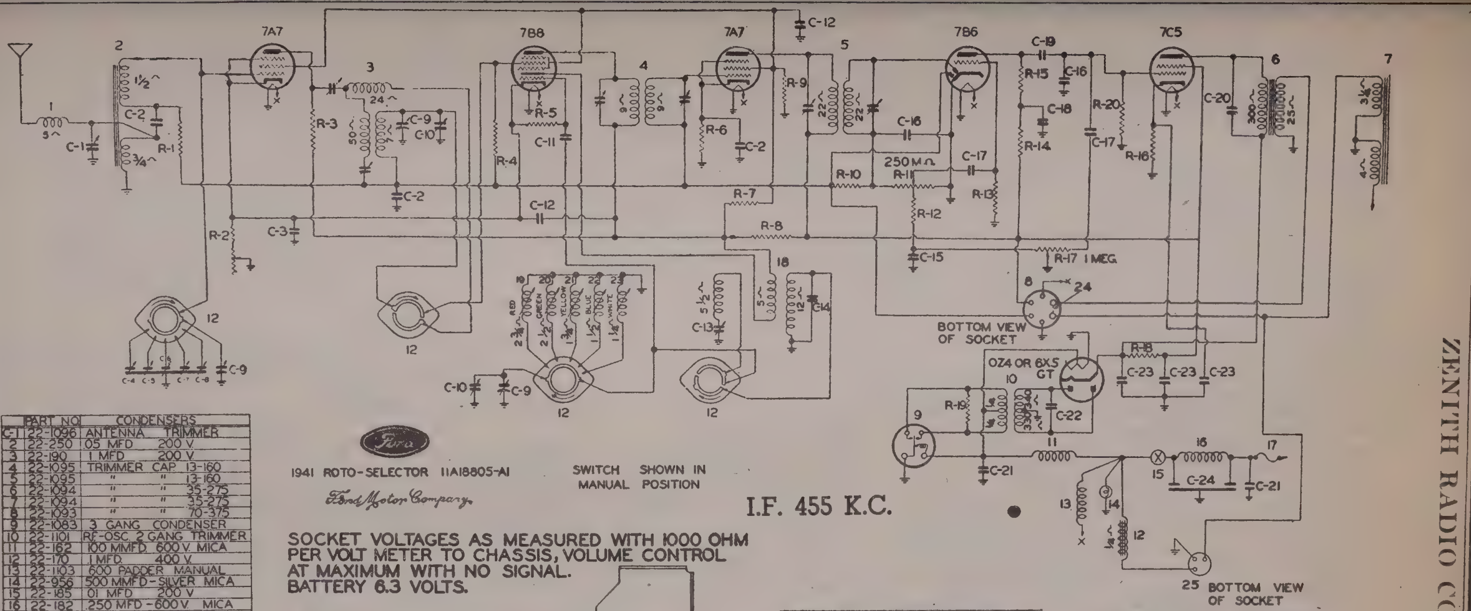


FIG. 1

ZENITH RADIO CORP.

MODELS 6MF590,6MF591
Chassis 6A21 Ford



1941 ROTO-SELECTOR 11A18805-A1

Ford Motor Company

SWITCH SHOWN IN MANUAL POSITION

I.F. 455 K.C.

	PART NO	CONDENSERS
C-1	22-1096	ANTENNA TRIMMER
2	22-250	.05 MFD 200 V.
3	22-190	1 MFD 200 V.
4	22-1095	TRIMMER CAP 13-160
5	22-1095	" " 13-160
6	22-1094	" " 35-275
7	22-1094	" " 35-275
8	22-1093	" " 70-375
9	22-1083	3 GANG CONDENSER
10	22-1101	RF-OSC. 2 GANG TRIMMER
11	22-162	100 MMFD. 600 V. MICA
12	22-170	.1 MFD. 400 V.
13	22-1103	600 PADDER MANUAL
14	22-956	500 MMFD - SILVER MICA
15	22-185	.01 MFD 200 V
16	22-182	.250 MFD - 600 V. MICA
17	22-906	.005 MFD. 200 V
18	22-212	.05 MFD 400 V
19	22-435	.02 MFD 600 V
20	22-838	.005 MFD 600 V.
21	22-908	.5 MFD. 120 V.
22	22-1079	.005 MFD 1600 V.
23	22-955	10-10-20 MFD 400-350-25 V.
24	22-1076	250 MMFD DUAL MICA

	PART NO	RESISTORS
R-1	63-593	470 M OHMS 1/4 W
2	63-1131	200 TO 800 OHM SEN.CONT.
3	63-311	15 M OHMS 1/4 W
4	63-596	330 M OHMS 1/4 W
5	63-593	47 M OHMS 1/4 W
6	63-634	820 OHMS 1/4 W
7	63-1065	15 M OHMS 1 W
8	63-1135	3900 OHMS 2 W
9	63-592	33 M OHMS 1/4 W
10	63-271	1 MEG OHM 1/4 W
11	63-1133	VOL. CONT & SWITCH
12	63-589	10 M OHMS 1/4 W
13	63-604	10 MEG. OHM 1/4 W
14	63-595	100 M OHMS 1/4 W
15	63-296	220 M OHMS 1/4 W
16	63-948	330 OHMS 1 W
17	63-1197	TONE CONTROL
18	63-968	1800 OHMS 2 W
19	63-971	220 OHMS 1/2 W
20	63-719	470 M OHMS 1/4 W

SOCKET VOLTAGES AS MEASURED WITH 1000 OHM PER VOLT METER TO CHASSIS, VOLUME CONTROL AT MAXIMUM WITH NO SIGNAL. BATTERY 6.3 VOLTS.

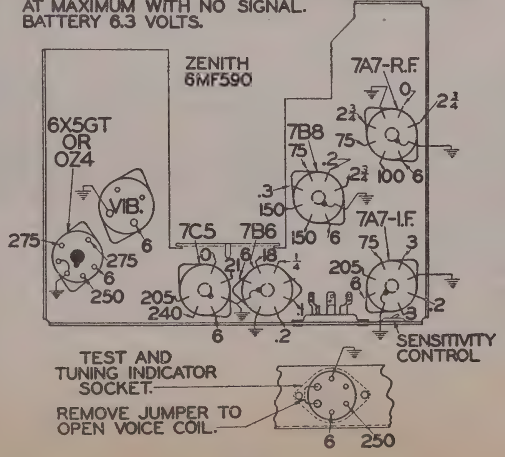


FIG. 1

	PART NO	MISCELLANEOUS
1	S-8819	ANT. MOTOR NOISE CHOKE
2	S-8927	ANTENNA COIL
3	S-8988	R.F. TRANSFORMER
4	95-742	1ST I.F. "
5	95-743	2ND I.F. "
6	95-744	OUTPUT "
7	49-421	SPEAKER
8	78-284	TUNING EYE SOCKET
9	190-15	NON SYNCHRON VIBRATOR
10	95-745	POWER TRANSFORMER
11	20-213	VIBRATOR HASH CHOKE
12	85-253	AUTO. SELECTOR SWITCH
13	20-228	HEATER LINE CHOKE
14	100-36	DIAL LIGHT MAZDA NO 51
15	63-1133	"A" LINE SWITCH ON VOL CONT.
16	20-229	"A" LINE CHOKE
17	136-12	FUSE
18	S-8928	OSCILLATOR COIL
19	S-8971	OSCILLATOR COIL(AUTOMATIC
20	S-8972	" " "
21	S-8973	" " "
22	S-8974	" " "
23	S-8975	" " "
24	58-92	VOICE COIL JUMPER
25	78-406	SOCKET

Sensitivity—7 Micro-volts at one watt output.

Power Output—4.5 watts measured at the voice coil.

Tuning Range 540-1600 K.C.

Tube Complement—7A7 R.F.; 7B8 Oscillator and Modulator; 7A7 I.F.; 7B6 second detector and A.V.C.; 6X5GT or 0Z4 Rectifier. 7C5 Beam power output;

Current Consumption—7 amp.

ALIGNMENT:

The alignment of a receiver is one of the most important functions that a service man performs, and the instructions must be carefully followed.

CAUTION:

Care should be taken while making all adjustments on the receiver to have the volume control turned full on. The intensity of the signal should be reduced only at the signal generator.

The signal for the entire alignment procedure, both I.F. and R.F. is fed through a special Zenith dummy which can be purchased from your Zenith distributor, Part No. S9187. The capacities in the Zenith dummy antenna as shown in Fig. 2 are identical with the Ford antenna.

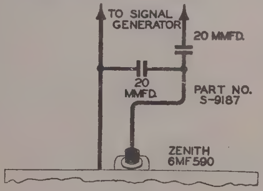


FIG. 2

NOTE:

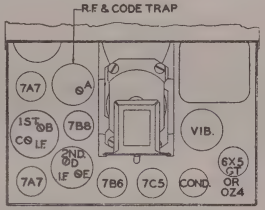
This receiver is equipped with an adjustable sensitivity control located on the bottom of the chassis as shown in Fig. I. The control is set at the factory to a position which gives sensitivity of 7 microvolts at 1 watt output. It is found advisable to hold the receiver at this level as any higher sensitivity may result in excessive background noise and unless laboratory equipment is available for measuring sensitivity it is not advisable to change the setting

I.F.—

1. The receiver must be in one of the automatic positions.

2. The signal generator is set at 455 K.C. and fed through the special Zenith dummy to the receiver.

3. The R.F. and code trap adjustment screw A (see Fig. 3) is adjusted for maximum response.



TUBE LAYOUT MODEL 6MF590

FIG. 3

4. The adjustment screws B, C, D and E (see Fig. 3) are then adjusted in order for maximum response.

5. The code trap A is then adjusted for minimum response.

R.F.—

1. The receiver is returned to manual tuning.

2. The tuning control is rotated until the condenser plates are out of mesh (1600 K.C.)

3. The signal generator is set to 1600 K.C.

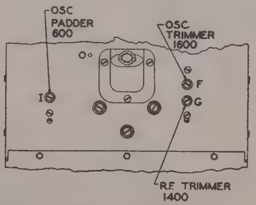
4. Adjust the 1600 K.C. oscillator trimmer F (see Fig. 4) for maximum response.

5. Set signal generator to 1400 K.C. and rotate the tuning control until a signal is heard.

6. Adjust the R.F. trimmer G (see Fig. 4) and the antenna trimmer H (see Fig. 5) for maximum response.

7. Set the signal generator to 600 K.C. and rotate the tuning control until signal is heard.

8. The condenser gang is then rocked slightly while adjusting the 600 K.C. padder I (see Fig. 4).

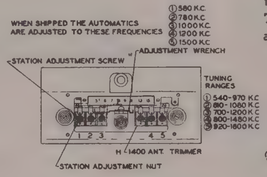


TRIMMER LAYOUT MODEL 6MF590

FIG. 4

SETTING THE ROTO-SELECTOR:

First turn the receiver on, and allow it to operate for approximately half an hour. This is necessary in order that the operating temperature may reach normal, and thereby assure accurate adjustment. After the set has been on for the necessary length of time, remove the plastic escutcheon over the tuning control by first pulling off the three knobs and removing the lock nuts on the tuning and volume control shafts. With the escutcheon removed, the automatic adjusting screws become accessible as shown in Fig. 5. The adjustments are made by means of a special wrench held in position by a clip as shown in Fig. 5 and using this wrench, the adjustments are made as follows:



MODEL 6MF590

FIG. 5

1. Select a station within the range of adjustment No. 1 (Fig. 5). The range of the adjustments is shown in Fig. 5.

2. Set Roto-Selector in position No. 1.

3. Adjust the No. 1 screw (see Fig. 5) with wrench provided until the desired station is tuned to the loudest point.

4. Adjust No. 1 nut (see Fig. 5) for maximum signal.

5. Repeat the last two above operations to make sure the adjustments are accurate.

6. The same procedure is followed in setting the remaining four adjustments selecting a station within the tuning range of each adjusting screw and placing the selector switch in the corresponding position for each adjusting screw.

The station adjusting eye can be used to great advantage in setting the stations. This eye will enable you to get an accurate setting regardless of signal strength.

The eye may also be used when aligning the receiver instead of an output meter. The eye with a special cable and plug is available at your Zenith distributor.

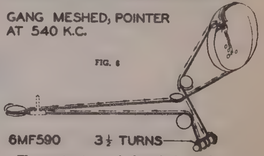


FIG. 6

The stringing of the dial cord is very important for unless properly strung the cord will jump off the pulleys. Figure 6 shows the proper way to string the cord.

The jumper shown on the test socket in Fig. 1 is provided so that an output meter may be connected to the voice coil side of the output transformer.

If you have the type of output meter which is usually connected to the plate of the output tube, it may be adapted for this type of connection by following the instructions shown in Fig. 7.

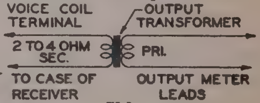
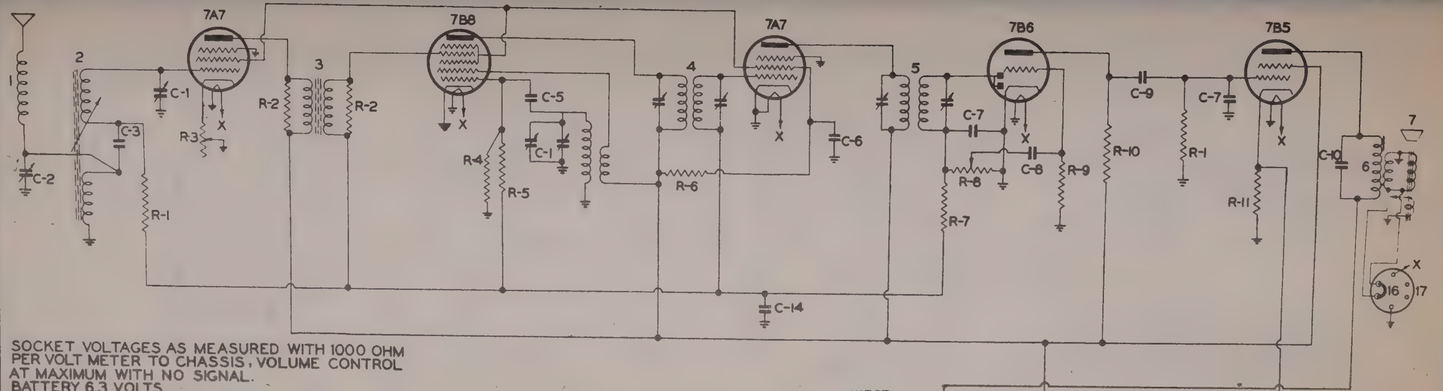
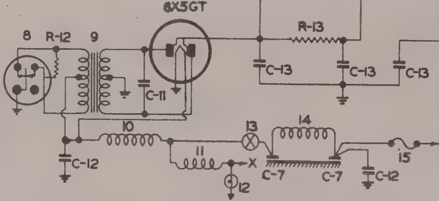


FIG. 7

ZENITH RADIO CORP.

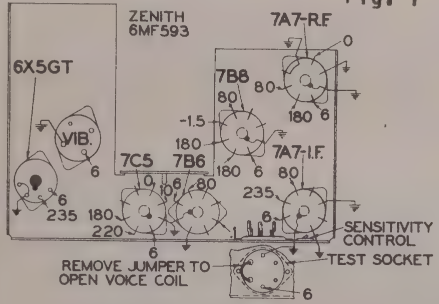
MODEL 6MF593,Chas.6A23





SOCKET VOLTAGES AS MEASURED WITH 1000 OHM PER VOLT METER TO CHASSIS, VOLUME CONTROL AT MAXIMUM WITH NO SIGNAL. BATTERY 6.3 VOLTS.

Fig. 1



1941 SPECIAL 11A-18805-C1

Ford Motor Company

I.F. 455 K.C.

CURRENT CONSUMPTION - 6 amp. TUNING RANGE 540 - 1600 K.C.

	PART NO.	CONDENSERS		PART NO	RESISTORS		PART NO	DESCRIPTION
C-1	22-1172	2 GANG VARIABLE COND.	R-1	63-597	470 M. OHMS ¼W	1	S-8819	ANT. MOTOR NOISE CHOKE
C-2	22-1177	ANTENNA TRIMMER	R-2	63-588	6800 OHMS ¼W	2	S-9371	ANTENNA COIL
C-3	22-250	.05 MFD 400 V.	R-3	63-1148	SENSITIVITY CONTROL	3	S-9391	R.F. COIL
C-4			R-4	63-595	100 M. OHMS ¼W	4	95-789	1st I.F. TRANSFOMER
C-5	22-289	50 MMFD MICA	R-5	63-673	8.2 MEG. OHM ¼W	5	95-784	2nd I.F. "
C-6	22-170	.1 MFD 400 V.	R-6	63-958	22 M OHMS 1 W	6	49-434	OUTPUT "
C-7	22-1076	250-250 DUAL MICA	R-7	63-271	1 MEG OHM ¼W	7	49-434	SPEAKER
C-8	22-906	.005 MFD 200 V	R-8	63-1177	250 M OHMS VOL. CONT.	8	190-15	VIBRATOR
C-9	22-435	.02 MFD 600 V.	R-9	63-604	10 MEG OHM ¼W	9	95-782	POWER TRANSFORMER
C-10	22-1170	.01 MFD 600 V	R-10	63-296	220 M OHMS ¼ W	10	20-213	HASH CHOKE
C-11	22-1171	.012 MFD 1600 V	R-11	63-941	390 OHMS 1 W	11	20-233	HEATER LINE CHOKE
C-12	22-908	.5 MFD 120 V	R-12	63-971	220 OHMS ½ W	12	100-32	DIAL LIGHT
C-13	22-1179	10-10-20 MMFD 350-300-25 V	R-13	63-1170	1500 OHMS 2 W	13	63-1177	SWITCH ON VOL CONTROL
C-14	22-1115	.05 MFD 200 V				14	20-229	MOTOR NOISE CHOKE
						15	136-11	FUSE
						16	58-92	VOICE COIL JUMPER
						17	78-248	TEST SOCKET

TUBE COMPLEMENT

7A7 R.F.

7B8 Oscillator and Modulator;

7A7 I.F.;

7B6 Second Detector and A.V.C.;

7B5 Pentode power output;

6X5GT Rectifier.

SENSITIVITY - 9 microvolts at one watt output.

POWER OUTPUT - 3 watts measured at the voice coil.

©John F. Rider, Publisher

MODEL 6MF593

ZENITH RADIO CORP.

ALIGNMENT:

The alignment of a receiver is one of the most important functions that a service man performs, and the instructions must be carefully followed.

CAUTION:

Care should be taken while making all adjustments on the receiver to have the volume control turned full on. The intensity of the signal should be reduced only at the signal generator.

The signal for the entire alignment procedure, both I.F. and R.F. is fed through a special Zenith dummy which can be purchased from your Zenith distributor, Part NO. S9187. The capacities in the Zenith dummy antenna as shown in Fig. 2 are identical with the Ford antenna.

NOTE:

This receiver is equipped with an adjustable sensitivity control located on the bottom of the chassis as shown in Fig. 1. The control is set at the factory to a position which gives sensitivity of 9 microvolts at 1 watt output. It is found advisable to hold the receiver at this level as any higher sensitivity may result in excessive background noise and unless laboratory equipment is available for measuring sensitivity it is not advisable to change the setting.

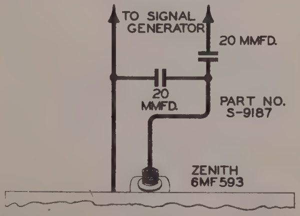


Fig. 2

I.F. —

1. The tuning control is rotated until the condenser plates are fully meshed. (540 K.C.)

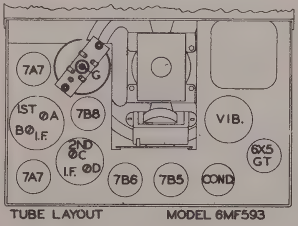


Fig. 3

2. The signal generator is set at 455 K.C. and fed through the special Zenith dummy to the receiver.

3. The adjustment screws A, B, C and D (see Fig. 3) are then adjusted in order for maximum response.

R.F. —

1. The tuning control is rotated until the condenser plates are out of mesh. (1600 K.C.)

2. The signal generator is set to 1600 K.C.

3. Adjust the 1600 K.C. oscillator trimmer E (see Fig. 4) for maximum response

4. Set signal generator to 1400 K.C. and rotate the tuning control until a signal is heard.

5. Adjust the 1400 antenna trimmer F (see Fig. 5) for maximum response.

6. Set the signal generator to 600 K.C. and rotate the tuning control until the signal is heard.

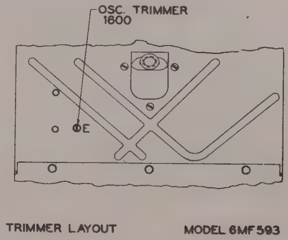


Fig. 4

7. The condenser gang is then rocked slightly while adjusting the 600 K.C. core G (see Fig. 3)

8. Repeat operations 4 and 5.

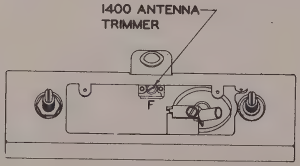


Fig. 5

The stringing of the cord is very important. Figure 6 shows the proper way to string the dial cord.

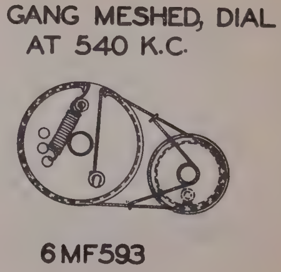


Fig. 6

The Zenith Radio Corporation furnishes the antenna for 1941 Ford and Mercury only.

Parts for this antenna will be available at your Zenith distributor.

The jumper shown on the test socket in Fig. 1 is provided so that an output meter may be connected to the voice coil side of the output transformer.

If you have the type of output meter which is usually connected to the plate of the output tube, it may be adapted for this type of connection by following the instructions shown in Fig. 7.

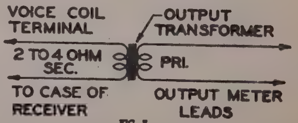
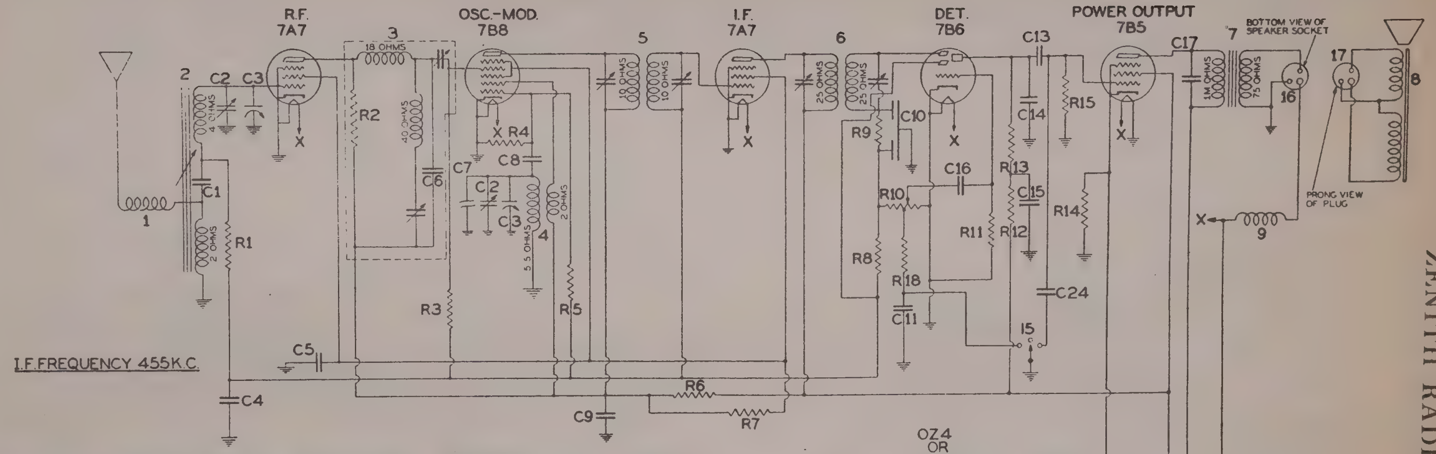


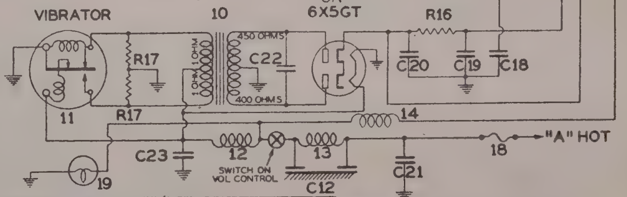
FIG. 7

ZENITH RADIO CORP.

MODEL 6MN595, Chassis 6A17 Nash

NASH AC6011 SPECIAL ZENITH MODEL 6MN595





DIAG NO.	PART NO.	CONDENSERS
C1	22-1080	.006MFD. -200V.
2	22-1082	2 PLATE TRIMMER
3	22 1067	2 CANG CONDENSER
4	22-250	.05MFD. -200V.
5	22-170	.1MFD. -400V.
6	22-988	.000020MFD. -600V.
7	22-1074	COMPENSATOR
8	22-162	.0001MFD. -600V. MICA
9	22-170	.1MFD. -400V.
10	22-1076	.00025MFD. DUAL MICA
11	22-185	.01MFD. -200V.
12	22-1076	.00025MFD. DUAL MICA
13	22-435	.02MFD. -600V.
14	22-182	.00025MFD. -600V. MICA
15	22-212	.05MFD. -400V.
16	22-906	.005MFD. -200V
17	22-838	.005MFD. -600V
18		20MFD. -25V.
19	22-904	10MFD. -350V.
20		10MFD. -400V.
21	22-905	25MFD. -200V.
22	22-1079	.006MFD. - 1600V.
23	22-908	.5MFD. -120V.
24	22-906	.005MFD. -200V.

DIAG NO.	PART NO.	RESISTORS
R1	63-597	470M OHMS - 1/4W.
2	63-640	8200 OHMS - 1/4W.
3	63-596	330M OHMS - 1/4W.
4	63-593	47M OHMS - 1/4W.
5	63-604	10 MEGOHMS - 1/4W.
6	63-1135	3900 OHMS - 2W.
7	63-1065	15M OHMS - 1W.
8	63-271	1 MEGOHM - 1/4W.
9	63-592	33M OHMS - 1/4W.
10	63-1128	1/4 MEGOHM VOL. CONT.
11	63-604	10 MEGOHMS - 1/4W.
12	63-595	100M OHMS - 1/4W.
13	63-296	220M OHMS - 1/4W.
14	63-941	390 OHMS - 1W.
15	63-597	470M OHMS - 1/4W.
16	63-968	1800 OHMS - 2W.
17	63-967	82 OHMS - 1/2W.
18	63-589	10M OHMS - 1/4W.

DIAG NO.	PART NO.	MISC.
1	S-8819	ANT. MOTOR NOISE CHOKE
2	S-8884	ANTENNA COIL
3	95-736	UNTUNED COIL ASSEMBLY
4	S-8887	OSCILLATOR COIL
5	95-737	1ST. I.F. TRANSFORMER
6	95-738	2ND. I.F. TRANSFORMER
7	95-734	OUTPUT TRANSFORMER
8	49-412	SPEAKER
9	20-225	SPEAKER FIELD CHOKE
10	95-733	POWER TRANSFORMER
11	190-15	VIBRATOR
12	20-213	VIBRATOR HASH CHOKE
13	20-229	"A" LINE CHOKE
14	20-226	HEATER LINE CHOKE
15	85-249	THREE POS. TONE CONTROL

DIAG NO.	PART NO.	MISC. CONT'D.
16	78-208	SPEAKER S'KET.
17	52-196	" CAB. & PLUG
18	136-11	FUSE - 14 AMPS.
19	100-32	DIAL LIGHT #51

MADE ESPECIALLY FOR
NASH MOTORS

NASH-A.C.6011-SPECIAL
ZENITH MODEL 6MN595

Zenith Model 6MN595 Zenith Model 7MN596
Nash A.C. 6011 Special Nash A.C. 6001 De Luxe

Tuning Range: 540 to 1600 K.C.

Sensitivity: 8 microvolts at 1 watt output.

The cover on both receivers may be removed to check tubes and vibrator without removing the set from the car.

SETTING THE SUPER-MATIC TUNING MODEL 6MN595

Adjustment should not be made until receiver has warmed up 15 minutes.

(A) Select a desired station at right side of dial scale.
(B) Loosen screw on right hand push button bar. (See Fig. 4)
(C) Push Super-Matic button bar in as far as possible and tighten screw while bar is in this position.
(D) Repeat the above for remaining bars, choosing three other desired stations.
(E) Insert push buttons on push button bars.

SOCKET VOLTAGES

Figs. 1 and 2 show approximate voltages at the socket terminals.

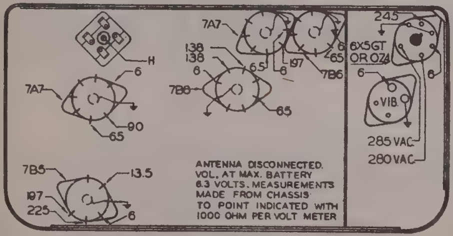

7A7
H
6
90
65
7A7
138
138
6
7B8
65
197
6
65
7B6
245
6X5GT OR OZ4
6
6
VIB.
285 VAC
280 VAC
7B5
13.5
197
225
6
ANTENNA DISCONNECTED. VOL. AT MAX. BATTERY 6.3 VOLTS. MEASUREMENTS MADE FROM CHASSIS TO POINT INDICATED WITH 1000 OHM PER VOLT METER

Fig. 1.

NASH AC 6011 SPECIAL
ZENITH 6MN 595

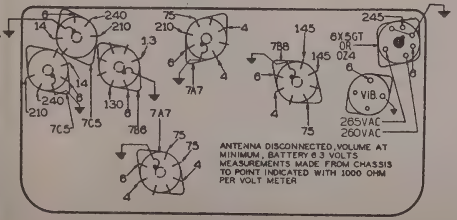

6
14
240
210
75
210
4
13
145
245
7B8
6X5GT OR 0Z4
145
6
14
240
210
7C5
7C5
130
8
7A7
7B6
7A7
6
4
VIB.
265VAC
260VAC
75
75
75
4
6
4
ANTENNA DISCONNECTED, VOLUME AT MINIMUM, BATTERY 6.3 VOLTS MEASUREMENTS MADE FROM CHASSIS TO POINT INDICATED WITH 1000 OHM PER VOLT METER

Fig. 2.

NASH AC 6001 DELUXE
ZENITH 7MN 596

6MN595 AC 6011 SPECIAL

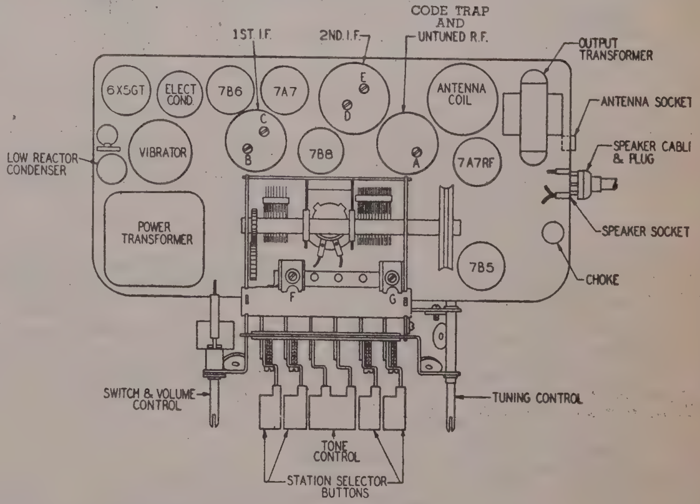


Fig. 3.

NASH AC 6011 SPECIAL
ZENITH 6MN 595

I.F.: The tuning condenser is fully meshed (540 K.C.) The signal generator is set at 455 K.C. and fed through the special Zenith antenna dummy to the receiver. The wave trap adjustment screw A, (see Fig. 3) is adjusted for maximum response. The adjusting screws B, C, D and E (see Fig. 3) are then adjusted in order for maximum response on the output meter. The wave trap A is then adjusted for minimum response.

R.F.: The tuning control is rotated until the condenser plates are completely out of mesh (1600 K.C.) Set the signal generator to 1600 K.C. Adjust the 1600 K.C. osc. trimmer F shown in Fig. 3 for maximum response.

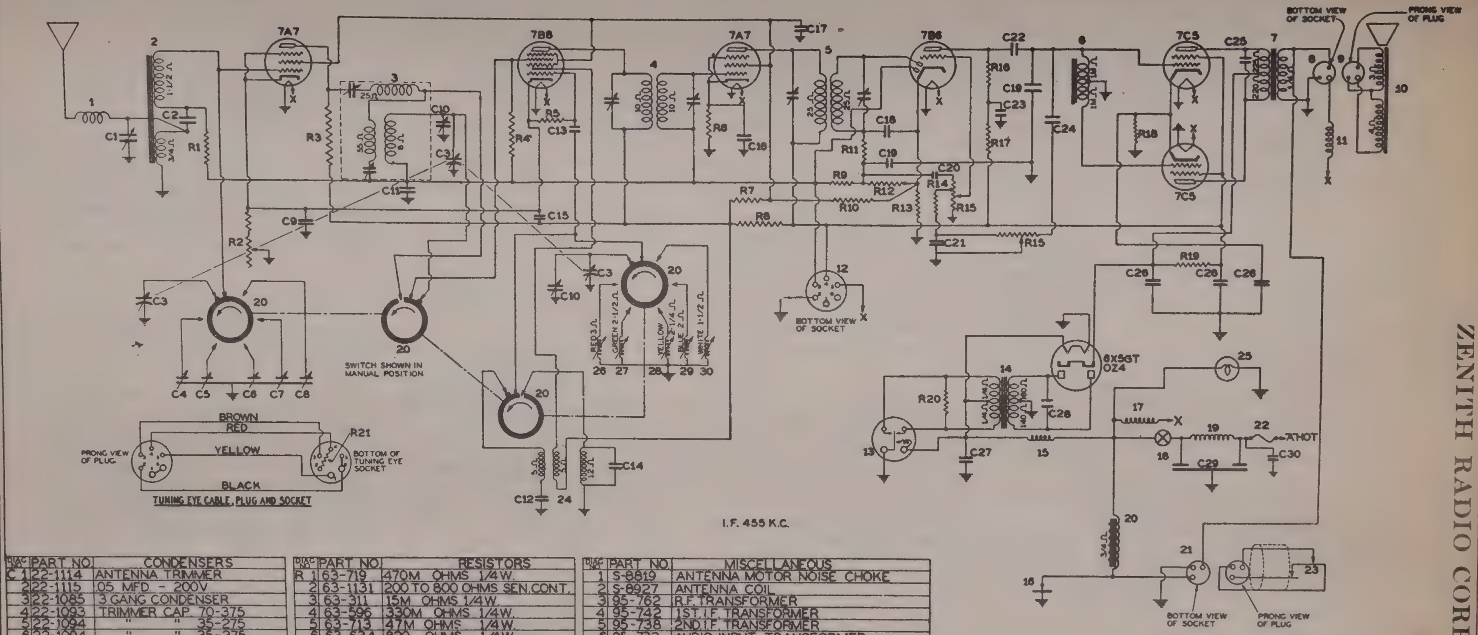
Set the signal generator to 1400 K.C. Rotate the tuning control until the signal is heard and adjust the 1400 antenna trimmer G (See Fig. 3) for maximum response.

Reset the signal generator to 600 K.C. and rotate the tuning control until a signal is heard, and adjust the core H (See Fig. 1) in the antenna coil for maximum response.

If core H is found to be off a great deal, the 1400 antenna trimmer G should be readjusted.

ZENITH RADIO CORP.

MODEL 7MN596, Chassis 7A08 Nash



DIAG NO.	PART NO.	CONDENSERS
C 1	22-1114	ANTENNA TRIMMER
2	22-1115	.05 MFD. - 200V
3	22-1085	3 GANG CONDENSER
4	22-1093	TRIMMER CAP. 70-375
5	22-1094	" " 35-275
6	22-1094	" " 35-275
7	22-1095	" " 13-160
8	22-1095	" " 13-160
9	22-190	.1 MFD - 200 V.
10	22-1102	R.F. & OSC. 2 GANG TRIMMER
11	22-250	.05 MFD. - 200 V.
12	22-1077	600 PADDER - MANUAL
13	22-162	100 MMFD. - 600 V. MICA
14	22-956	500 MMFD. SILVER MICA
15	22-170	.1 MFD. - 400 V.
16	22-250	.05 MFD - 200 V.
17	22 170	.1 MFD - 400 V
18	22-182	250 MMFD - 600 V. MICA
19	22-1076	250 MMFD. DUAL MICA
20	22-185	.01 MFD. - 200 V.
21	22-906	.005 MFD - 200 V.
22	22-435	.02 MFD. - 600 V.
23	22-212	.05 MFD. - 400 V.
24	22-1075	.007 MFD - 200 V.
25	22-838	.005 MFD - 600 V.
26	22-917	20-10-20 MFD. - 450-400-25V
27	22-908	5 MFD. - 120 V.
28	22-1116	.007 MFD - 1600 V.
29	22-1076	250 MMFD. DUAL MICA
30	22-905	25 MFD. - 200 V.

DIAG NO.	PART NO.	RESISTORS
R 1	63-719	470M OHMS 1/4 W.
2	63-1131	200 TO 800 OHMS SEN. CONT.
3	63-311	15M OHMS 1/4 W.
4	63-596	330M OHMS 1/4 W.
5	63-713	47M OHMS 1/4 W.
6	63-634	820 OHMS 1/4 W.
7	63-1065	15M OHMS 1 W.
8	63-1140	4700 OHMS 2 W.
9	63-271	1 MEGOHM 1/4 W.
10	63-647	39M OHMS 1/4 W.
11	63-713	47M OHMS 1/4 W.
12	63-296	220M OHMS 1/4 W.
13	63-581	470 OHMS 1/4 W.
14	63-712	33M OHMS 1/4 W.
15	63-1129	VOL. CONT. - TONE CONT. & SW.
16	63-649	56M OHMS 1/4 W.
17	63-649	56M OHMS 1/4 W.
18	63-948	330 OHMS 1 W.
19	63-968	1800 OHMS 2 W.
20	63-971	220 OHMS 1/2 W.
21		1/2 MEGOHM 1/4 W.

DIAG NO.	PART NO.	MISCELLANEOUS
1	S-8819	ANTENNA MOTOR NOISE CHOKE
2	S-8927	ANTENNA COIL
3	95-762	R.F. TRANSFORMER
4	95-742	1ST. I.F. TRANSFORMER
5	95-738	2ND. I.F. TRANSFORMER
6	95-732	AUDIO INPUT TRANSFORMER
7	95-735	AUDIO OUTPUT TRANSFORMER
8	78-208	SPEAKER SOCKET
9	52-196	SPEAKER CABLE & PLUG
10	49-413	SPEAKER
11	20-231	SPEAKER FIELD CHOKE
12	78-284	TUNING EYE SOCKET
13	190-15	NON-SYNCHRONOUS VIBRATOR
14	95-731	POWER TRANSFORMER
15	20-213	VIBRATOR HASH CHOKE
16	S-9172	MANUAL SELECTOR SWITCH
17	20-232	HEATER LINE CHOKE
18		"A" LINE SWITCH-ON VOLUME CONTROL
19	20-229	"A" LINE CHOKE
20	85-252	AUTOMATIC SELECTOR SOLENOID
21	78-406	SAFETY FOOT CONTROL SOCKET
22	136-12	FUSE - 20 AMPERES
23	85-264	SAFETY FOOT CONTROL SWITCH
24	S-9182	OSCILLATOR COIL
25	100-32	DIAL LIGHT - MAZDA NO. 51
26	S-8971	AUTOMATIC OSCILLATOR COIL
27	S-8972	AUTOMATIC OSCILLATOR COIL
28	S-8973	AUTOMATIC OSCILLATOR COIL
29	S-8974	AUTOMATIC OSCILLATOR COIL
30	S-8975	AUTOMATIC OSCILLATOR COIL

ZENITH RADIO

NASH-A.C.6001-DELUXE
ZENITH SAFETY FOOT CONTROL MODEL-7MN596

MADE ESPECIALLY FOR
NASH MOTORS

NASH—A.C.6001—

DELUXE ZENITH SAFETY FOOT

CONTROL MODEL—7MN596

MODEL 7MN596
MODEL 6MN595

ZENITH RADIO CORP.

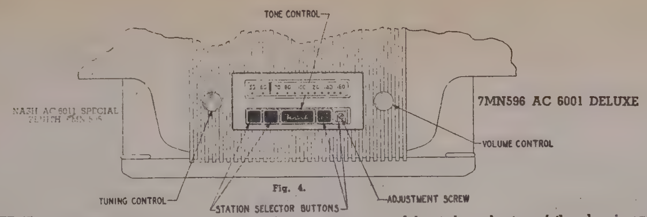


Fig. 4.

NOTE: This receiver is equipped with an adjustable sensitivity control located on the top of the chassis as shown in Fig. 5. The control is set at the factory to a position which gives sensitivity of 8 microvolts at 1 watt output. It is found advisable to hold the receiver at this level as any higher sensitivity may result in excessive background noise and unless laboratory equipment is available for measuring sensitivity, it is not advisable to change this setting.

I.F.: The receiver must be in one of the automatic positions. The signal generator is set at 455 K.C. and fed through the special Zenith antenna dummy to the receiver. The code trap adjustment screw A (see Fig. 5) is adjusted for maximum response. The adjustment screws B, C, D and E are then adjusted in order for maximum response on the output meter (See Fig. 5). The code trap A is then adjusted for minimum response.

R.F.: The receiver is returned to manual and the tuning control is rotated until the condenser plates are out of mesh (1600 K.C.) Set the signal generator to 1600 K.C. and adjust the 1600 K.C. osc. trimmer F (See Fig. 5) for maximum response.

Set the signal generator to 1400 K.C. and rotate the tuning control until a signal is heard and adjust the R.F. trimmer G and antenna trimmer H (See Fig. 5) for maximum response.

Set the signal generator to 600 K.C. and rotate the tuning control until the signal is heard. The condenser gang is then rocked slightly while adjusting the 600 K.C. padder I (See Fig. 5) to maximum reading on output meter.

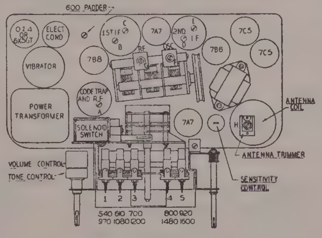


Fig. 5.
NASH AC 6001 DELUXE
ZENITH 7MN 596

IMPORTANT — Unless certain dummy antenna capacities are employed with either the signal generator, or in making the adjustments on stations, a receiver will not respond properly. The capacities provided in the Zenith dummy antenna part No. S7694 shown in Fig. 6 are identical with the conditions found in the Nash car, and if adjusted accordingly, the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna is especially priced very low, and should be purchased at once for use in servicing the Zenith built Nash receiver.

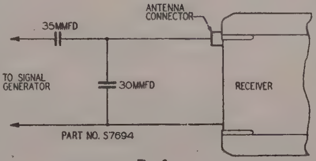


Fig. 6.
NASH AC 6011 SPECIAL
ZENITH 6MN 595
NASH AC 6001 DELUXE
ZENITH 7MN 596

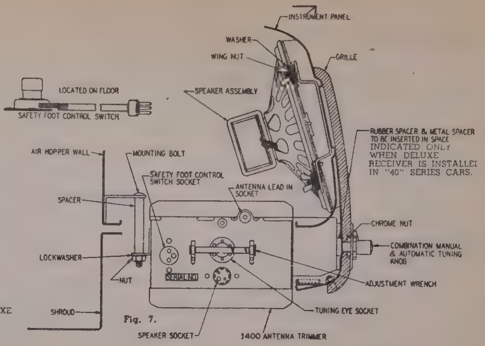


Fig. 7.
NASH AC 6001 DELUXE
ZENITH 7MN 596

SETTING THE SAFETY AUTOMATIC ELECTRIC TUNING

(A) The automatic station adjusting eye is plugged into the socket on the receiver. (See Fig. 7)

(B) The indicator window is removed from the receiver by inserting a small screw driver underneath the left edge of the indicator window and pressing outward. This makes the adjustment screws available.

The set should be turned on and allowed to warm up at least half an hour.

(C) The range for each adjustment is located underneath the adjustment number.

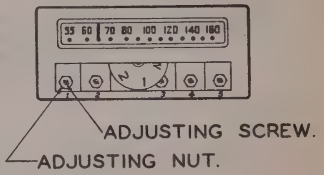


Fig. 8.
NASH AC 6001 DELUXE
ZENITH 7MN 596

A station close to 580 K.C. is set by having the figure 1 so it would appear in indicator window. The adjustment screw No. 1 (See Fig. 8) is then adjusted to the proper signal until the tuning eye gap can not be decreased in size. The No. 1 nut (See Fig. 8) is then adjusted until the gap on the tuning eye cannot be further decreased in size. A wrench for making these adjustments is located on the side of the receiver. (See Fig. 7)

(D) For stations 2, 3, etc. on the Safety Automatic Electric Tuner you set the adjustment screws and nuts the same as for station 1.

The Safety Automatic Station Adjusting Eye is available at all Zenith distributors.

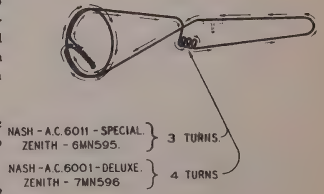


Fig. 9.

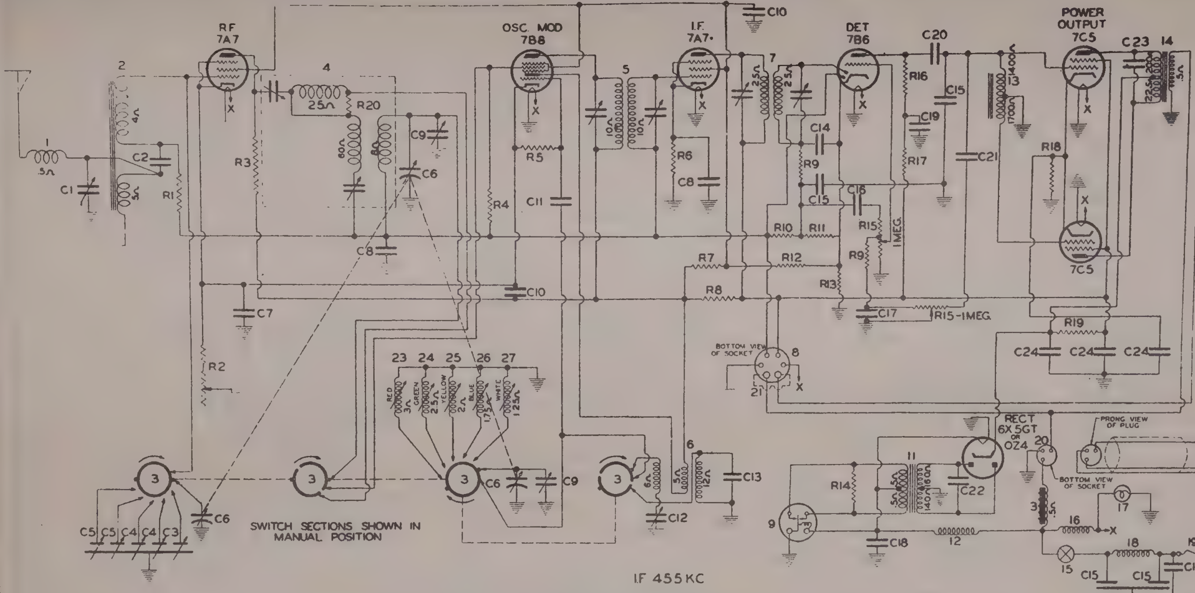
The stringing of the dial cord is very important for unless properly strung the cord will jump off the pulleys. Figure 9 shows the proper way to string the cords on both receivers.

ZENITH RADIO CORP.

MODEL 7ML592,Chassis
7A09 Lincoln

Sensitivity—6 microvolts at one watt output. **Power Output**—6 watts measured at the voice coil. **Tuning Range**—540 to 1600 K.C. **Speaker**—full size electrodynamic. **I.F.**—455 K.C. **Roto-Selector** tuning with foot control switch—Selection of any five desired stations automatically by using the foot control or Roto-Selector on instrument panel.

Tube Complement—7A7 R.F. — 7B8 oscillator and modulator — 7A7 I.F. — 7B6 2nd detector and A.V.C. — two 7C5 beam power push pull output — 6X5GT or 0Z4 rectifier — **Current consumption** 8 amperes.



1941 ROTO-SELECTOR 16H-18805-A
WITH FOOT CONTROL SWITCH
LINCOLN MOTOR CAR DIVISION
FORD MOTOR COMPANY

SOCKET VOLTAGES AS MEASURED WITH 1000 OHM PER VOLT METER TO CHASSIS. VOLUME CONTROL AT MAXIMUM WITH NO SIGNAL.
BATTERY 6.3 VOLTS.

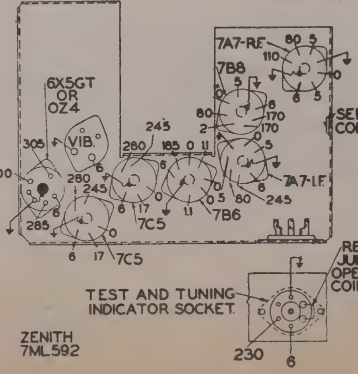


FIG. 1

DIAG. NO.	PART NO	CONDENSERS
C1	22-1109	ANTENNA TRIMMER
2	22-1115	.05 MFD 200 VOLTS
3	22-1093	TRIMMER CAP 70-375
4	22-1094	TRIMMER CAP 35-275
5	22-1095	TRIMMER CAP 13-160
6	22-1084	3 GANG VARIABLE
7	22-190	.1 MFD 200 VOLTS
8	22-250	.05 MFD 200 VOLTS
9	22-1106	RF&OSC 2 GANG TRIMMER
10	22-170	.1 MFD 400 VOLTS
11	22-162	100 MMFD 600 VOLTS MICA
12	22-1106	600 PADDER MANUAL
13	22-956	500MMFD SILVER MICA
14	22-182	250MMFD 600 VOLTS MICA
15	22-1076	250MMFD-DUAL MICA
16	22-185	.01 MFD 200 VOLTS
17	22-906	.005MFD 200 VOLTS
18	22-908	.5 MFD 120 VOLTS
19	22-212	.05 MFD 400 VOLTS
20	22-435	.02 MFD 600 VOLTS
21	22-1075	.007MFD 200 VOLTS
22	22-1105	.008MFD 1600 VOLTS
23	22-838	.005MFD 600 VOLTS
24	22-917	20-10-20MFD 450-400-25V.

DIAG. NO.	PART NO	RESISTORS
R1	63-597	470 M-OHMS 1/4 W. ±20%
2	63-1131	200 TO 800 OHMS SEN. CONT.
3	63-311	15 M-OHMS 1/4 W. ±10%
4	63-718	330 M-OHMS 1/4 W. ±20%
5	63-713	47 M-OHMS 1/4 W. ±20%
6	63-634	820 OHMS 1/4 W. ±10%
7	63-1065	15 M-OHMS 1 W. ±10%
8	63-1140	4700 OHMS 2 W. ±10%
9	63-712	33 M-OHMS 1/4 W. ±20%
10	63-271	1 MEGOHM 1/4 W. ±20%
11	63-296	220 M-OHMS 1/4 W. ±20%
12	63-647	39 M-OHMS 1/4 W. ±10%
13	63-747	470 OHMS 1/4 W. ±10%
14	63-971	220 OHMS 1/2 W. ±20%
15	63-1134	VOL. CONT-TONE CONT. & SW.
16	63-768	56 M-OHMS 1/4 W ±10%
17	63-649	56 M-OHMS 1/4 W. ±10%
18	63-948	330 OHMS 1 W. ±10%
19	63-968	1800 OHMS 2 W. ±10%
20	63-595	100 M-OHMS 1/4 W ±20%

DIAG. NO.	PART NO.	MISCELLANEOUS
1	S-8819	ANTENNA MOTOR NOISE CHOKE
2	S-9087	ANTENNA COIL
3	85-261	AUTOMATIC SELECTOR SWITCH
4	S-8988	R F TRANSFORMER
5	95-737	1ST I.F. TRANSFORMER
6	S-9171	OSCILLATOR COIL
7	95-738	2ND I.F. TRANSFORMER
8	78-284	TUNING EYE TUBE SOCKET
9	190-15	NON-SYNCHRONOUS VIBRATOR
10	49-422	ELECTRO-DYNAMIC SPEAKER
11	95-751	POWER TRANSFORMER
12	20-213	VIBRATOR HASH CHOKE
13	95-749	AUDIO INPUT TRANSFORMER
14	95-750	AUDIO OUTPUT TRANSFORMER
15	63-1134	"A" LINE SWITCH ON VOLUME CONTROL
16	20-228	HEATER LINE CHOKE
17	100-36	DIAL LIGHT MAZDA NO.44
18	20-229	"A" LINE CHOKE
19	136-12	FUSE-20 AMPERES
20	78-406	FOOT CONTROL SOCKET
21	58-92	TUNING EYE SOCKET JUMPER
22	85-265	FOOT CONTROL SWITCH ASSEMBLY
23	S-8971	AUTOMATIC OSCILLATOR COIL
24	S-8972	AUTOMATIC OSCILLATOR COIL
25	S-8973	AUTOMATIC OSCILLATOR COIL
26	S-8974	AUTOMATIC OSCILLATOR COIL
27	S-8975	AUTOMATIC OSCILLATOR COIL

ALIGNMENT:

The alignment of the receiver is one of the most important functions that a service man performs, and the instructions must be carefully followed.

CAUTION:

Great care should be taken while making all adjustments on the receiver to have the volume control turned full on. The intensity of the signal should be reduced only at the signal generator.

The signal for the entire alignment procedure, both I.F. and R.F. is fed through a special Zenith dummy which can be purchased from your Zenith distributor—Part No. S9189.

The capacities in the Zenith dummy as shown in Fig. 2 are identical with the Lincoln antenna, and if the receiver is adjusted accordingly, the instrument will operate properly when installed in the car.

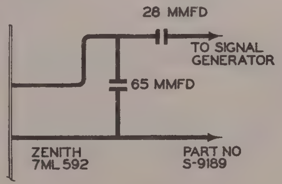
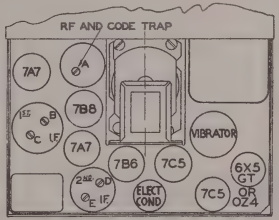


FIG. 2

NOTE:

This receiver is equipped with an adjustable sensitivity control located on the side of the chassis as shown in Fig. 1. The control is set at the factory to a position which gives sensitivity of 6 microvolts at 1 watt output. It is found advisable to hold the receiver at this level as any higher sensitivity may result in excessive background noise and unless laboratory equipment is available for measuring sensitivity, it is not advisable to change this setting.

3. The R.F. and code trap adjustment screw A (see Fig. 3) is adjusted for maximum response.
4. The adjustment screws B, C, D and E (see Fig. 3) are then adjusted in order for maximum response.
5. The code trap A is then adjusted for minimum response.



TUBE LAYOUT—MODEL 7ML 592
FIG. 3

R.F.—

1. The receiver is returned to manual tuning.

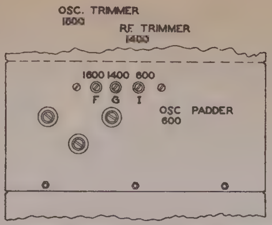
2. The tuning control is rotated until the condenser plates are out of mesh (1600 K.C.)

3. The signal generator is set to 1600 K.C.
4. Adjust the 1600 K.C. oscillator trimmer F (see Fig. 4) for maximum response.

5. Set signal generator to 1400 K.C. and rotate the tuning control until a signal is heard.

6. Adjust the R.F. trimmer G (see Fig. 4) and the antenna trimmer H (see Fig 5) for maximum response.
7. Set the signal generator to 600 K.C. and rotate the tuning control until signal is heard.

8. The condenser gang is then rocked slightly while adjusting the 600 K.C. padder I (see Fig. 4) for maximum response.



TRIMMER LAYOUT FIG. 4 MODEL 7ML592

3. Adjust the No. 1 screw (see Fig. 5) with the wrench provided until the desired station is tuned to the loudest point.

4. Adjust No. 1 nut (see Fig. 5) for maximum signal.

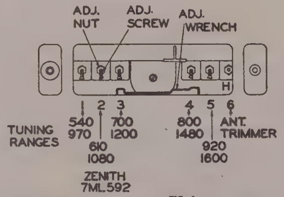


FIG. 5

5. Repeat the last two above operations to make sure the adjustments are accurate.

6. The same procedure is followed in setting the remaining four adjustments, selecting a station within the tuning range of each adjustment screw and placing the selector switch in the corresponding position for each adjustment screw.

SETTING THE ROTO-SELECTOR:

The tuning range is shown below each adjustment number (see Fig. 5).

1. Turn receiver on and allow it to operate for half an hour before making any adjustment.

2. Select a station within the range of position 1 on the Roto-Selector

7. Place escutcheon in position and secure in place with screws (see Fig. 6).

8. Place the control knobs in the proper position.

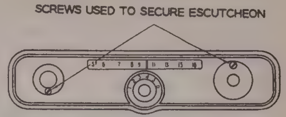


FIG. 6

A station adjusting eye is available at your Zenith distributor. It is especially essential when setting the Roto-Selector on a strong signal. This eye may also be used for alignment work instead of an output meter.

A jumper is provided on the test socket (see Fig. 1) located on the bottom of the receiver. Removing of this jumper will open the voice coil and allow you to connect your output meter to the voice coil side of the output transformer.

If you have the type of output meter which is usually connected to the plate of the output tube, it may be adapted for this type of connection by following the instructions shown in Fig. 7.

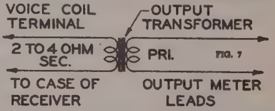


FIG. 7

The stringing of the dial cord is most important for unless properly strung the cord will jump off the pulleys. Fig 8 shows the proper way to string the dial cord.

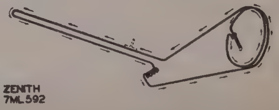
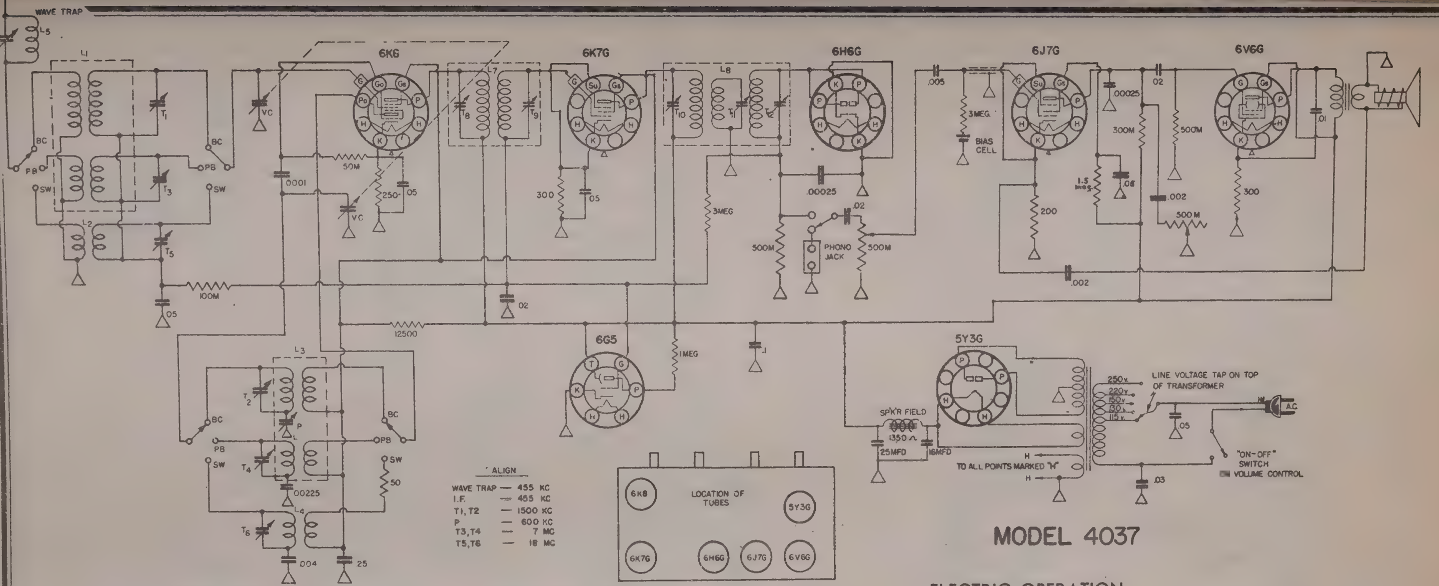


FIG. 8

©John F. Rider, Publisher

MODEL 4016
MODEL 4037

AIR-KING PRODUCTS CO. INC.



MODEL 4037

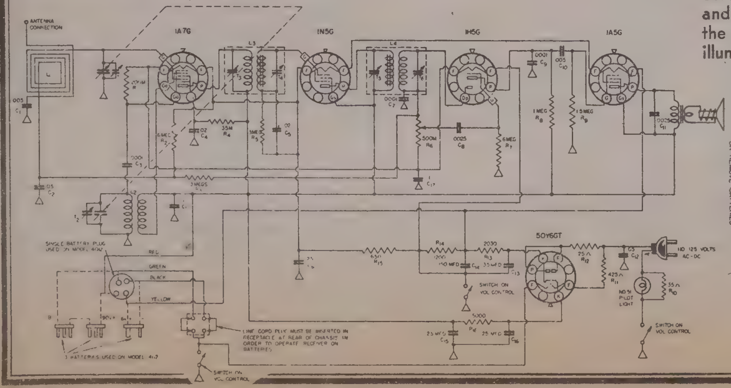
This receiver comprises a five tube superheterodyne receiver, employing the new 1.4 volt battery tubes. This receiver operates on either batteries, or 110-125 volts A.C.-D.C.

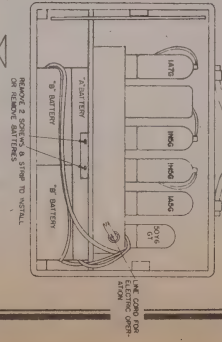
The frequency range covered is standard broadcast, 530 to 1730 kc and some of the low frequency police transmitters.

ELECTRIC OPERATION:

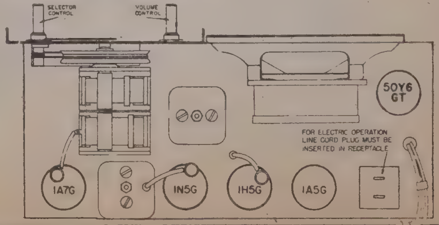
A power cord and plug is provided in a compartment at the rear of the cabinet. To place the set in operation, open the flap cover which is secured by the snap fastener and remove the power cord plug from its receptacle in the chassis. Stretch the line cord to its full length and plug it into the electric outlet. Finally, the set may be switched on by turning the volume control knob in a clockwise direction. A pilot light is provided which illuminates the dial when the set is operated on the power lines.

Do not attempt to close the flap when the line cord is plugged into the electric outlet.




1A7G
1N5G
1H5G
1A5G
50Y6 GT
"A" BATTERY
"B" BATTERY
"B" BATTERY
REMOVE 2 SCREWS & STRAP TO INSTALL OR REMOVE BATTERIES
LINE CORD FOR ELECTRIC OPERATION

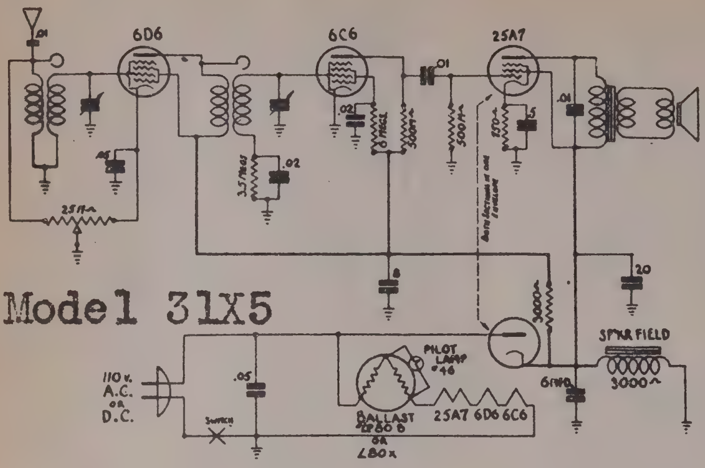
LOCATION OF TUBES & BATTERIES


SELECTOR CONTROL
VOLUME CONTROL
50Y6 GT
FOR ELECTRIC OPERATION LINE CORD PLUG MUST BE INSERTED IN RECEPTACLE
1A7G
1N5G
1H5G
1A5G

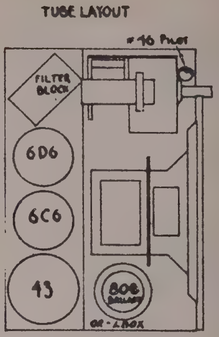
©John F. Rider, Publisher

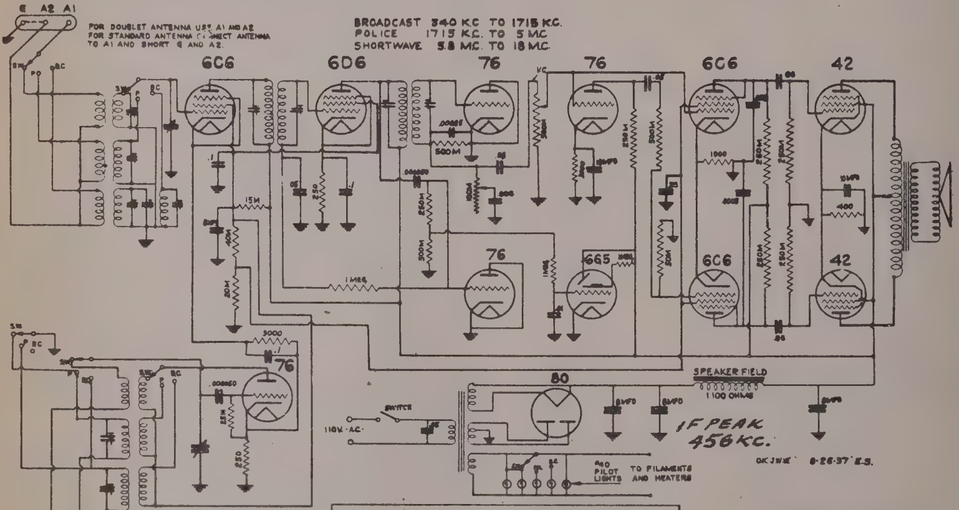
MODEL 31X5
MODEL 36Y12

ZEPHYR RADIO CO.



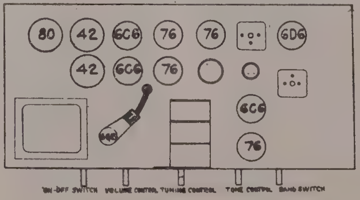
Model 31X5




G A2 A1
FOR DOUBLET ANTENNA USE A1 AND A2
FOR STANDARD ANTENNA CONNECT ANTENNA TO A1 AND SHORT G AND A2.
BROADCAST 540 K.C TO 1715 K.C.
POLICE 1715 K.C. TO 5 M.C
SHORTWAVE 5.8 M.C. TO 18 M.C.
6C6
6D6
76
76
6C6
42
76
6G5
6C6
42
76
80
SW
PO
BC
15M
1 MEG
500M
250M
3000
SPEAKER FIELD
1100 OHMS
SWITCH
110V. A.C.
TO FILAMENTS AND HEATERS
PILOT LIGHTS
IF PEAK 456 KC.
OK JWE 8-26-37 E.S.

12 TUBE-3 BAND-A.C
SUPERHETERODYNE
WITH MAGIC EYE

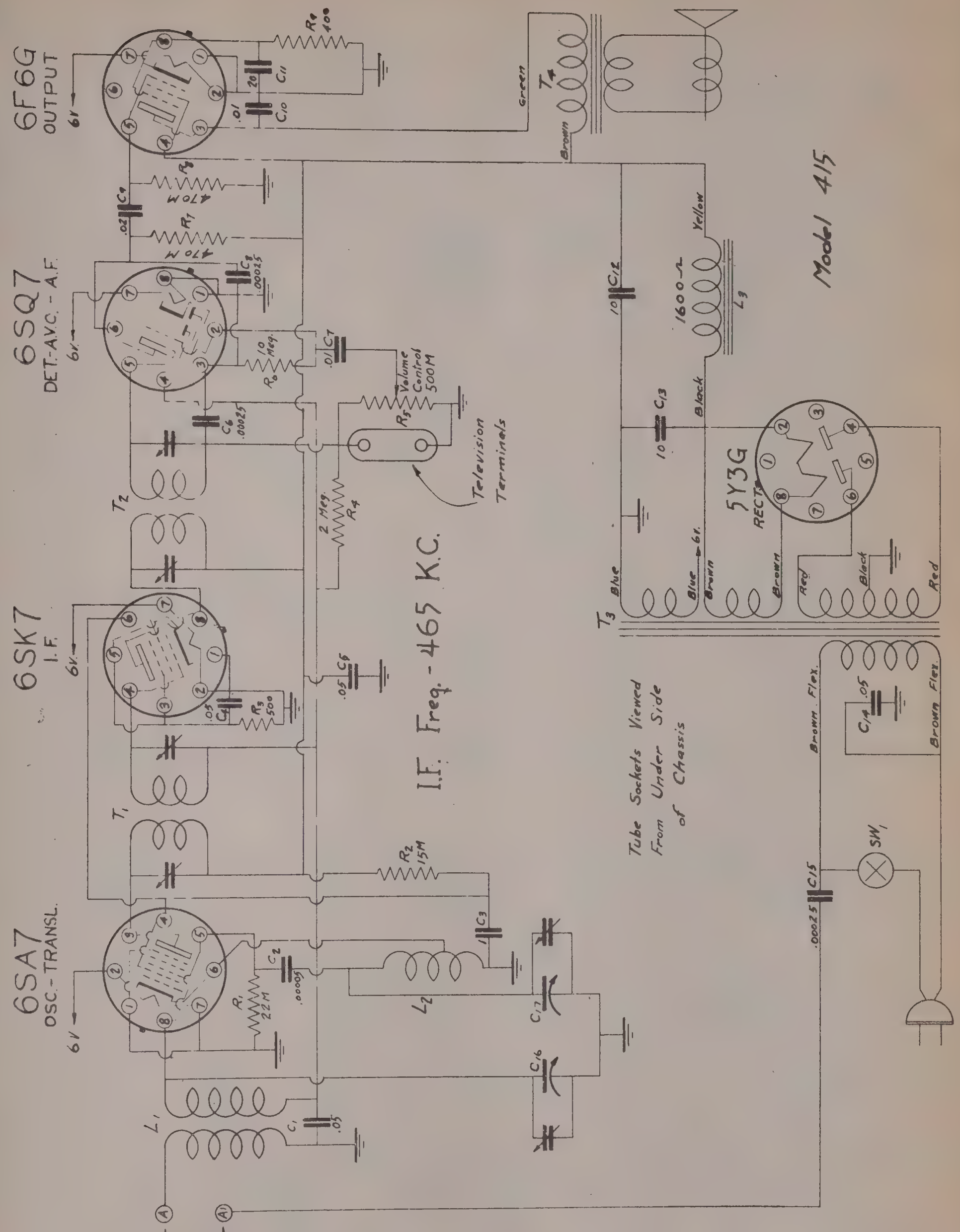
MODEL 36Y12



C205	8 MFD 450V DRY TUBULAR ELECT
L18	WAVE TRAP
L34	BC ANT PRESELECTOR COIL
C9	3 GANG VARIABLE CONDENSER
T21	POWER TRANSFORMER
DA36	DIAL ASSEMBLY
X100	AC SWITCH
X14	BAND SWITCH
V15	VOLUME CONTROL
[illegible]	TONE CONTROL
L32	S.W. ANT COIL
L33	POLICE ANT COIL
L31	3 BAND OSCILLATOR COIL
I18	1st IF
I6	2nd IF
C216	8 MFD 500V WET ELECTROLYTIC
S120	SPEAKER
PART	NAME

MISSION BELL RADIO MFG. CO., INC.

MODEL 415

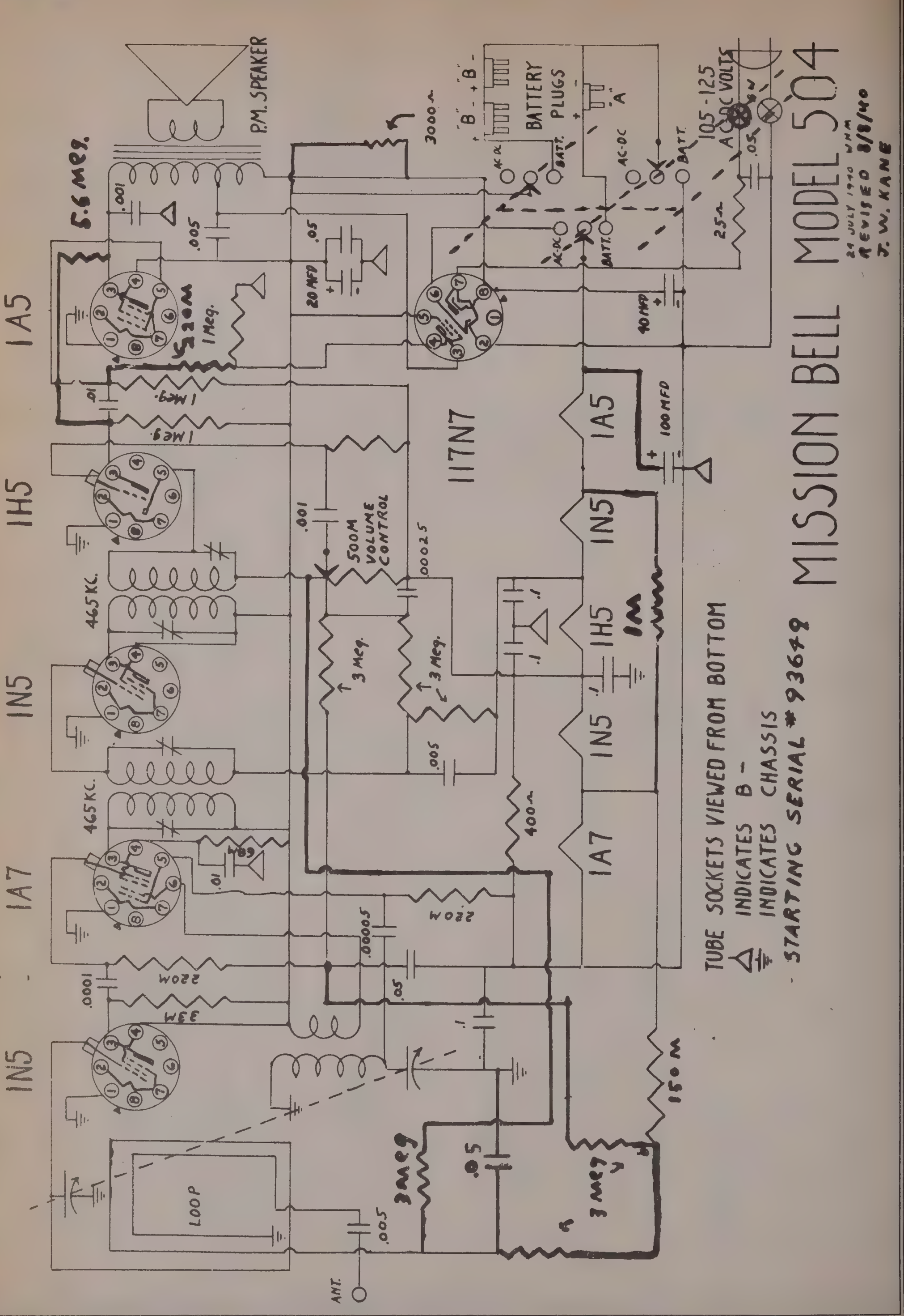


I.F. Freq. - 465 K.C.

Tube Sockets Viewed From Under Side of Chassis

Model 415

MISSION BELL RADIO MFG. CO., INC.



CLARIFIED SCHEMATICS

The diagrams on the yellow sheets in this section indicate the breakdown of the individual bands of the multi-wave band receivers specified in the corner cards and shown in the respective manufacturers' sections in the main part of this Manual. Those schematics for which breakdowns have been made bear a designation (☞) in the upper margin. The purpose of these breakdowns is to show how the components, that is the coils, condensers and switch contacts, are used when the receiver is set to different bands. In the majority of cases the circuits shown are the r-f and oscillator systems; however, in a few instances, a-f breakdowns are given.

The switch contacts which are associated with the various circuits, are represented as small circles, bearing either numerical or alphabetical designations corresponding to those designations shown upon the complete diagram contained in the respective manufacturers' sections in the main part of the Manual. The connections between the switch points are shown by dotted lines.

Each of the main diagrams, that is complete schematics, shows the wave-band switch in a certain position; usually this is the broadcast-band position. This same position is shown as the first position in the breakdown diagram unless the contrary is specified. Reference in the breakdown diagrams to the fact that the switch is shown as having been moved from one position, indicates the first position immediately following either the broadcast band, if that is the first shown, or whatever the band may be which is the first shown. Expressed differently this is, if the designation is "switch moved one position", this means that the wave-band switch has been turned one position from the reference point designated as "switch as shown".

When all switches associated with the movement turn in the same direction, this is specified as "clockwise" or "counter-clockwise" as the case may be.

You will note that corner cards on some of the "Clarified Schematic" breakdowns indicate several receivers. This means that the r-f and oscillator sections, as shown in the breakdown, apply to those receivers. However, this should not be construed as signifying that all these receivers are the same throughout. It simply means that the wave-band positions and associated circuits are the same for each model or chassis listed under the same "Clarified Schematic".

In some cases sections of the wave-band switch are used to short-circuit coils which are not in operation on the particular band shown in the schematic. In cases where inclusion of these shorted coils unnecessarily complicates the breakdown, they have been omitted, since they are not essential to the operation of the signal-carrying circuits.

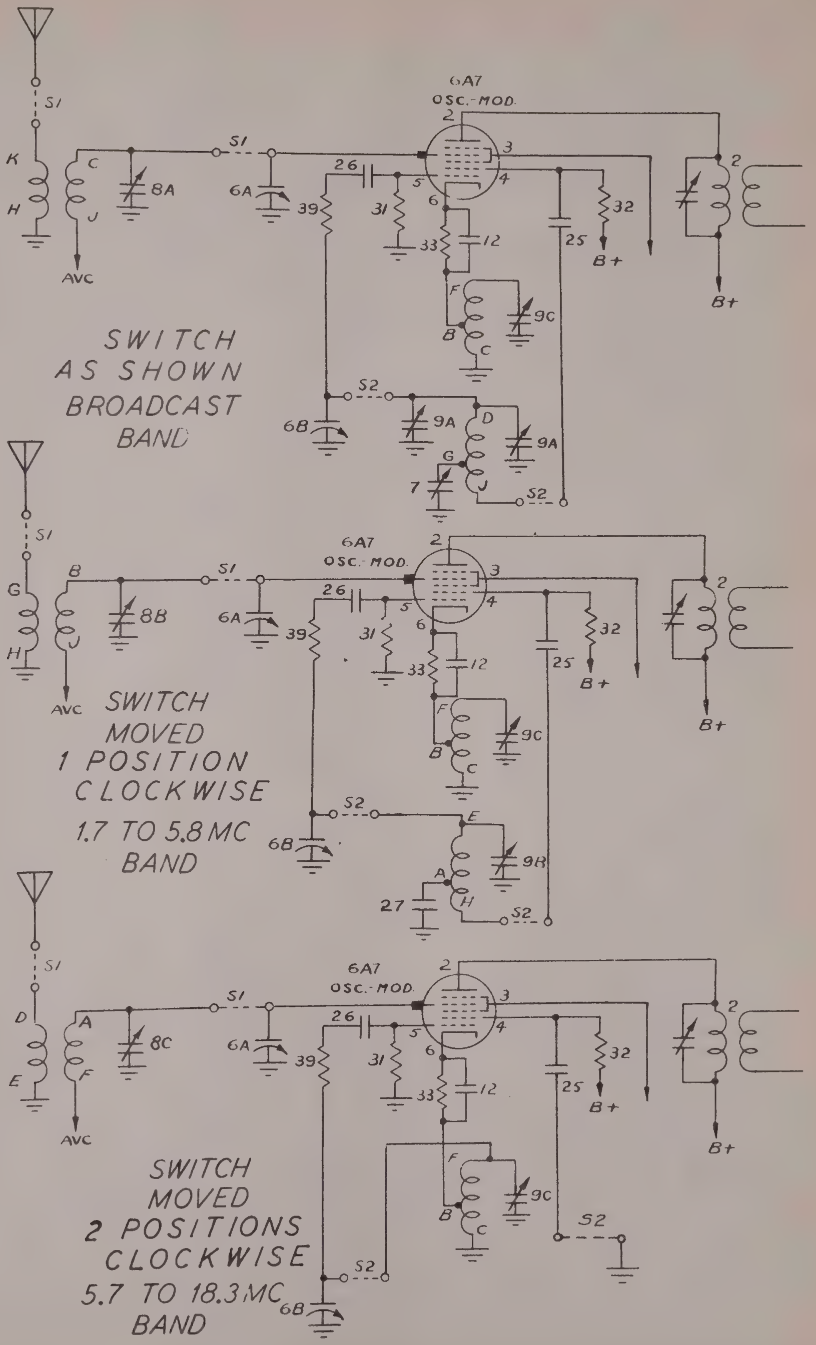
In the case of audio-frequency circuit breakdowns, the designations shown upon the breakdown schematics correspond with the designations shown upon the complete schematics.

For your convenience the pin terminals for each tube represented in the breakdown diagrams have been numbered according to the RMA system.

You will note that in some cases the bands are identified in accordance with the frequency range covered. Then again in some instances these frequency ranges are omitted. The reason for the omission is that we were unable to identify the specific ranges covered by the various bands and it was felt that, since all receivers do not employ switch arrangements which increase the frequency range in exact sequence as the range switch is advanced, it was deemed advisable to speak simply in terms of the switch positions, rather than the frequency ranges. Of course, where the frequency range was known it has been identified.

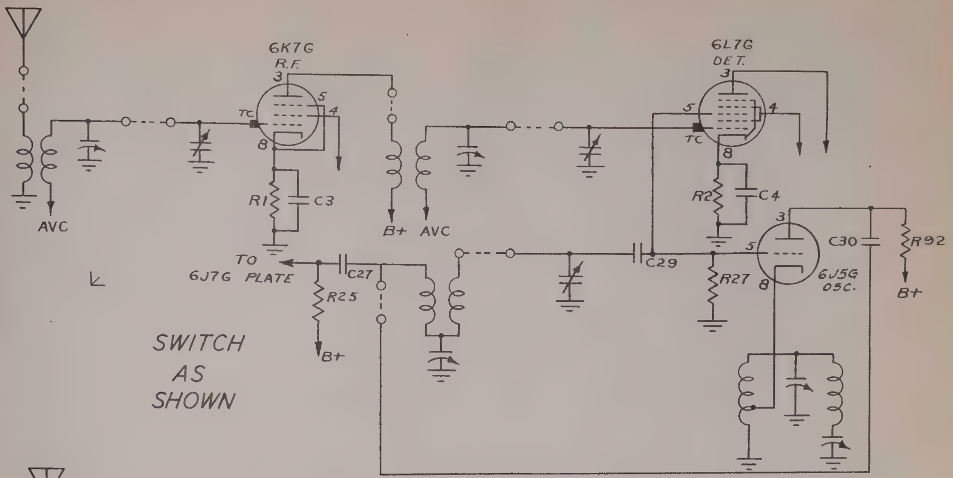
ALLIED RADIO CORP. MODELS B-10572, B-10585, B-10586

See Allied Page 12-9

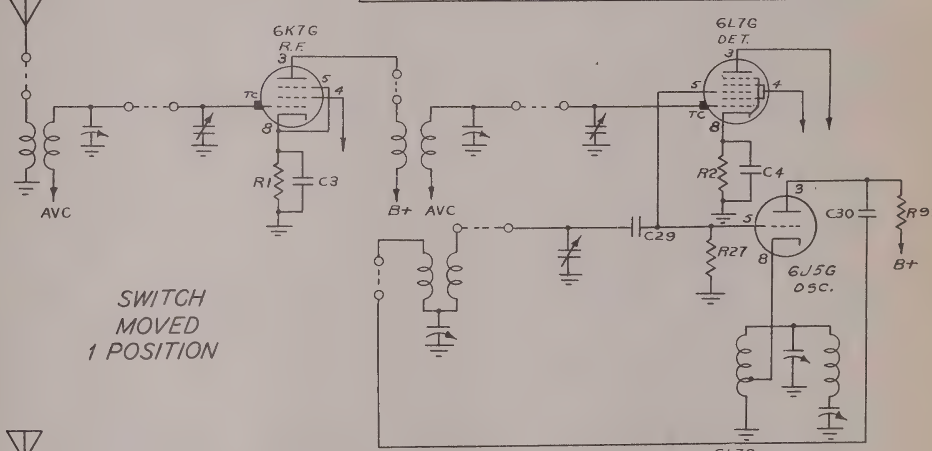

6A7
OSC.-MOD.
S1
K
H
C
J
8A
6A
26
39
31
5
6
33
12
3
4
25
32
B+
2
AVC
F
B
C
9C
S2
6B
9A
D
9A
G
7
J
S2
SWITCH AS SHOWN BROADCAST BAND
G
H
B
J
8B
E
9B
A
27
H
SWITCH MOVED 1 POSITION CLOCKWISE 1.7 TO 5.8 MC BAND
D
E
A
F
8C
SWITCH MOVED 2 POSITIONS CLOCKWISE 5.7 TO 18.3 MC BAND

ALLIED RADIO CORP.

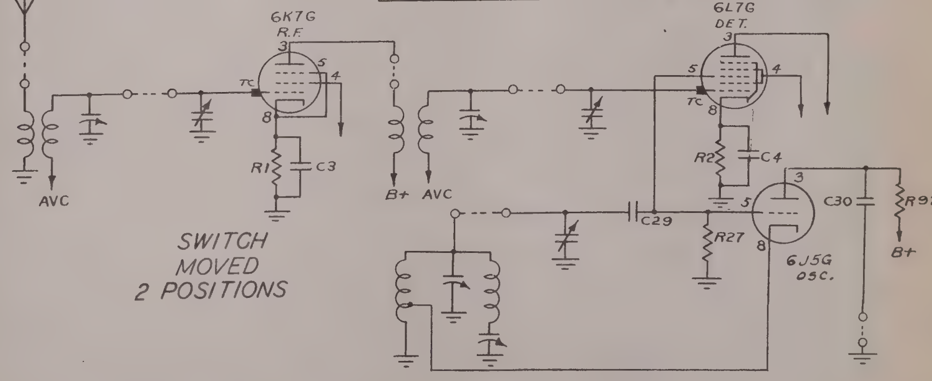
MODEL E-10880
See Allied Page 12-27



SWITCH AS SHOWN



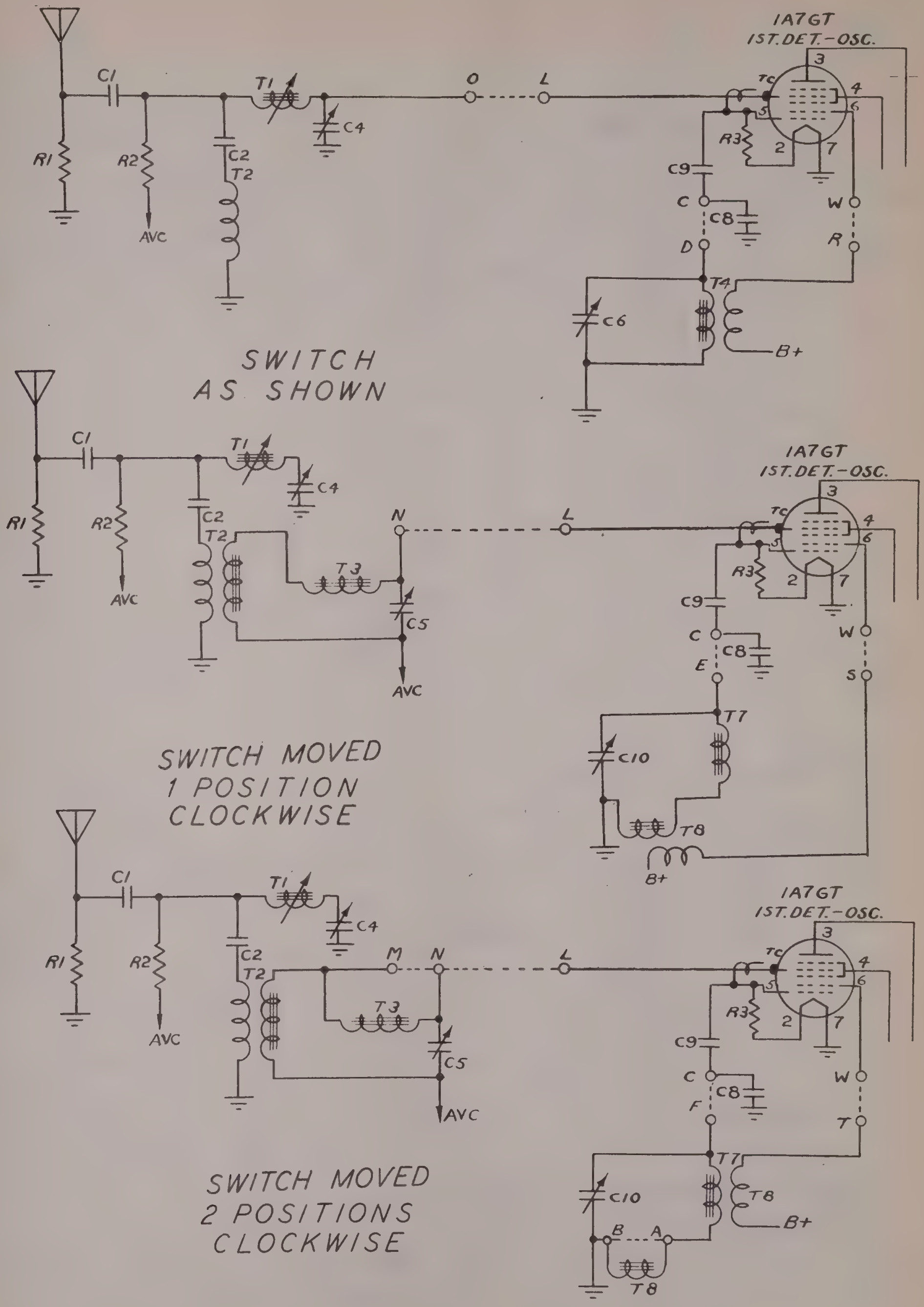
SWITCH MOVED 1 POSITION



SWITCH MOVED 2 POSITIONS

BELMONT RADIO CORP.

MODEL 509
See Belmont Page 12-41



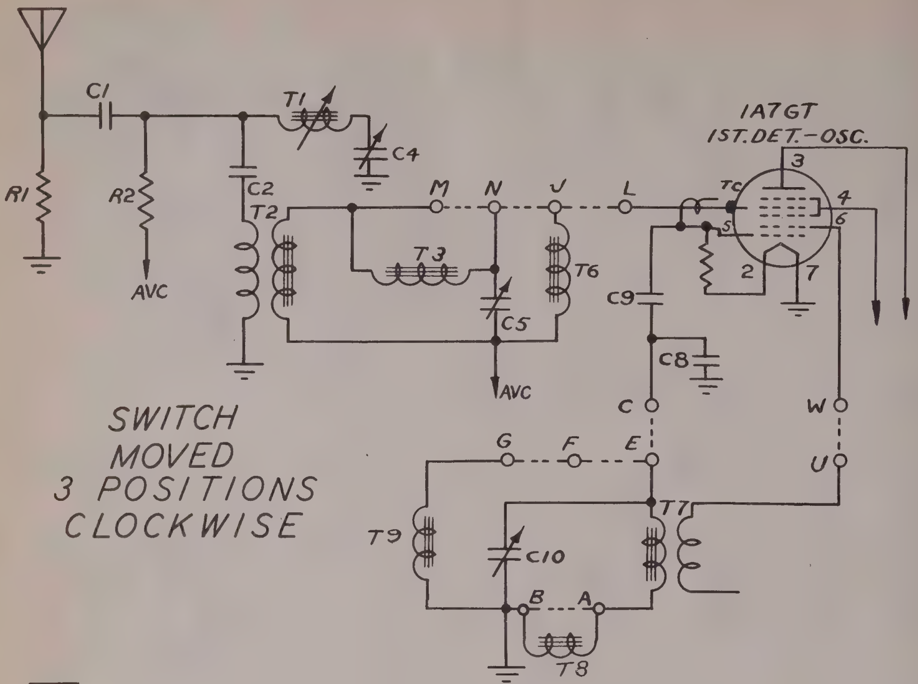
SWITCH AS SHOWN

SWITCH MOVED 1 POSITION CLOCKWISE

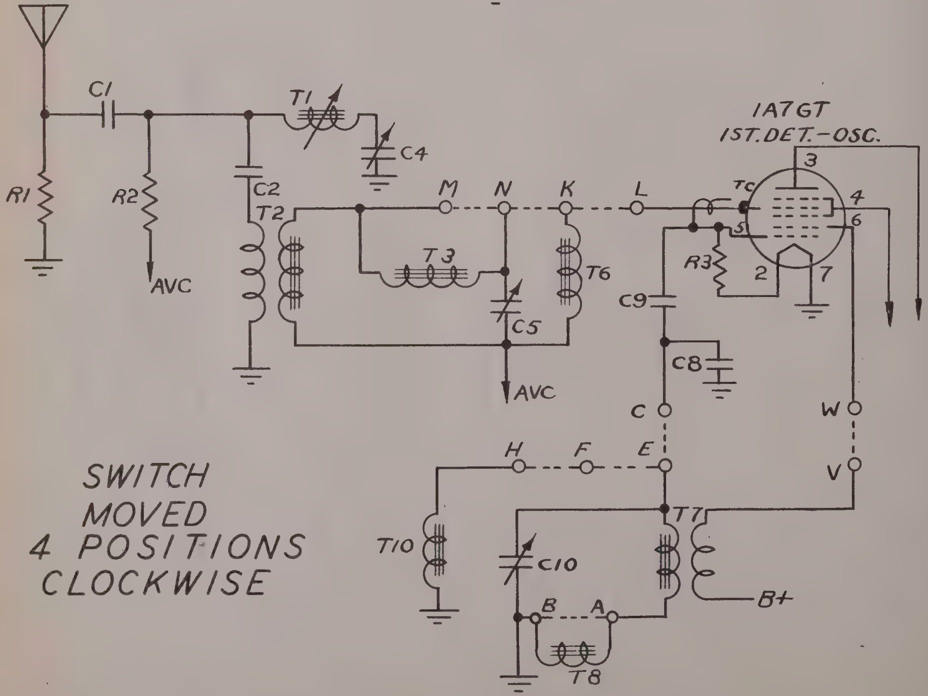
SWITCH MOVED 2 POSITIONS CLOCKWISE

MODEL 509
See Belmont Page 12-41

BELMONT RADIO CORP.



SWITCH MOVED 3 POSITIONS CLOCKWISE

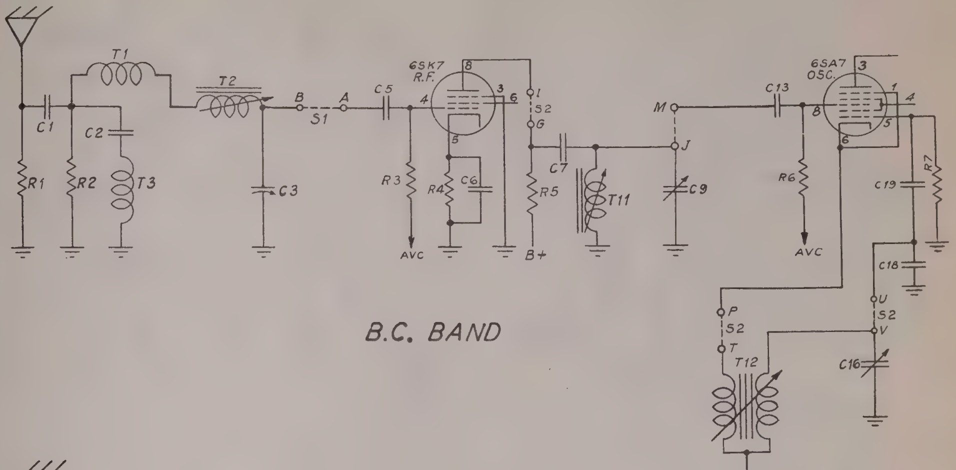


SWITCH MOVED 4 POSITIONS CLOCKWISE

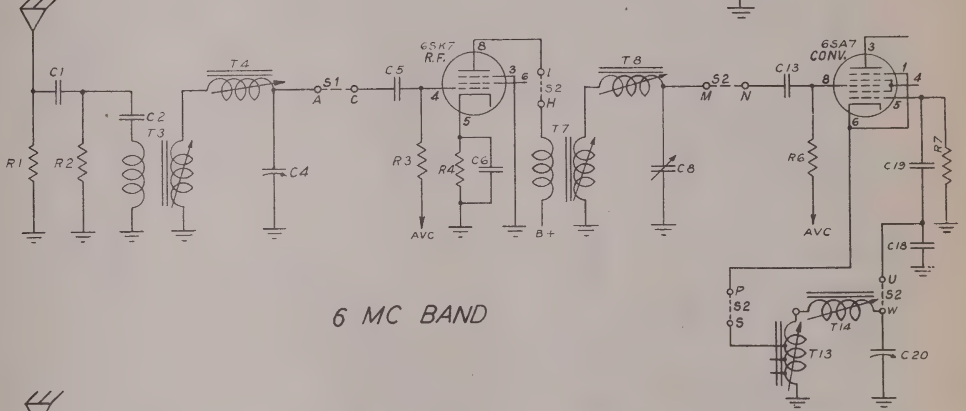
MODEL 902
See Belmont Page 12-38

BELMONT RADIO CORP.

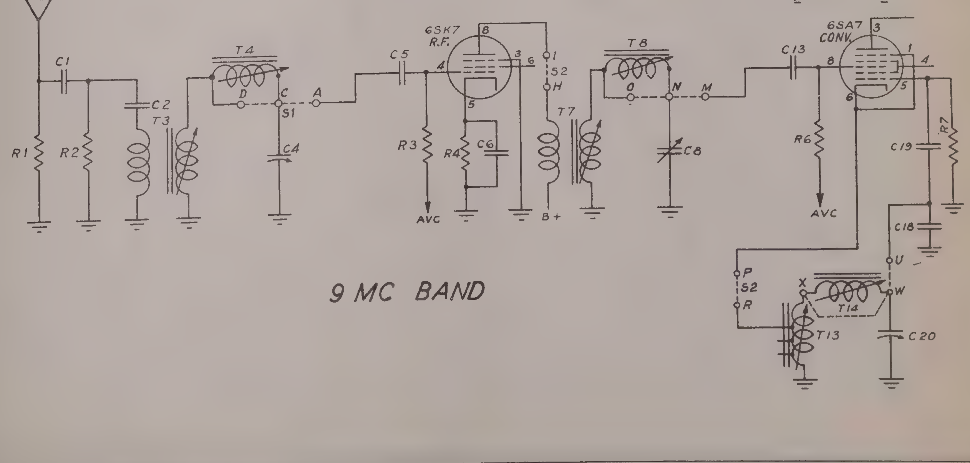
MODEL 800
See Belmont Page 12-31
MODEL 801
See Belmont Page 12-34



B.C. BAND



6 MC BAND

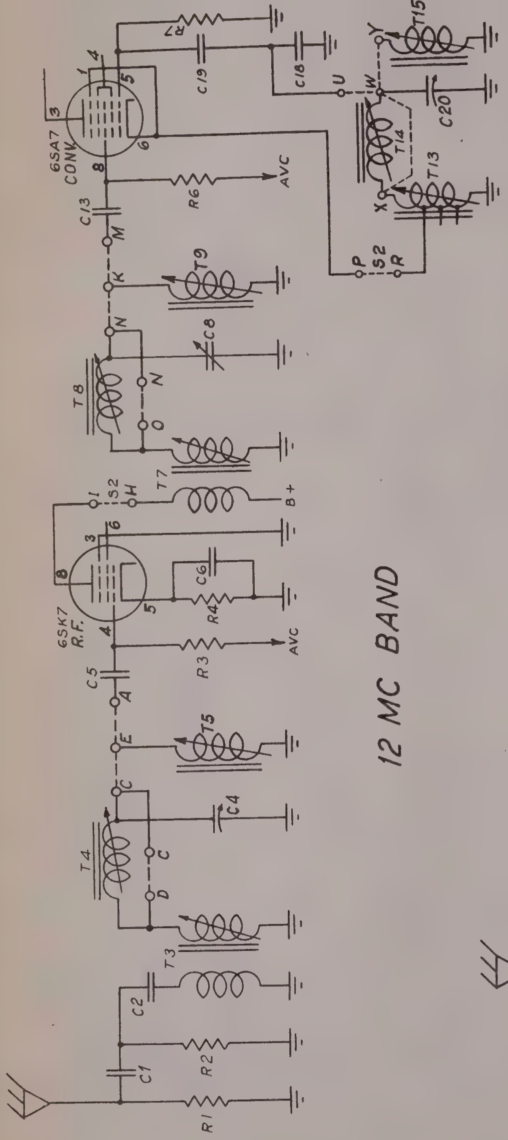


9 MC BAND

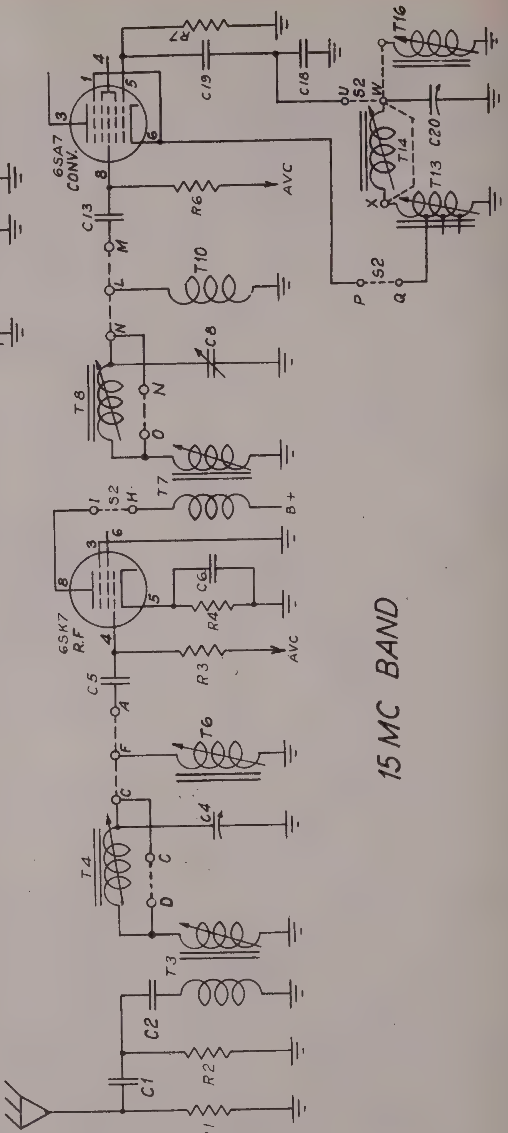
MODEL 800
See Belmont Page 12-31
MODEL 801
See Belmont Page 12-34

BELMONT RADIO CORP.

MODEL 902
See Belmont Page 12-38

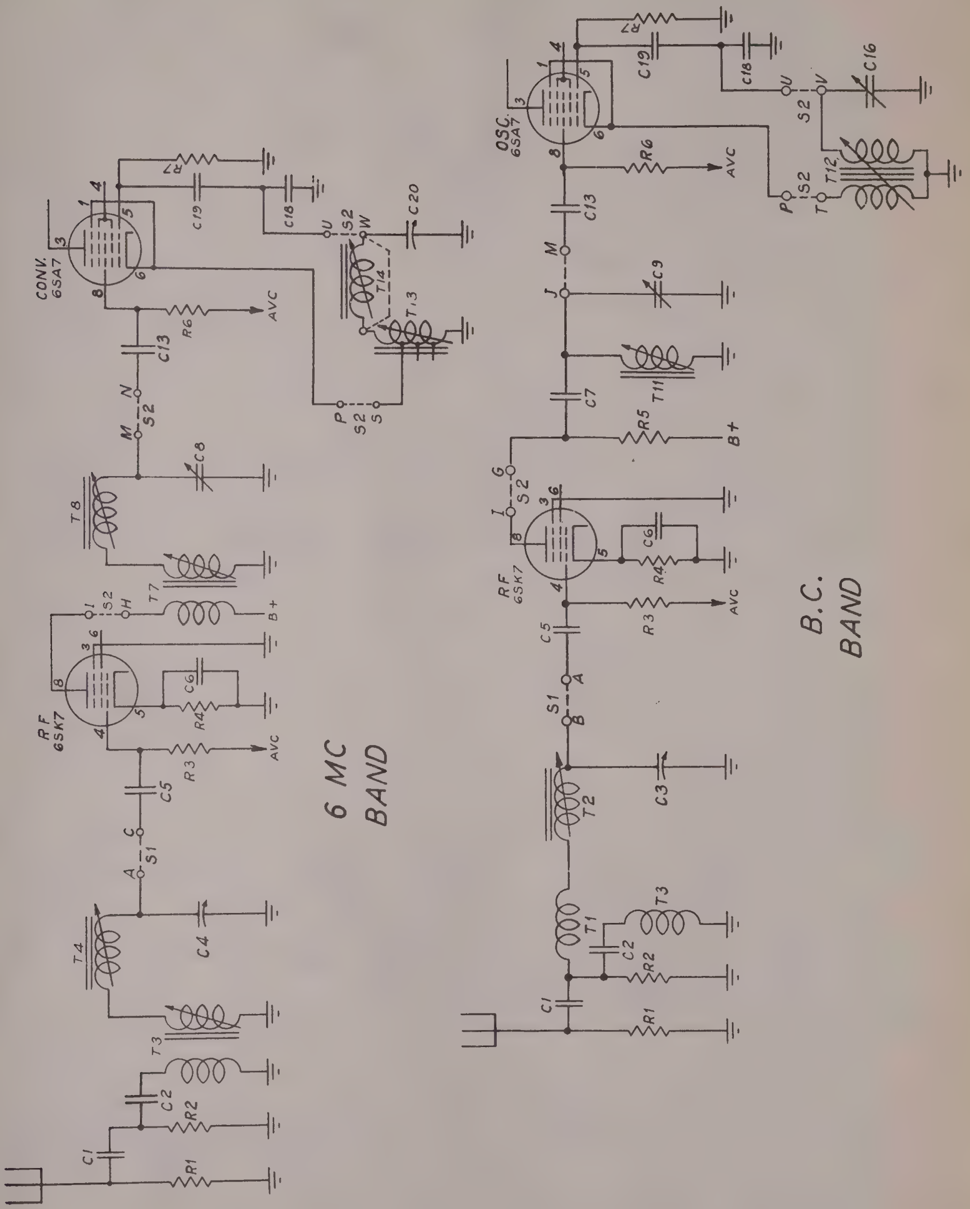


12 MC BAND



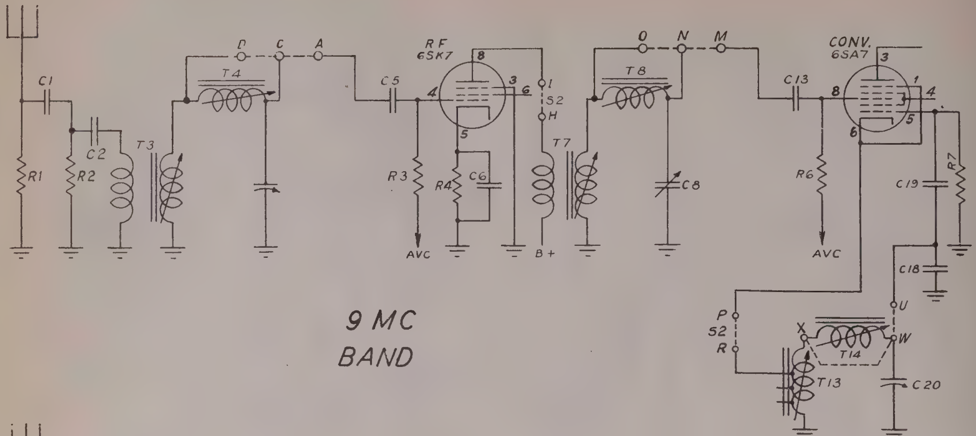
15 MC BAND

BELMONT RADIO CORP. MODEL 1100 Series A
See Belmont Page 12-39

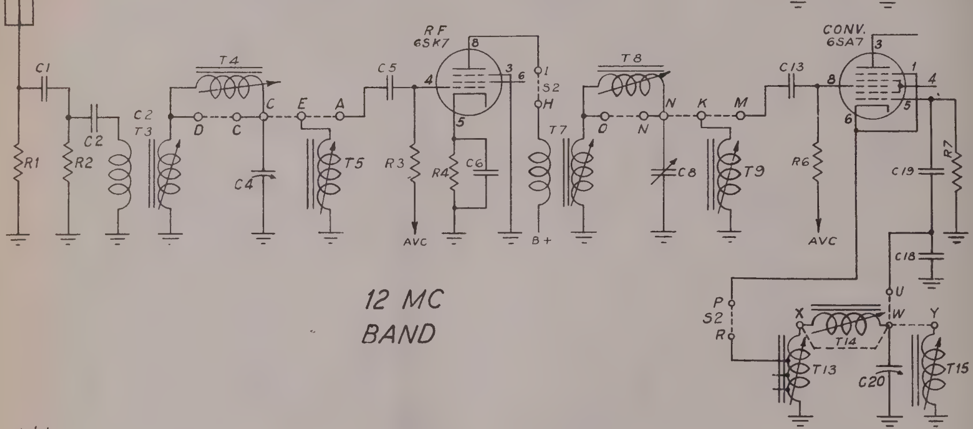


MODEL 1100 Series A
See Belmont Page 12-39

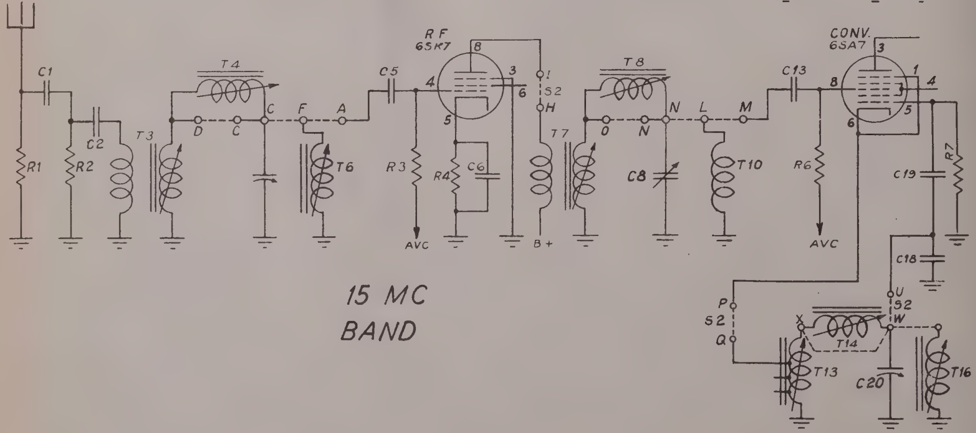
BELMONT RADIO CORP.



9 MC
BAND



12 MC
BAND

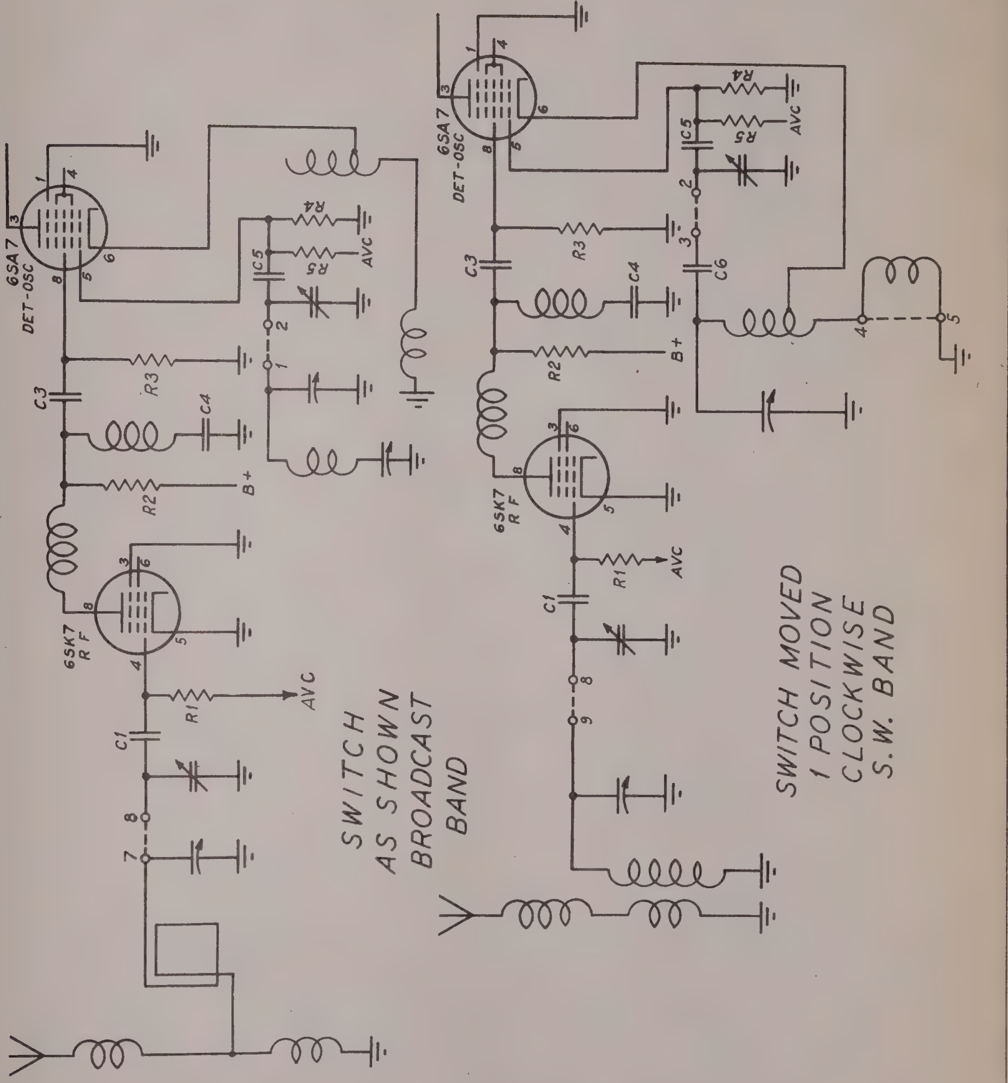


15 MC
BAND

MODEL B-7
See Continental
Page 12-13

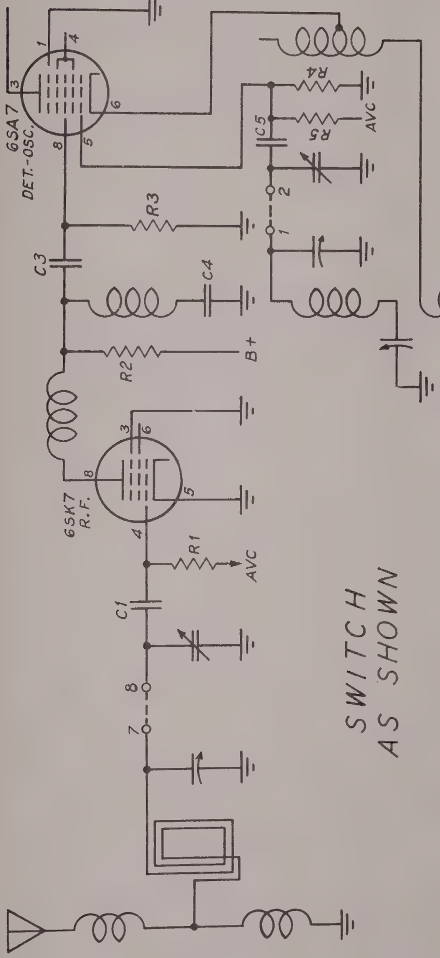
CONTINENTAL RADIO & TELEV. CORP.

MODEL A-7
See Continental
Page 12-12

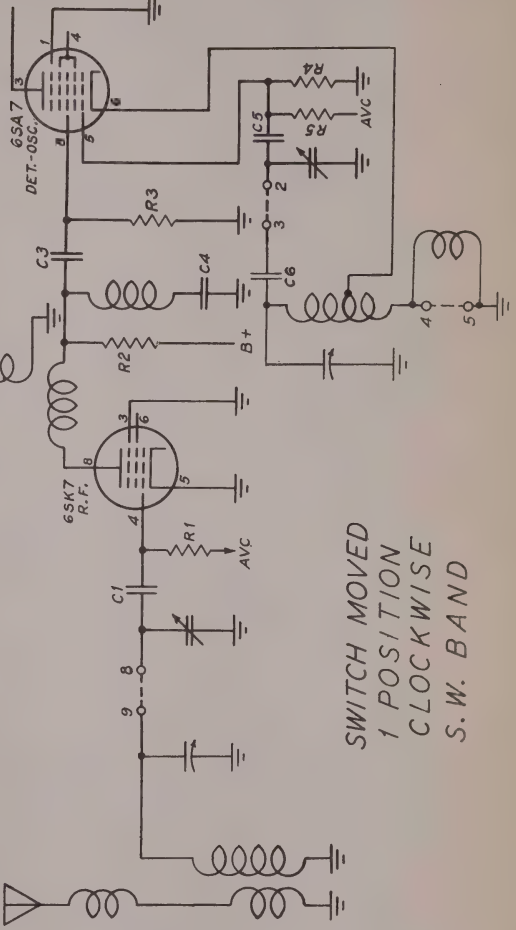


CONTINENTAL RADIO & TELEV. CORP.

MODEL A-77
See Continental
Page 12-22



SWITCH
AS SHOWN

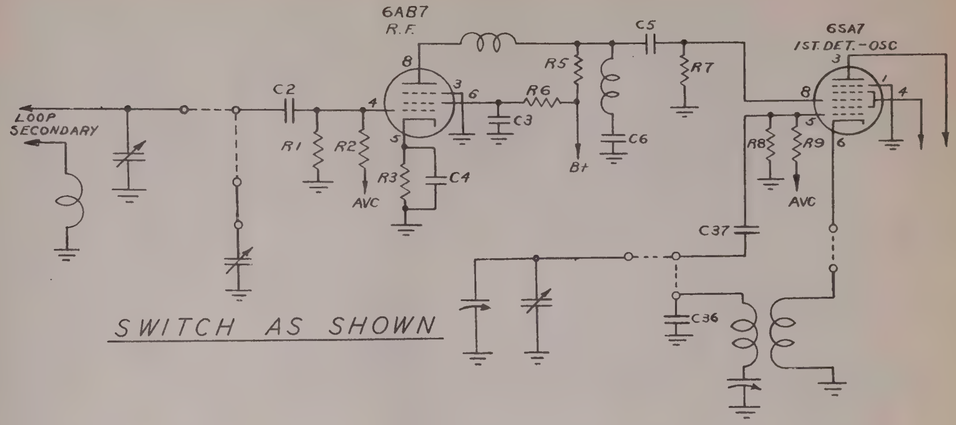


SWITCH MOVED
1 POSITION
CLOCKWISE
S.W. BAND

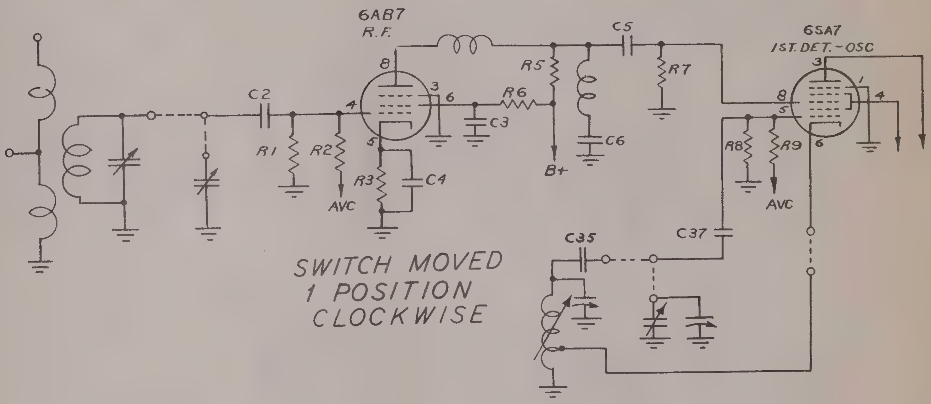
MODEL B11
See Continental
Page 12-19

CONTINENTAL RADIO & TELEV. CORP.

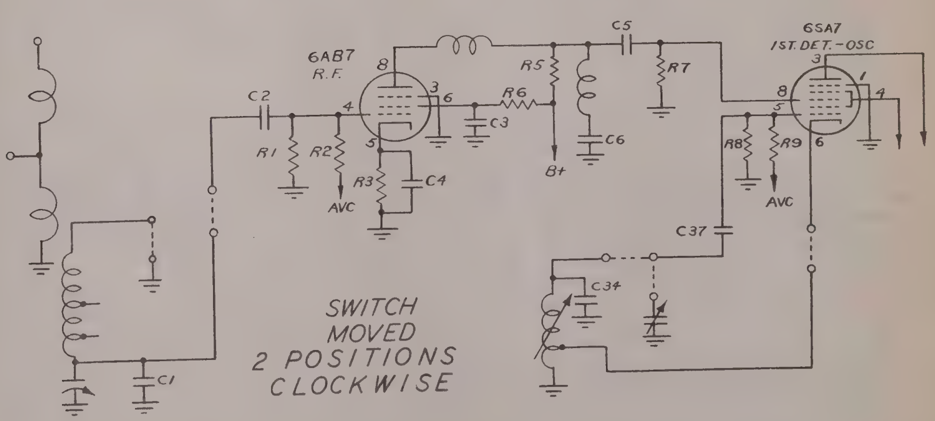
MODELS A11, A11-PH
See Continental
Page 12-15



SWITCH AS SHOWN



SWITCH MOVED
1 POSITION
CLOCKWISE

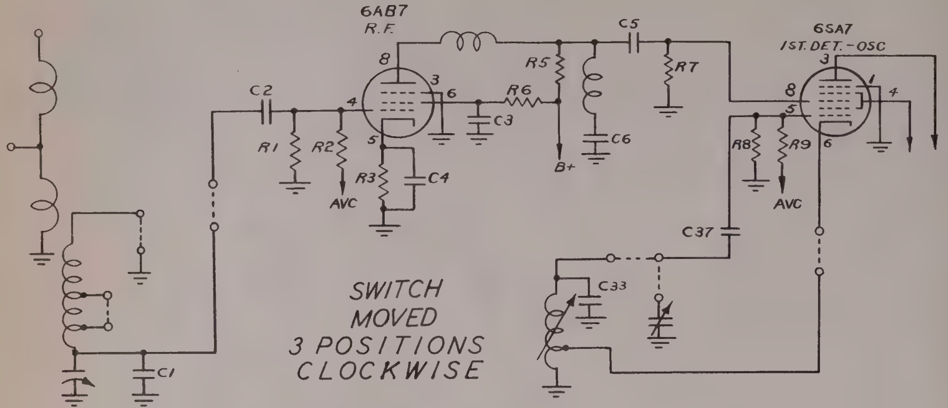


SWITCH
MOVED
2 POSITIONS
CLOCKWISE

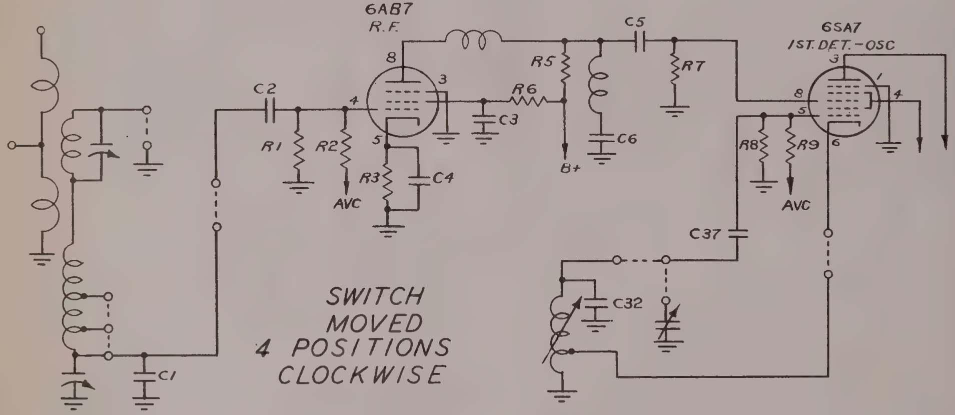
MODEL B11
See Continental
Page 12-19

CONTINENTAL RADIO & TELEV. CORP.

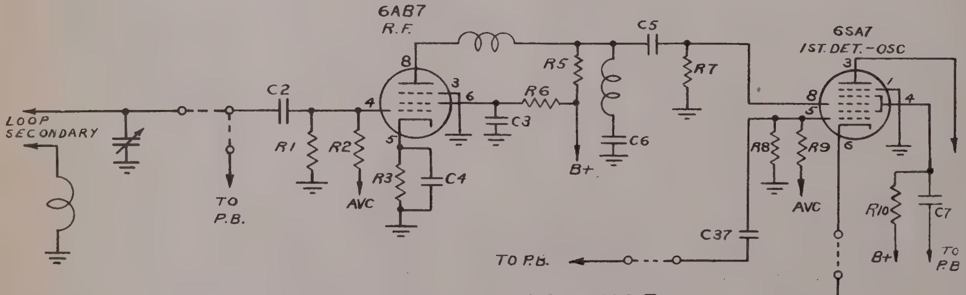
MODEL A11, A11-PH
See Continental
Page 12-15



SWITCH MOVED 3 POSITIONS CLOCKWISE



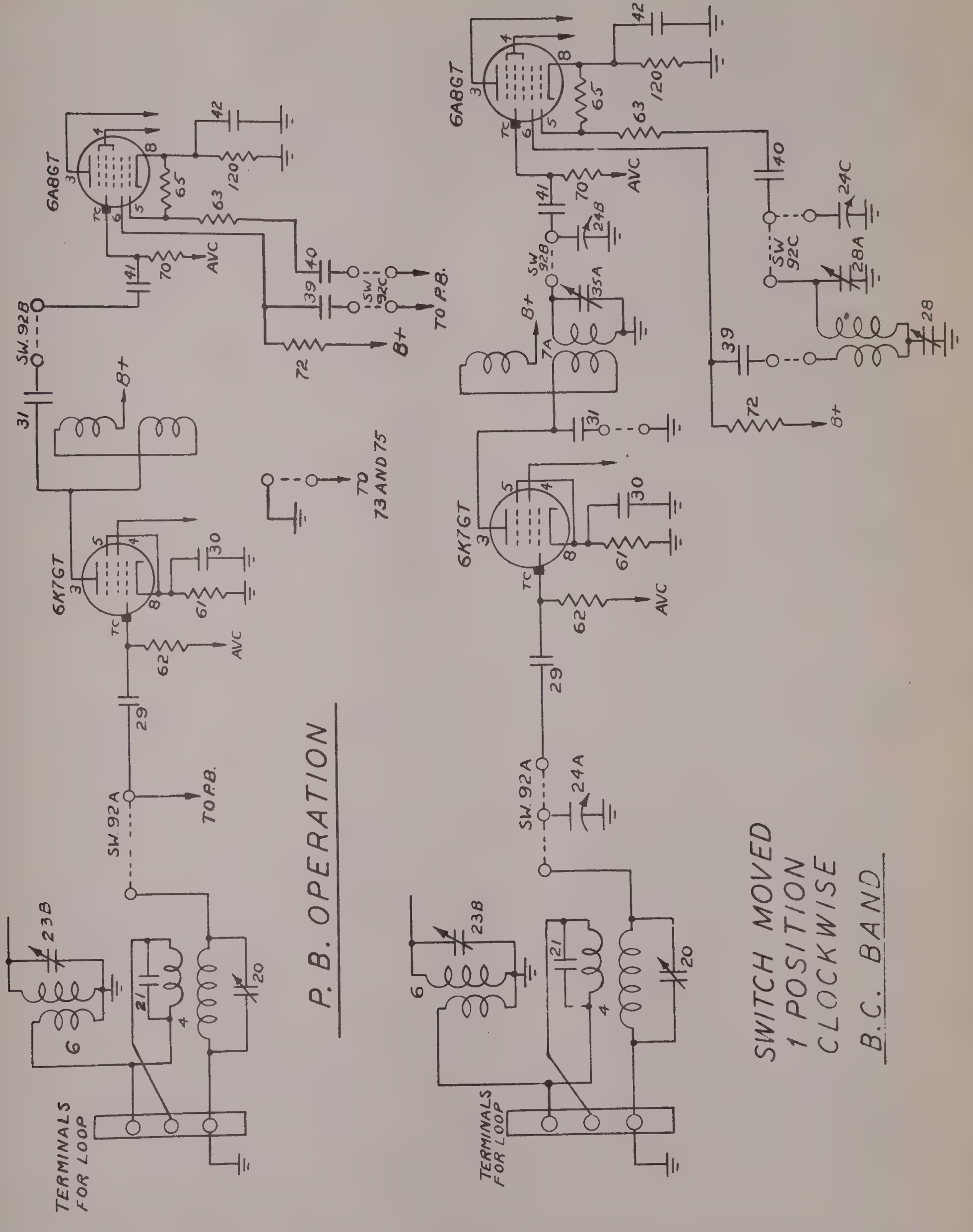
SWITCH MOVED 4 POSITIONS CLOCKWISE



SWITCH MOVED 5 POSITIONS CLOCKWISE

CROSLEY CORP.

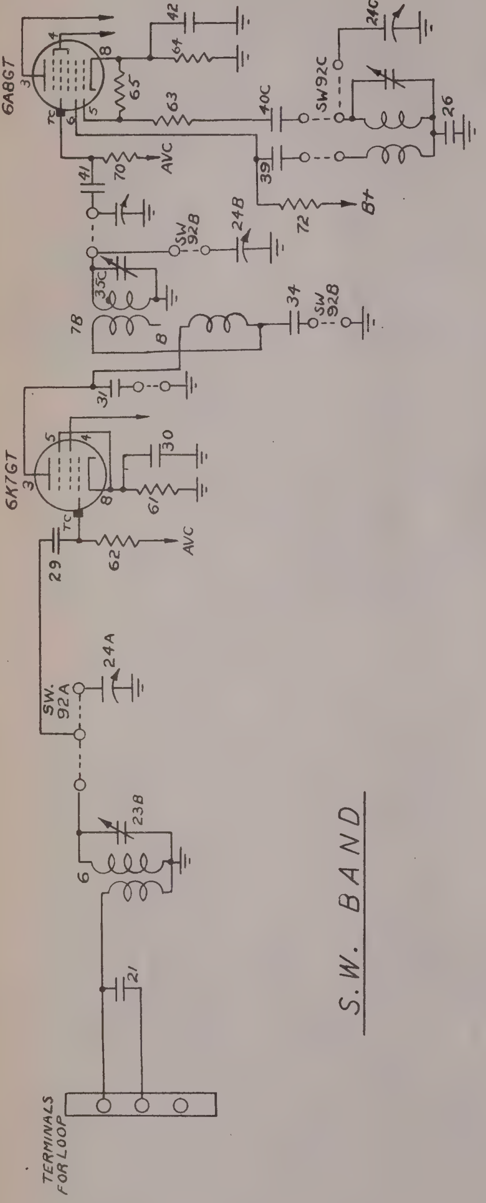
MODEL 26
MODEL 26 Revised
See Crosley Page 12-21


P. B. OPERATION

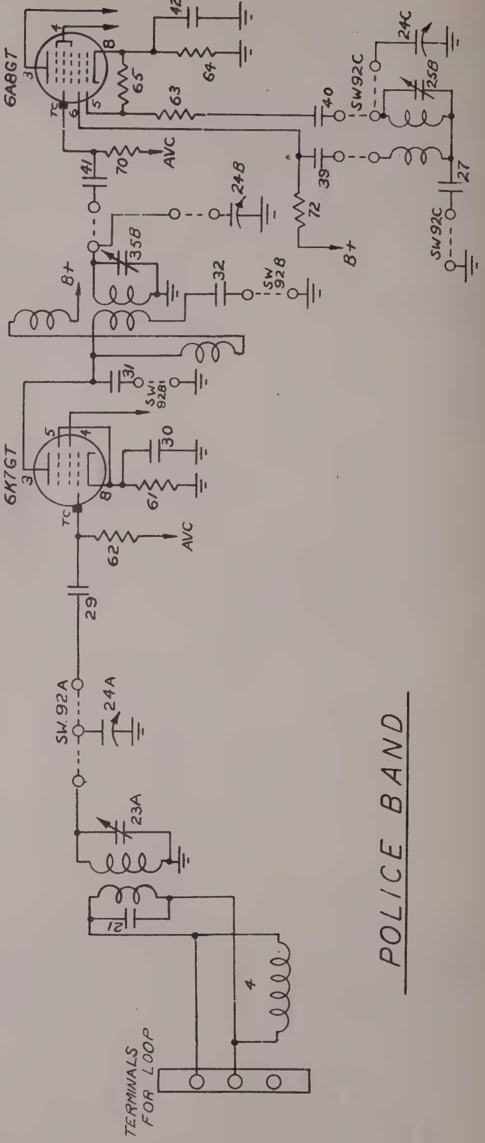
SWITCH MOVED 1 POSITION CLOCKWISE B.C. BAND

MODEL 26
MODEL 26 Revised
See Crosley Page 12-21

CROSLEY CORP.



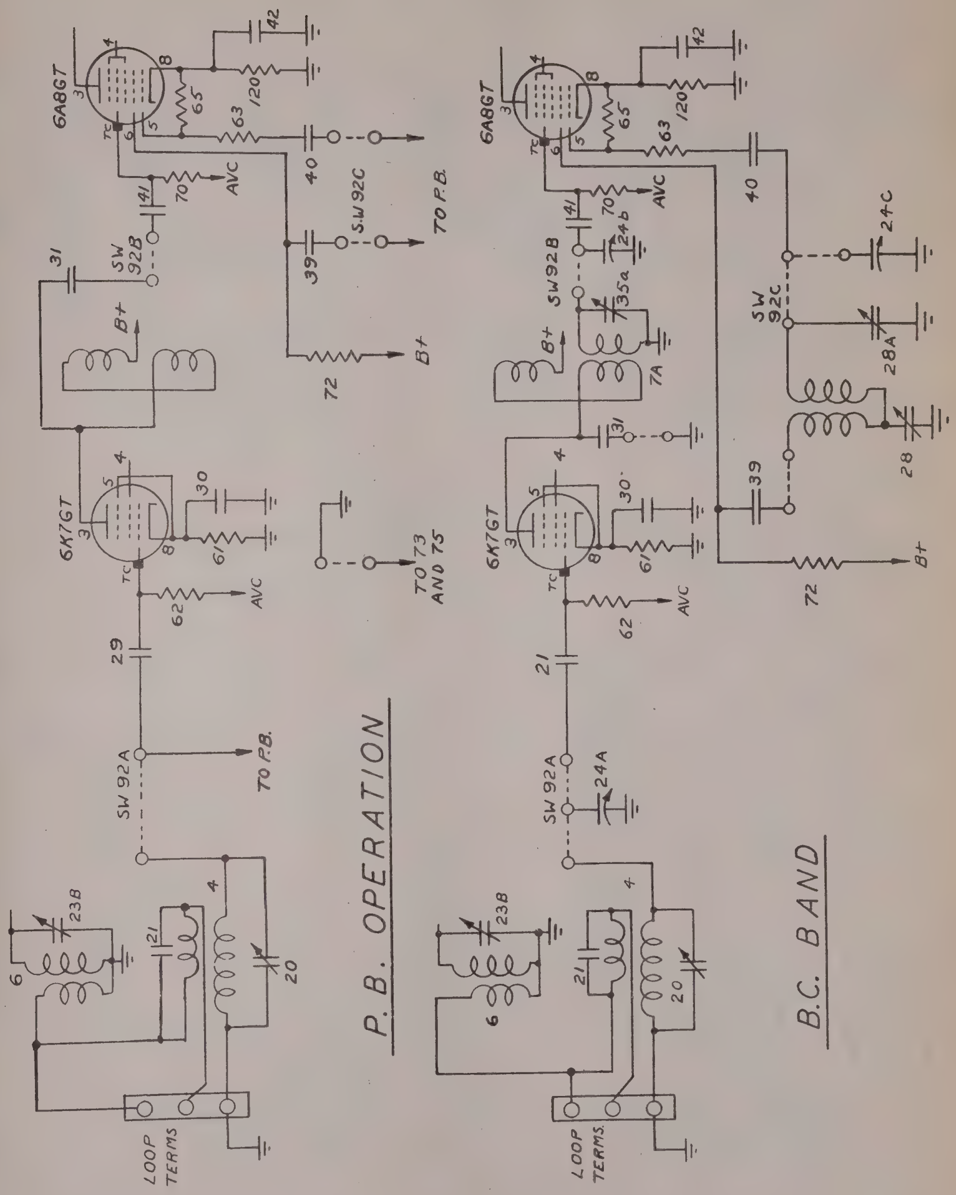
S.W. BAND



POLICE BAND

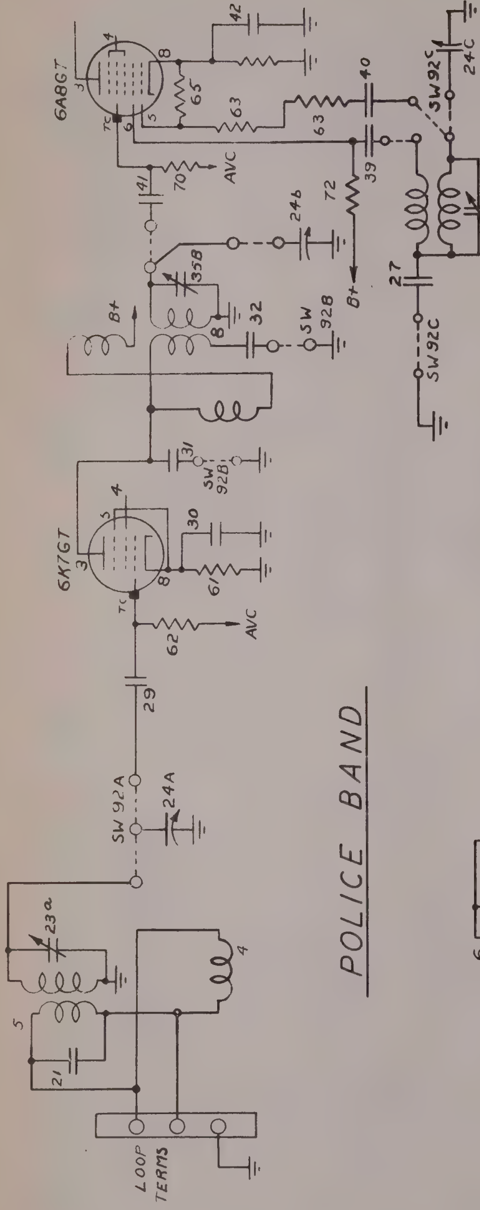
CROSLEY CORP.

MODEL 29
See Crosley Page 12-25

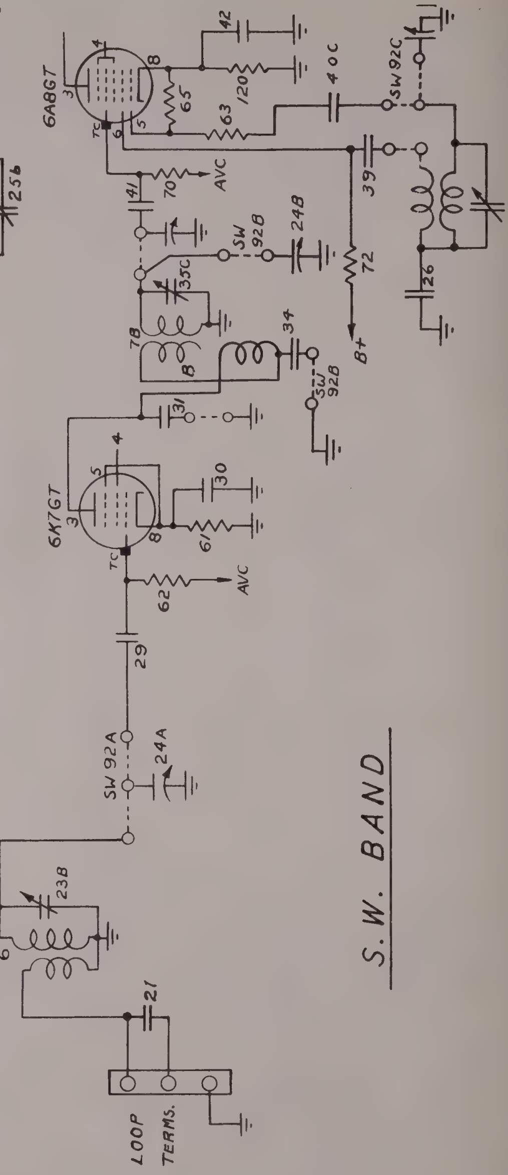


MODEL 29
See Crosley
Page 12-25

CROSLEY CORP.



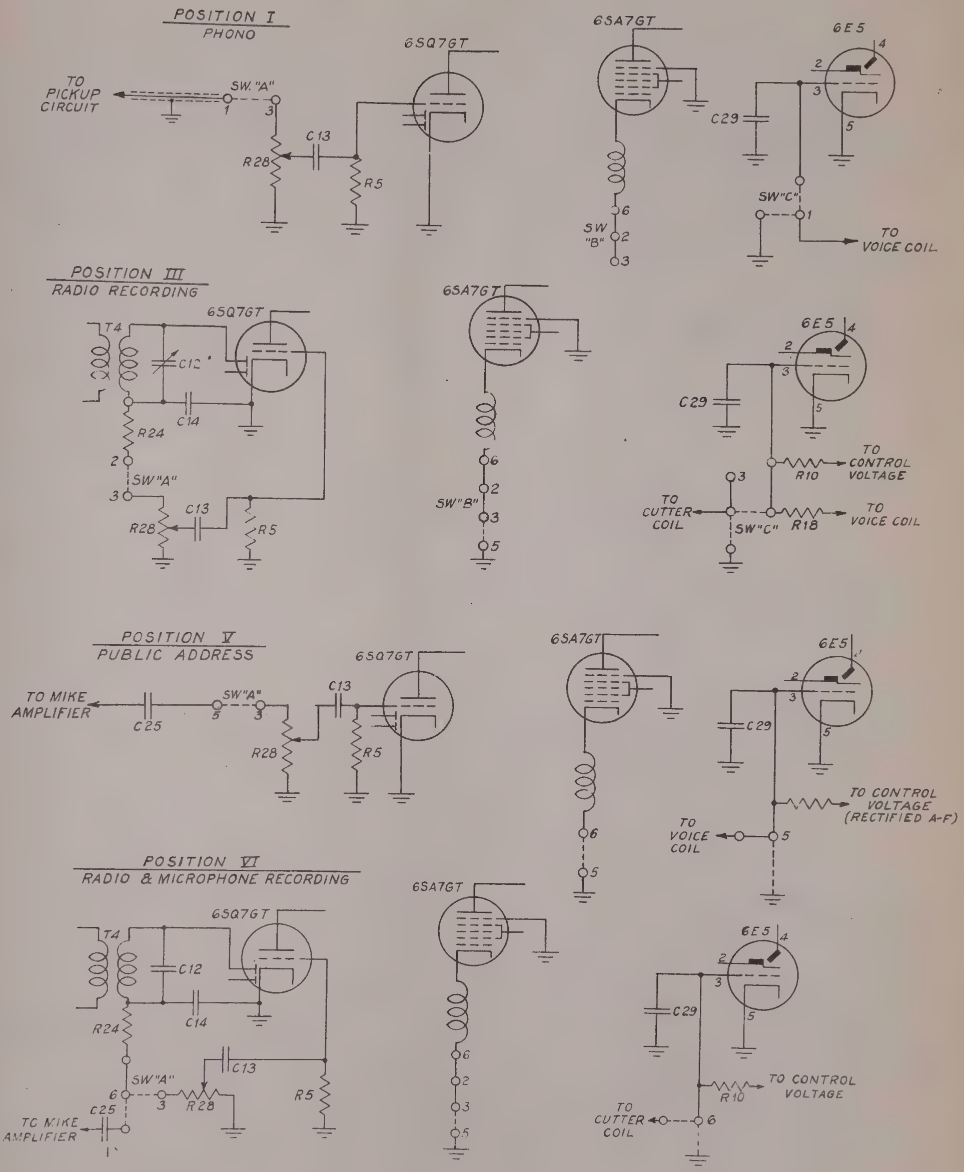
POLICE BAND



S.W. BAND

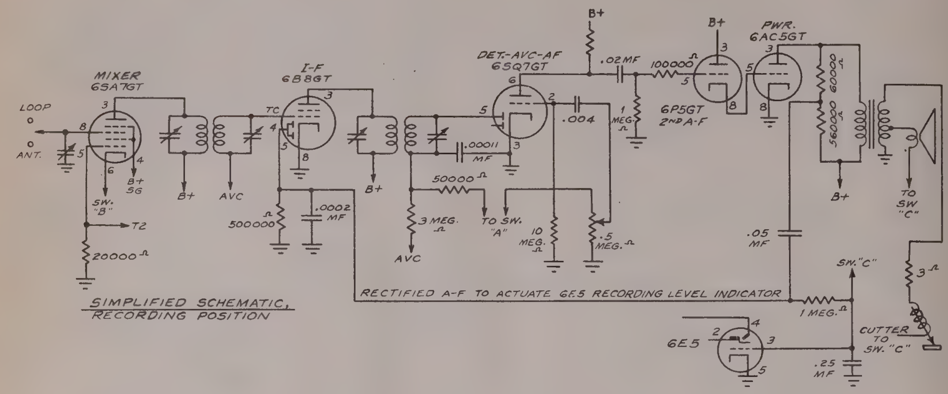
EMERSON RADIO & PHONOGRAPH CORP.

MODELS
DV-364, DZ-371
See Emerson Page 12-17



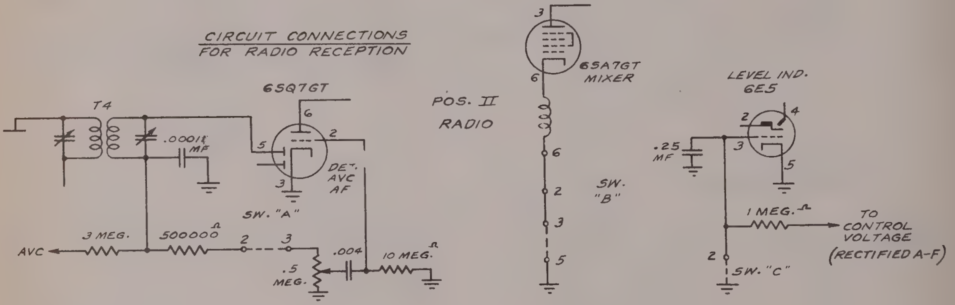
MODELS
DV-364, DZ-371
See Emerson Page 12-17

EMERSON RADIO & PHONOGRAPH CORP.

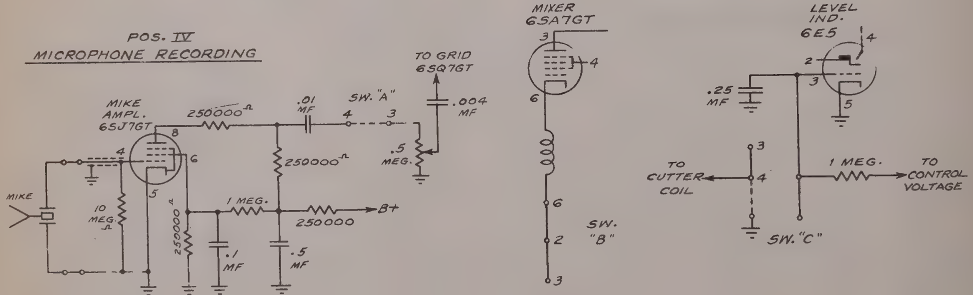


SIMPLIFIED SCHEMATIC, RECORDING POSITION

CIRCUIT CONNECTIONS FOR RADIO RECEPTION

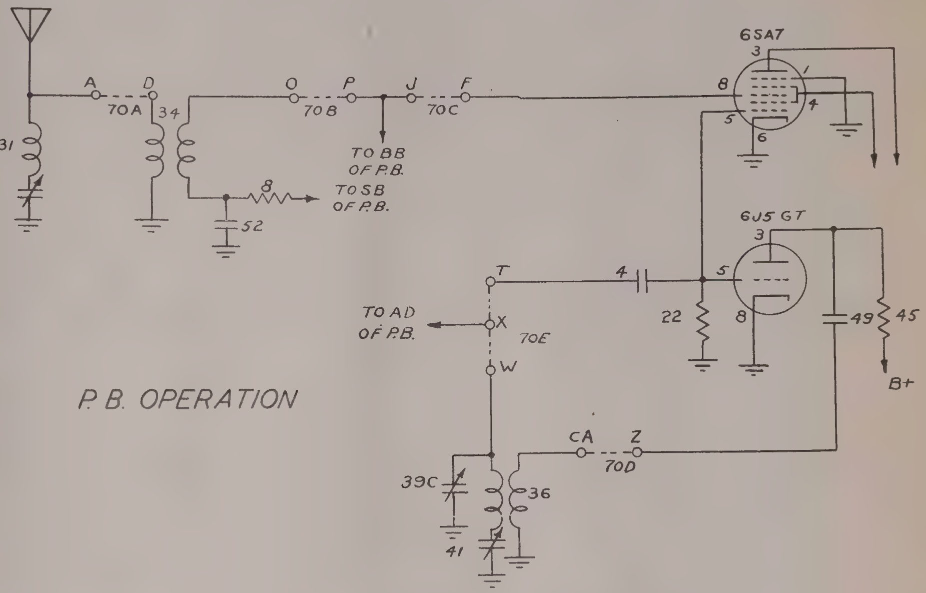


POS. IV
MICROPHONE RECORDING

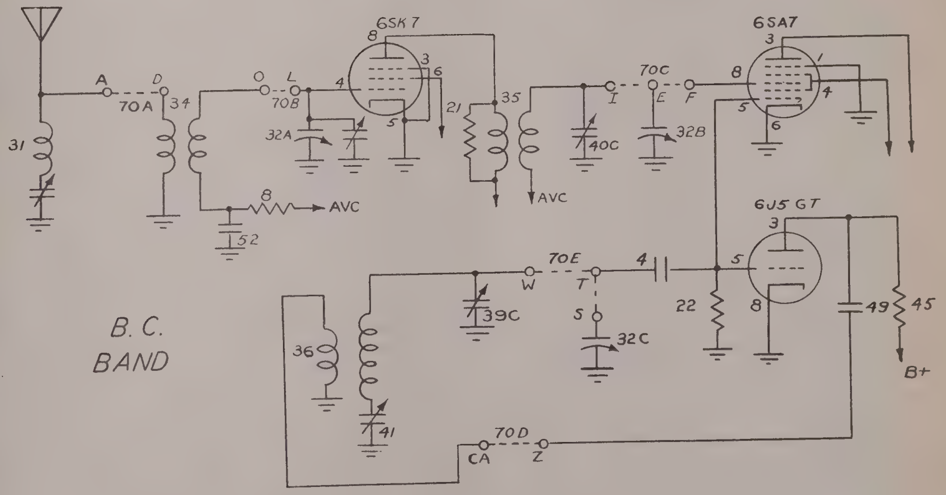


FIRESTONE TIRE & RUBBER CO.

MODEL S-7404-3
See Firestone
Page 12-7, 8



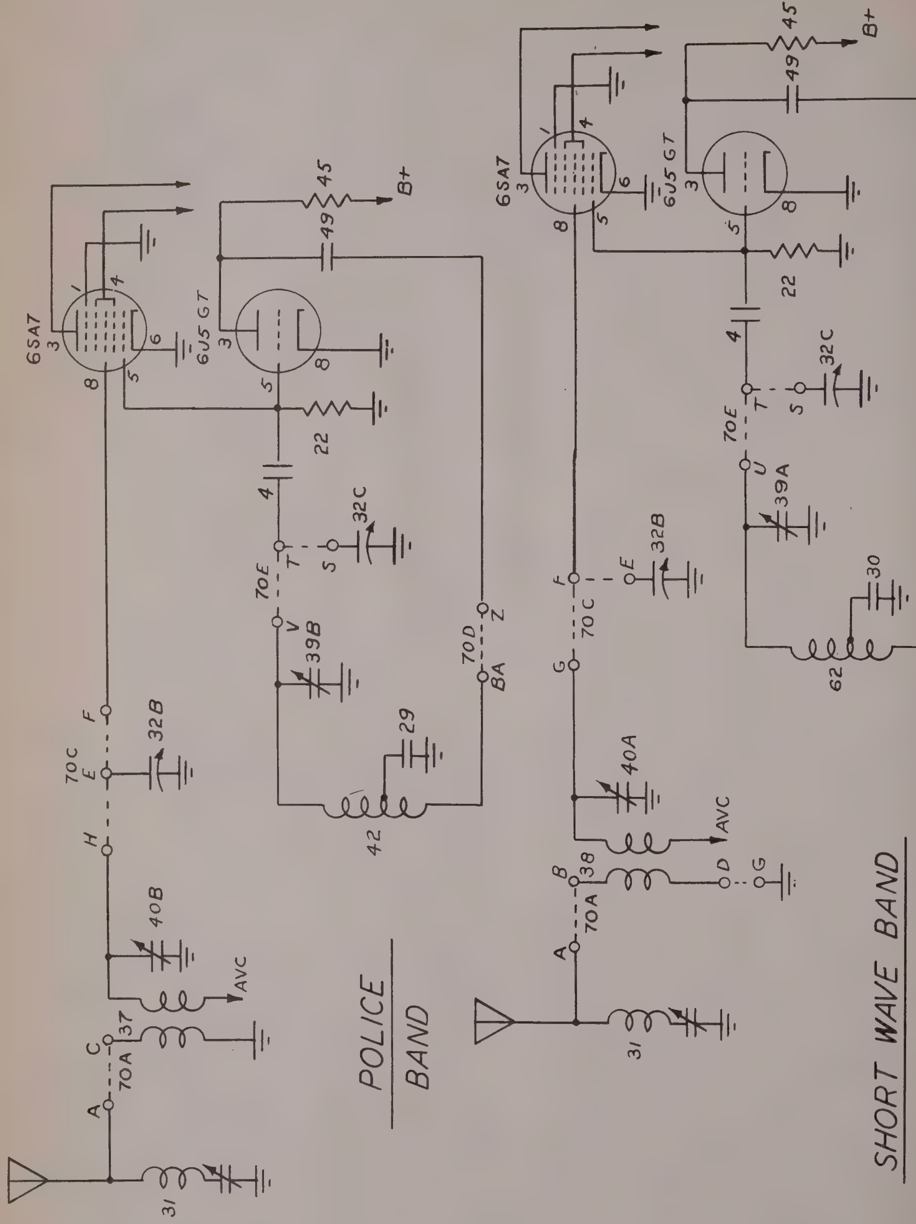
P. B. OPERATION



B. C.
BAND

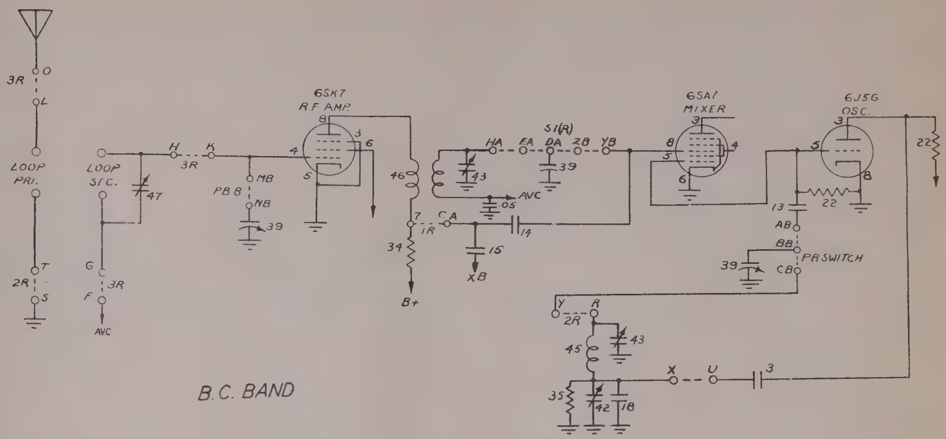
MODEL S-7404-3
See Firestone
Page 12-7, 8

FIRESTONE TIRE & RUBBER CO.

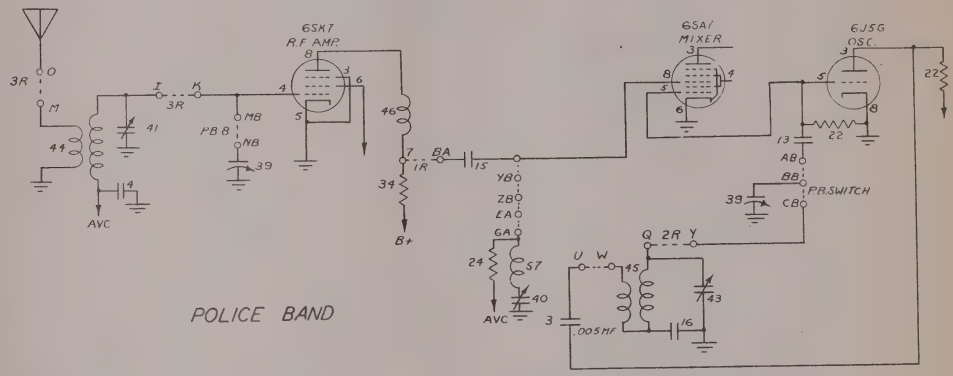


FIRESTONE TIRE & RUBBER CO.

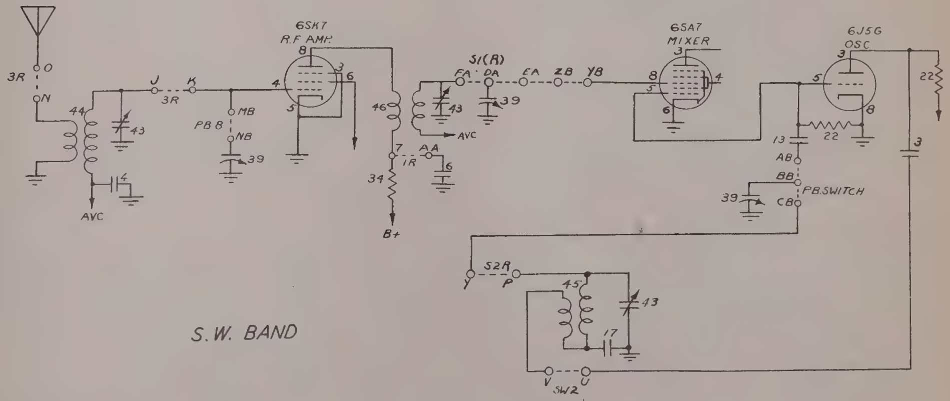
MODEL S-7406-7
See Firestone
Page 12-17



B.C. BAND



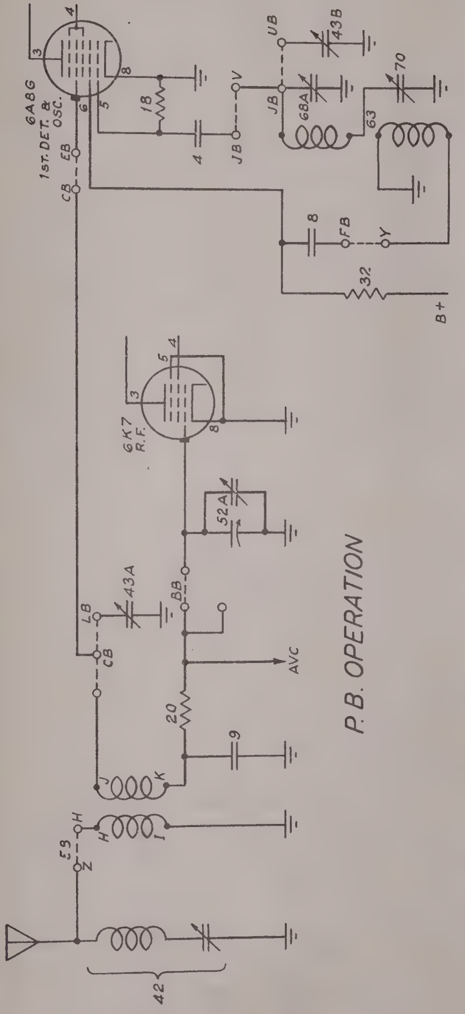
POLICE BAND

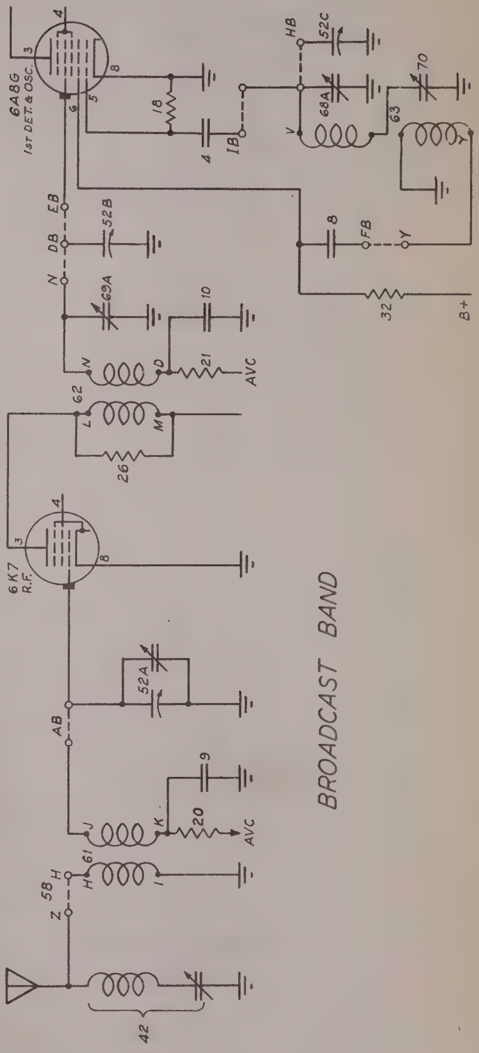


S.W. BAND

FIRESTONE TIRE & RUBBER CO.

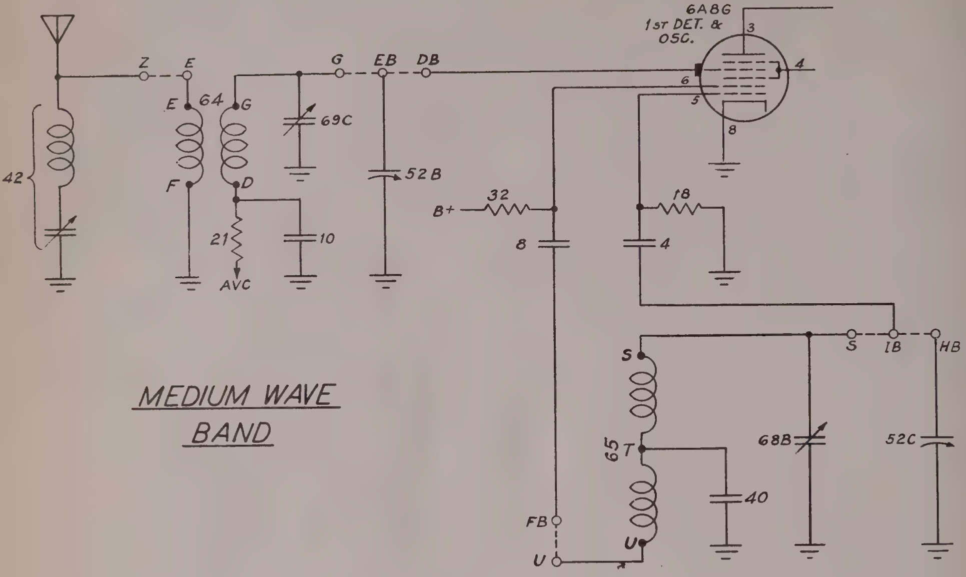
MODEL S-7427-2
See Firestone
Page 12-19, 20

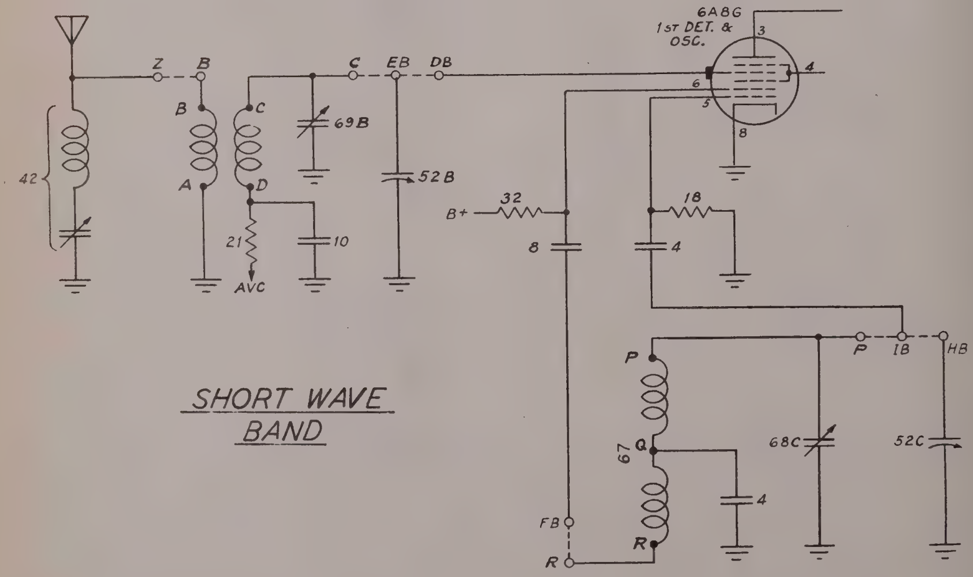

P.B. OPERATION


BROADCAST BAND

MODEL S-7427-2
See Firestone
Page 12-19, 20

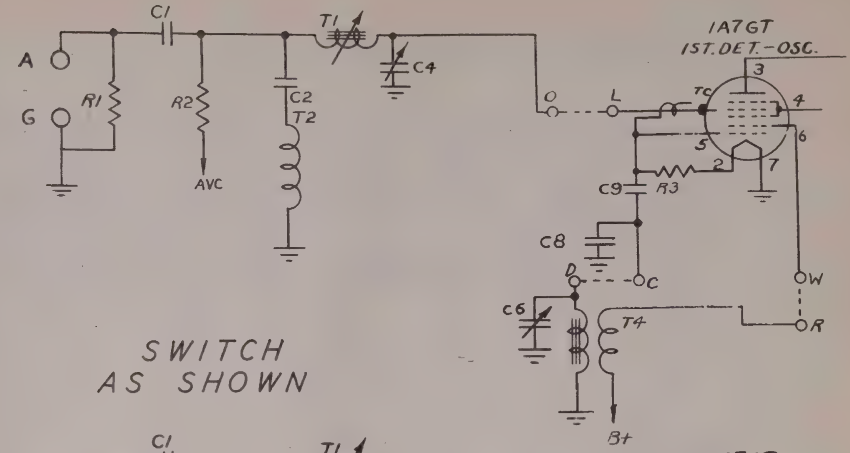
FIRESTONE TIRE & RUBBER CO.



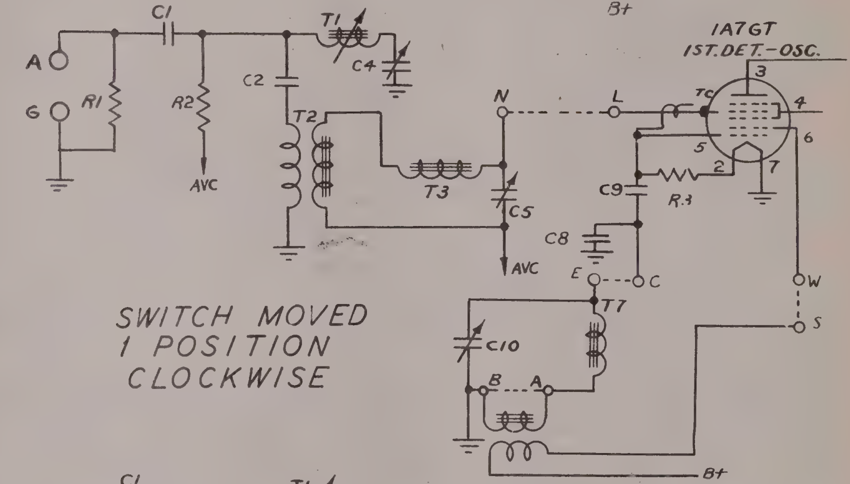


GAMBLE-SKOGMO, INC.

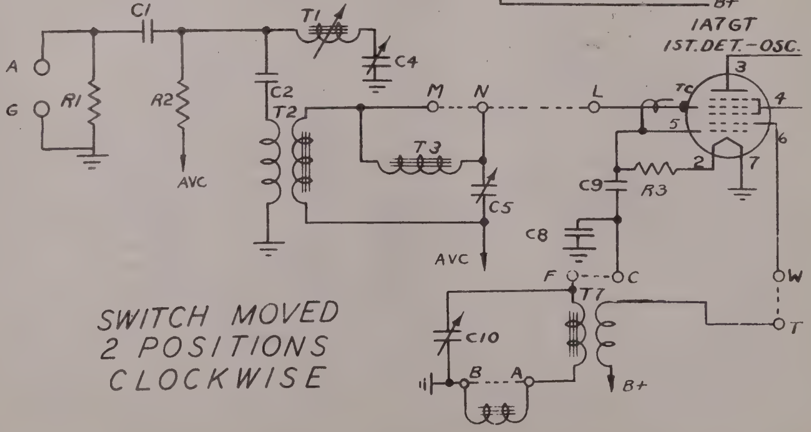
MODEL C509
See Gamble Page 12-3



SWITCH AS SHOWN

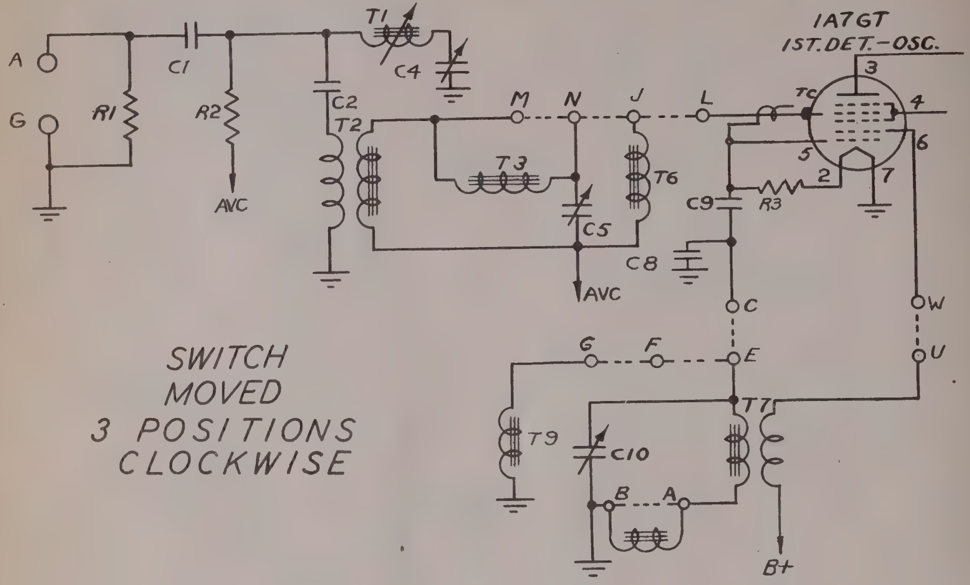


SWITCH MOVED 1 POSITION CLOCKWISE

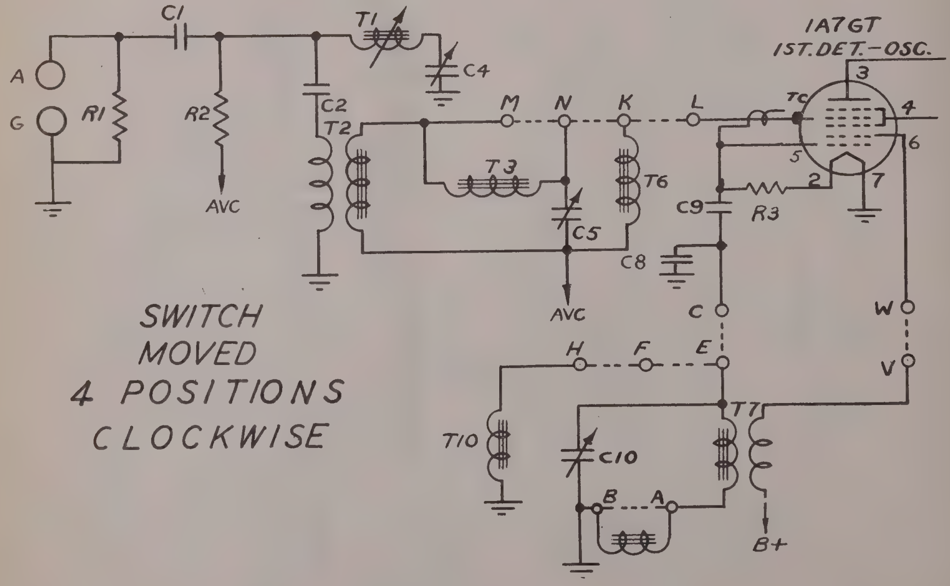


SWITCH MOVED 2 POSITIONS CLOCKWISE

MODEL C-509 (CONTINUED)



SWITCH MOVED 3 POSITIONS CLOCKWISE

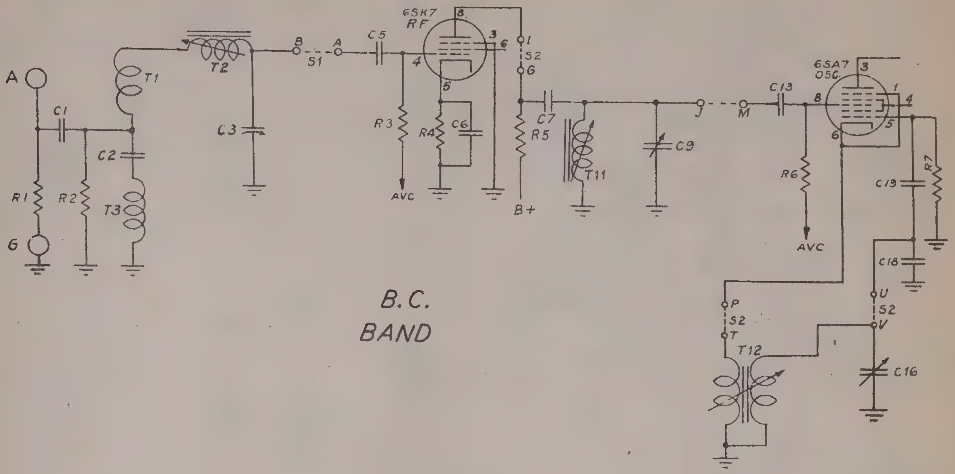


SWITCH MOVED 4 POSITIONS CLOCKWISE

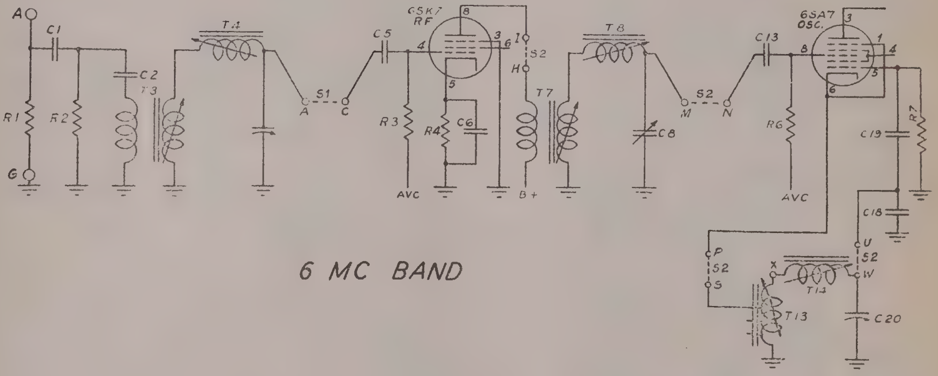
MODEL C1100
See Gamble Page 12-23

GAMBLE-SKOGMO, INC.

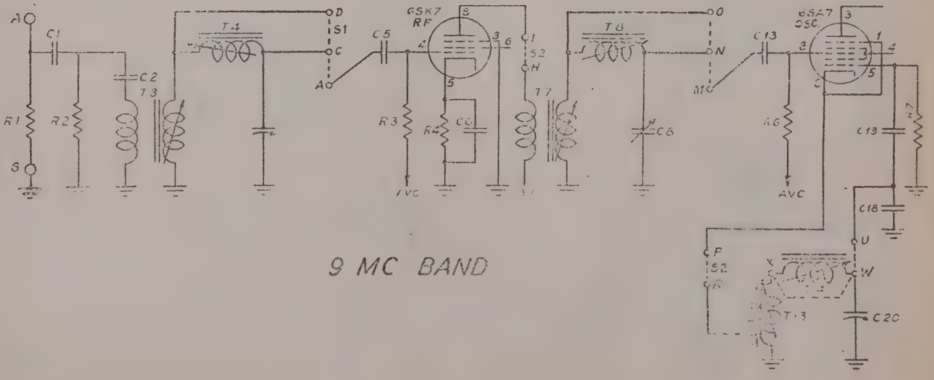
MODEL C800
See Gamble Page 12-17
MODEL C901
See Gamble Page 12-19



B.C.
BAND



6 MC BAND

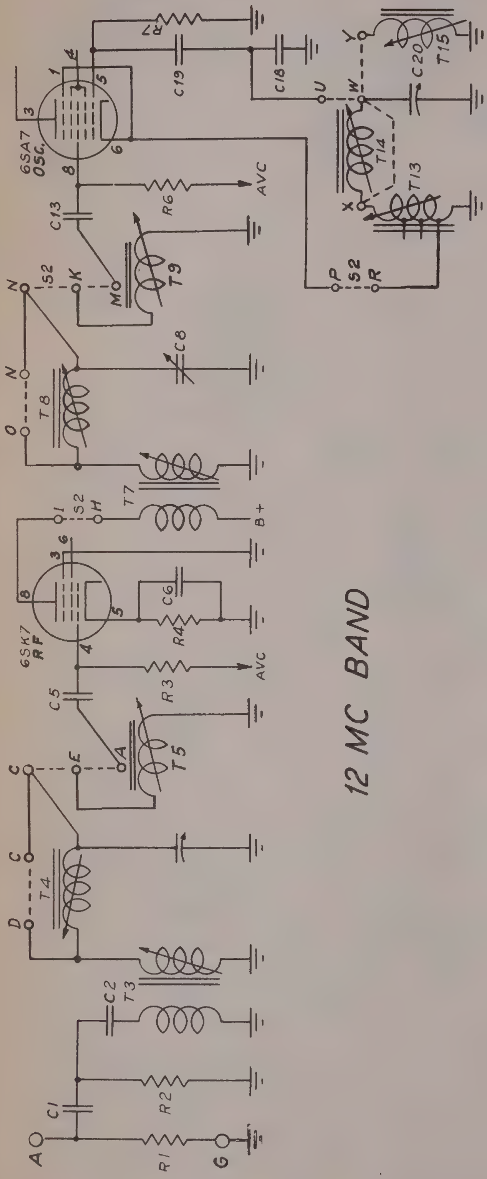


9 MC BAND

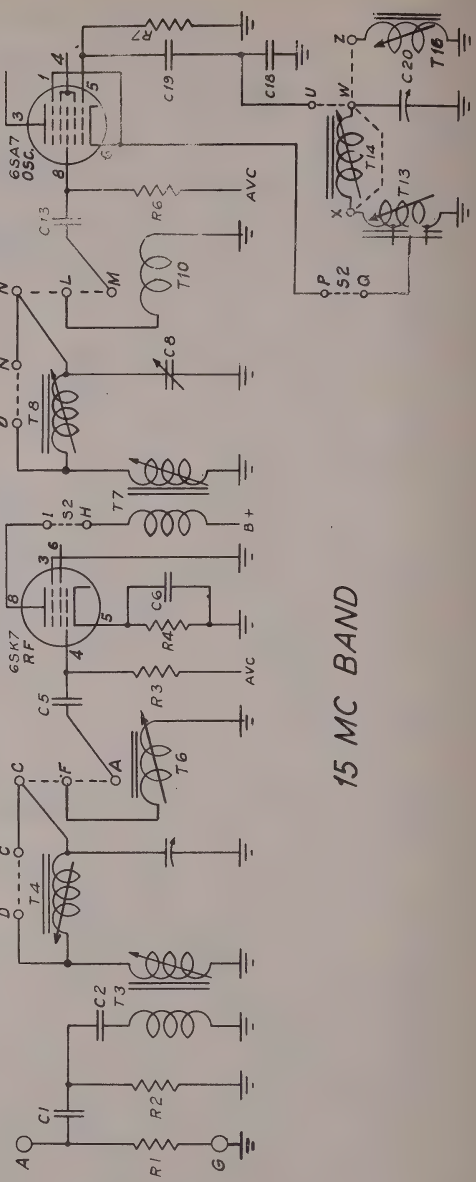
GAMBLE SKOGMO, INC.

MODEL C800
See Gamble Page 12-17
MODEL C901
See Gamble Page 12-19

MODEL C1100
See Gamble Page 12-23



12 MC BAND

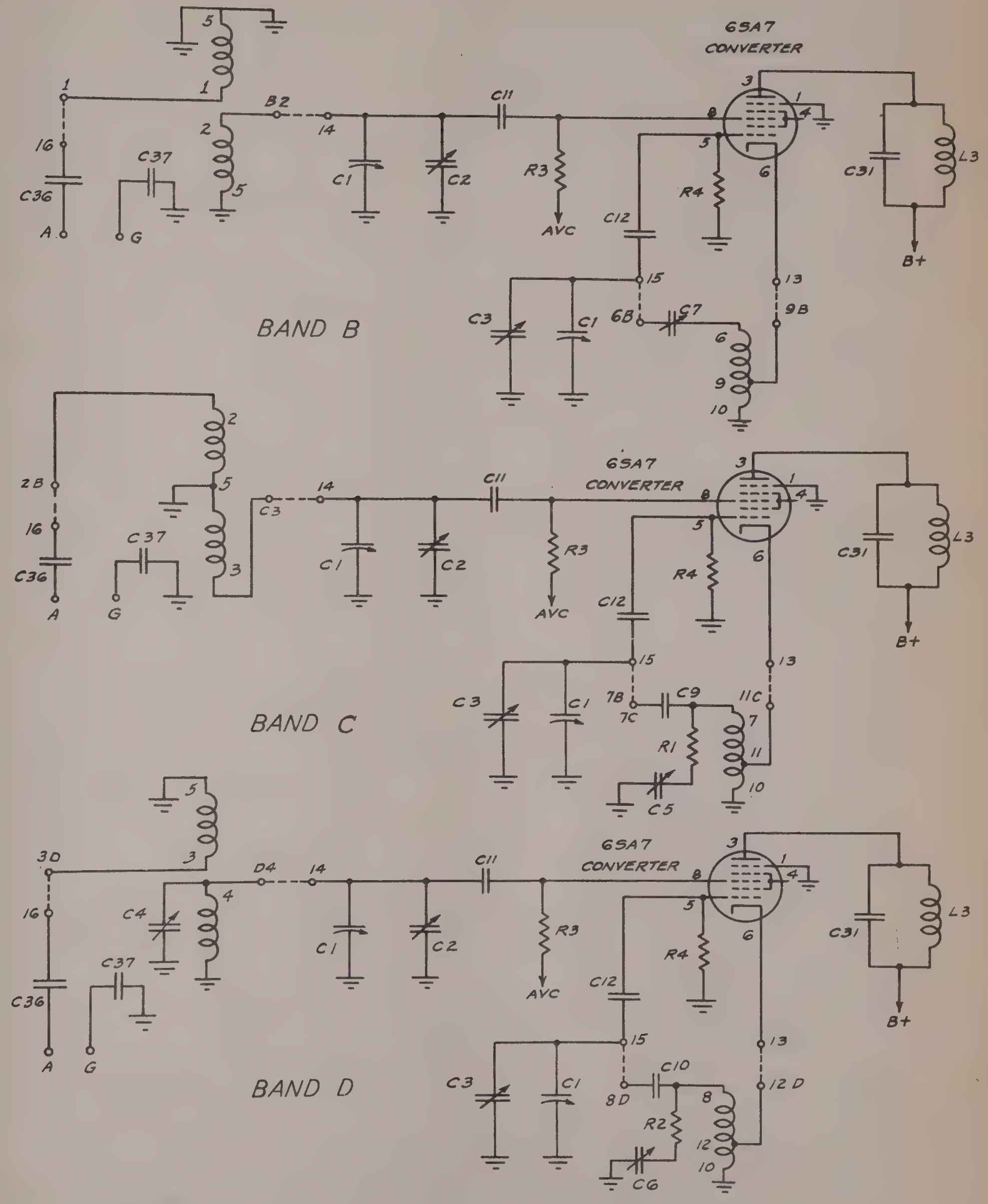


15 MC BAND

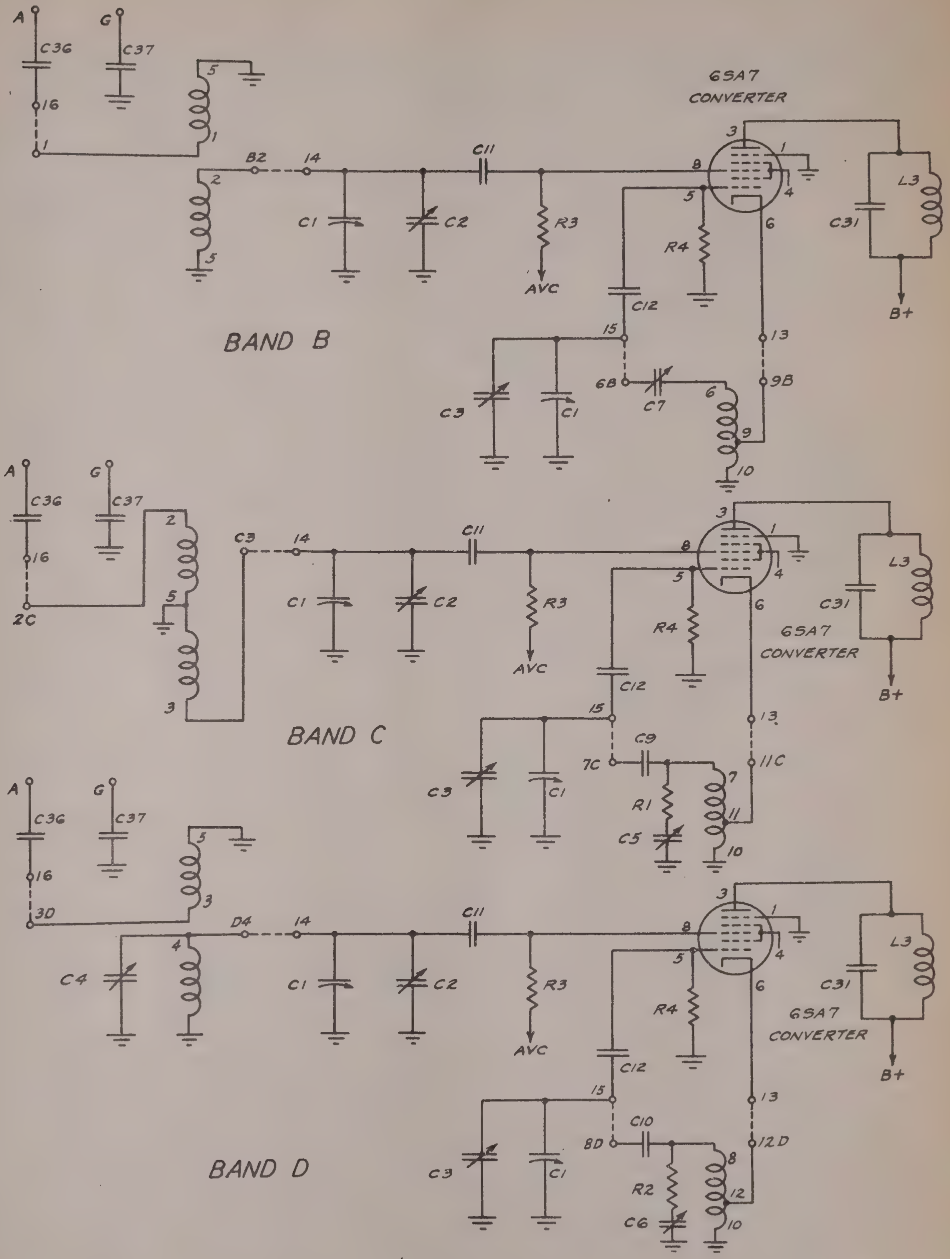
MODEL HE-540
See G.E.Page 12-66

GENERAL ELECTRIC CO.

MODEL HE-50
See G.E. Page 12-23
MODEL JE-61L
See G.E. Page 12-18

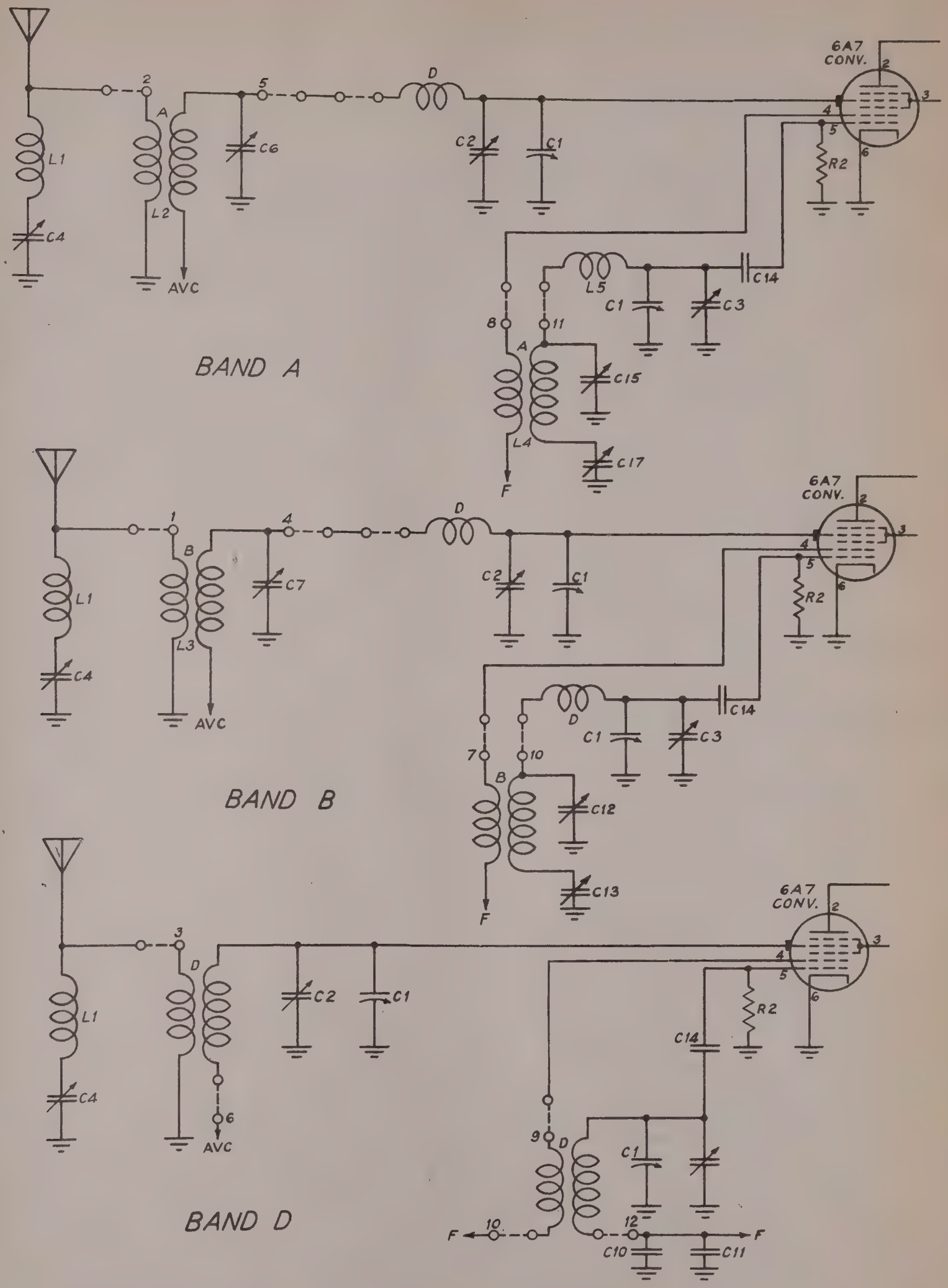


GENERAL ELECTRIC CO. MODELS JE-51, JE-61, JE-510
See G.E. Page 12-9



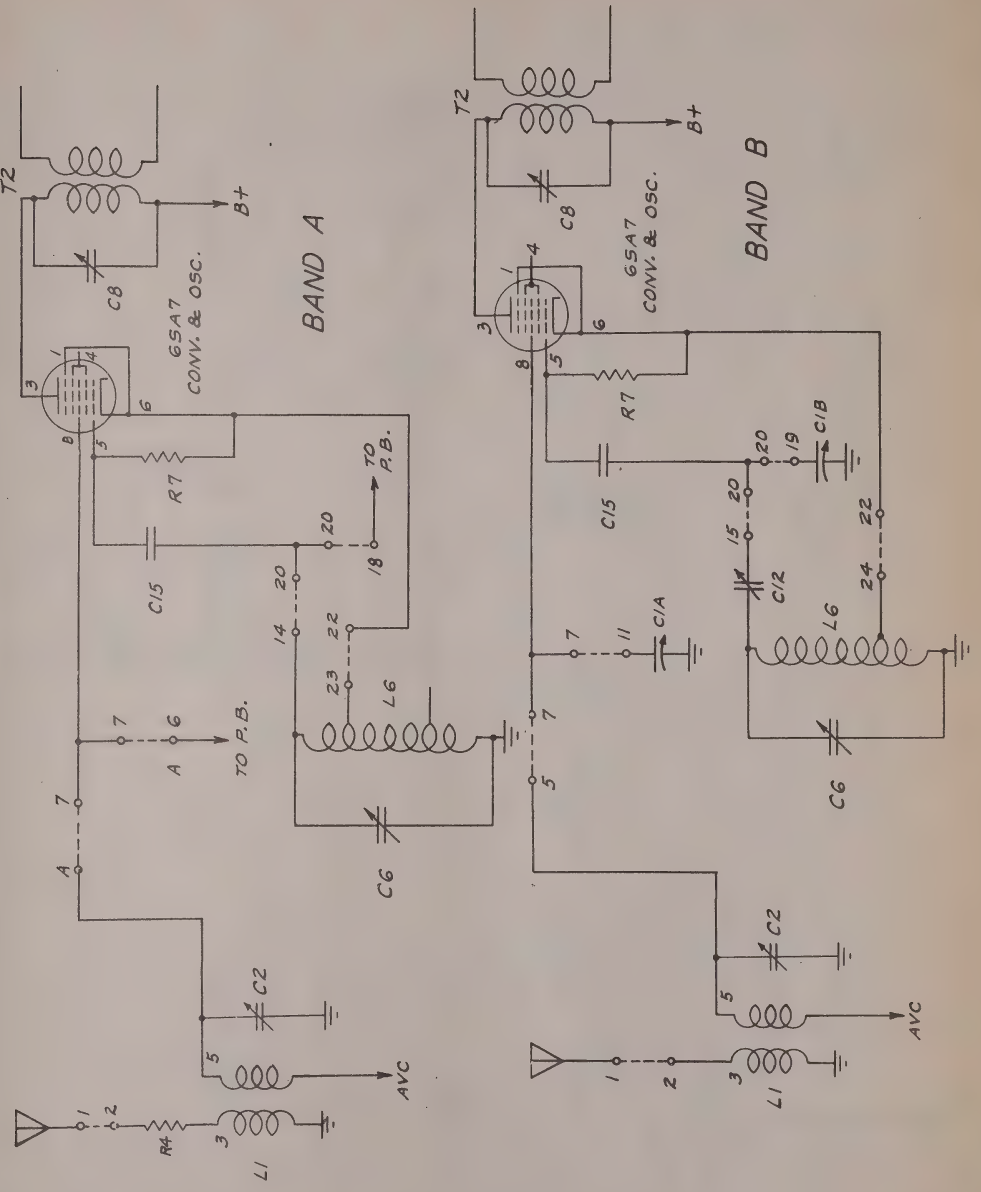
GENERAL ELECTRIC CO. MODELS FE-62, FE-67, FE-68

See G.E. Page 12-19



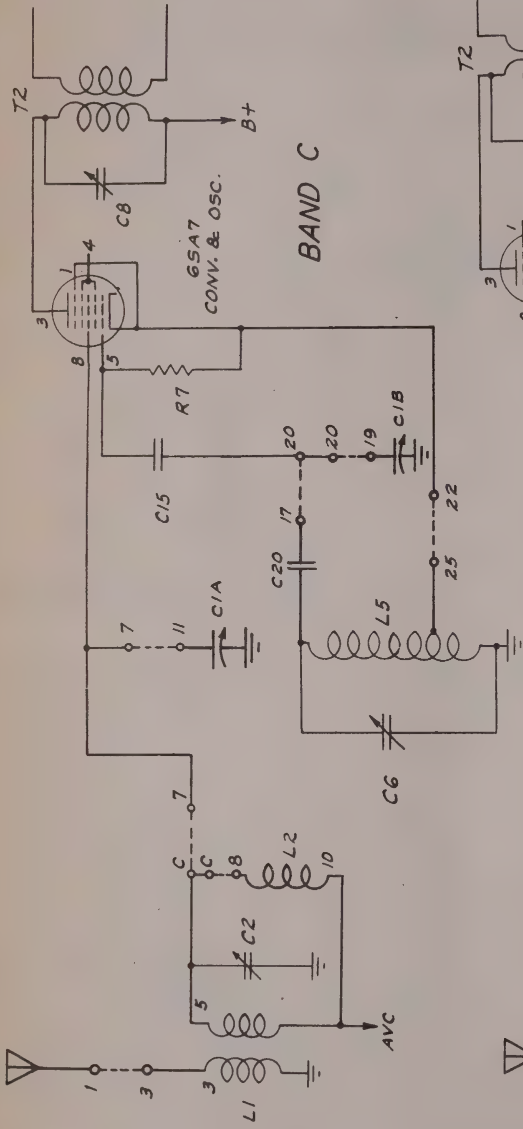
GENERAL ELECTRIC CO.

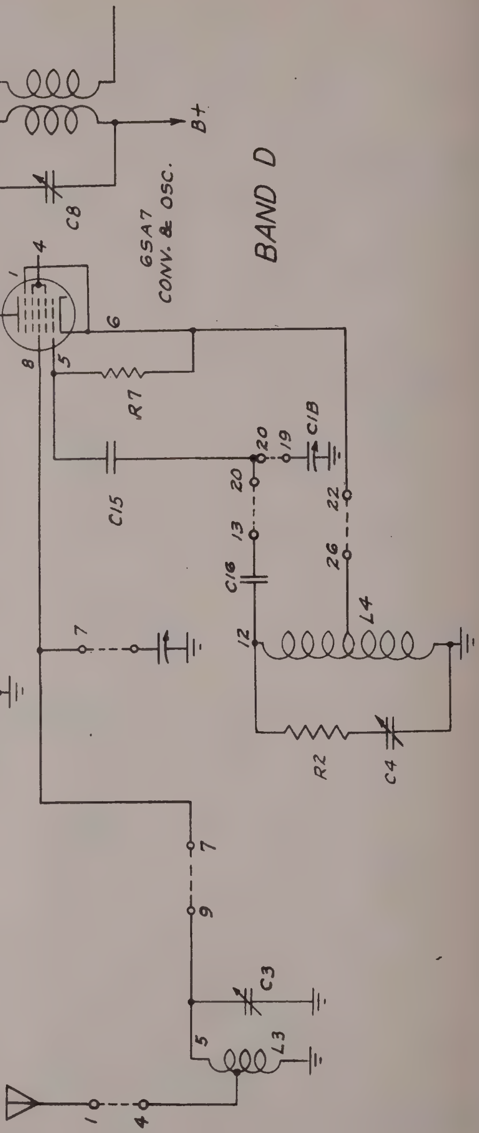
MODEL J-64
See G.E. Page 12-25



MODEL J-64
See G.E. Page 12-25

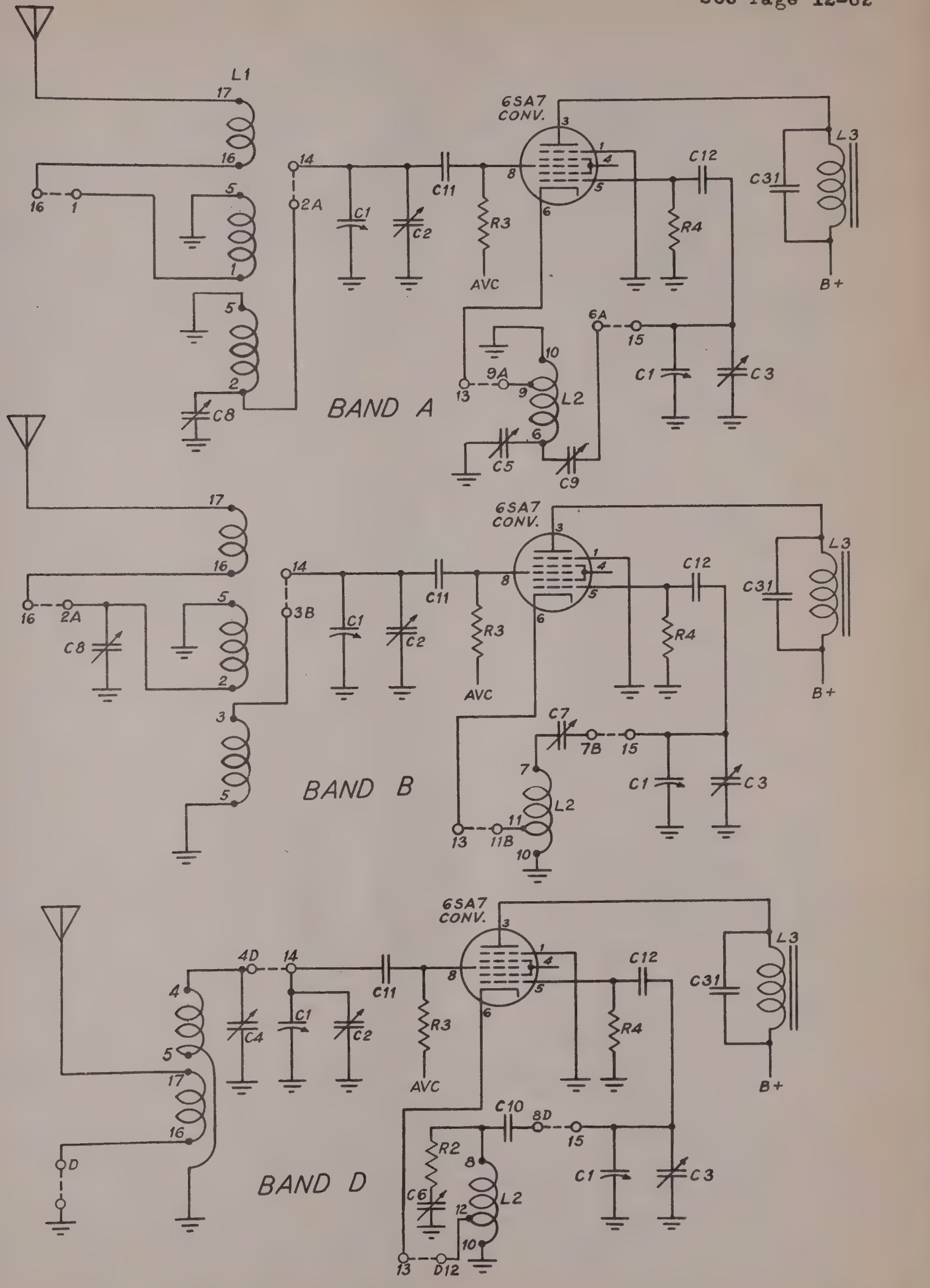
GENERAL ELECTRIC CO.





GENERAL ELECTRIC CO.

MODEL HE-64L
See G.E. Page 12-2
MODEL HE-640L
See Page 12-62



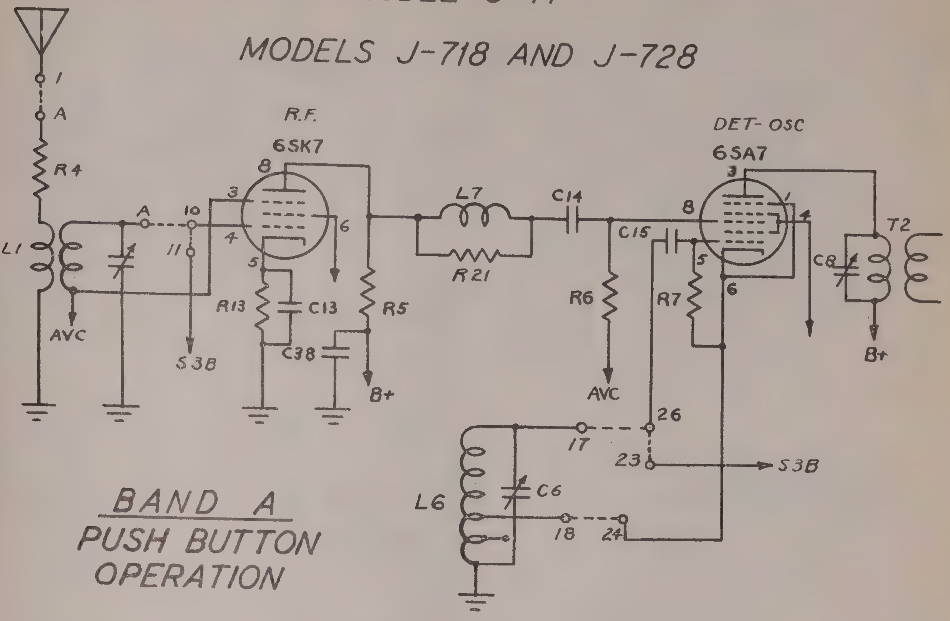
MODELS J-718, J-728
See G.E. Page 12-77

GENERAL ELECTRIC CO.

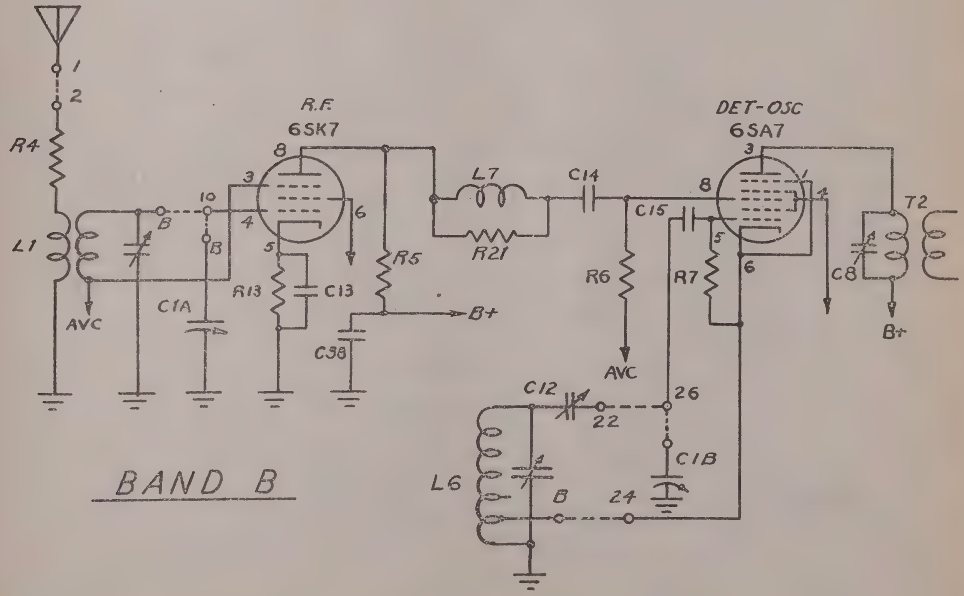
MODEL J-71
See G.E. Page 12-28

MODEL J-71

MODELS J-718 AND J-728

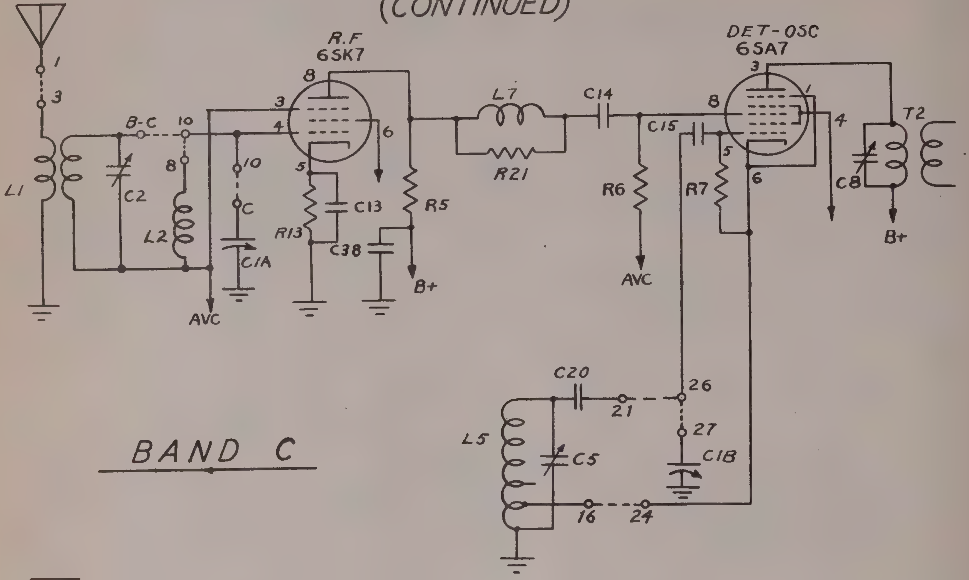


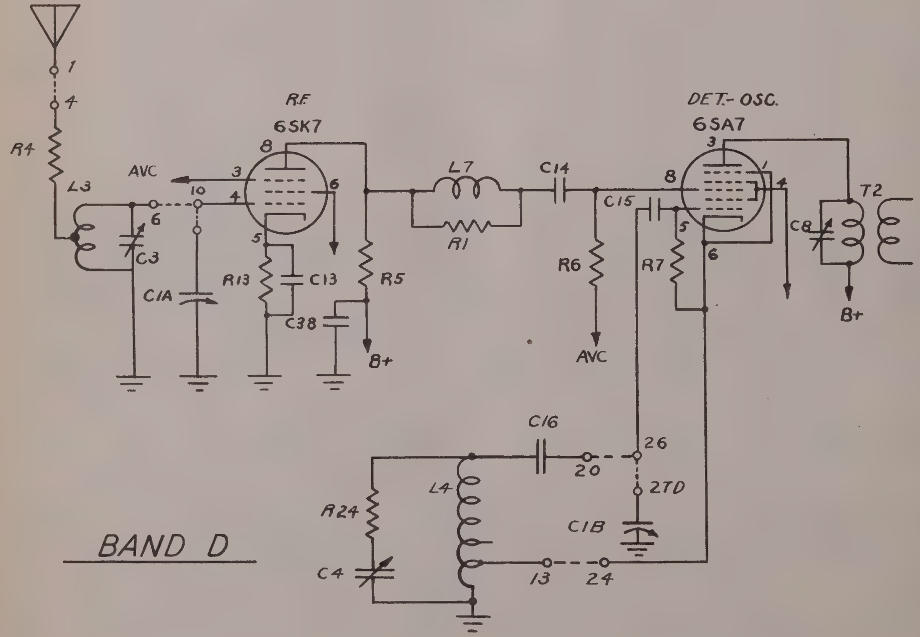
BAND A
PUSH BUTTON
OPERATION



BAND B

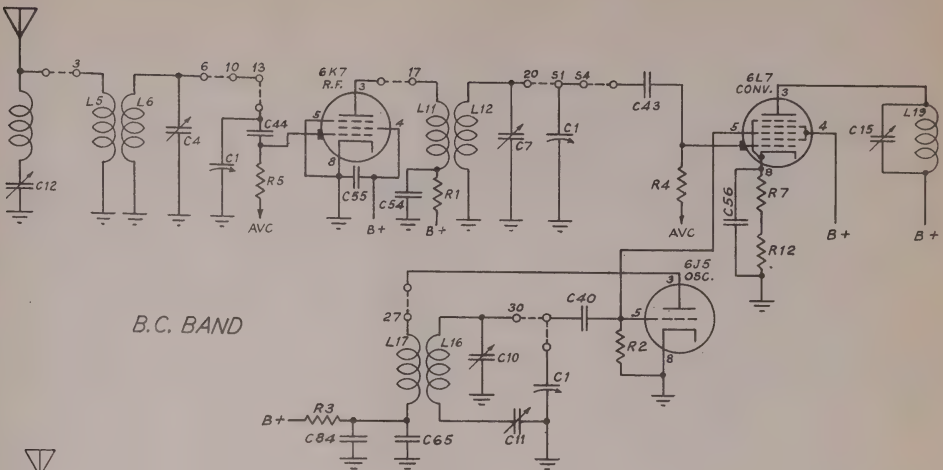
MODEL J-71
MODELS J-718 AND J-728
(CONTINUED)



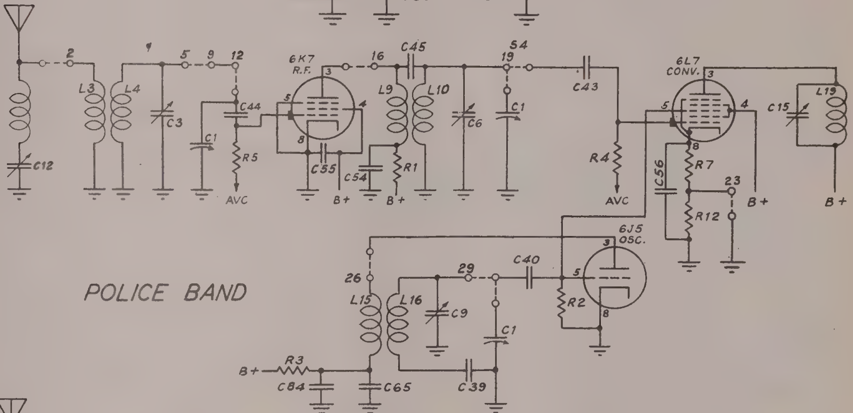


GENERAL ELECTRIC CO.

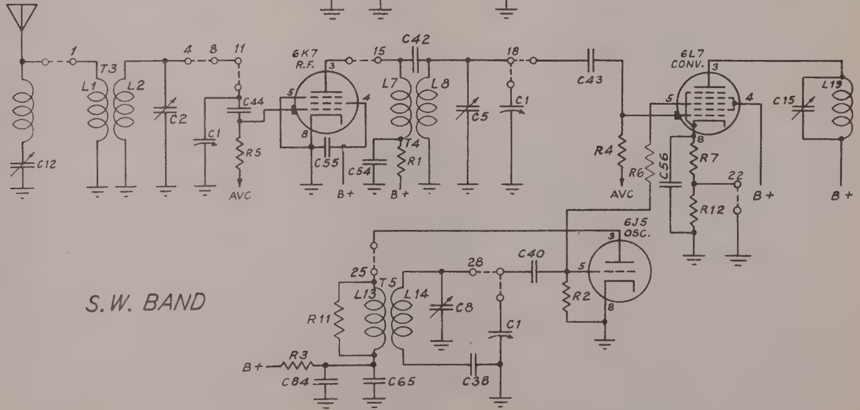
MODELS GE-93, GE-96
See G.E. Page 12-45



B.C. BAND



POLICE BAND

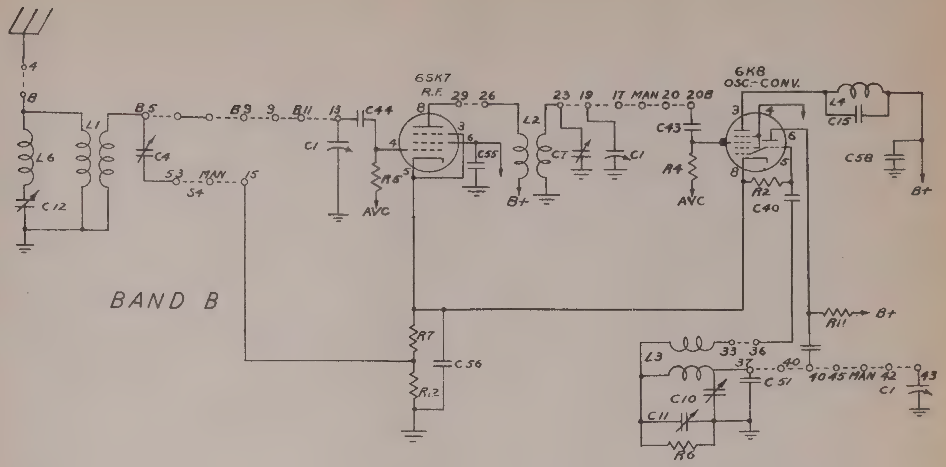


S.W. BAND

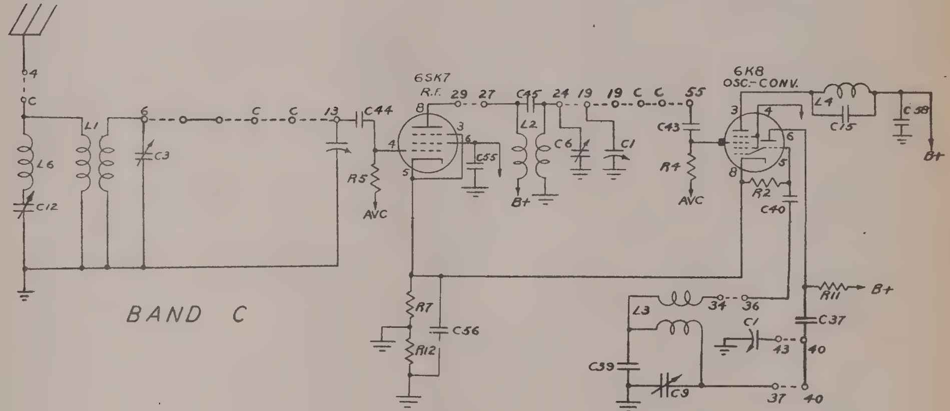
GENERAL ELECTRIC CO.

MODELS HE-100, HE-100H, HE-105

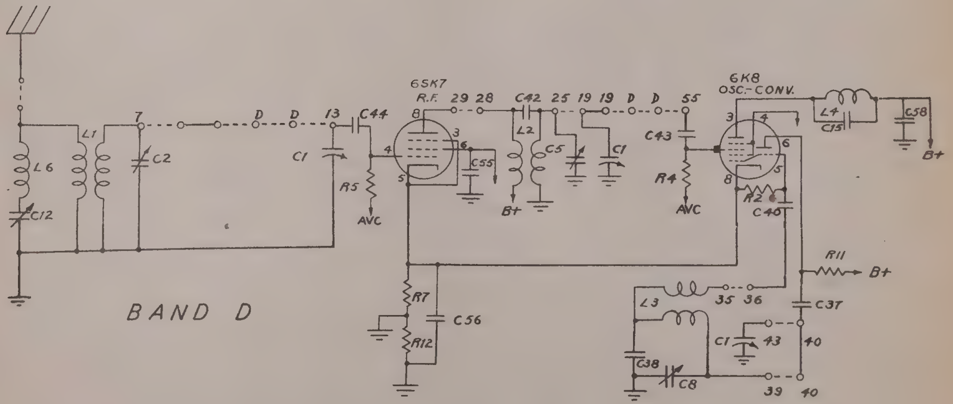
See G.E. Page 12-47



BAND B

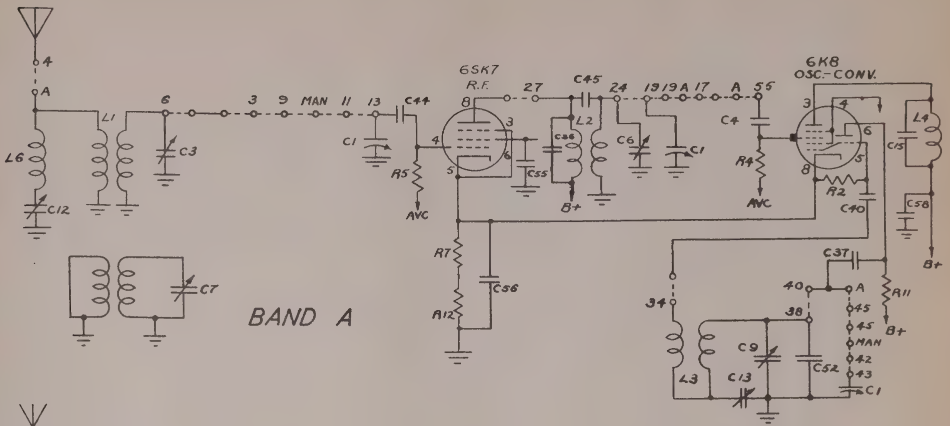


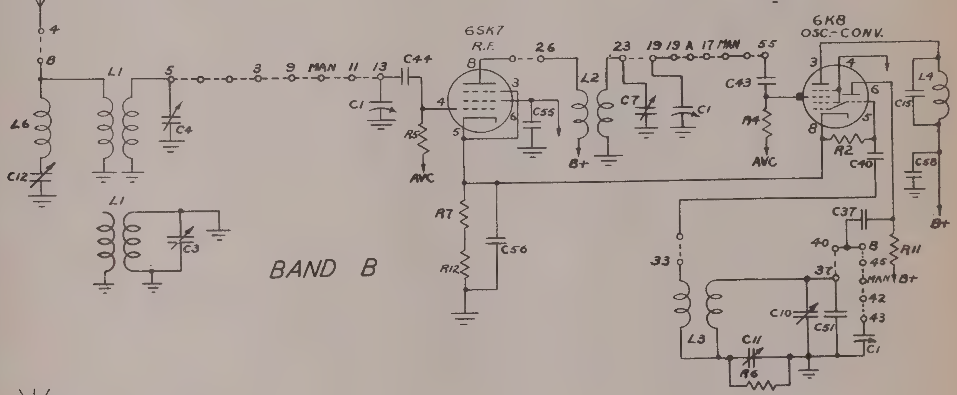
BAND C

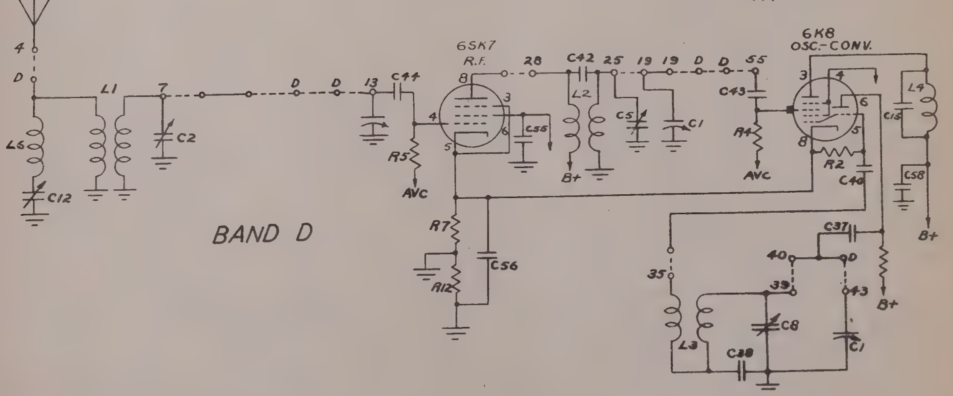


BAND D

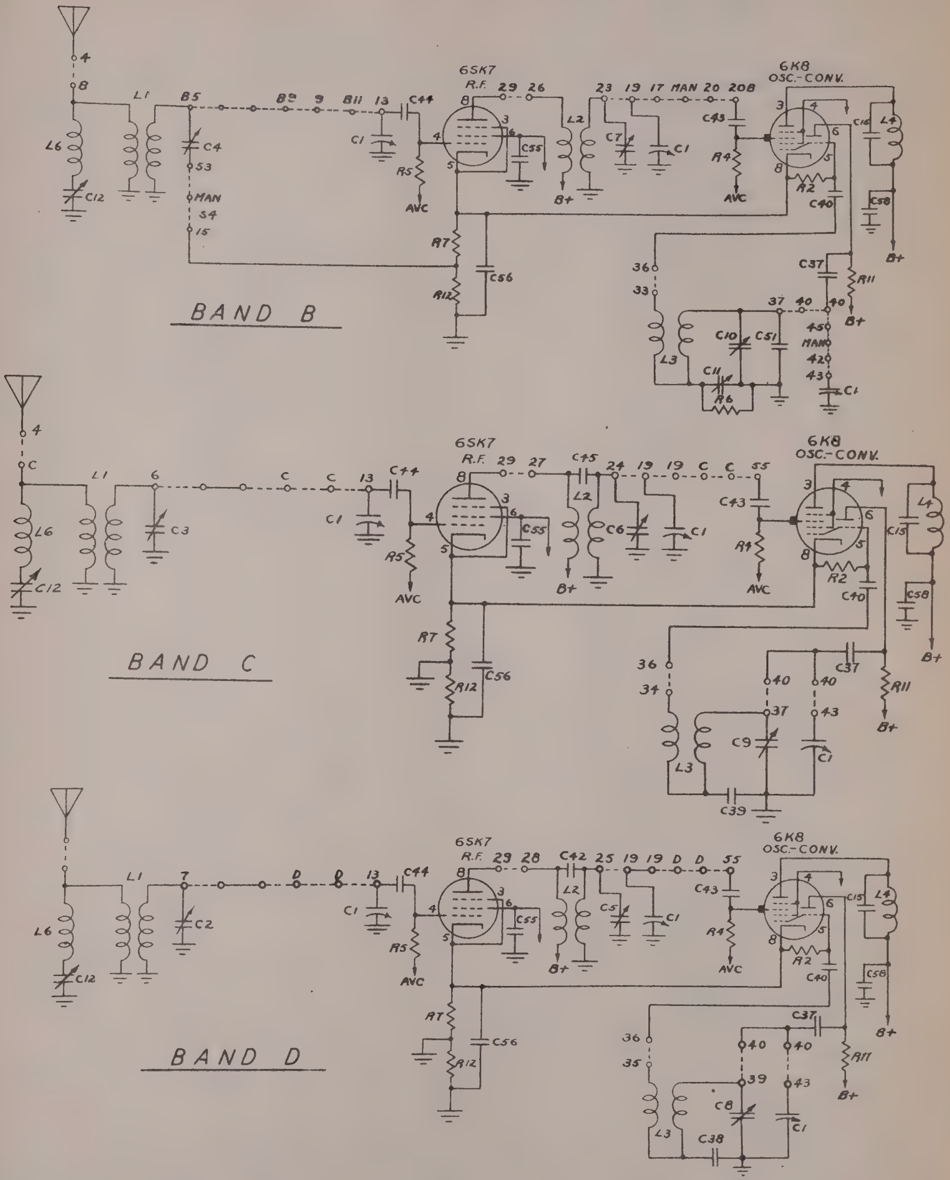
GENERAL ELECTRIC CO. MODELS HE-100L, HE-100LH,
HE-105L
See G.E. Page 12-48







GENERAL ELECTRIC CO. MODELS JE-101,JE-107
See G.E. Page 12-50



BAND B

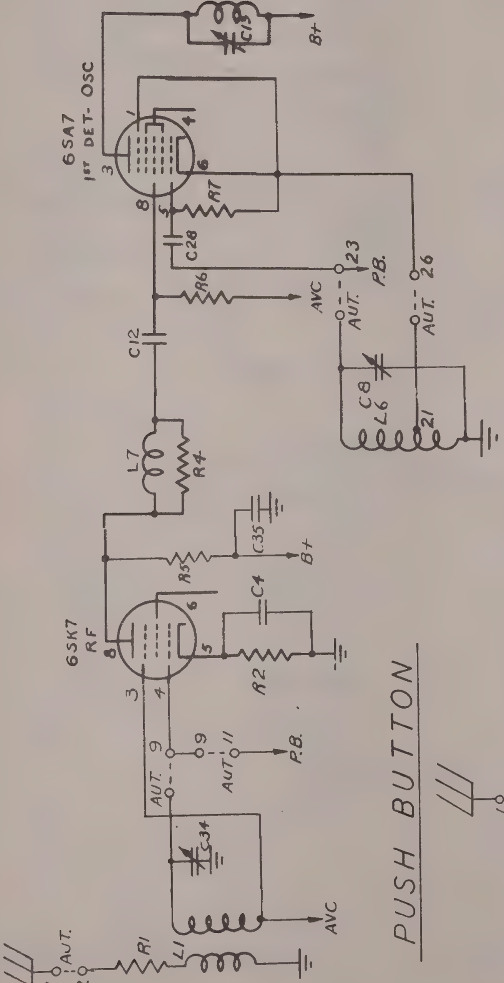
BAND C

BAND D

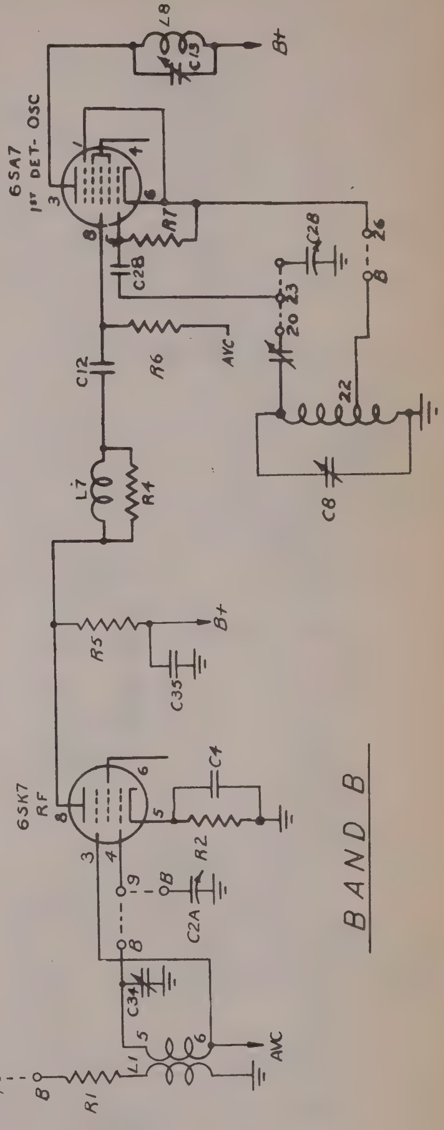
MODELS J-808, J-818, J-828
See G.E. Page 12-83
MODEL J-809
See G.E. Page 12-87

GENERAL ELECTRIC CO.

MODEL J-105, Golden Tone
See G.E. Page 12-53



PUSH BUTTON



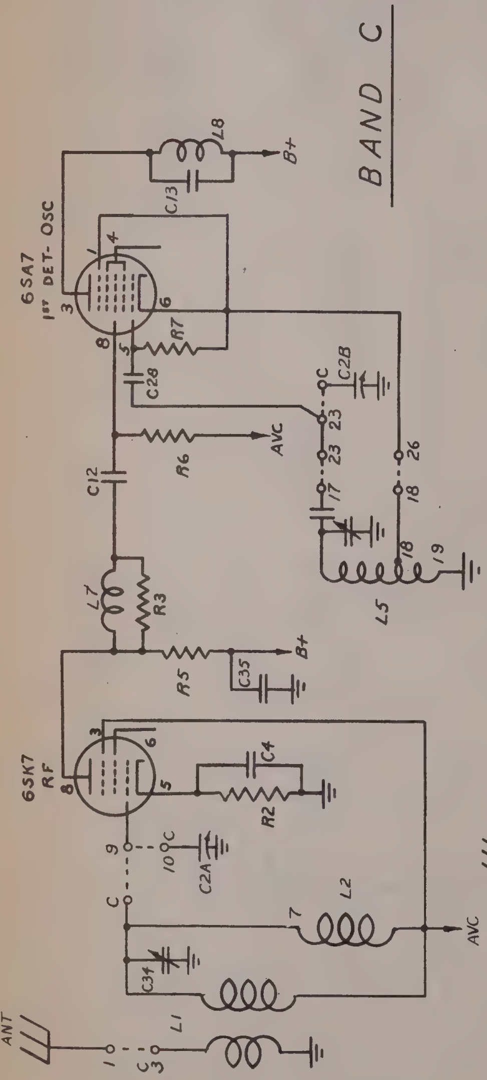
BAND B

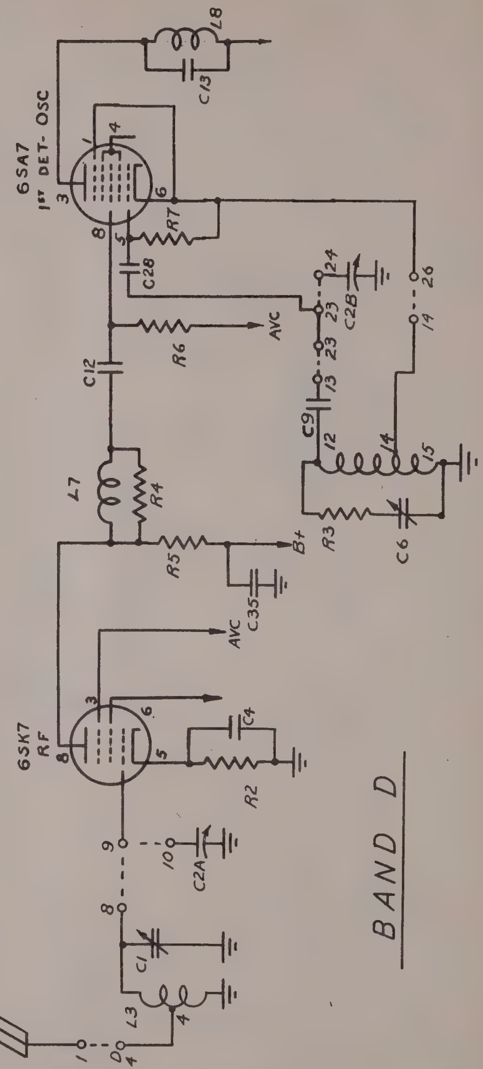
©John F. Rider, Publisher

MODEL J-105, Golden Tone
See G.E. Page 12-53

GENERAL ELECTRIC CO.

MODELS J-808, J-818, J-828
See G.E. Page 12-83
MODEL J-809
See G.E. Page 12-87

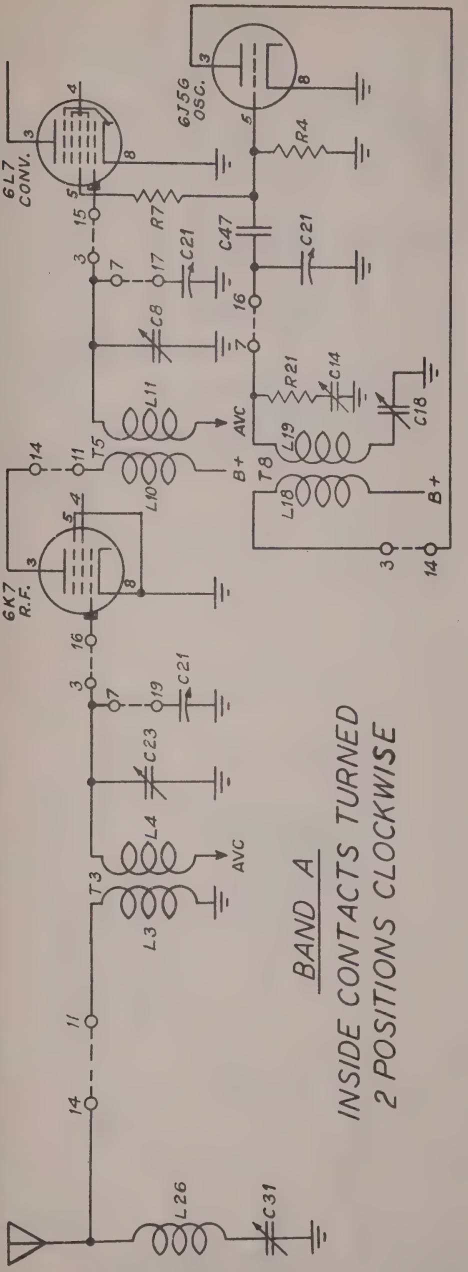




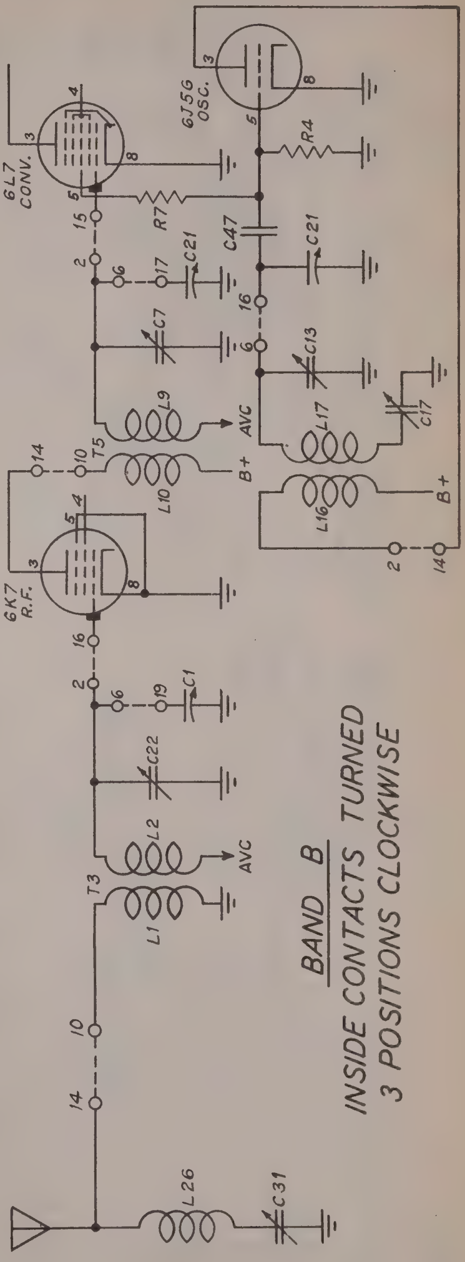
GENERAL ELECTRIC CO.

MODELS **FE-112, FE-116, FE-119**

See G.E. Page 12-57



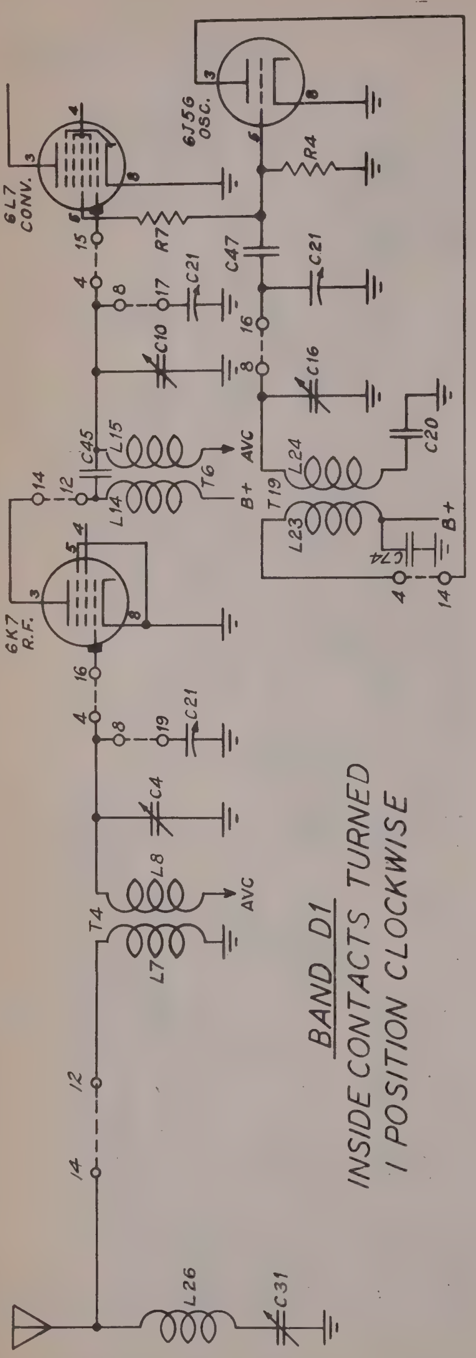
BAND A
INSIDE CONTACTS TURNED
2 POSITIONS CLOCKWISE



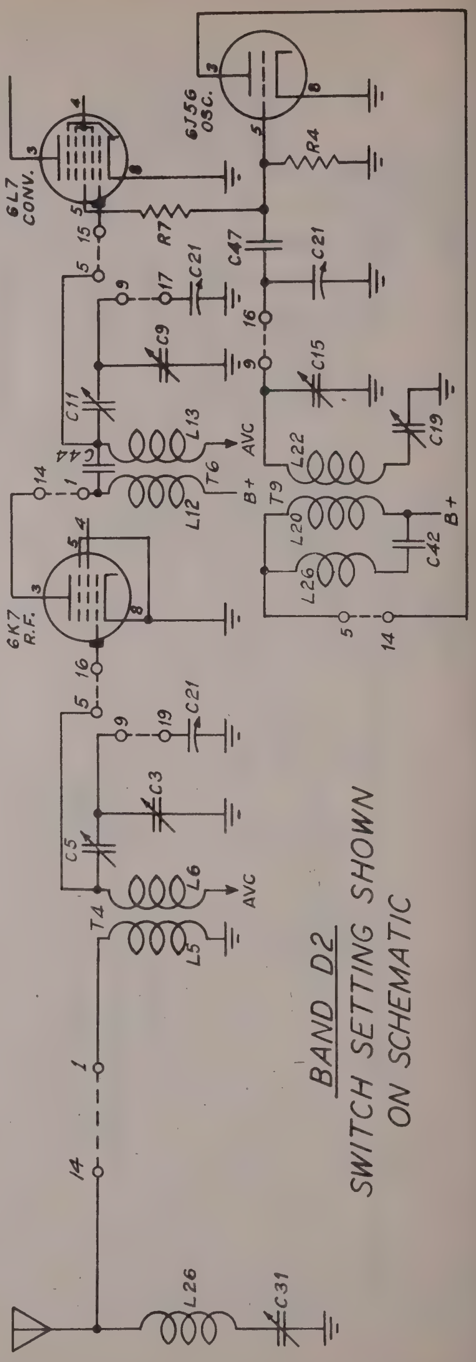
BAND B
INSIDE CONTACTS TURNED
3 POSITIONS CLOCKWISE

MODELS FE-112, FE-116,
FE-119
See G.E. Page 12-57

GENERAL ELECTRIC CO.

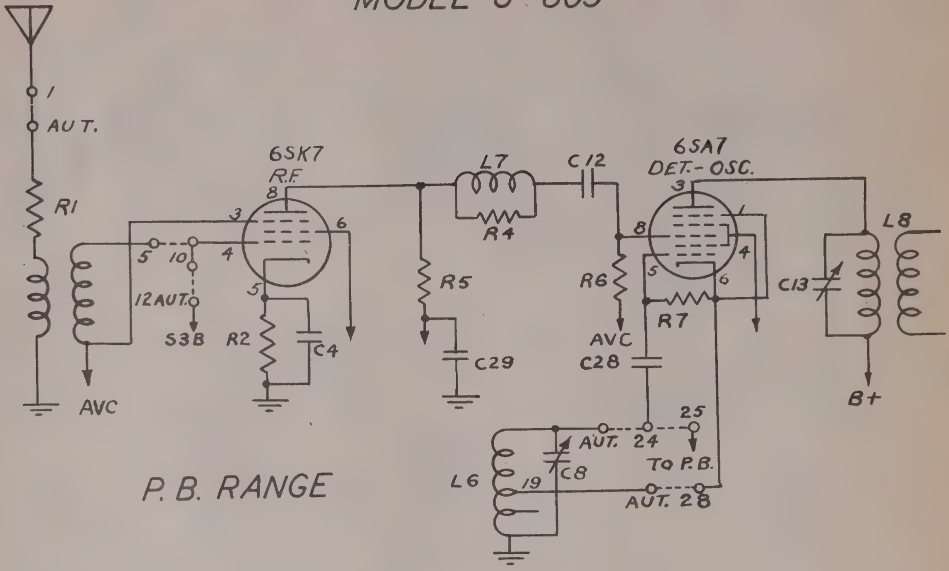


BAND D1
INSIDE CONTACTS TURNED
1 POSITION CLOCKWISE

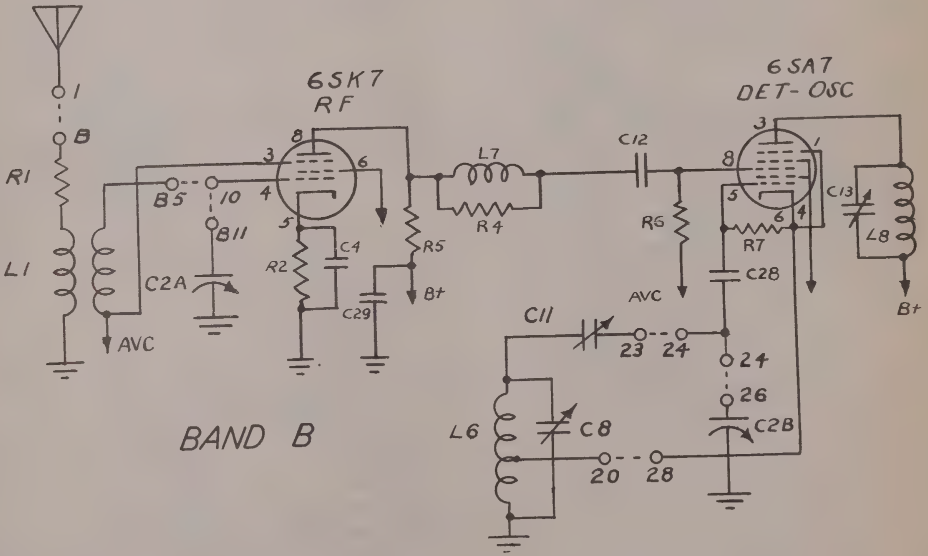


BAND D2
SWITCH SETTING SHOWN
ON SCHEMATIC

MODEL J-805

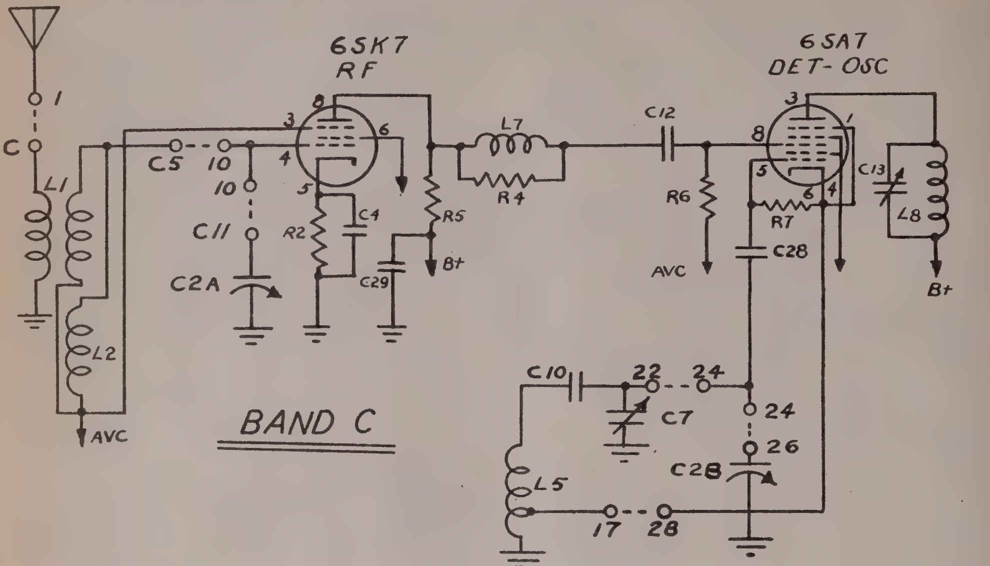


P. B. RANGE

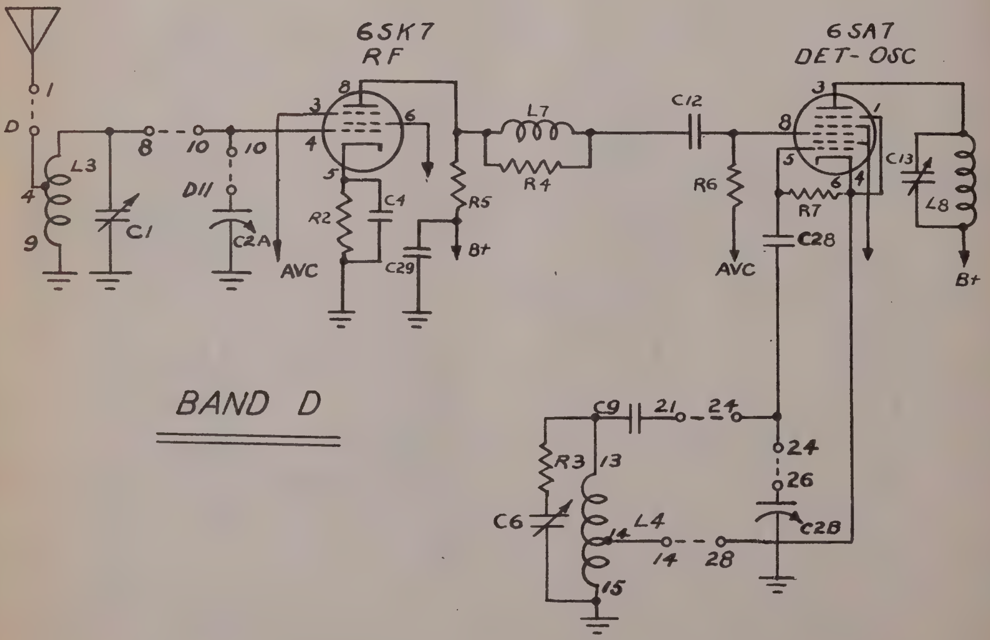


BAND B

MODEL J-805 (CONTINUED)



BAND C

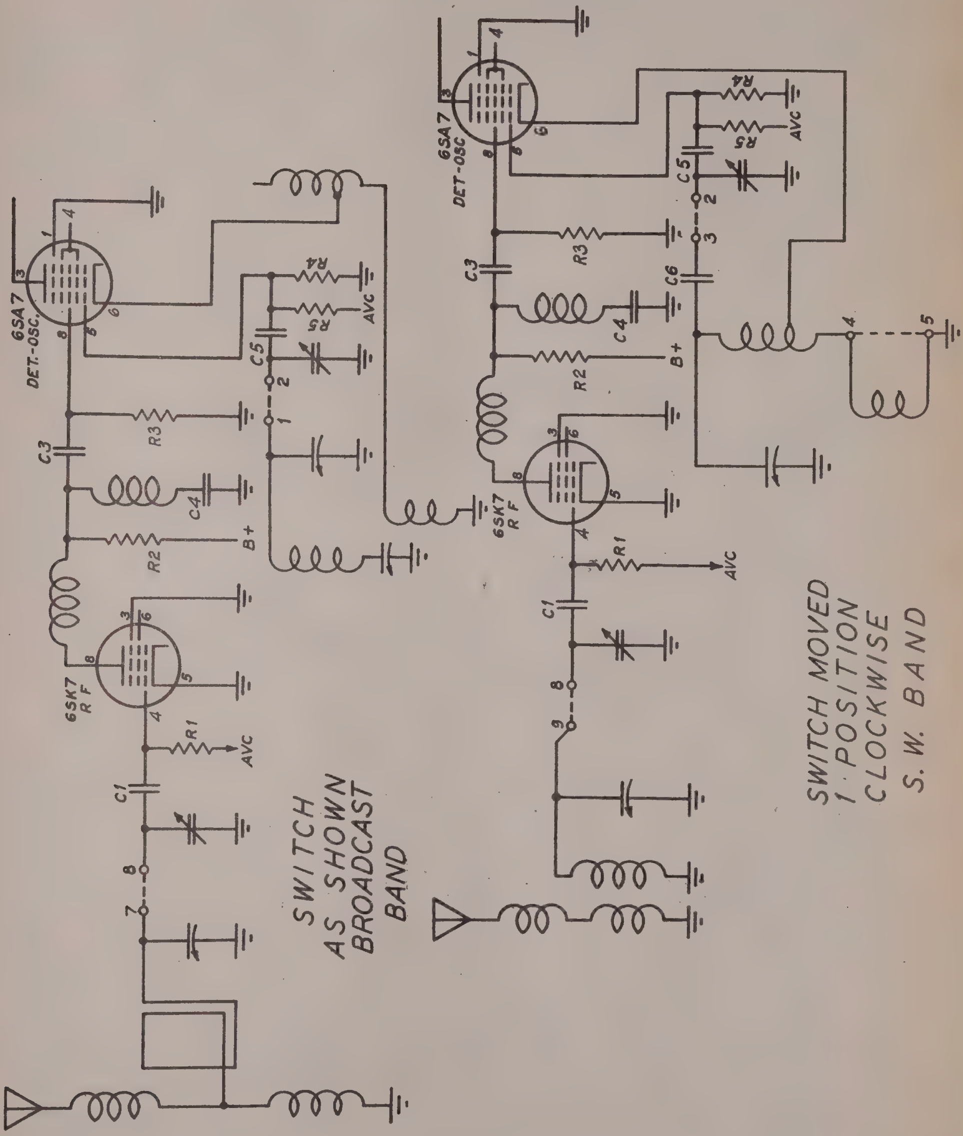


BAND D

MODEL R458
See Goodrich Page 12-24

B. F. GOODRICH

MODEL R454
See Goodrich Page 12-24
MODEL R480
See Goodrich Page 12-26

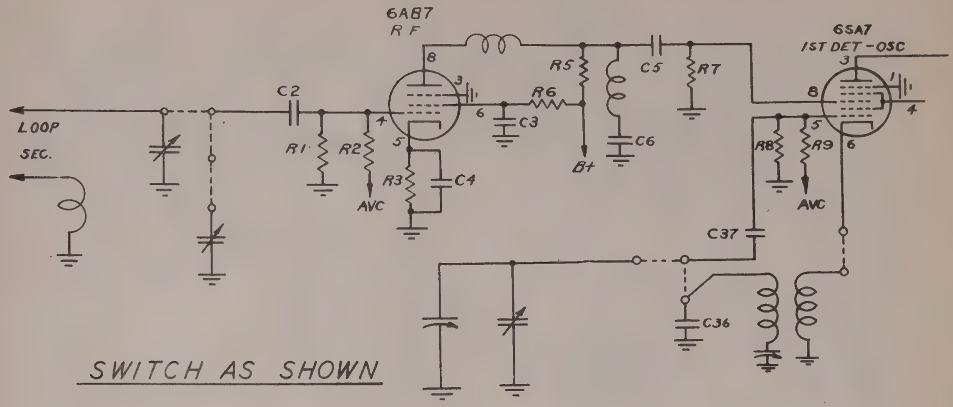


SWITCH AS SHOWN BROADCAST BAND

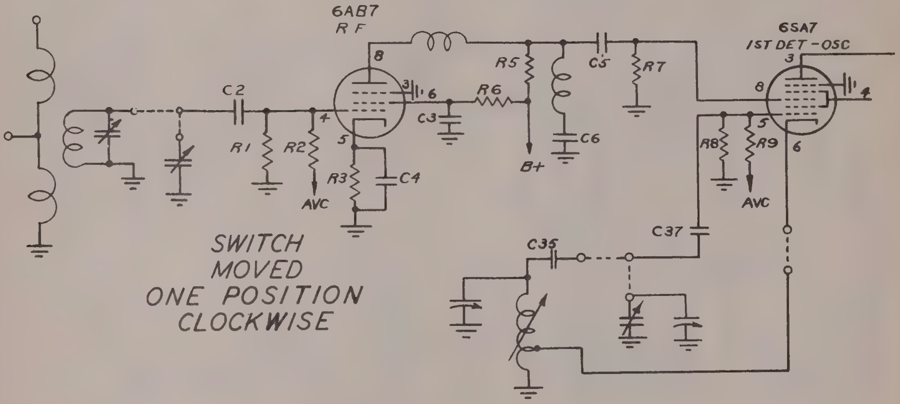
SWITCH MOVED 1 POSITION CLOCKWISE S. W. BAND

B. F. GOODRICH

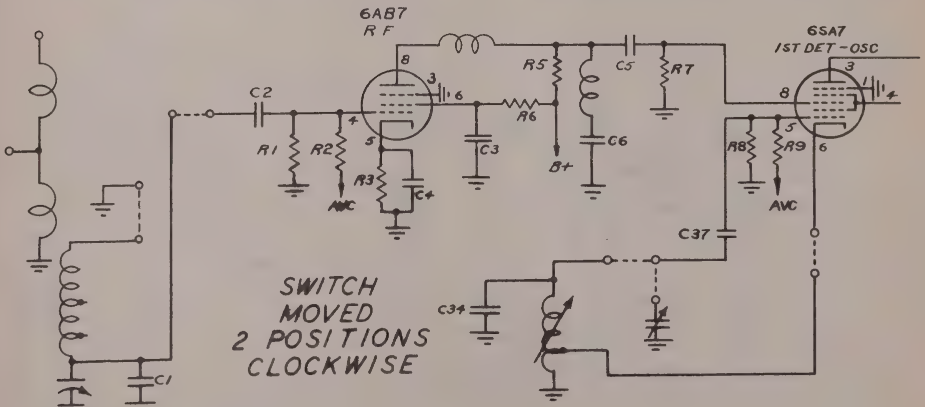
MODEL R459
See Goodrich Page 12-25



SWITCH AS SHOWN



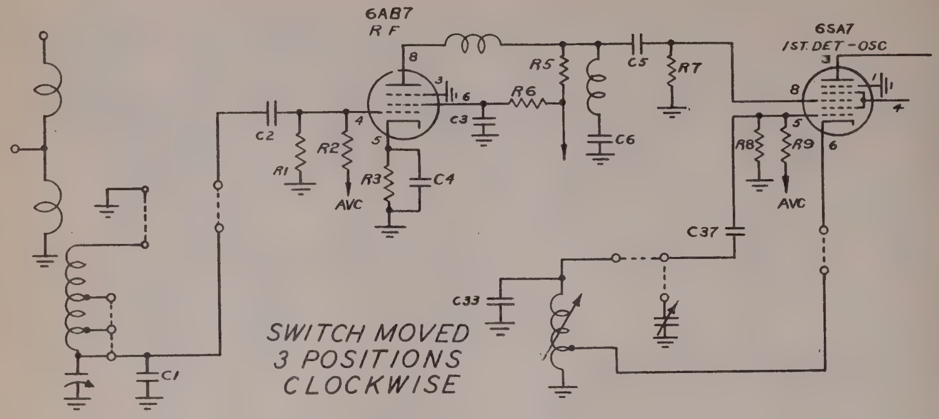
SWITCH MOVED ONE POSITION CLOCKWISE



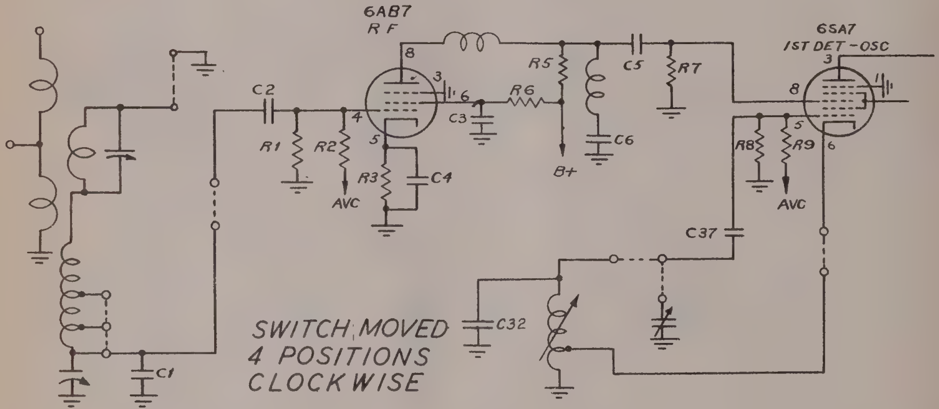
SWITCH MOVED 2 POSITIONS CLOCKWISE

MODEL R459
See Goodrich Page 12-25

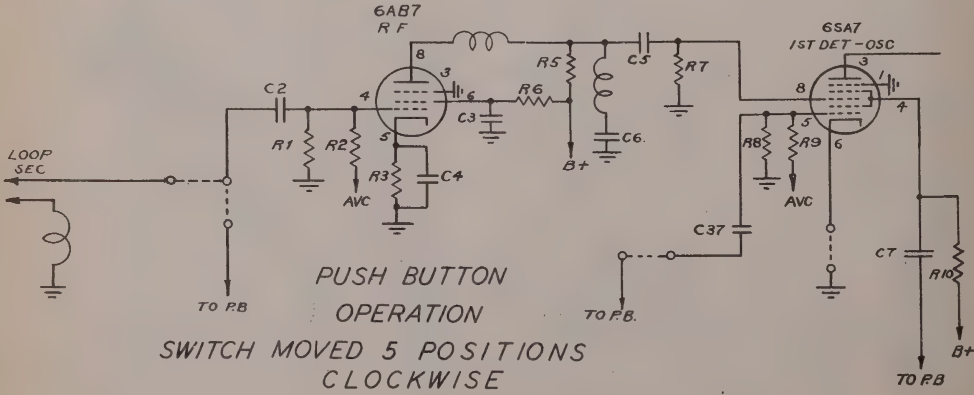
B. F. GOODRICH



SWITCH MOVED
3 POSITIONS
CLOCKWISE



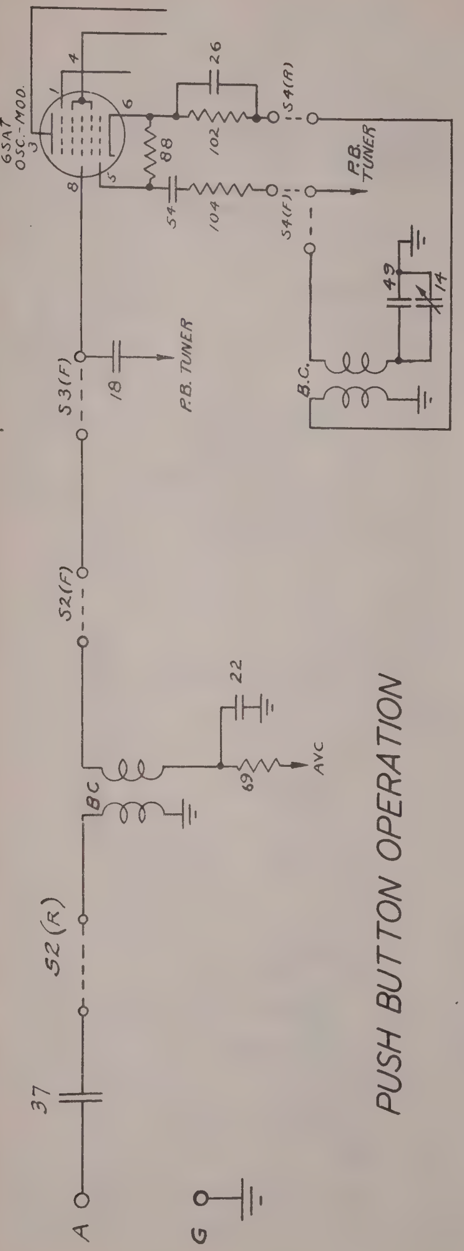
SWITCH MOVED
4 POSITIONS
CLOCKWISE



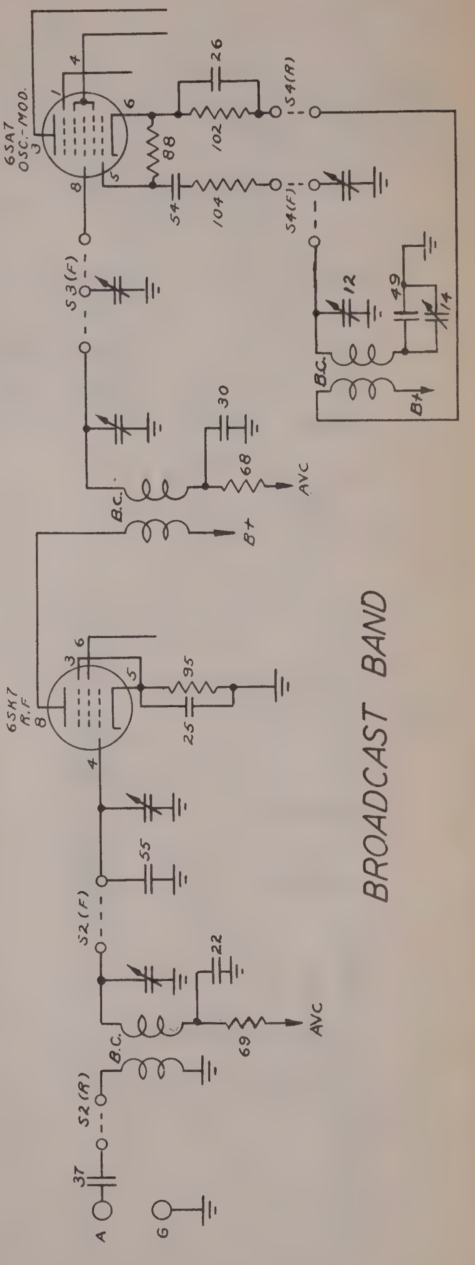
SWITCH MOVED 5 POSITIONS
CLOCKWISE

THE MAGNAVOX CO. INC.

CHASSIS CR-149
See Magnavox Page 12-1
CHASSIS CR-152, CR-161
See Magnavox Page 12-3



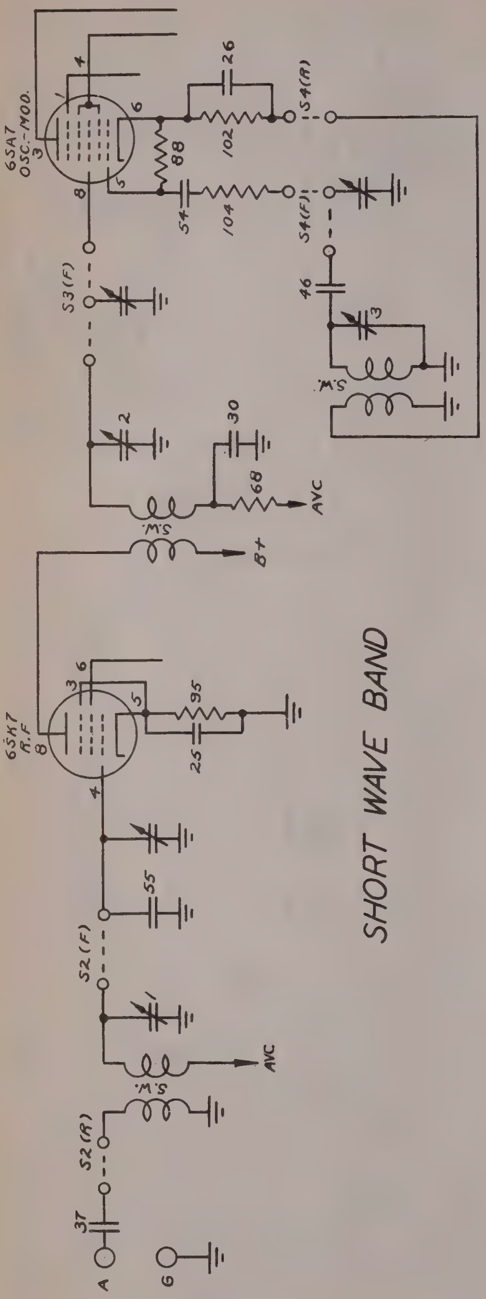
PUSH BUTTON OPERATION



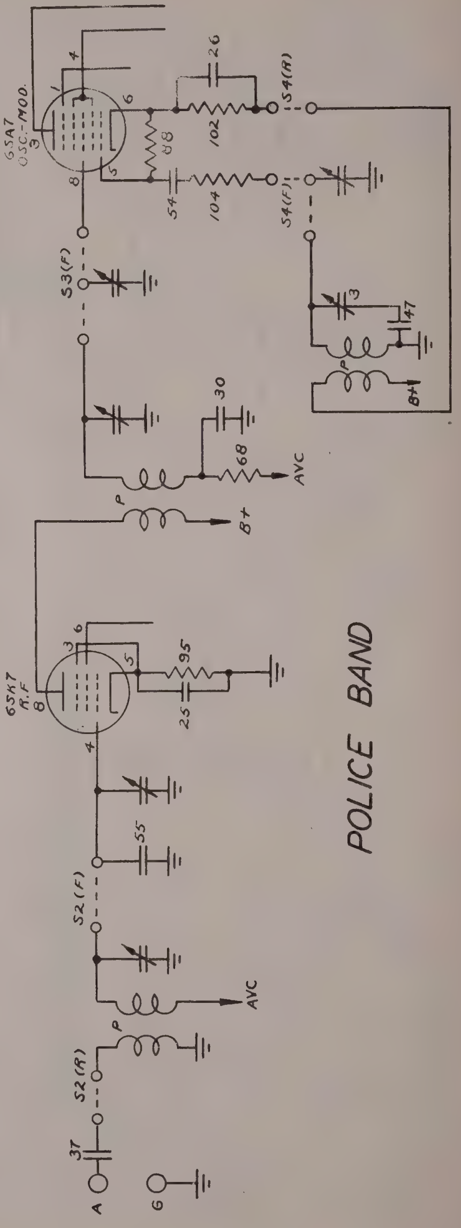
BROADCAST BAND

CHASSIS CR-149
See Magnavox Page 12-1
CHASSIS CR-152, CR-161
See Magnavox Page 12-3

THE MAGNAVOX CO. INC.



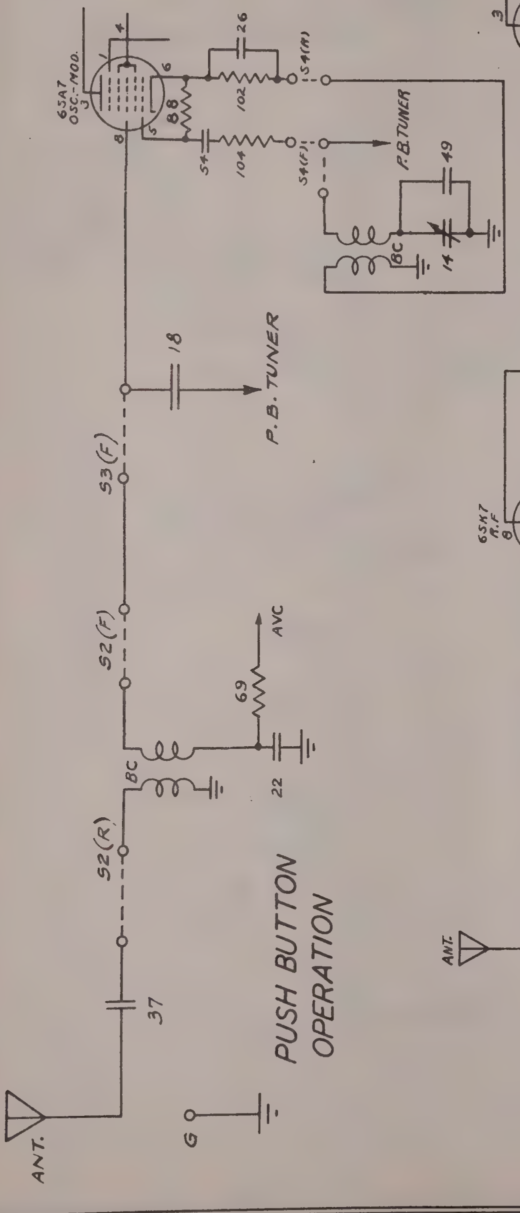
SHORT WAVE BAND

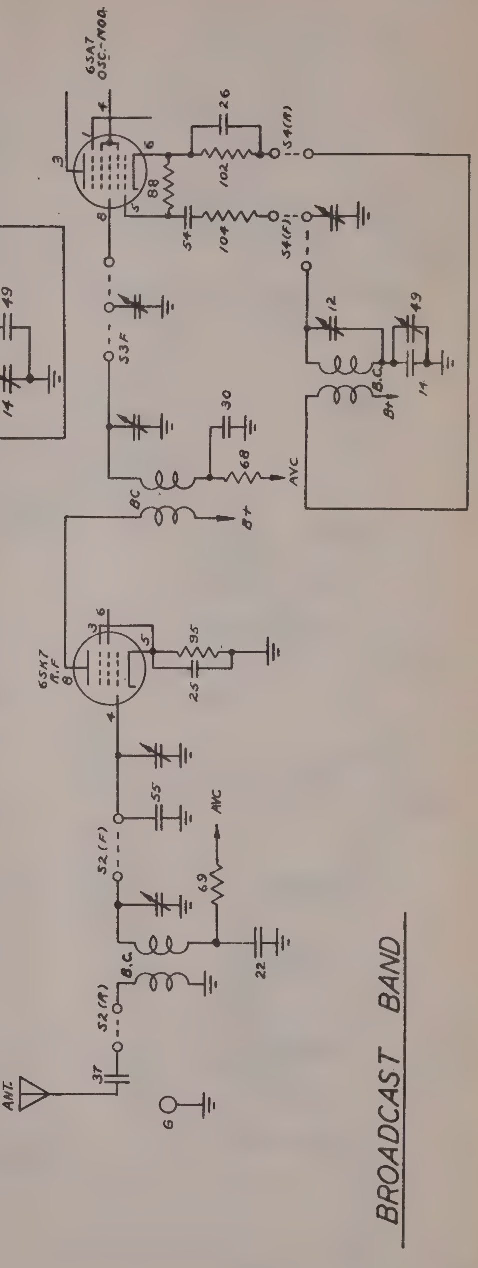


POLICE BAND

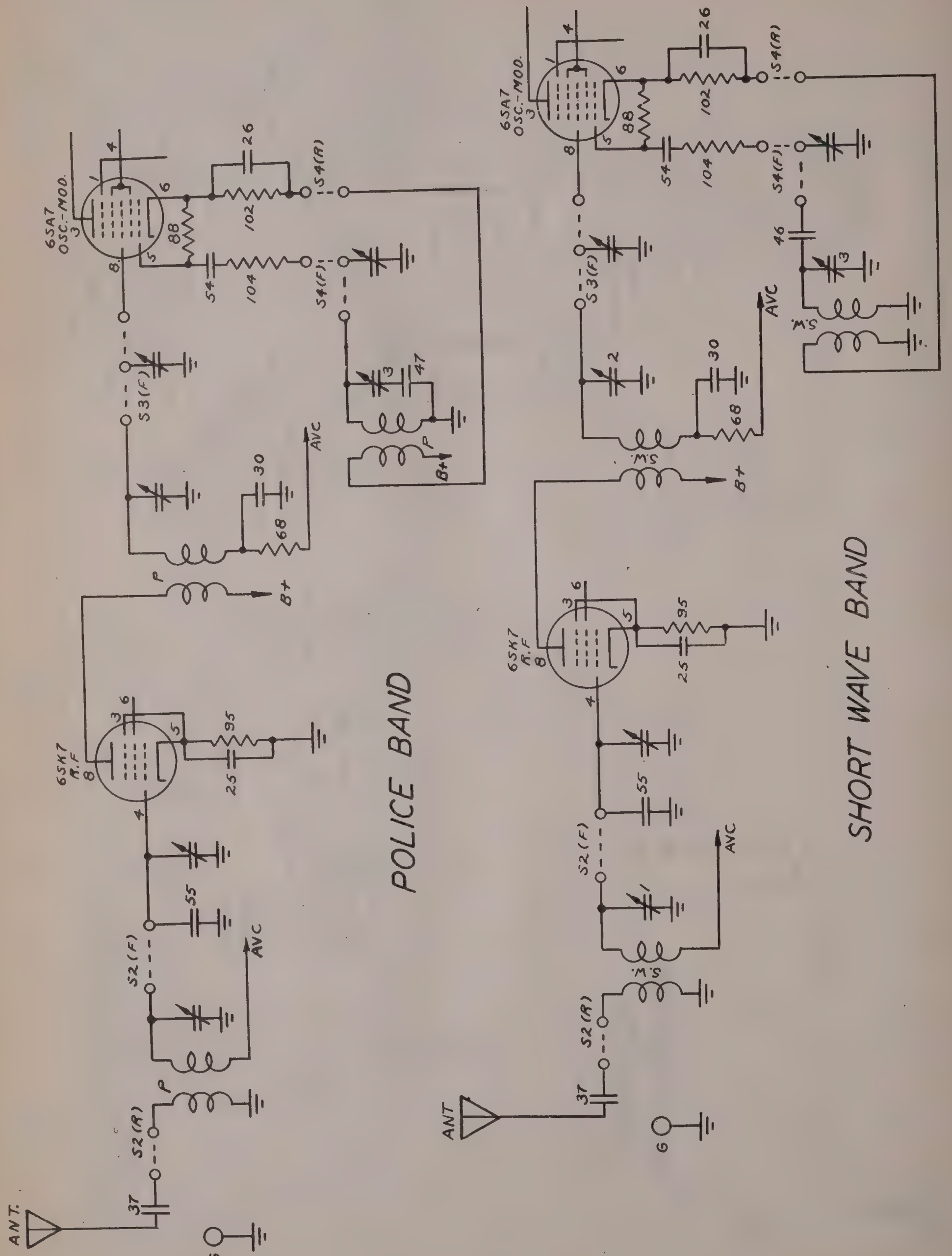
THE MAGNAVOX CO. INC.

CHASSIS CR-154
See Magnavox Page 12-7, 8
CHASSIS CR-155
See Magnavox Page 12-9, 10


PUSH BUTTON OPERATION


BROADCAST BAND

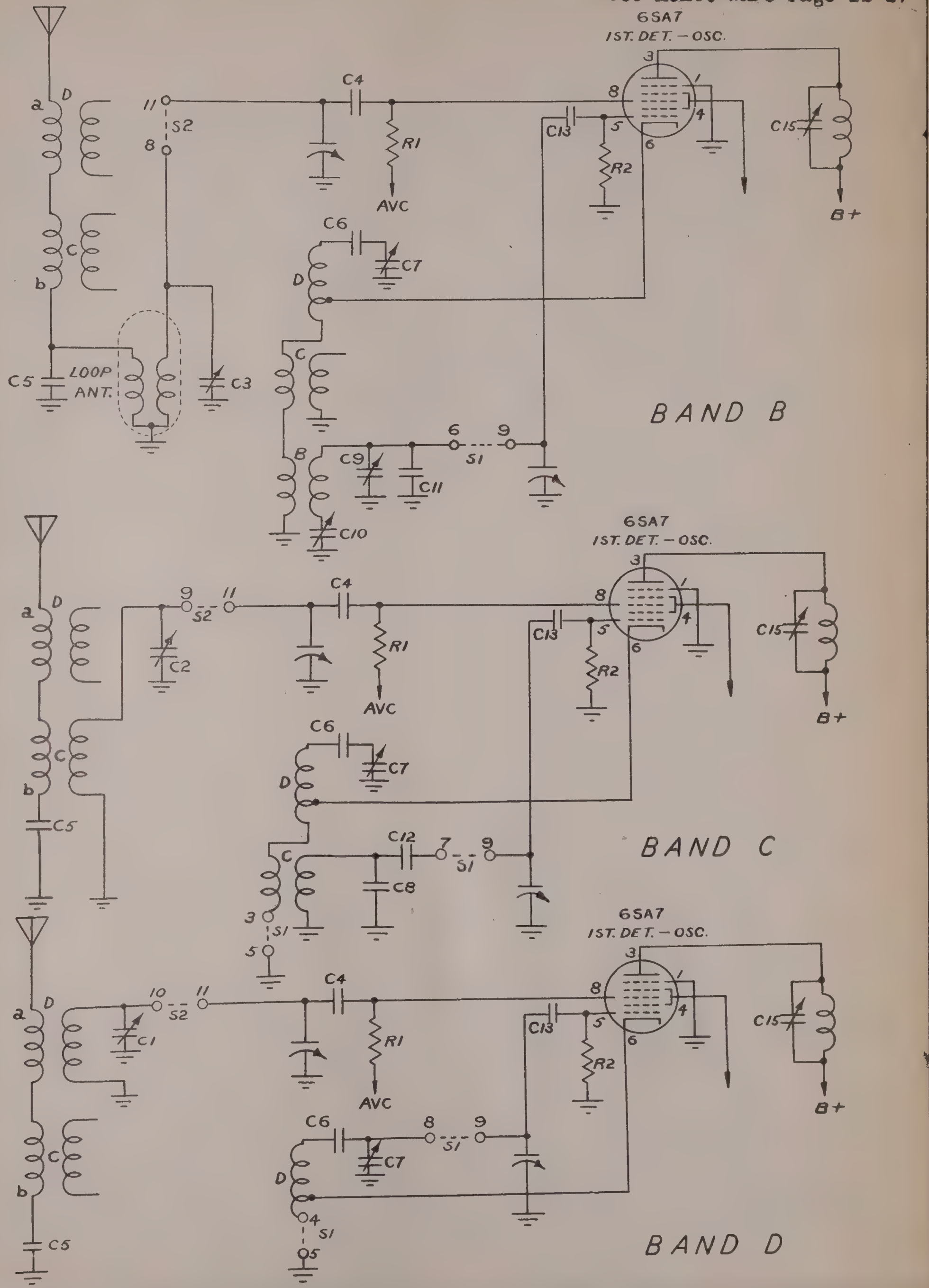
CHASSIS CR-154
See Magnavox Page 12-7, 8
CHASSIS CR-155
See Magnavox Page 12-9, 10



MODELS 04WG-622A, 04WG-623A
See Mont.-Ward Page 12-29

MONTGOMERY WARD & CO.

MODEL 04WG-614
See Mont.-Ward. Page 12-23
MODELS 04WG-619, 04WG-621,
04WG-621NI
See Mont.-Ward Page 12-27

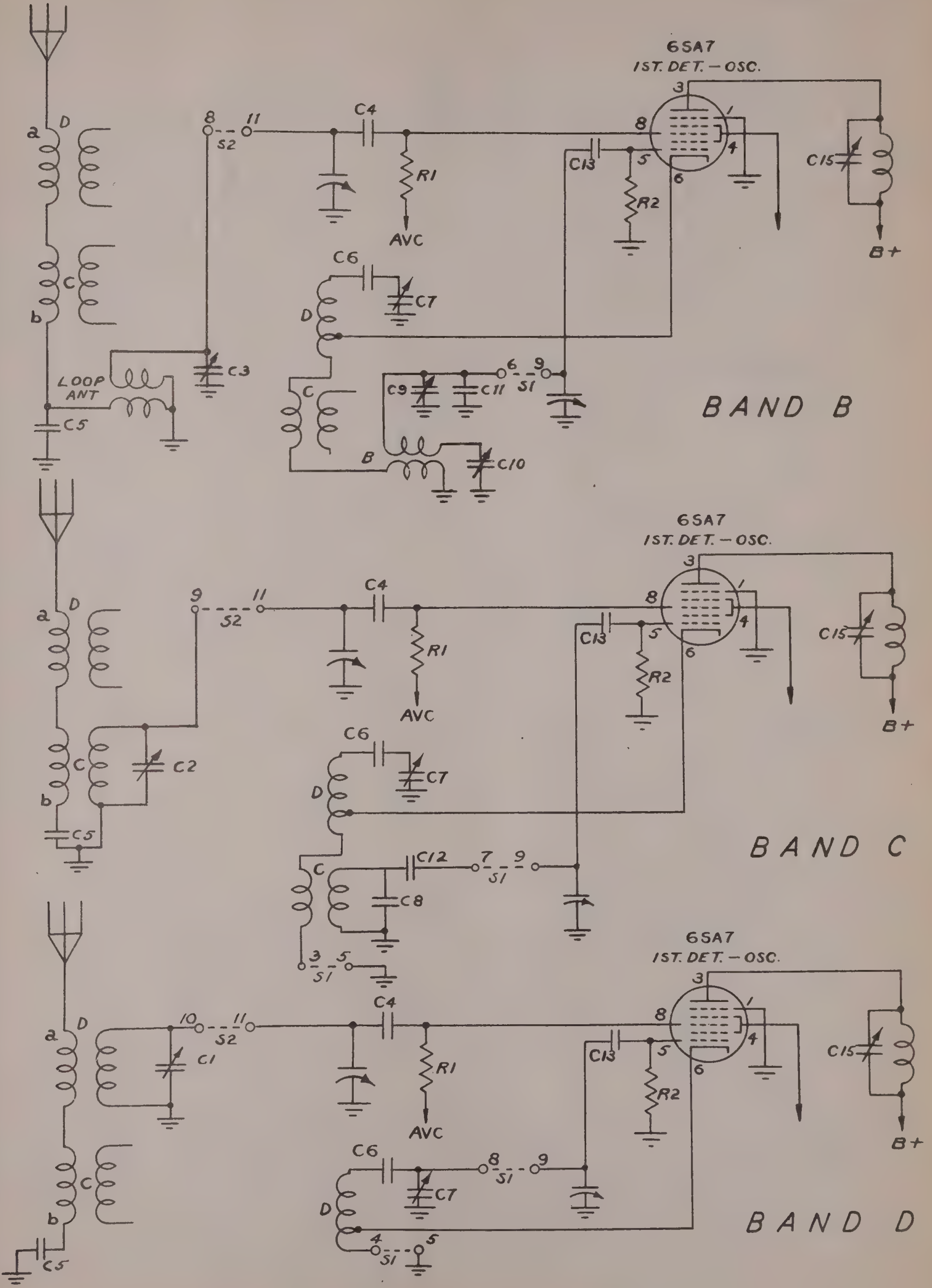


©John F. Rider, Publisher

MONTGOMERY WARD & CO.

MODELS 04WG-728, 04WG-732

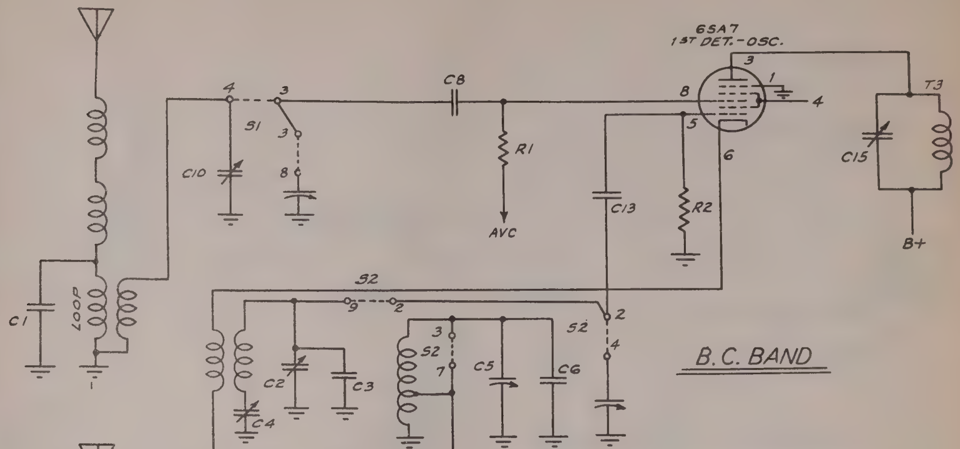
See Mont.-Ward Page 12-43



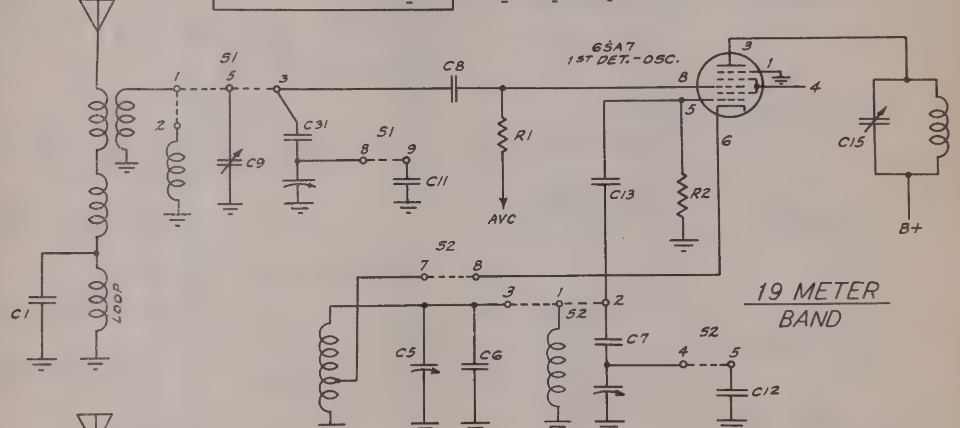
MONTGOMERY WARD & CO.

MODELS 04WG-803,
04WG-803B

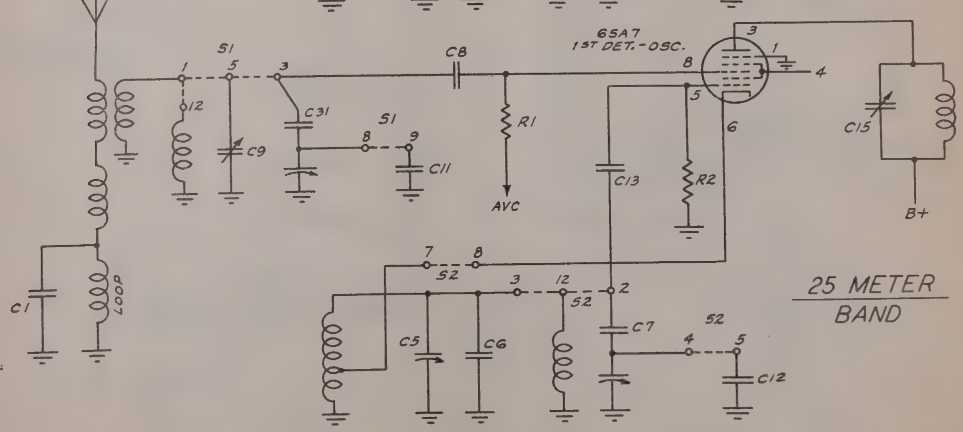
See Mont.-Ward
Page 12-45



B.C. BAND



19 METER BAND

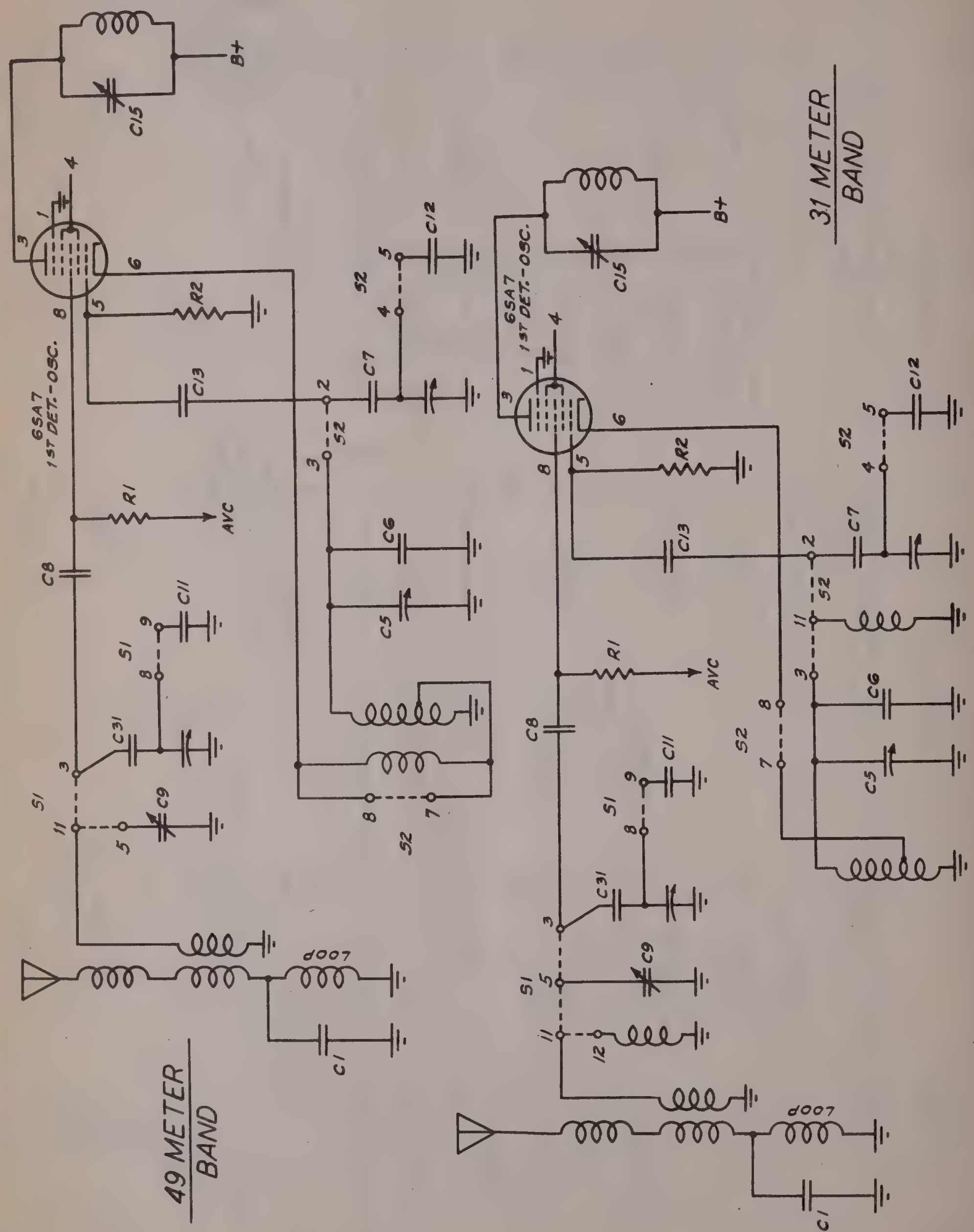


25 METER BAND

MODELS 04WG-803,
04WG-803B

MONTGOMERY WARD & CO.

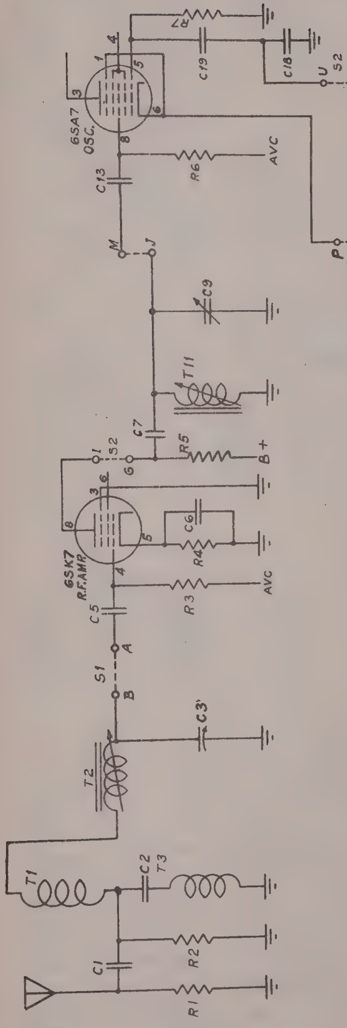
See Mont.-Ward Page 12-45



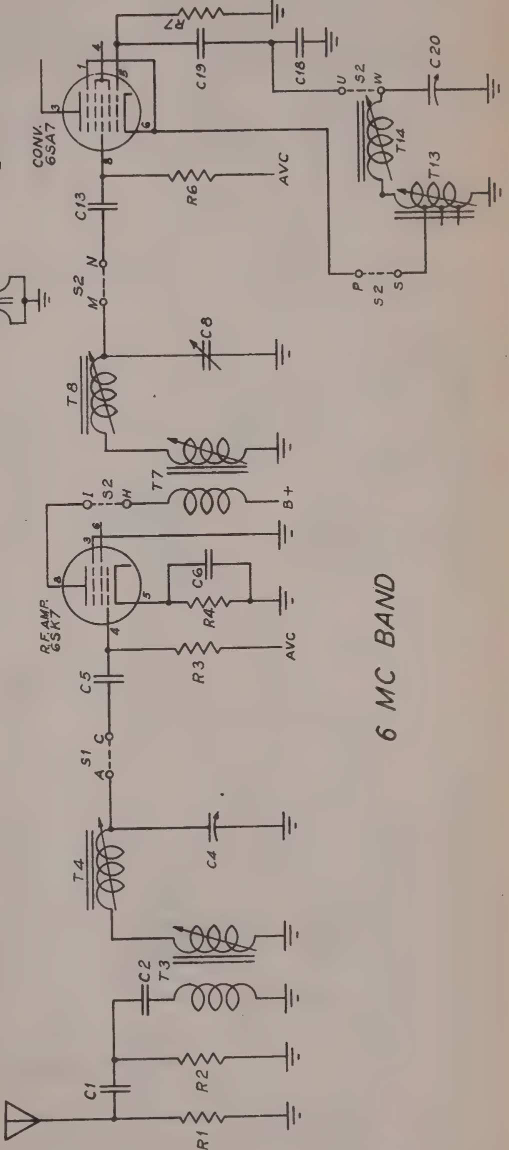
MONTGOMERY WARD & CO.

MODEL 04BR-1105A,
See Mont.-Ward Page 12-52
MODEL 04BR-1106A
See Mont.-Ward. Page 12-51

MODELS 04BR-903A, 04BR-907A
See Mont.-Ward Page 12-47
MODELS 04BR-904A, 04BR-906A
See Mont.-Ward Page 12-50



B. C. BAND

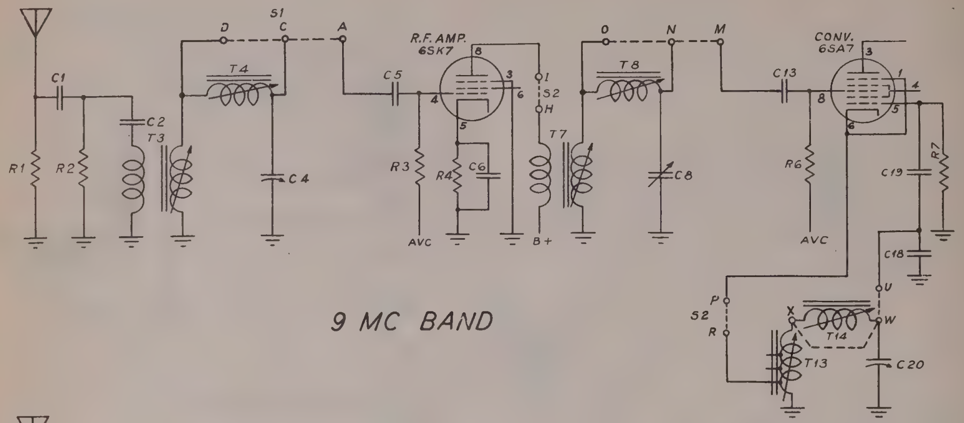


6 MC BAND

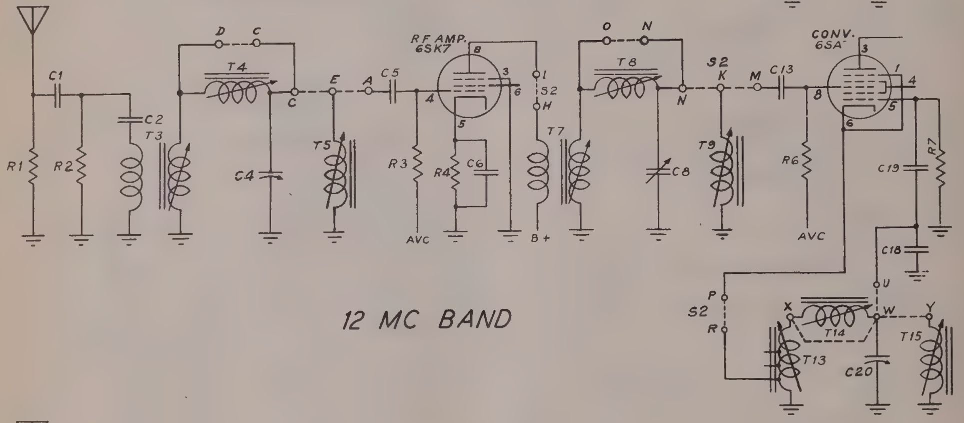
MONTGOMERY WARD & CO.

MODELS 04BR-903A, 04BR-907A
See Mont.-Ward Page 12-47
MODELS 04BR-904A, 04BR-906A
See Mont.-Ward Page 12-50

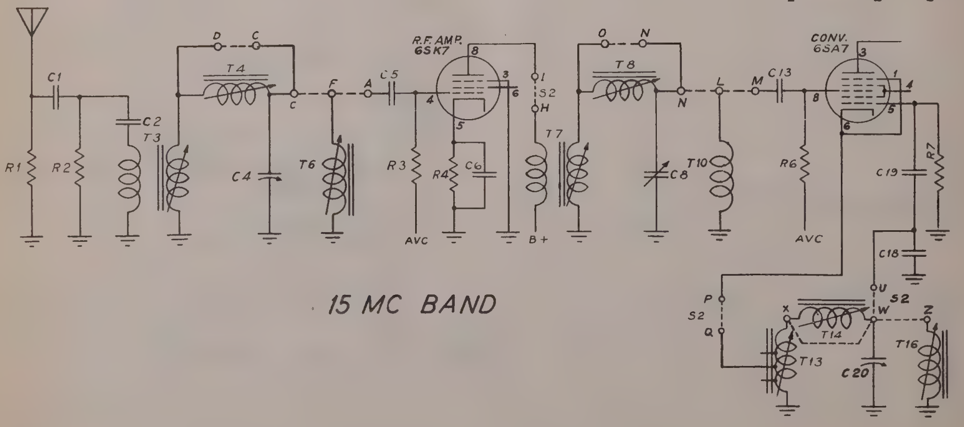
MODEL 04BR-1105A
See Mont.-Ward Page 12-52
MODEL 04BR-1106A
See Mont.-Ward Page 12-51



9 MC BAND



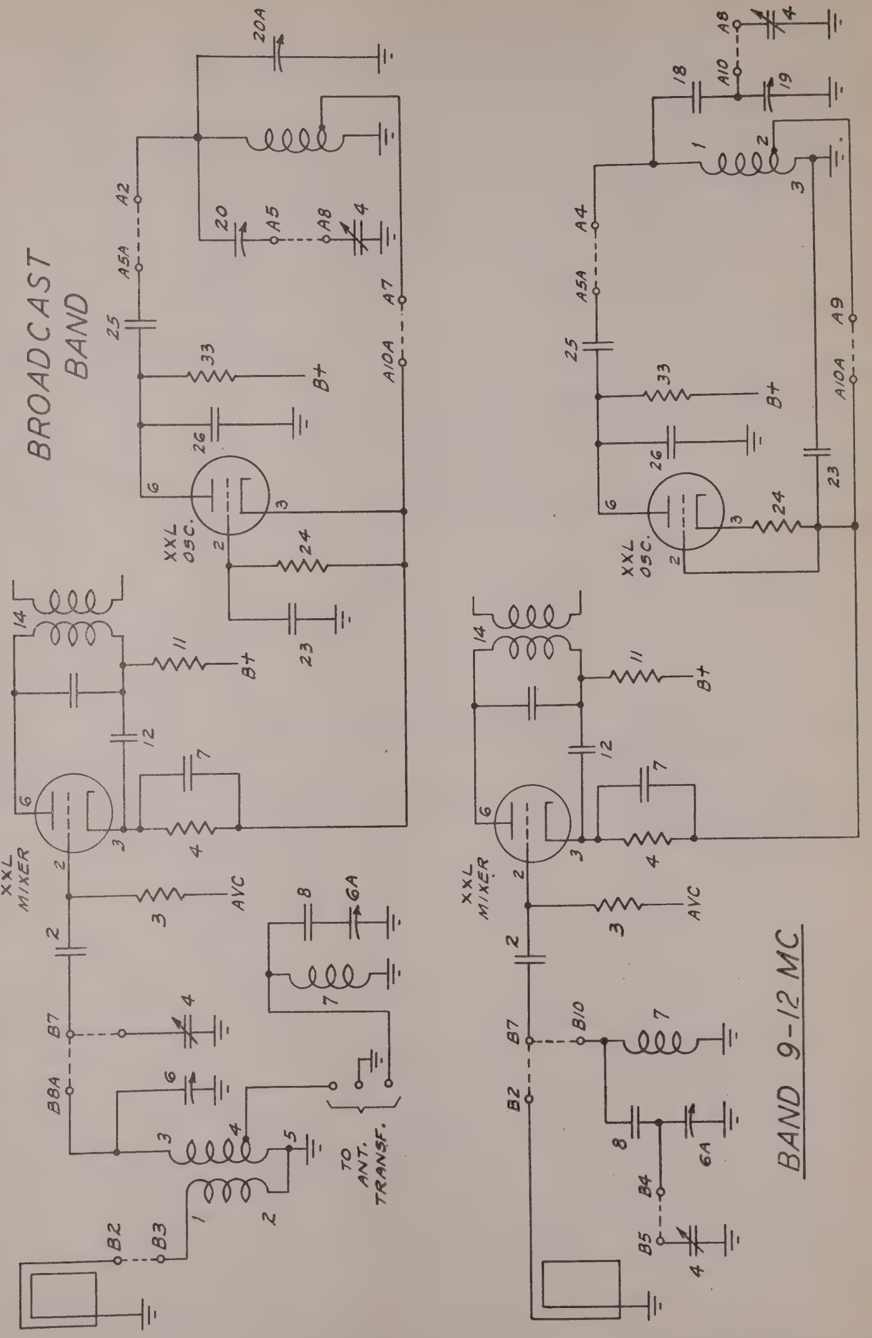
12 MC BAND



15 MC BAND

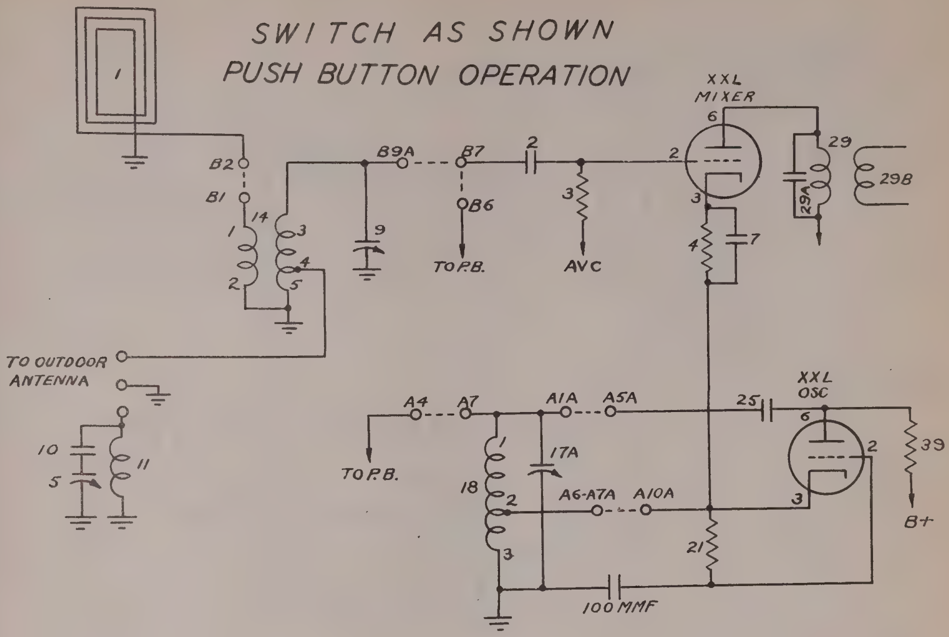
PHILCO RADIO & TELEV. CORP.

MODEL 41-240
See Philco
Page 12-52

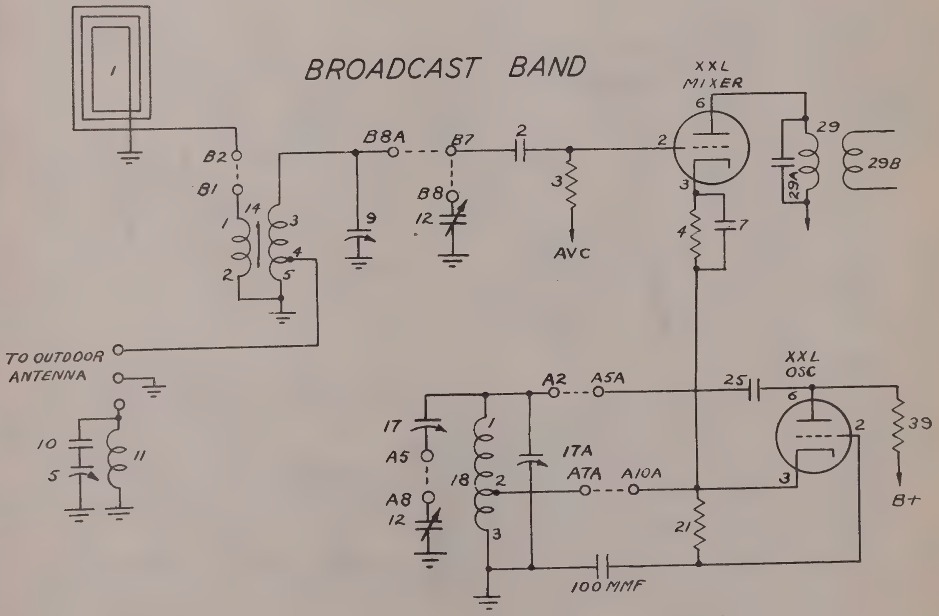


MODEL 41-245
See Philco
Page 12-53

SWITCH AS SHOWN PUSH BUTTON OPERATION

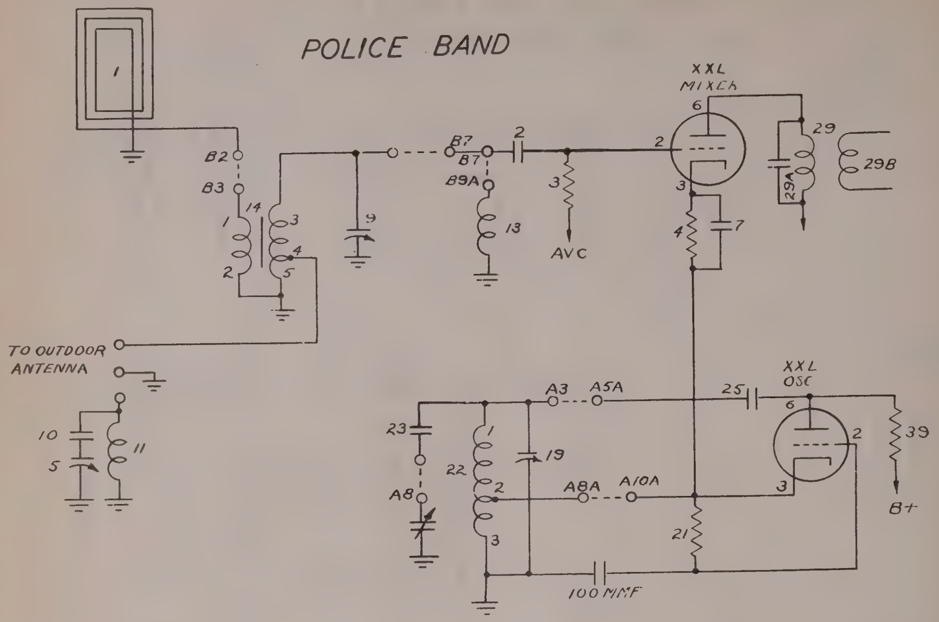


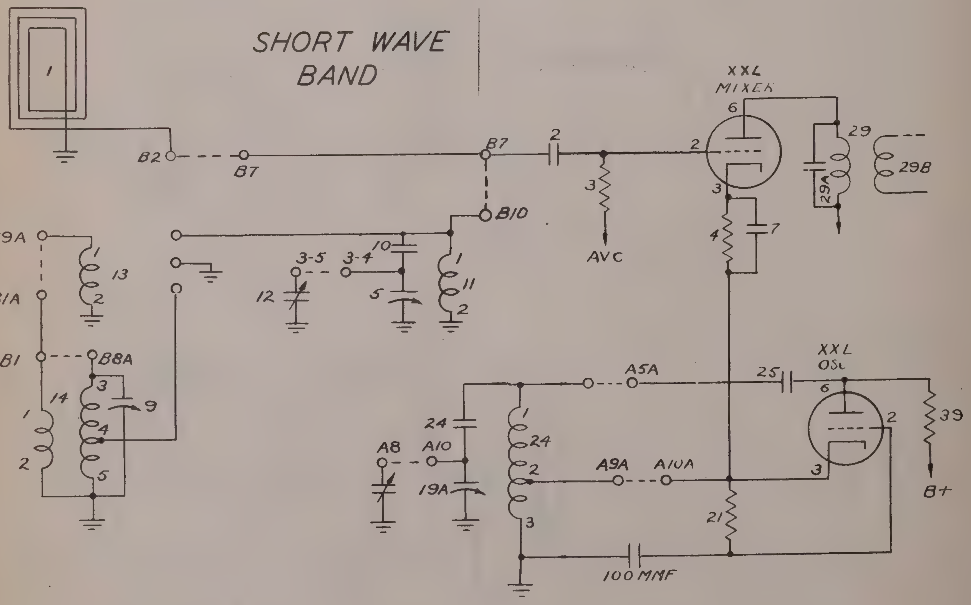
BROADCAST BAND



MODEL 41-245
See Philco
Page 12-53

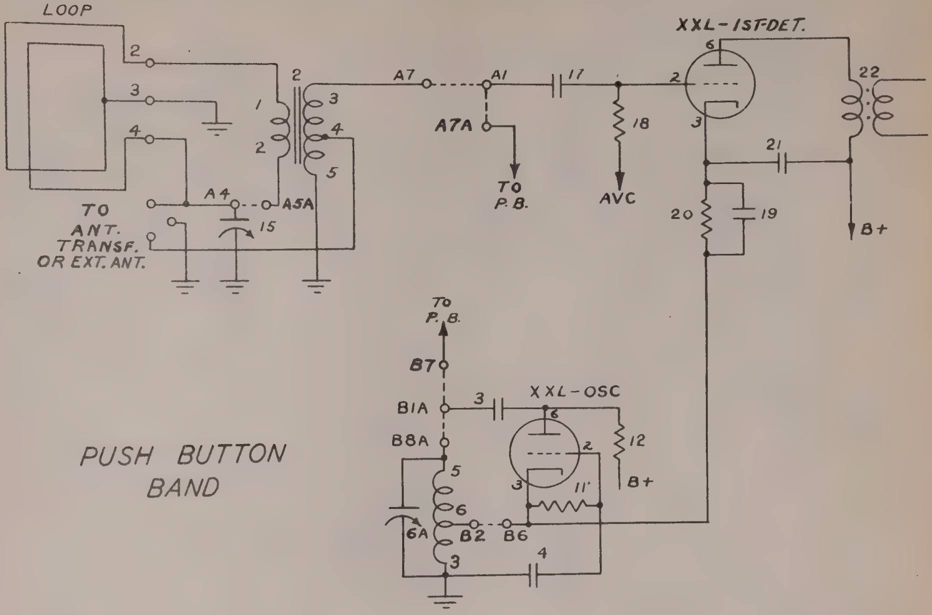
PHILCO RADIO & TELEV. CORP.


POLICE BAND

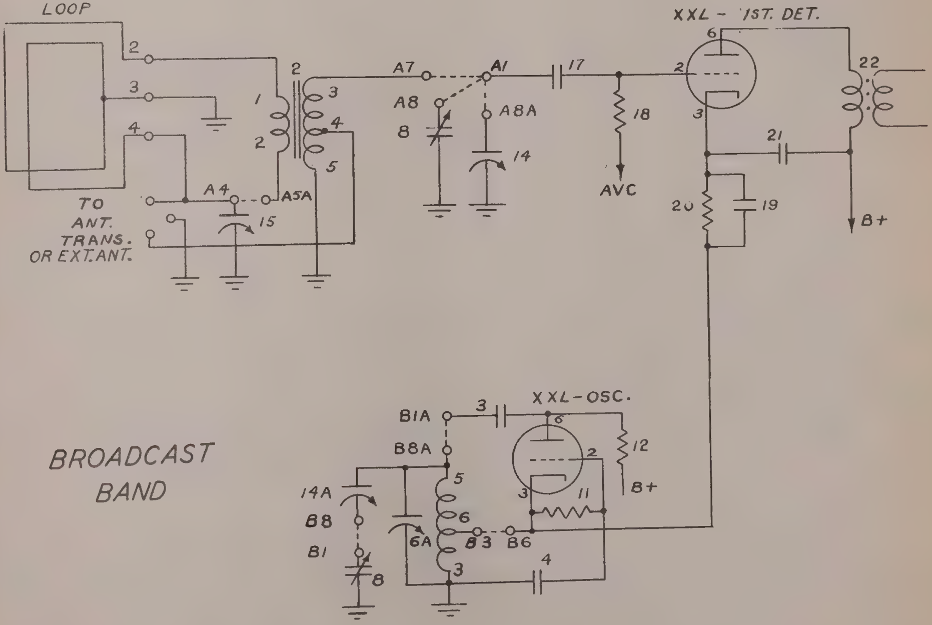

SHORT WAVE BAND

PHILCO RADIO & TELEV. CORP.

MODEL 41-265
See Philco
Page 12-60



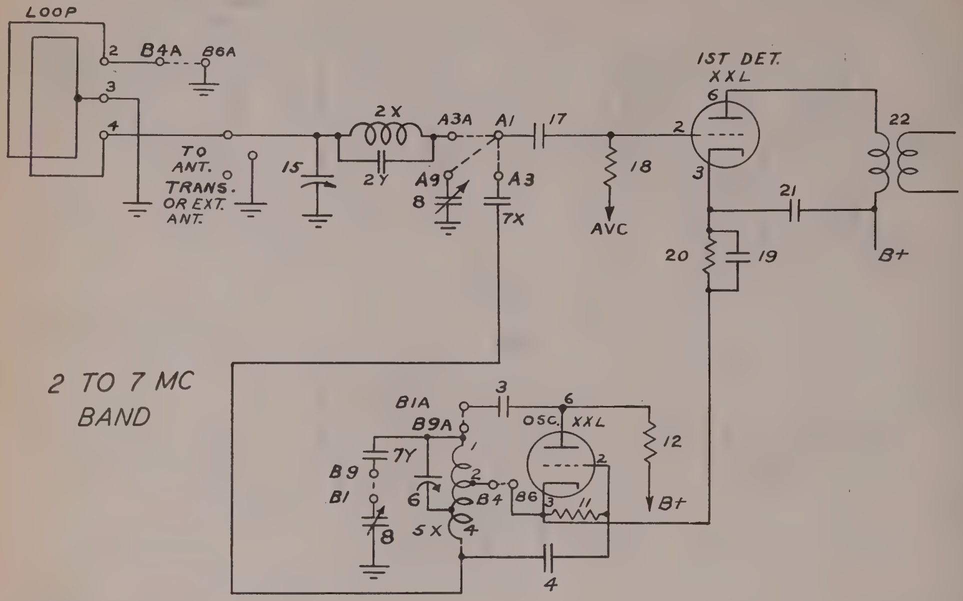
PUSH BUTTON BAND



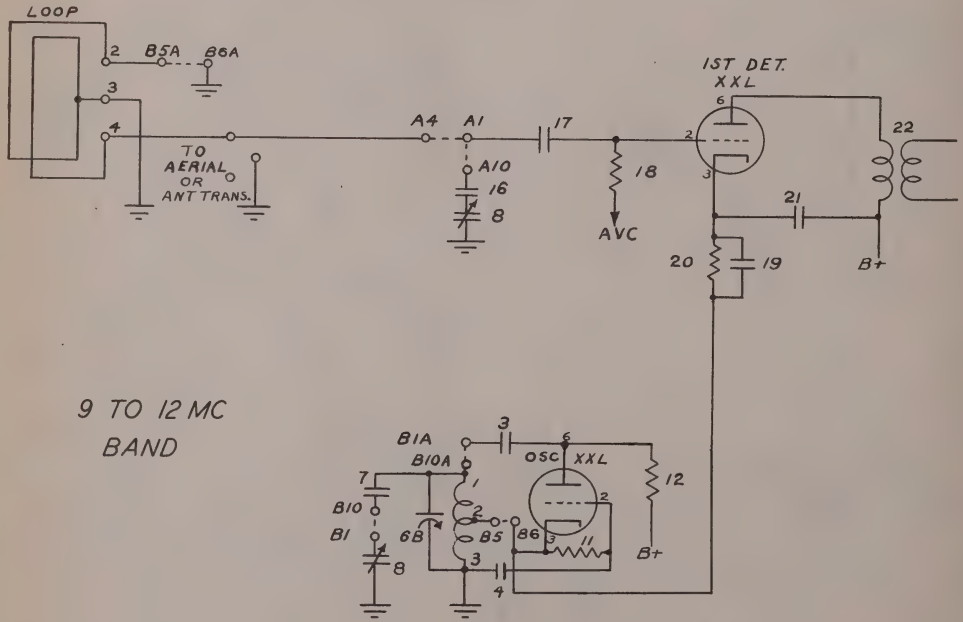
BROADCAST BAND

MODEL 41-265
See Philco Page 12-60

PHILCO RADIO & TELEV. CORP.

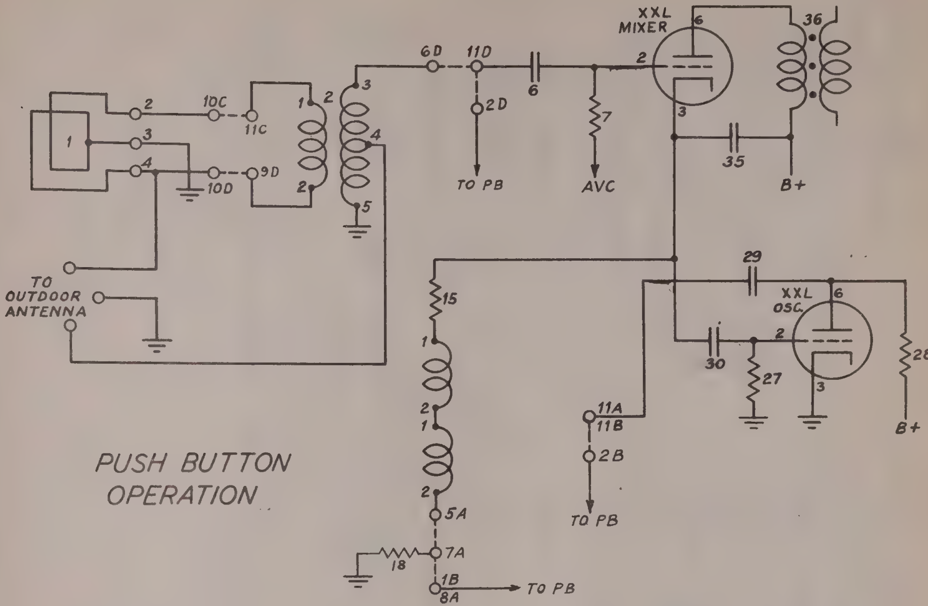


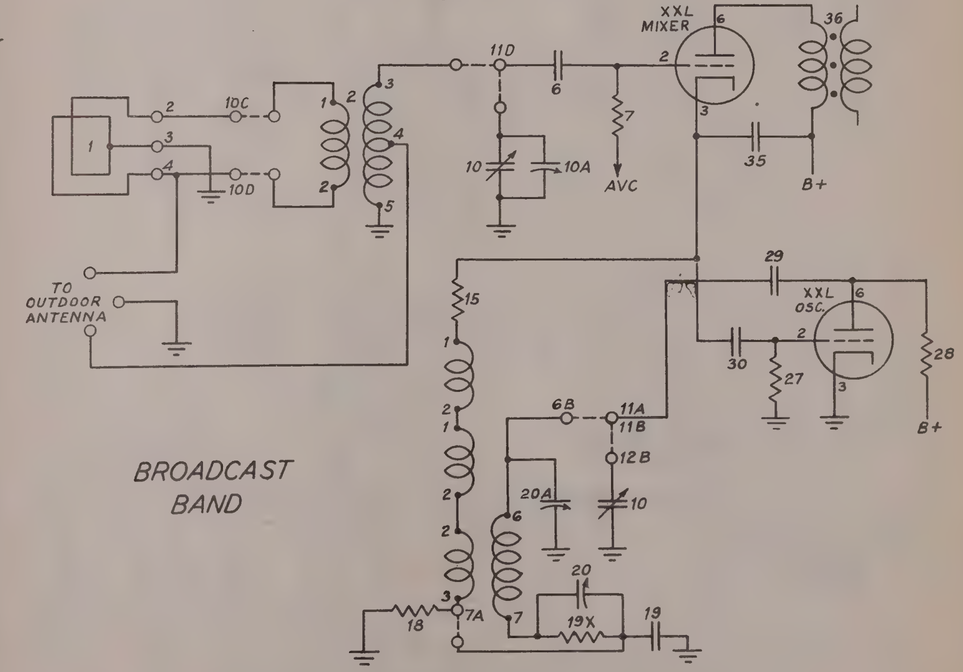
2 TO 7 MC BAND



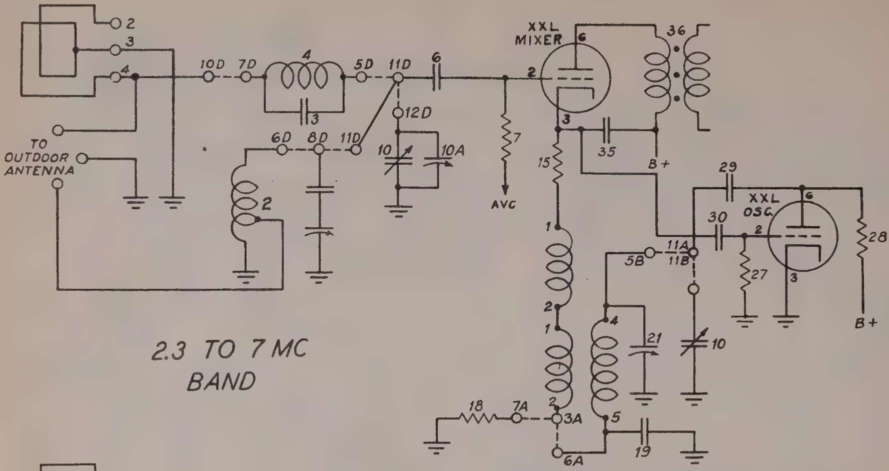
9 TO 12 MC BAND

PHILCO RADIO & TELEV. CORP. MODELS 41-295, 41-300
See Philco Page 12-65

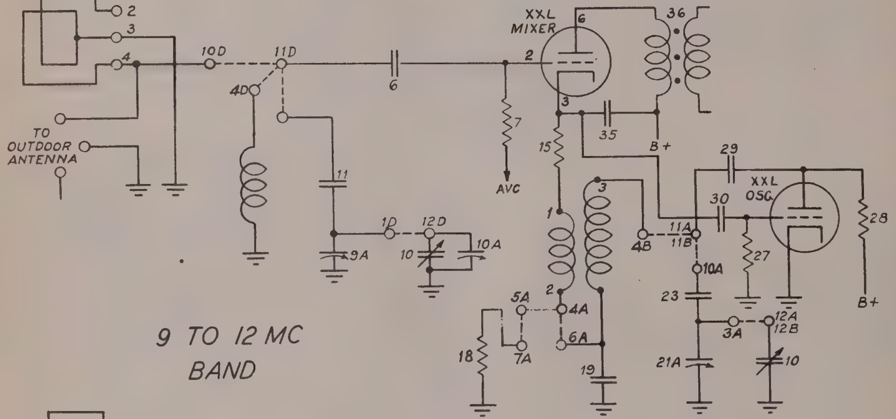




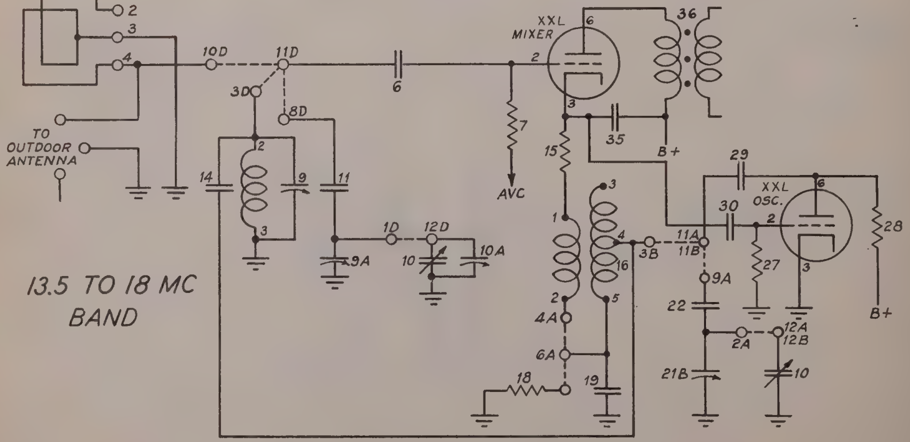
MODELS 41-295, 41-300 PHILCO RADIO & TELEV. CORP.
See Philco Page 12-65



2.3 TO 7 MC BAND



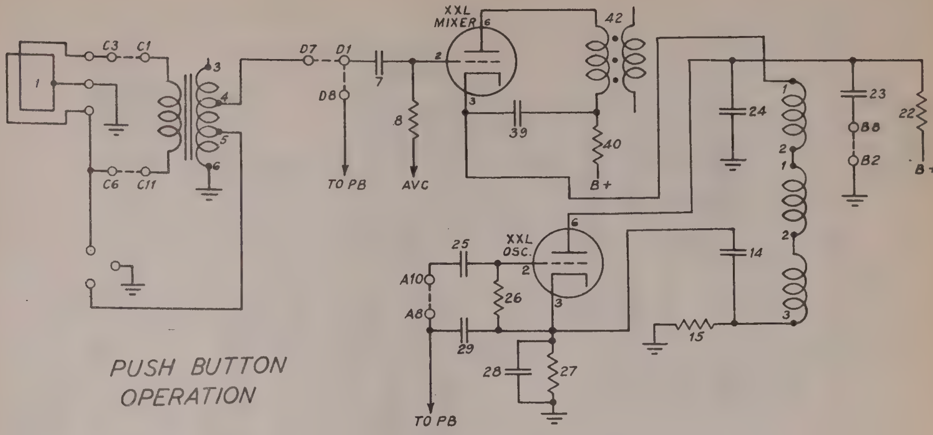
9 TO 12 MC BAND



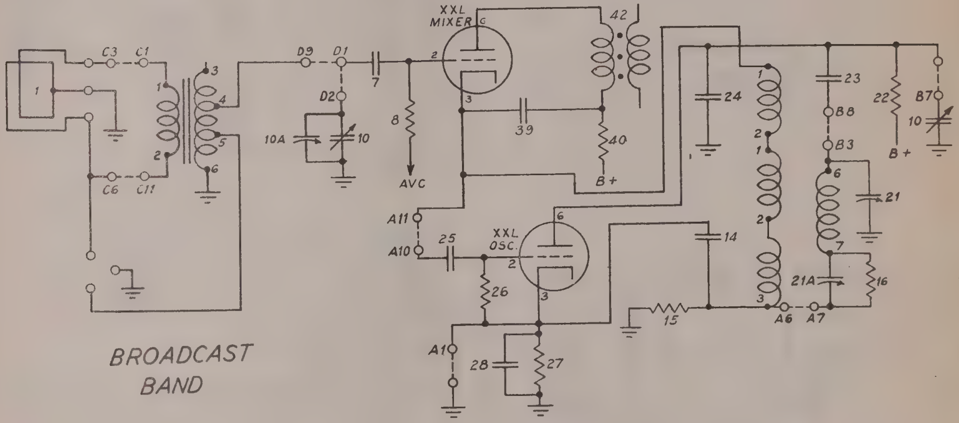
13.5 TO 18 MC BAND

PHILCO RADIO & TELEV. CORP.

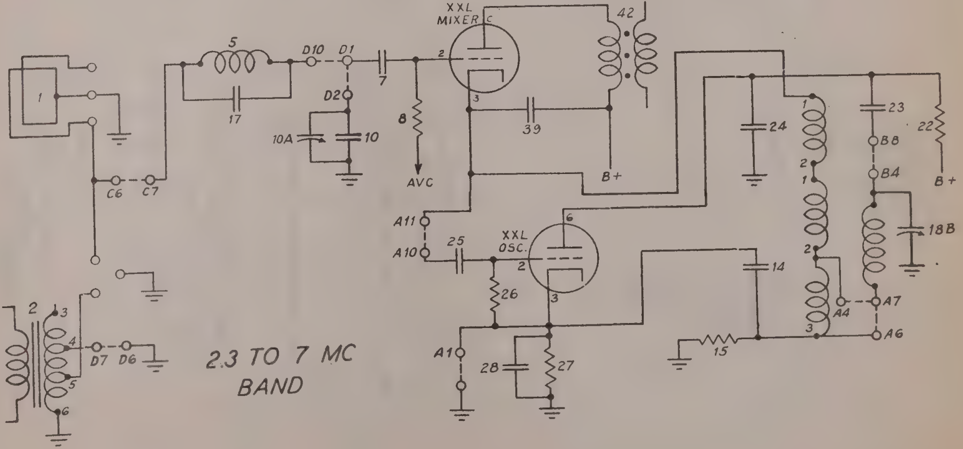
MODEL 41-316
See Philco
Page 12-67, 68



PUSH BUTTON OPERATION



BROADCAST BAND

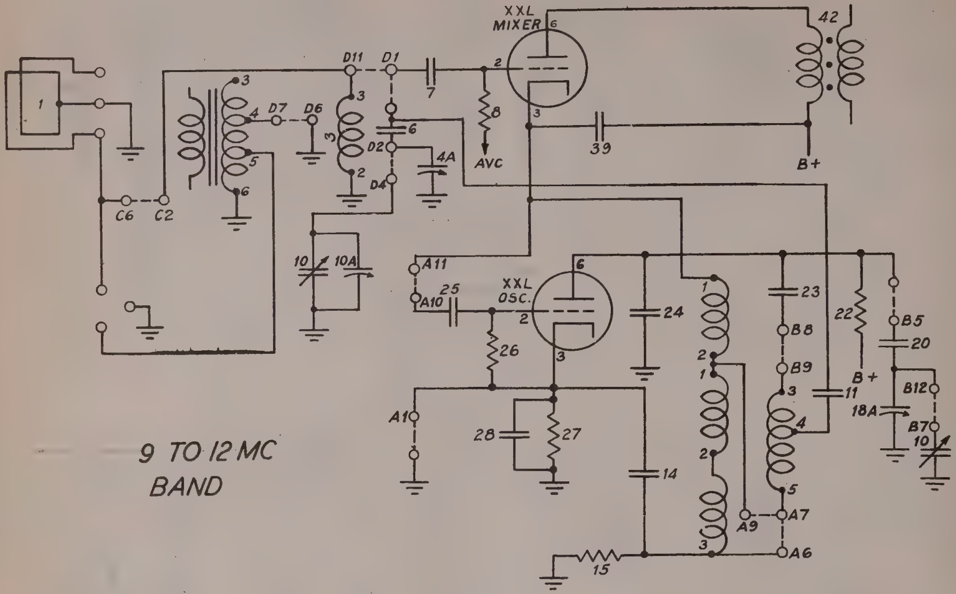


2.3 TO 7 MC BAND

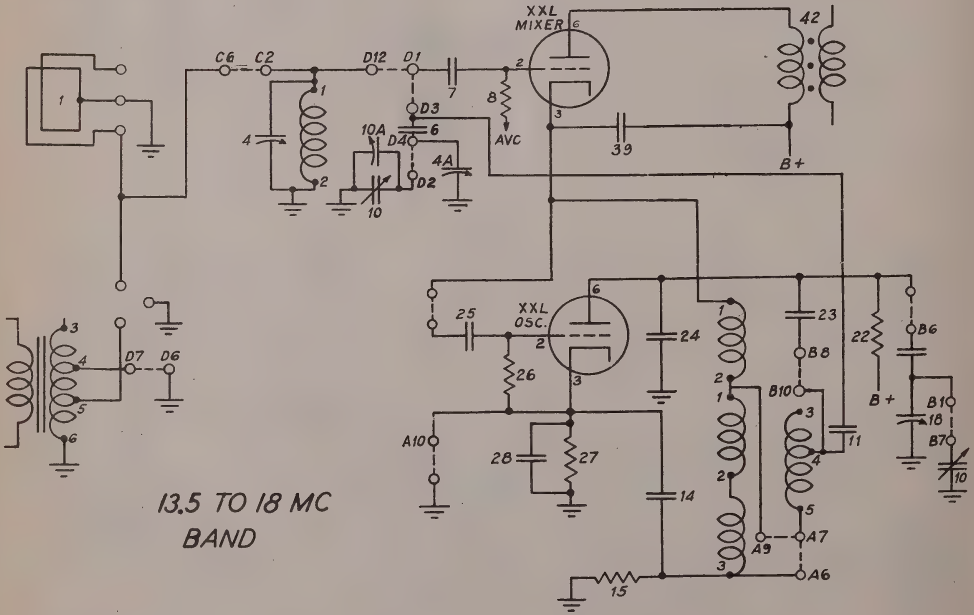
MODEL 41-316

PHILCO RADIO & TELEV. CORP.

See Philco Page 12-67,68



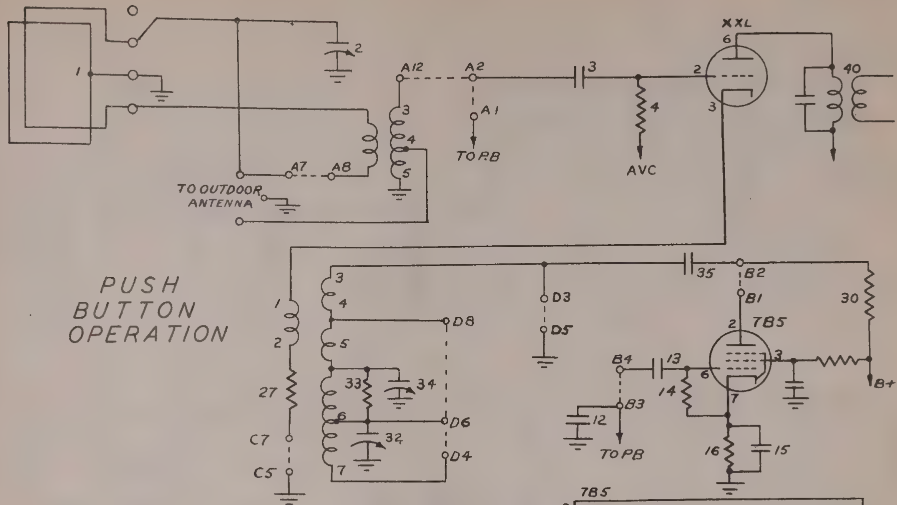
9 TO 12 MC BAND



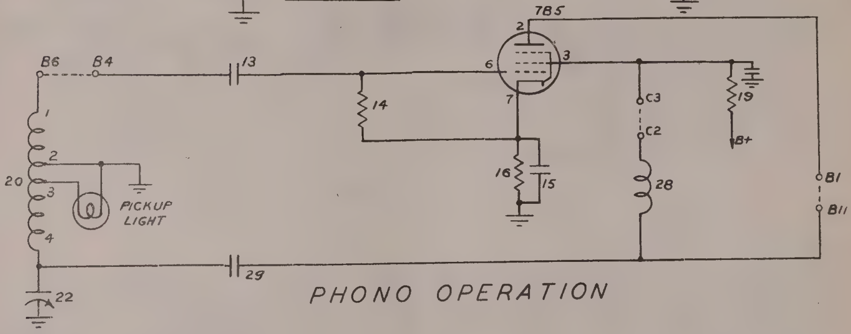
13.5 TO 18 MC BAND

PHILCO RADIO & TELEV. CORP.

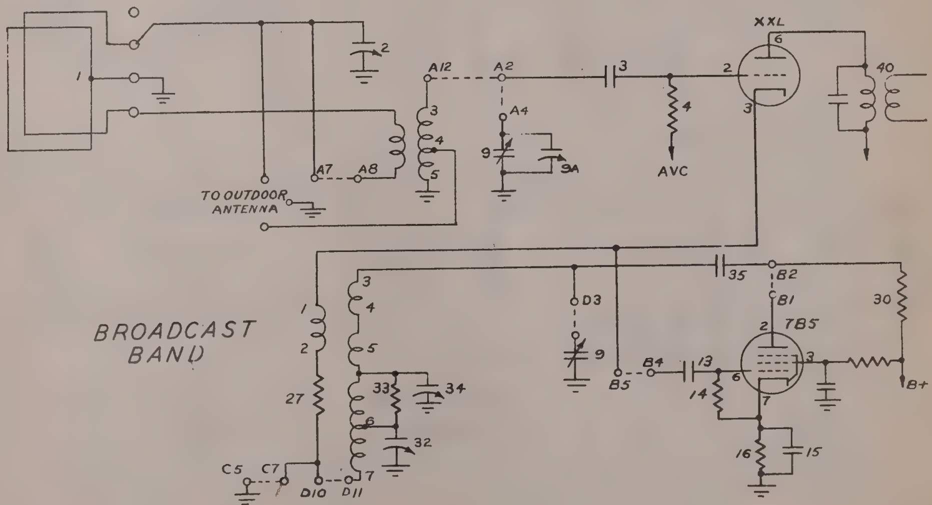
MODELS 41-610, 41-611
See Philco Page 12-77



PUSH BUTTON OPERATION



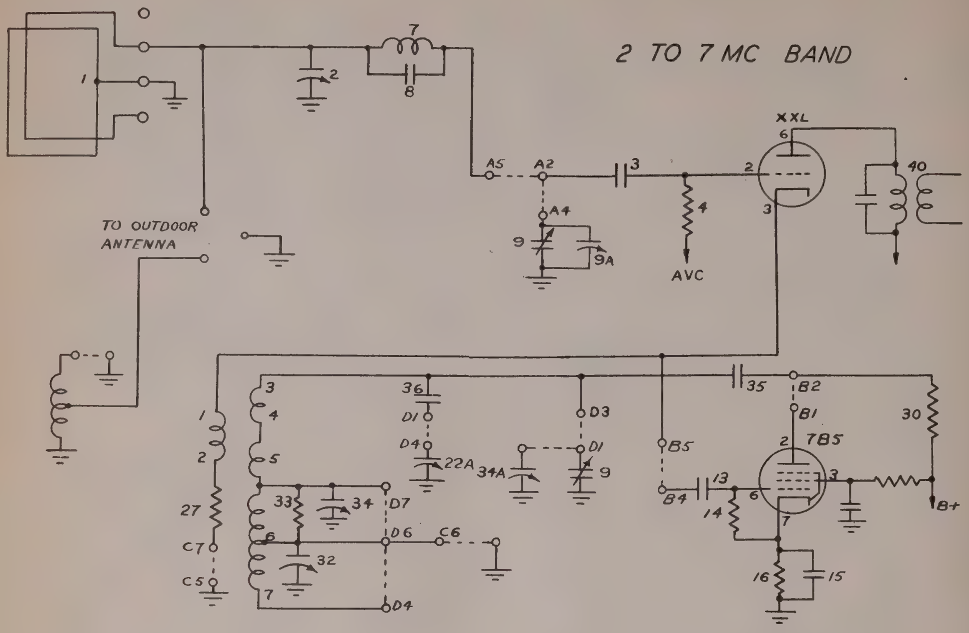
PHONO OPERATION

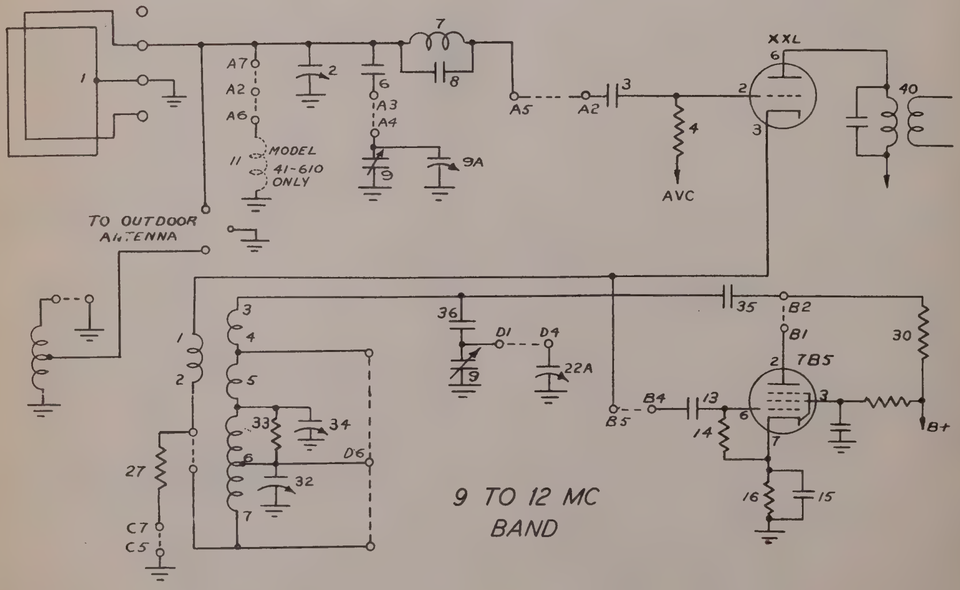


BROADCAST BAND

MODELS 41-610, 41-611
See Philco Page 12-77

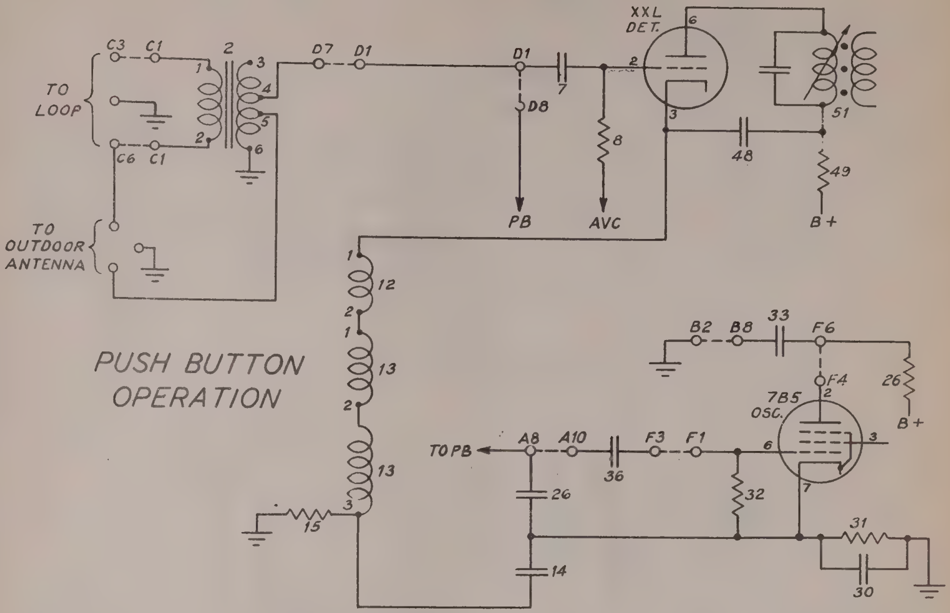
PHILCO RADIO & TELEV: CORP.



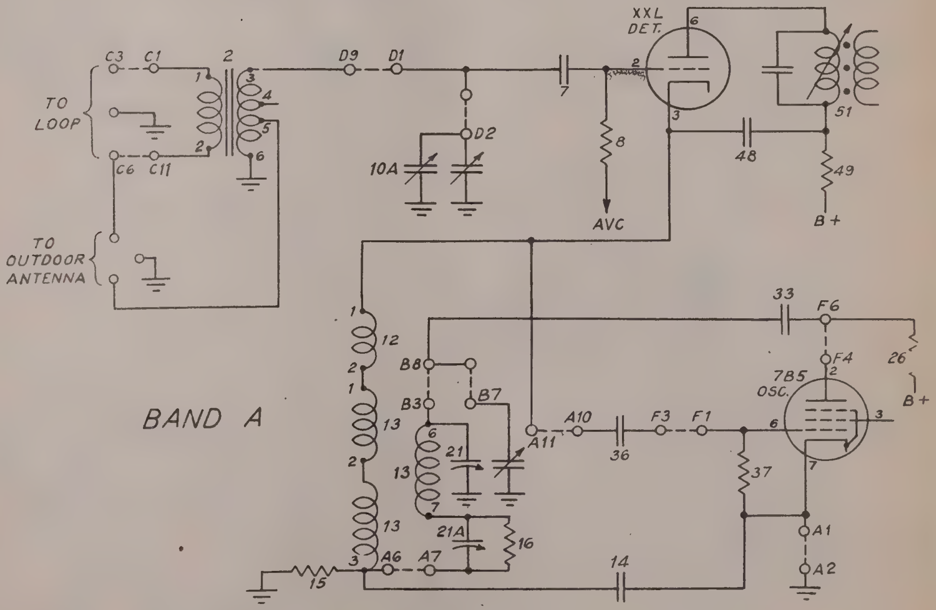


PHILCO RADIO & TELEV. CORP.

MODELS 41.616P,
41.616PW
See Philco
Page 12-79, 80



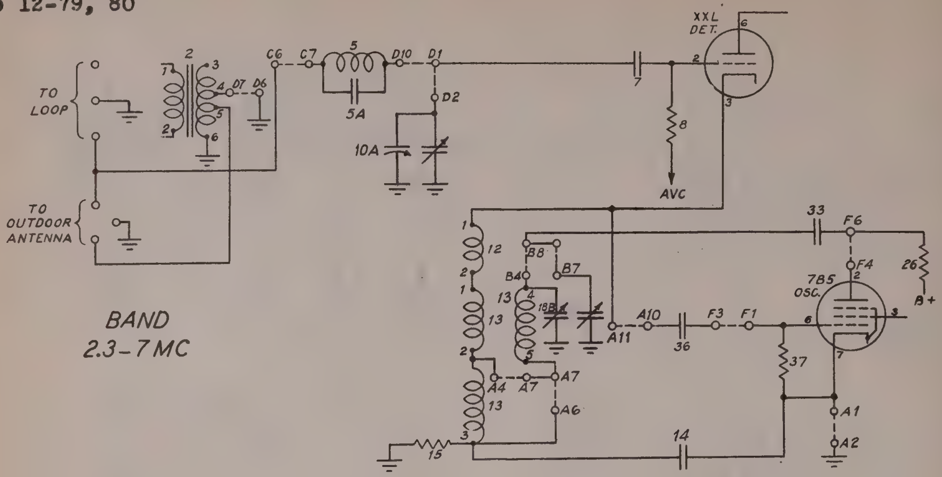
PUSH BUTTON OPERATION

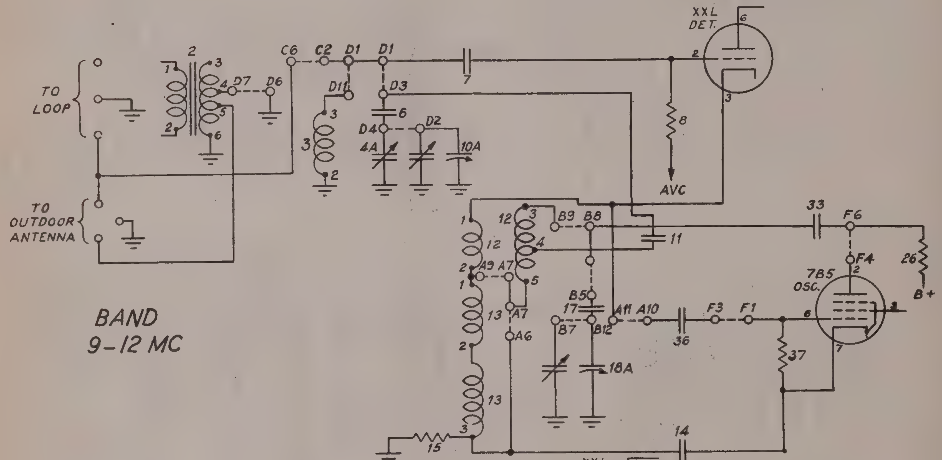


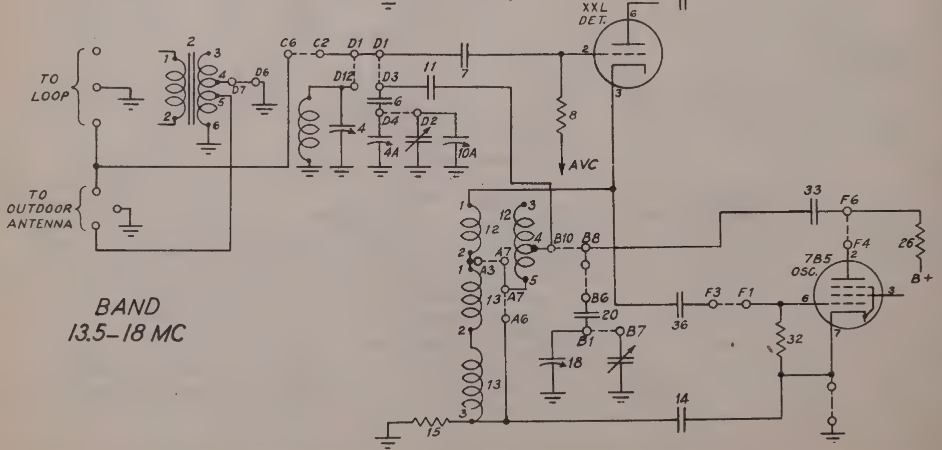
BAND A

MODELS 41.616P,
41.616PW
See Philco
Page 12-79, 80

PHILCO RADIO & TELEV. CORP.

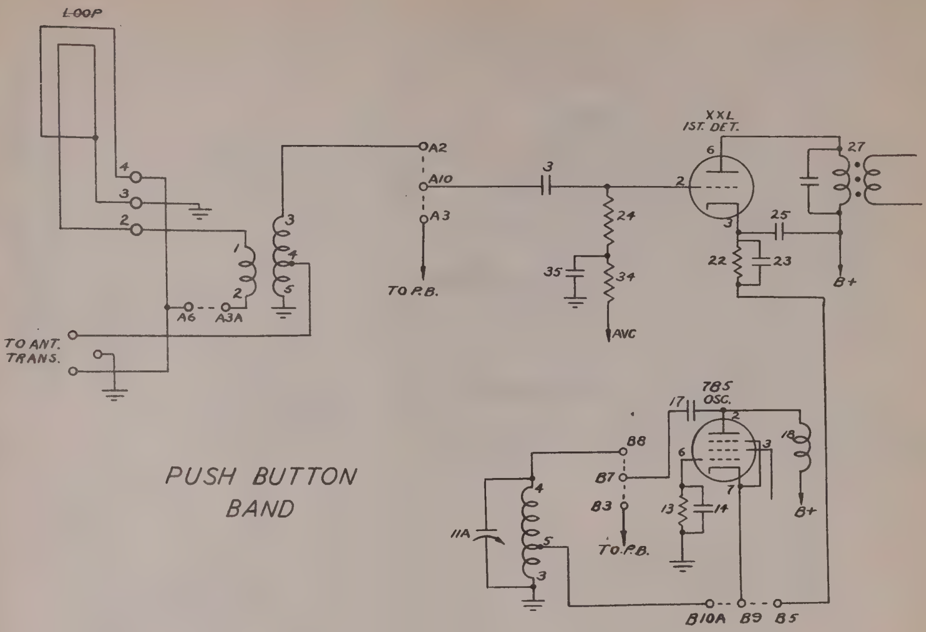




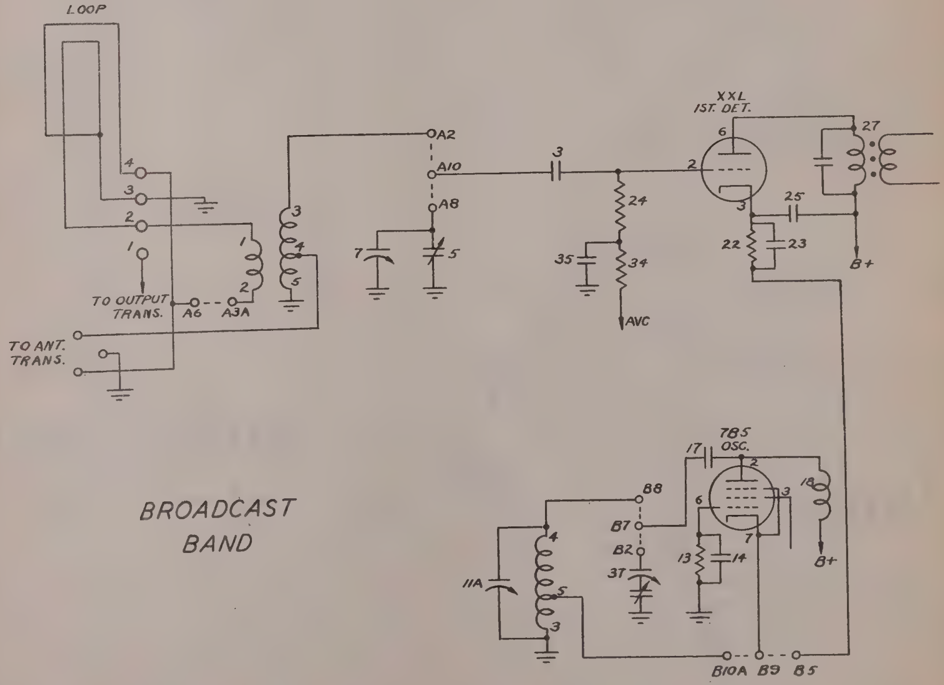


PHILCO RADIO & TELEV. CORP. MODEL 41-629

See Philco Page 12-85



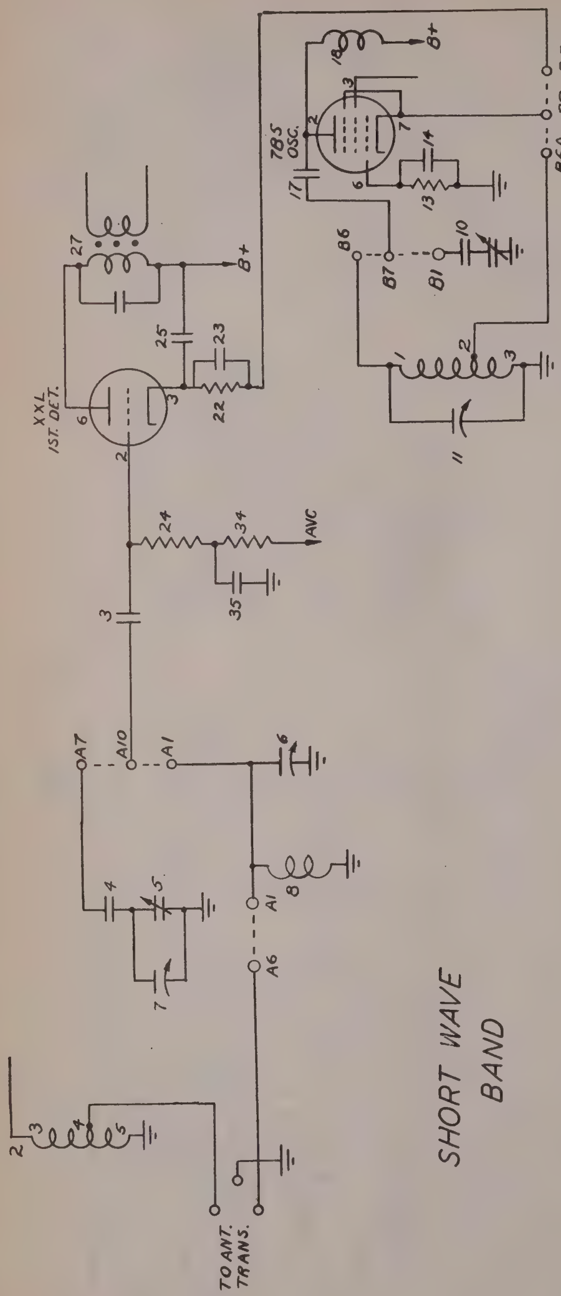
PUSH BUTTON BAND



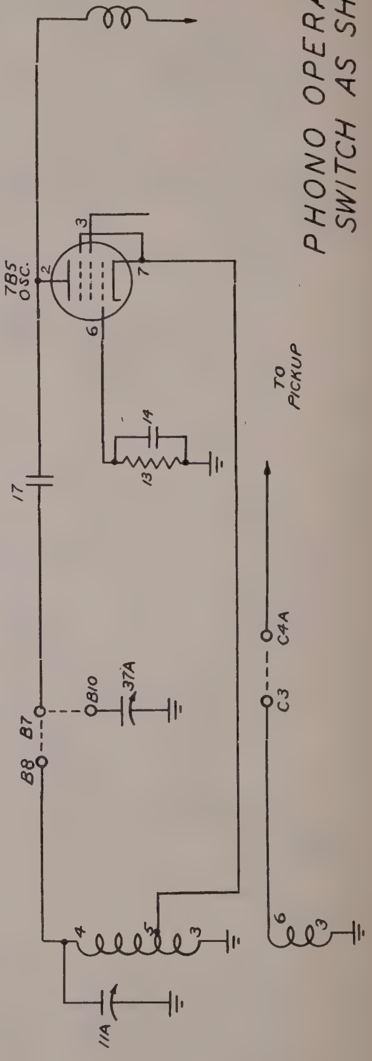
BROADCAST BAND

MODEL 41-629
See Philco Page 12-85

PHILCO RADIO & TELEV. CORP.



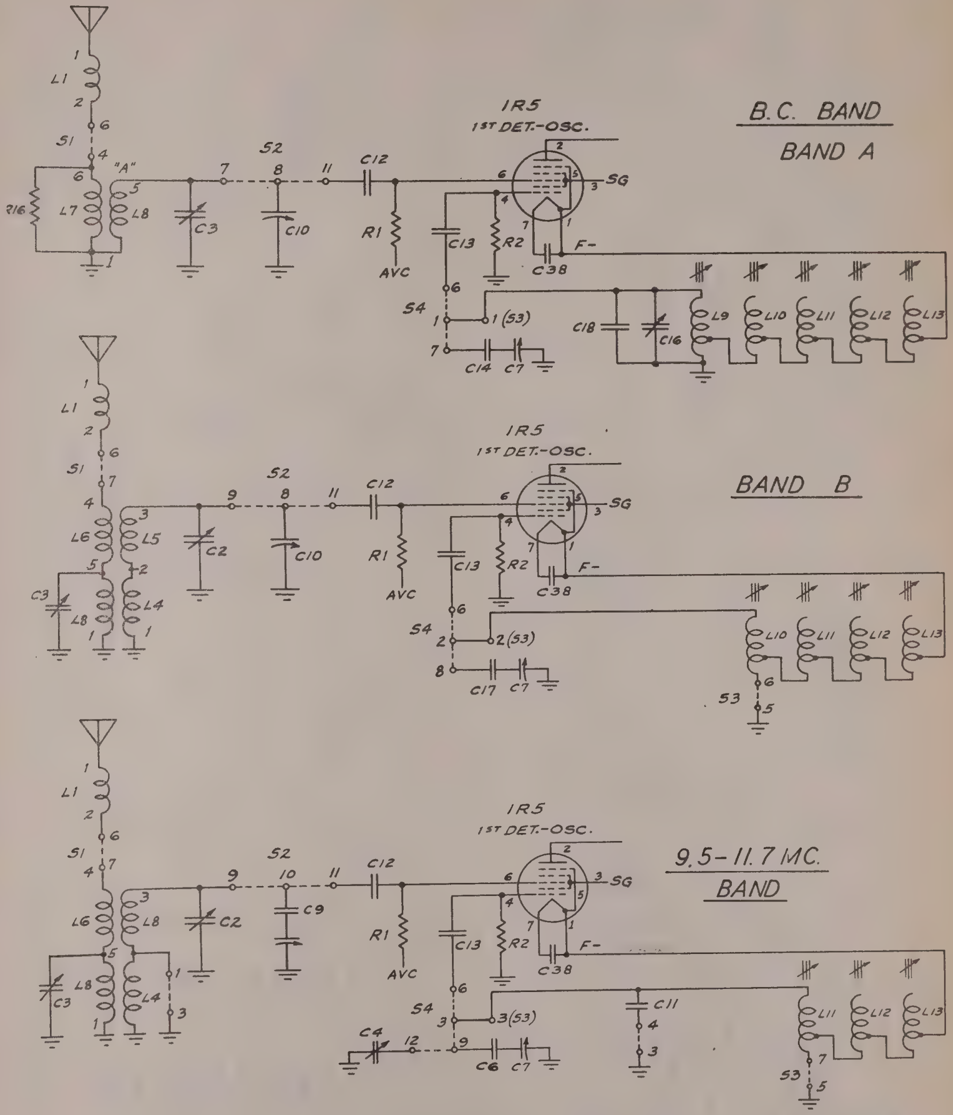
SHORT WAVE BAND



PHONO OPERATION SWITCH AS SHOWN

RCA MFG. CO., INC.

MODEL QB2
See RCA Page 12-3



B.C. BAND

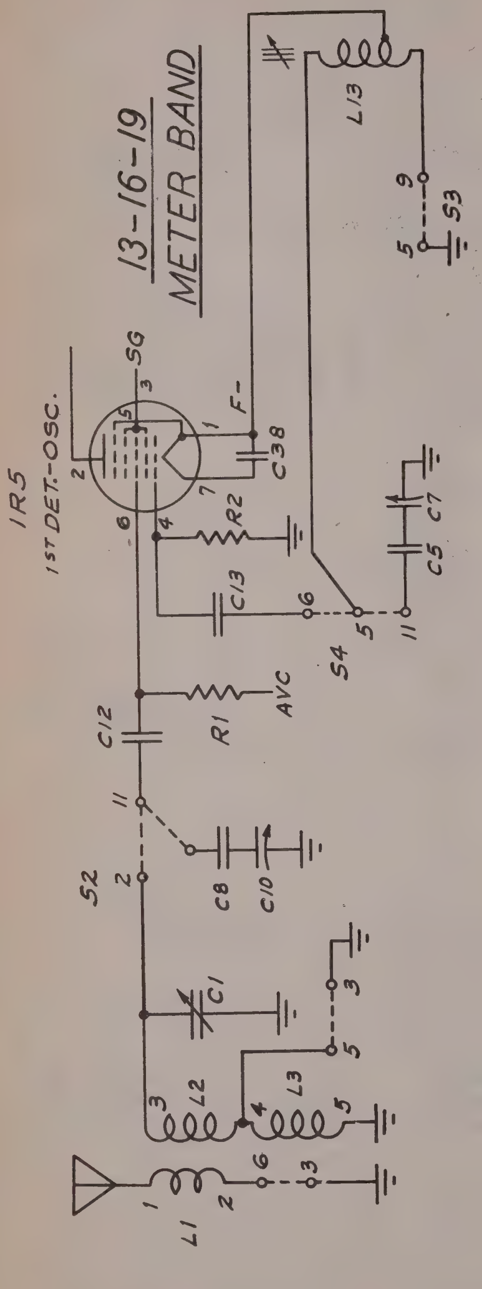
BAND A

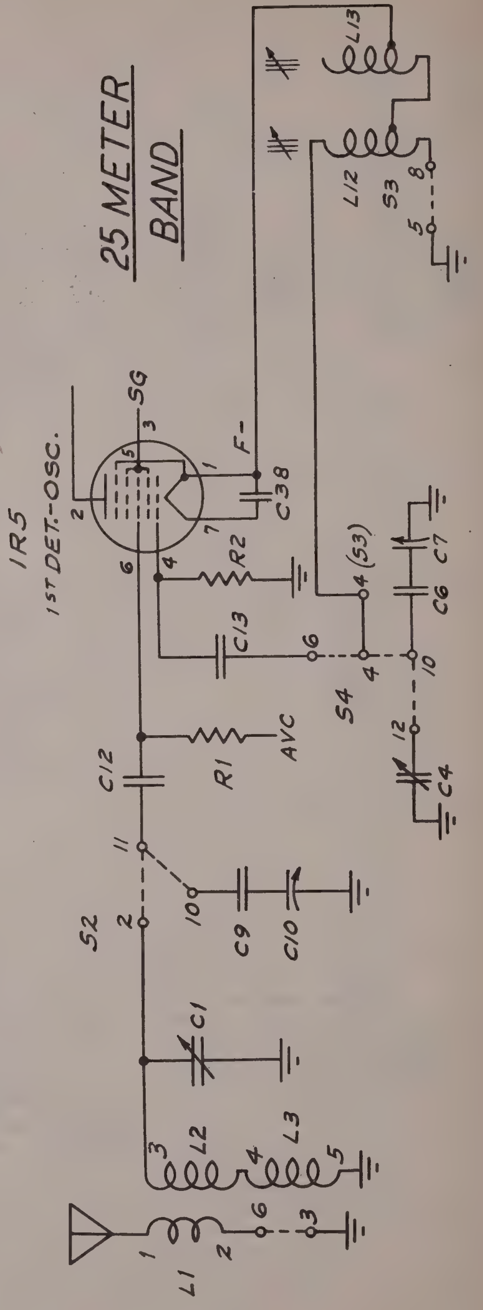
BAND B

9.5-11.7 MC. BAND

MODEL QB2
See RCA Page 12-3

RCA MFG. CO., INC.

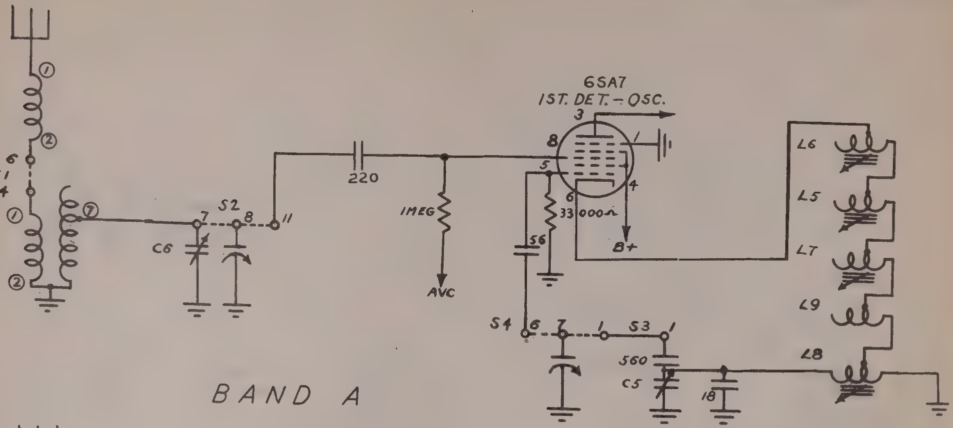




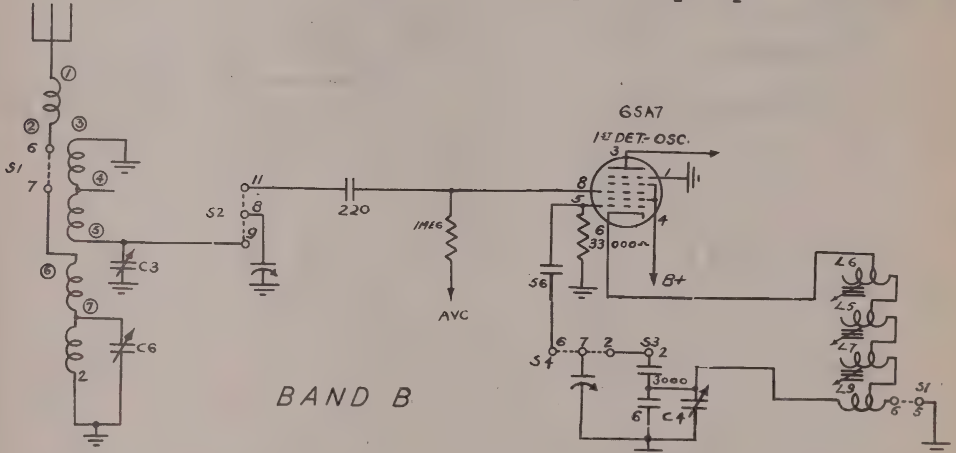
MODEL Q24
See RCA Page 12-33

RCA MFG. CO., INC.

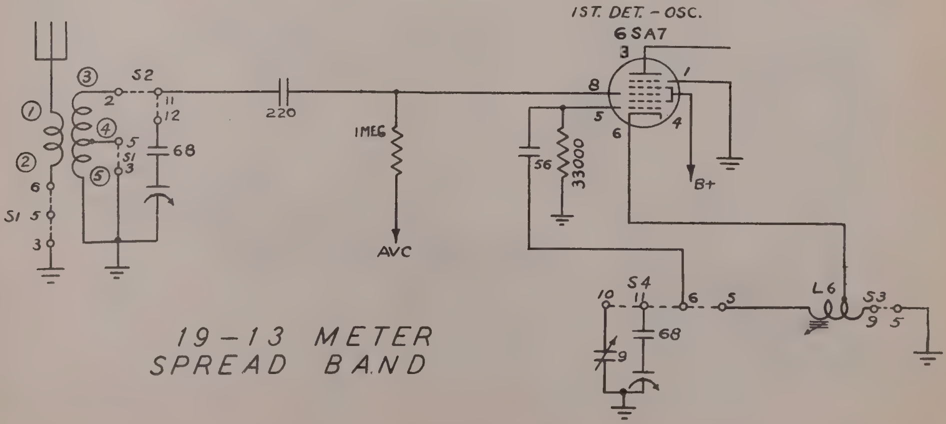
MODELS QU2C, QU2M
See RCA Page 12-5
MODELS Q22, QK23, Q25
See RCA Page 12-31



BAND A



BAND B

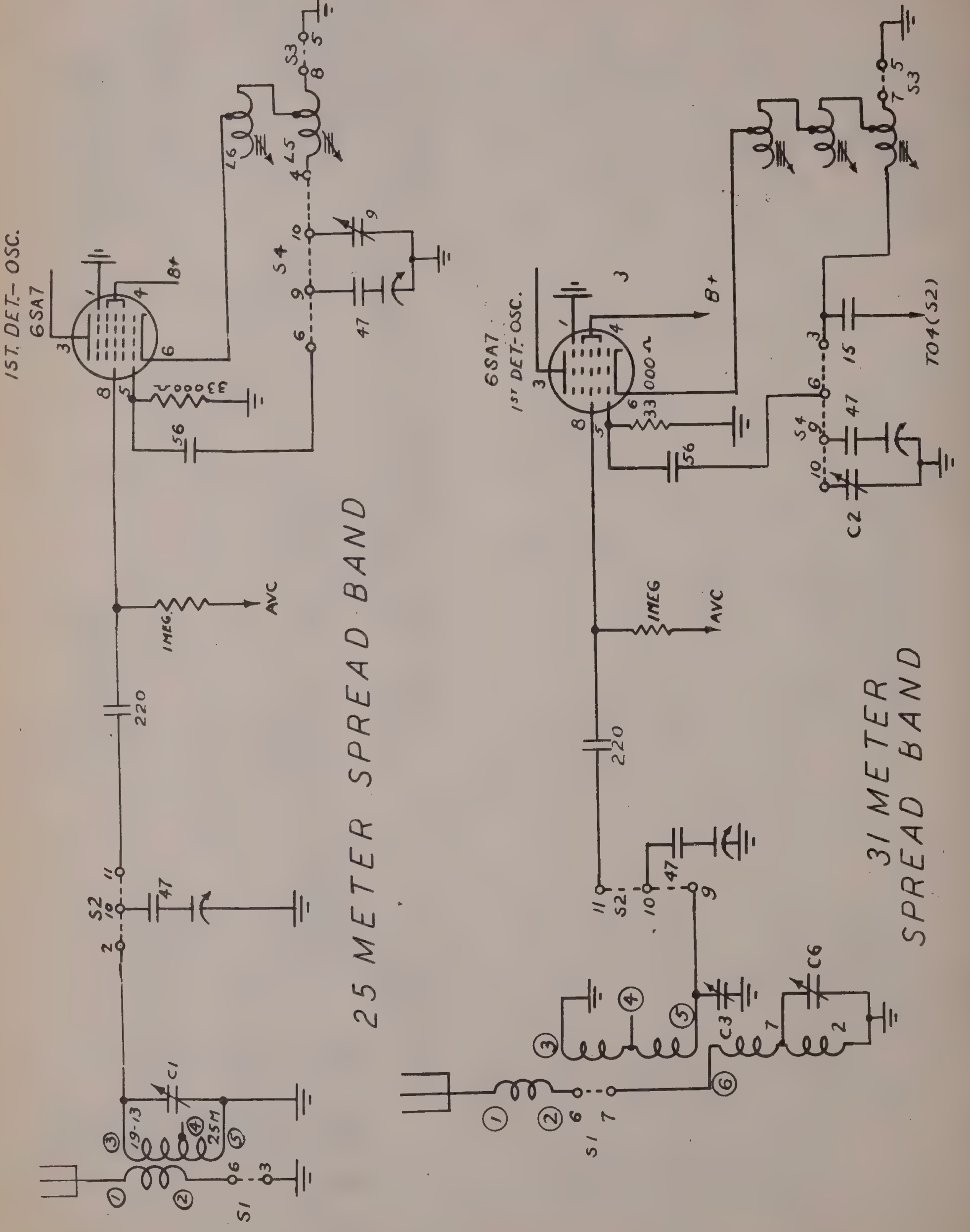


19 – 13 METER
SPREAD BAND

MODELS QU2C, QU2M
See RCA Page 12-5
MODELS Q22, QK23, Q25
See RCA Page 12-31

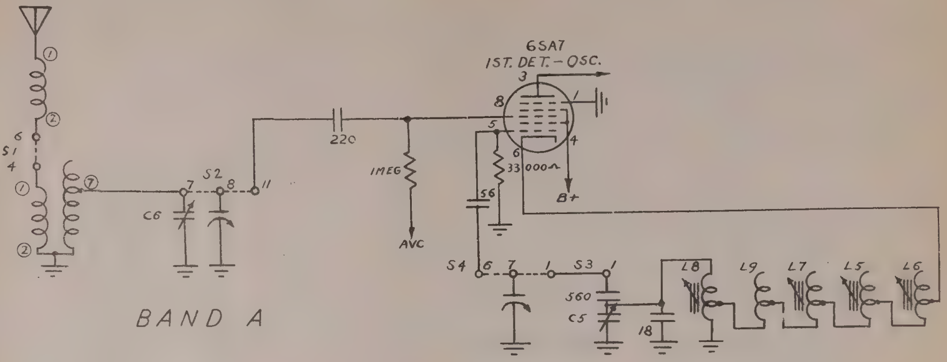
RCA MFG. CO., INC.

MODEL Q24
See RCA Page 12-33

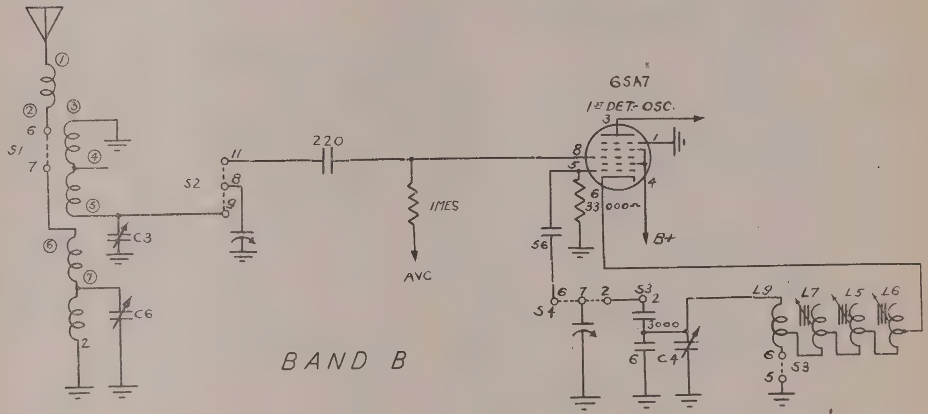


RCA MFG. CO., INC.

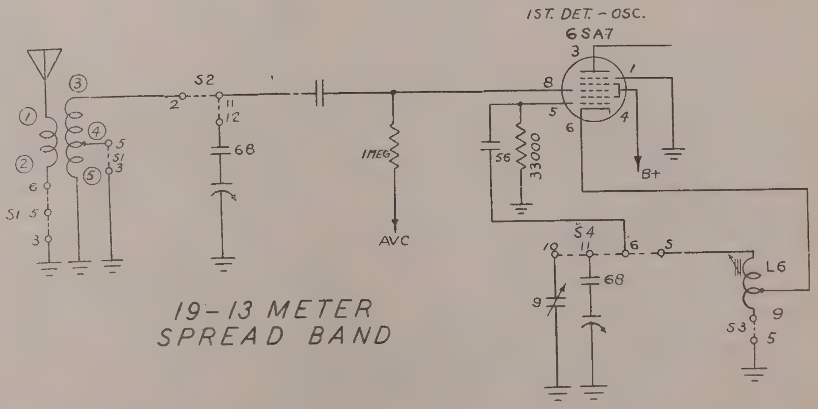
MODELS QU3C, QU3M, Q26
See RCA Page 12-93
MODEL QU5
See RCA Page 12-9



BAND A



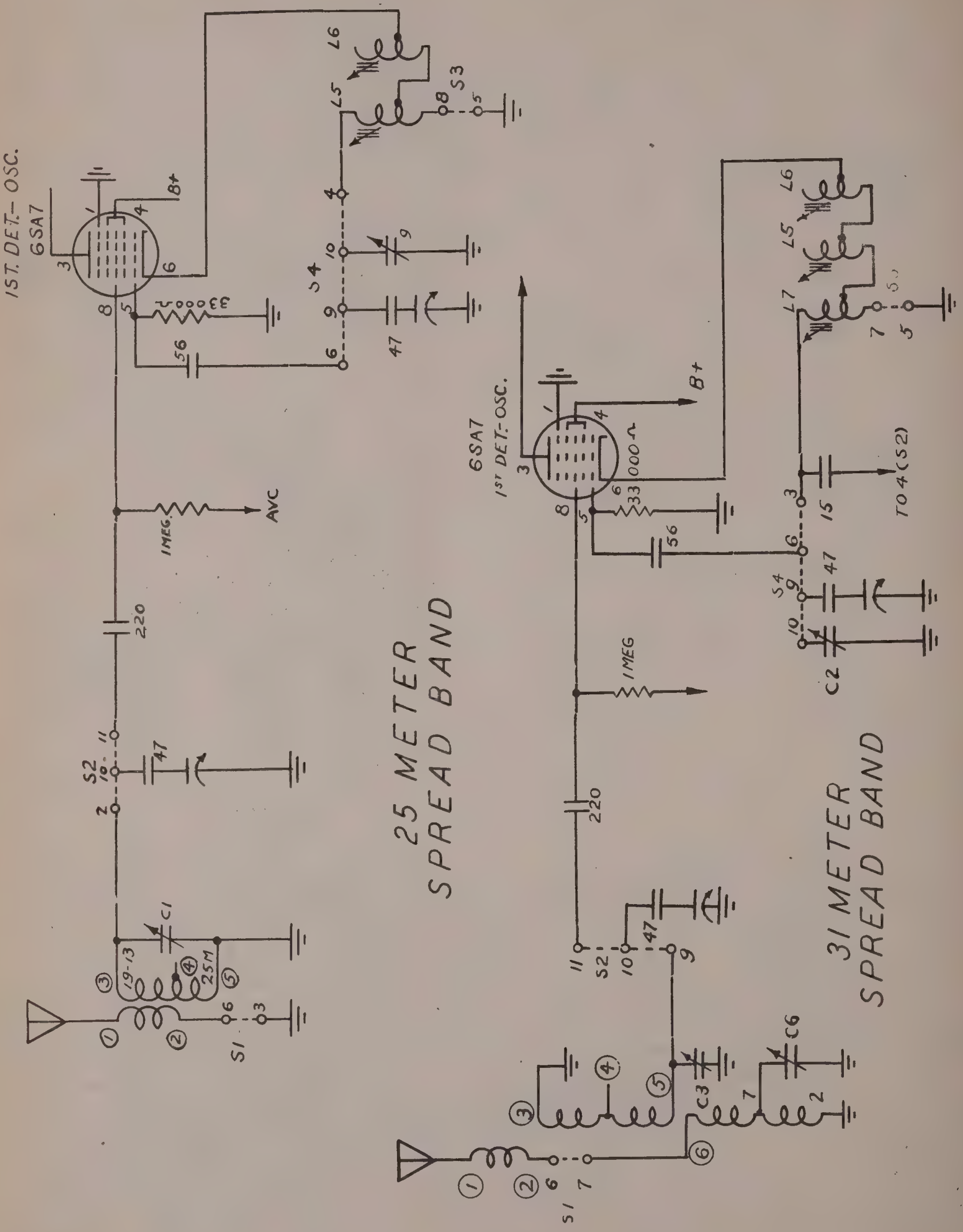
BAND B



19-13 METER
SPREAD BAND

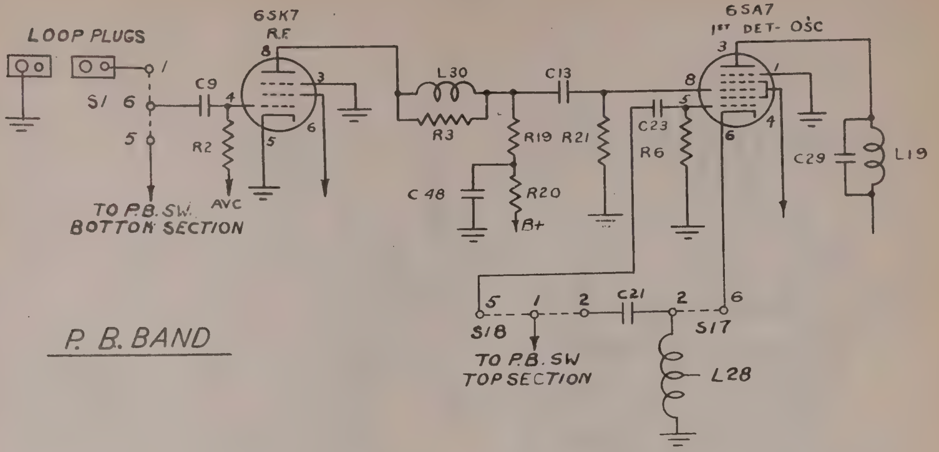
MODELS QU3C, QU3M, Q26
See RCA Page 12-93
MODEL QU5
See RCA Page 12-9

RCA MFG. CO., INC.

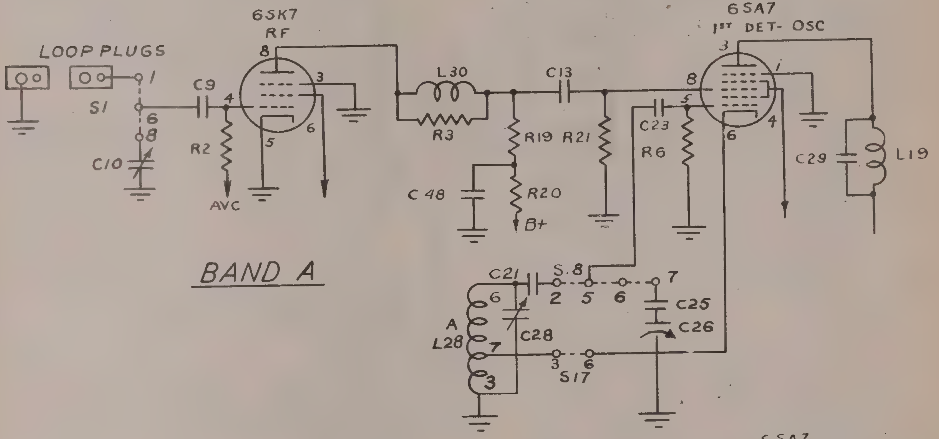


RCA MFG. CO., INC.

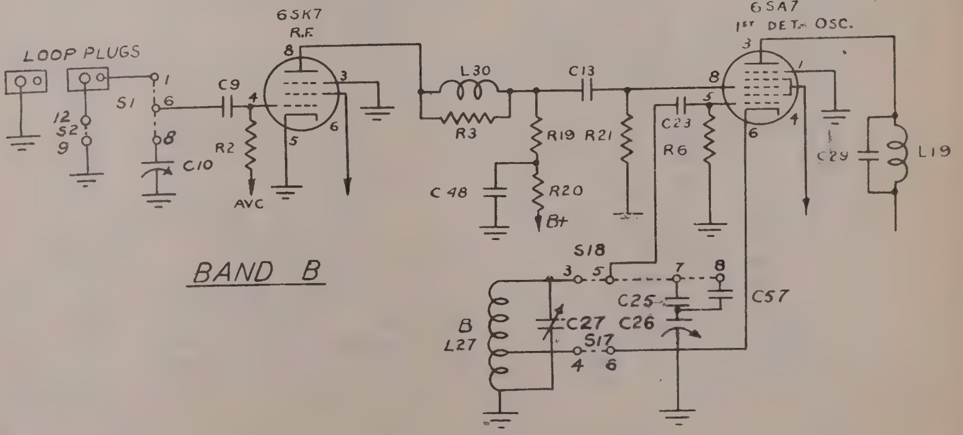
MODEL 110K
See RCA Page 12-43



P. B. BAND



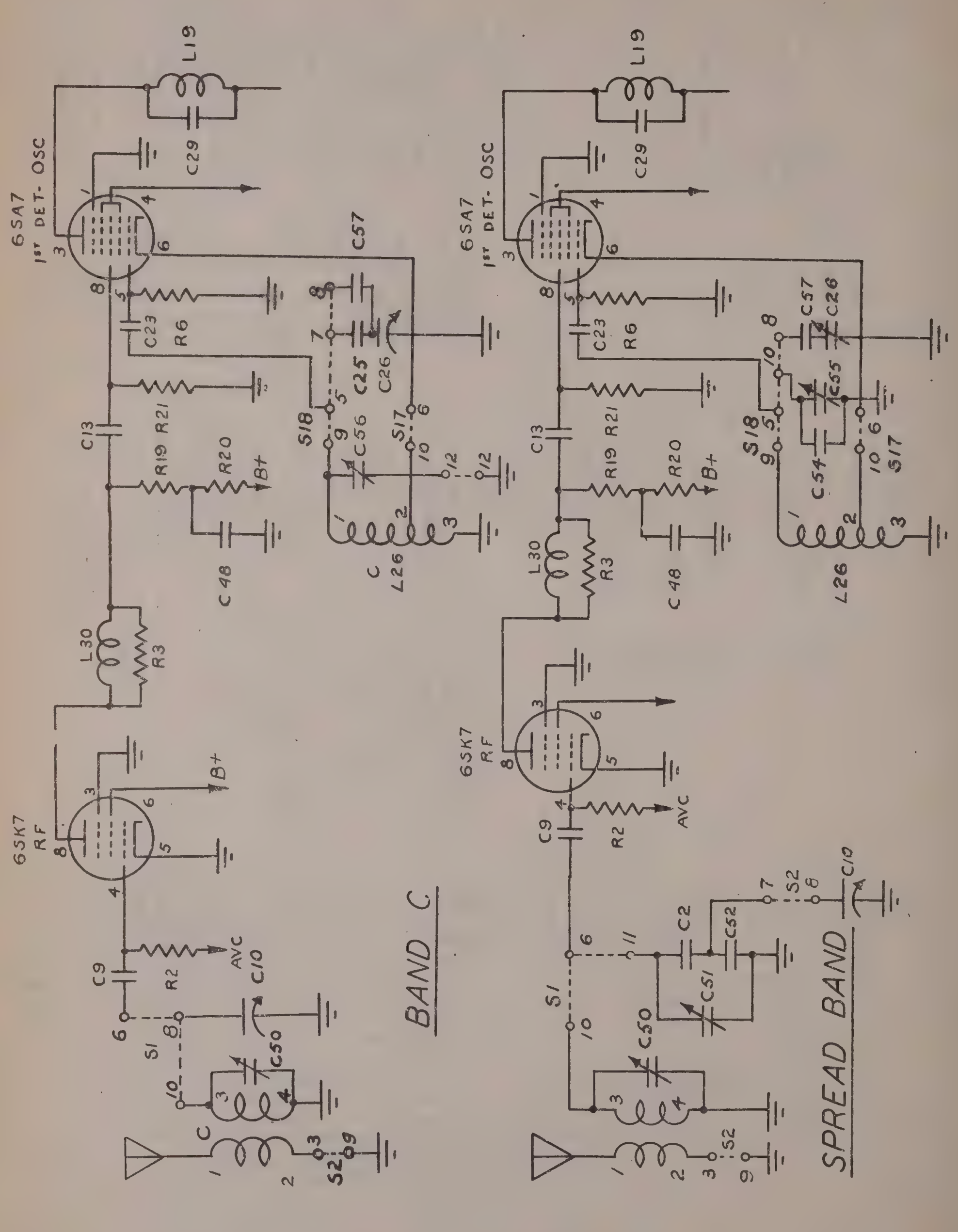
BAND A



BAND B

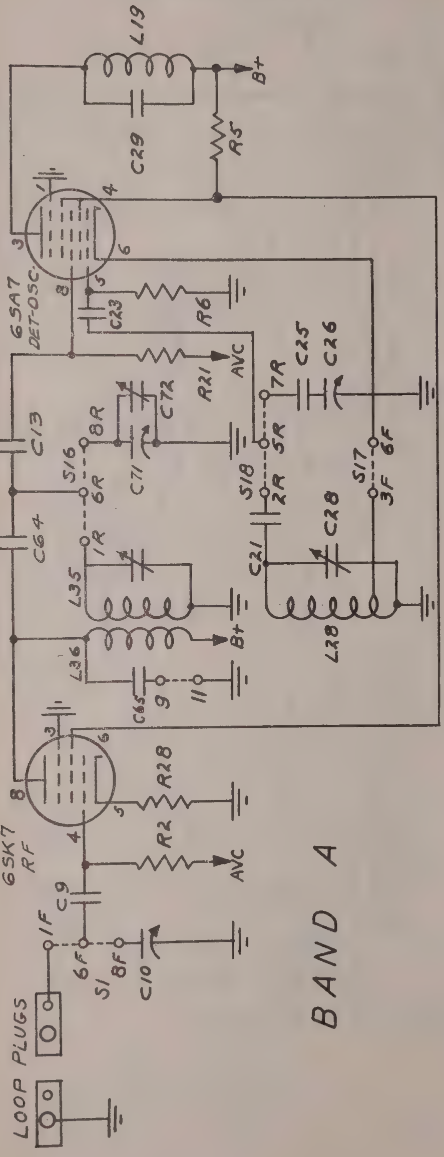
MODEL 110K
See RCA Page 12-43

RCA MFG. CO., INC.

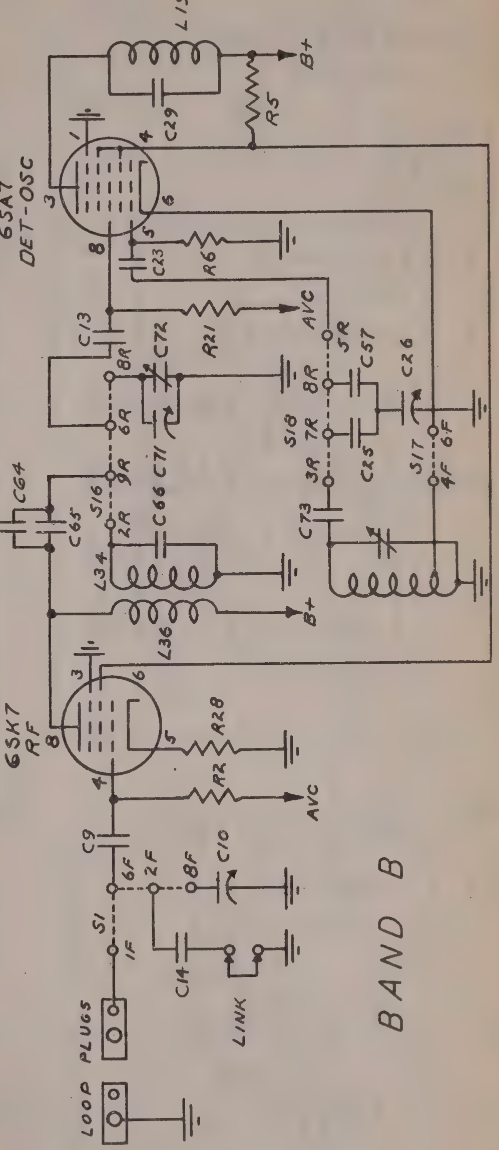


RCA MFG. CO., INC.

MODEL 111K
See RCA Page 12-45



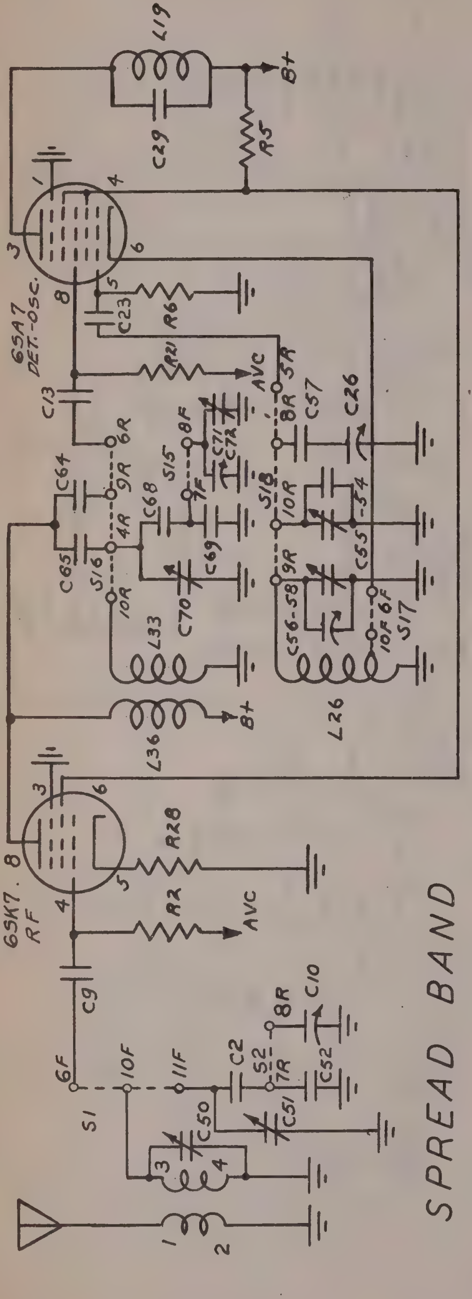
BAND A



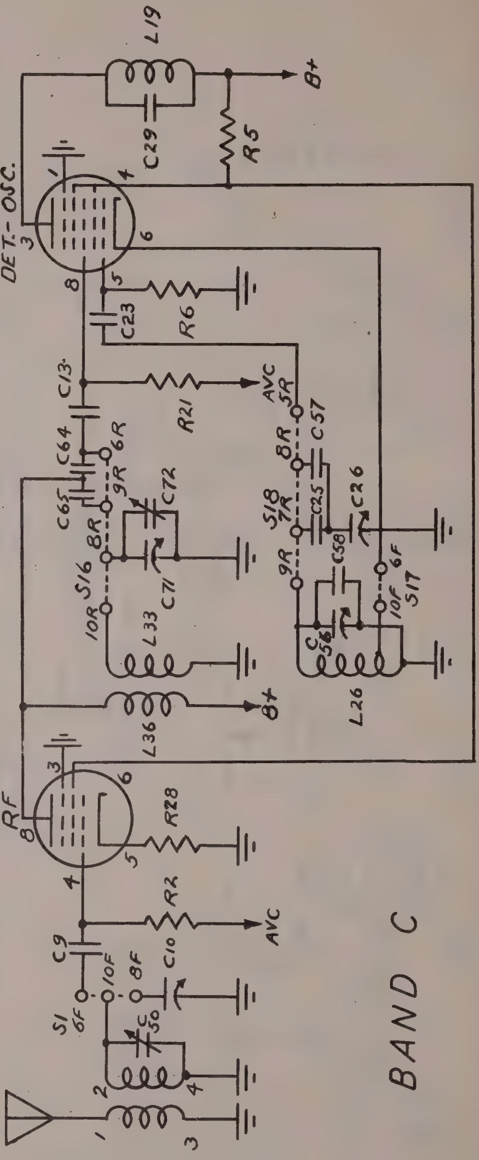
BAND B

MODEL 111K
See RCA Page 12-45

RCA MFG. CO., INC.



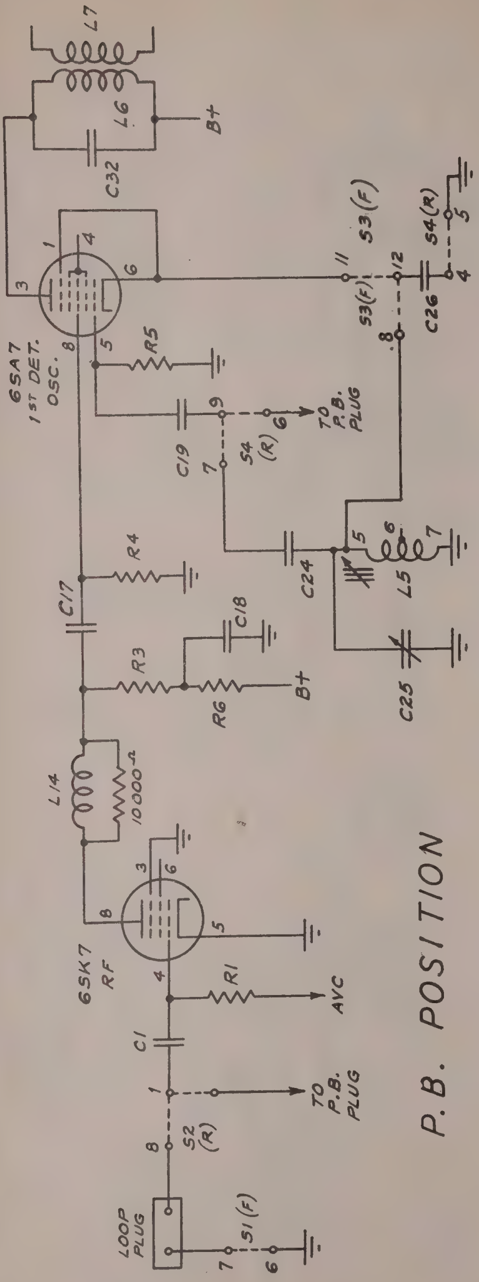
SPREAD BAND



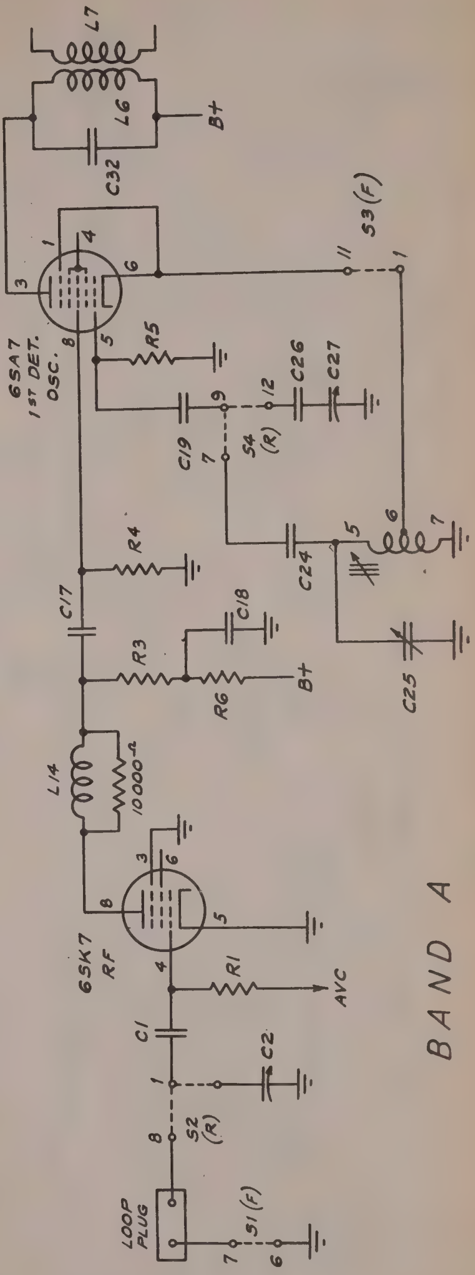
BAND C

RCA MFG. CO., INC.

MODELS V205, V405
See RCA Page 12-61



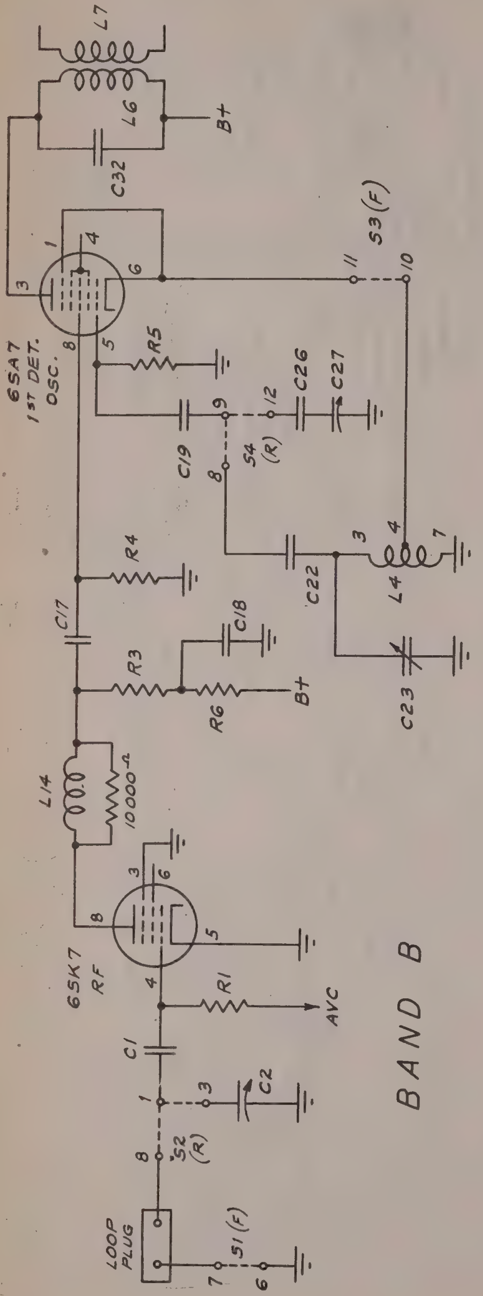
P. B. POSITION



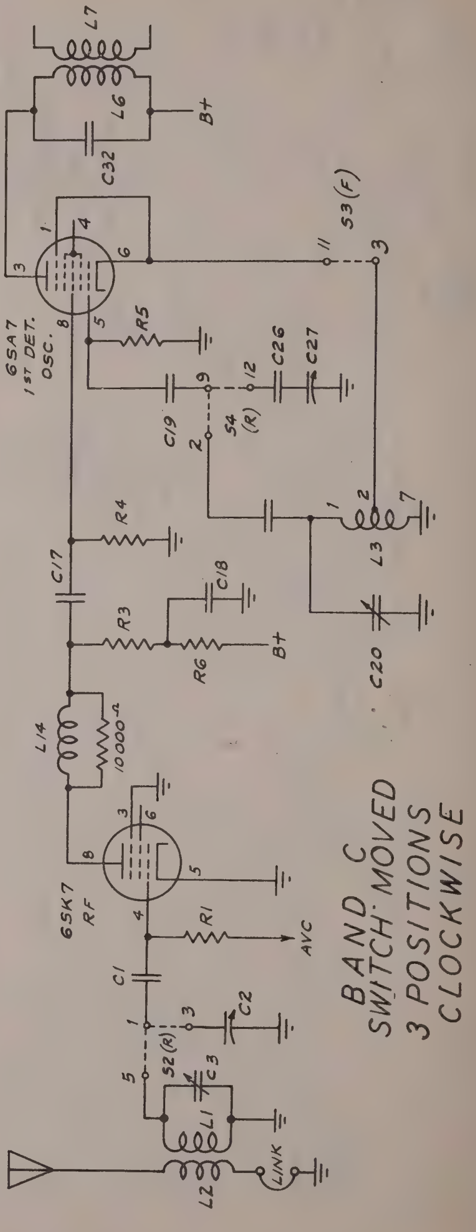
BAND A

MODELS V205, V405
See RCA Page 12-61

RCA MFG. CO., INC.



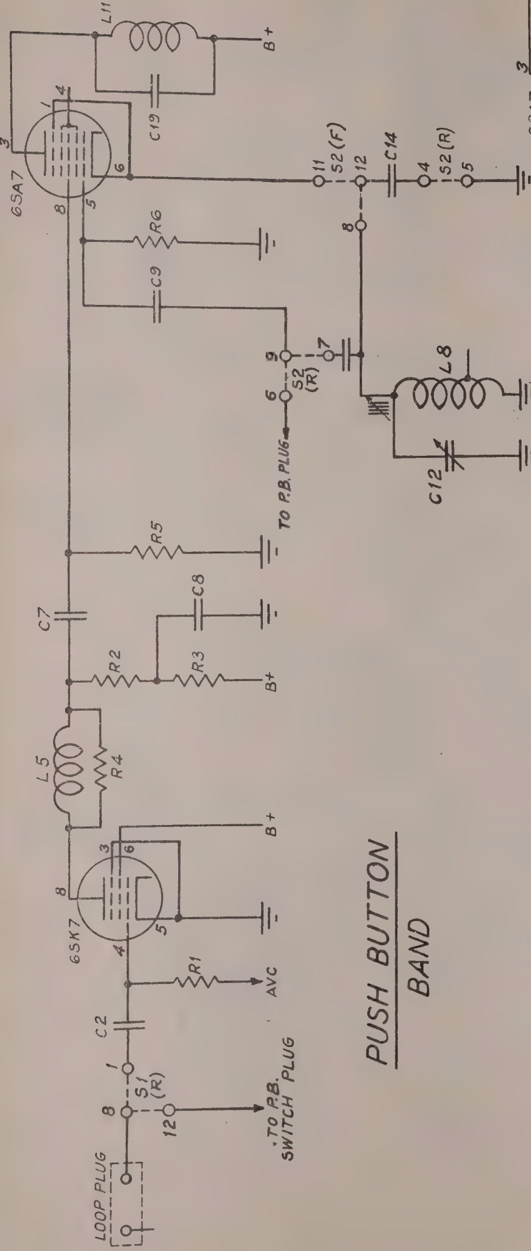
BAND B



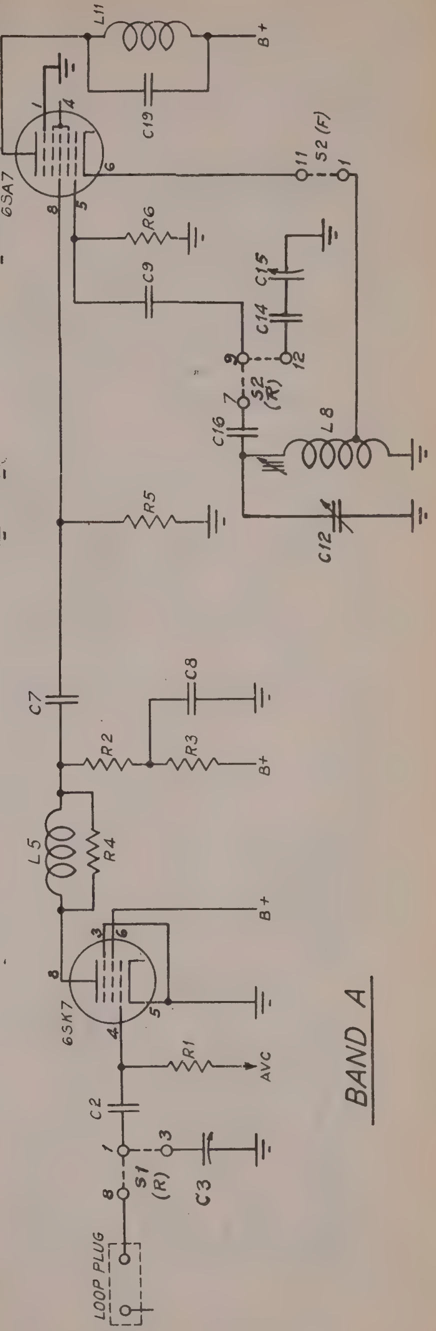
BAND C
SWITCH MOVED
3 POSITIONS
CLOCKWISE

RCA MFG. CO., INC.

MODELS VHR-207, VHR-407
See RCA Page 12-55



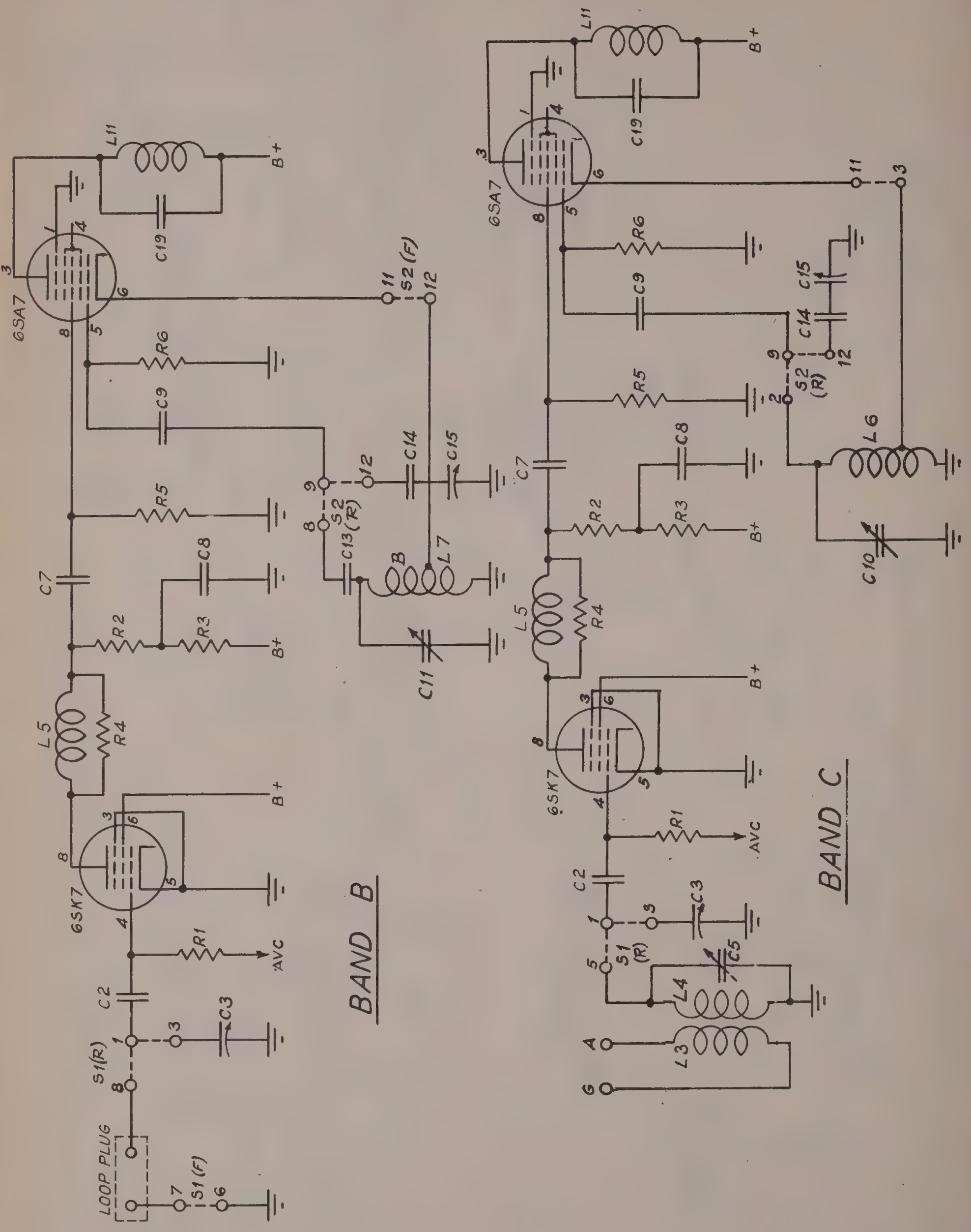
PUSH BUTTON BAND



BAND A

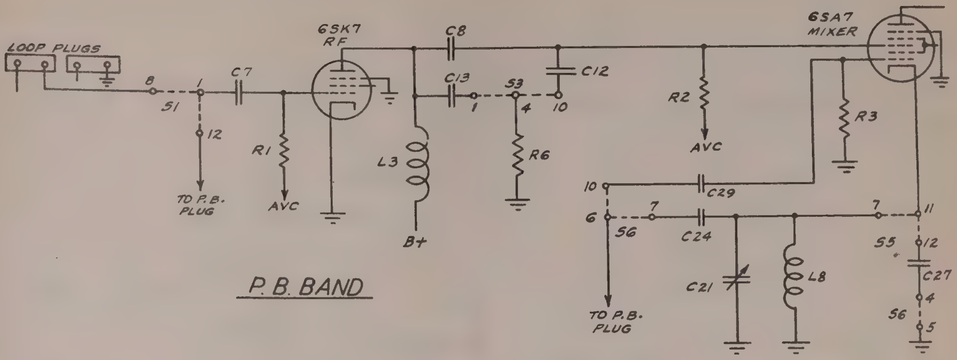
MODELS VHR-207, VHR-407
See RCA Page 12-55

RCA MFG. CO., INC.

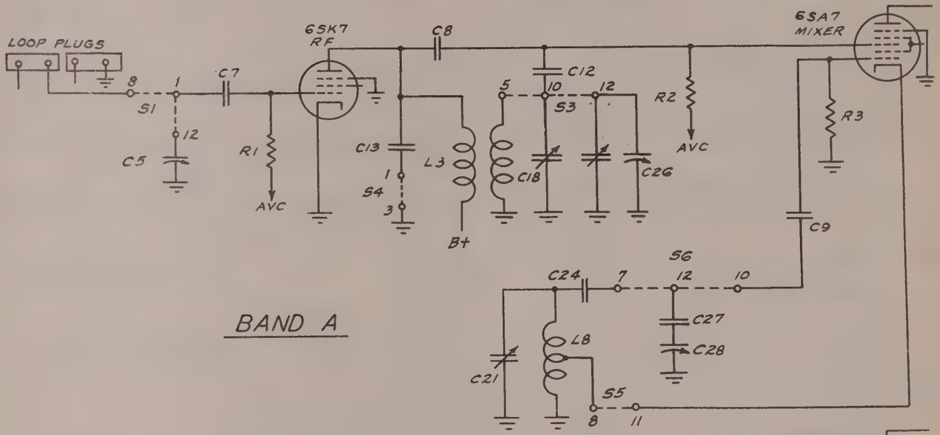


RCA MFG. CO., INC.

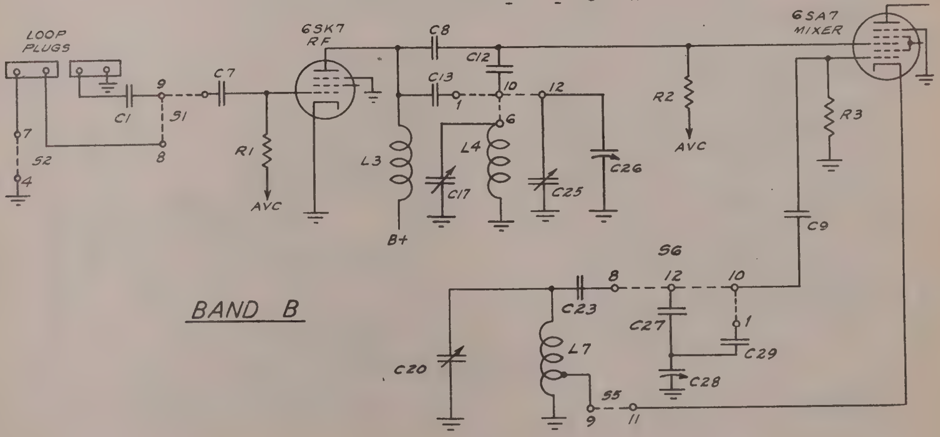
**MODELS V-300, V-301,
V-302**
See RCA Page 12-63



P.B. BAND



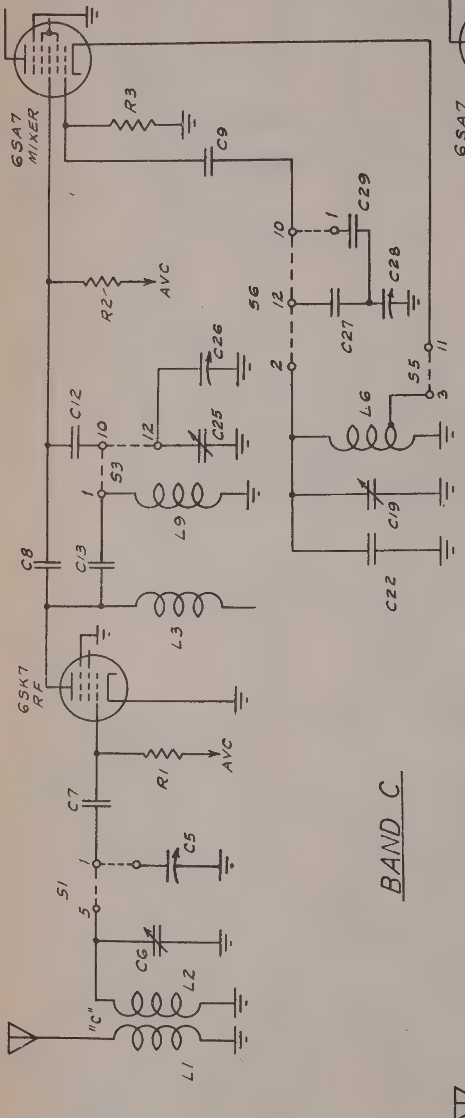
BAND A



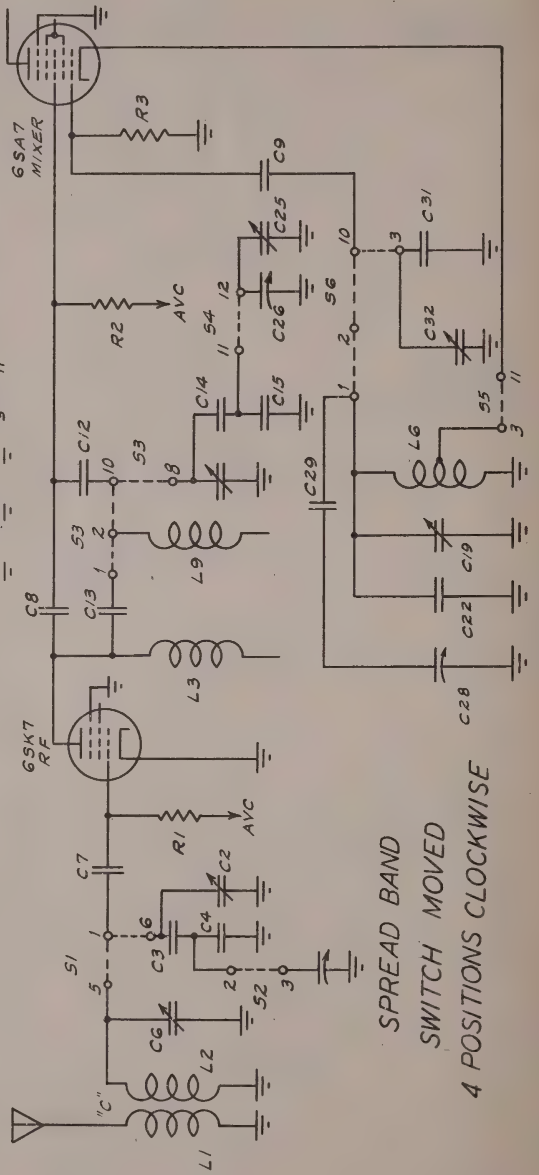
BAND B

MODELS V-300, V-301,
V-302
See RCA Page 12-63

RCA MFG. CO., INC.



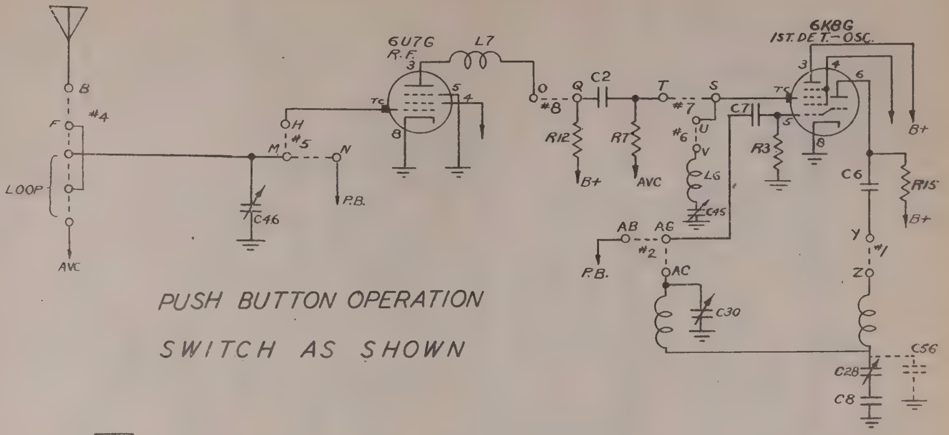
BAND C



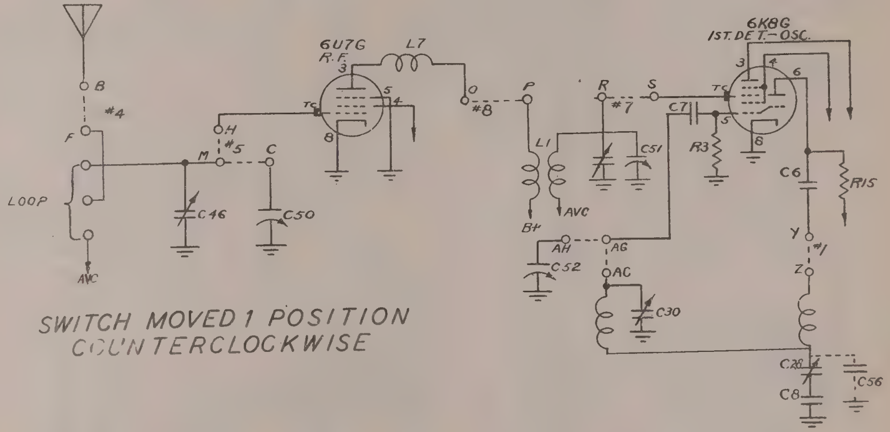
SPREAD BAND
SWITCH MOVED
4 POSITIONS CLOCKWISE

SEARS ROEBUCK & CO.

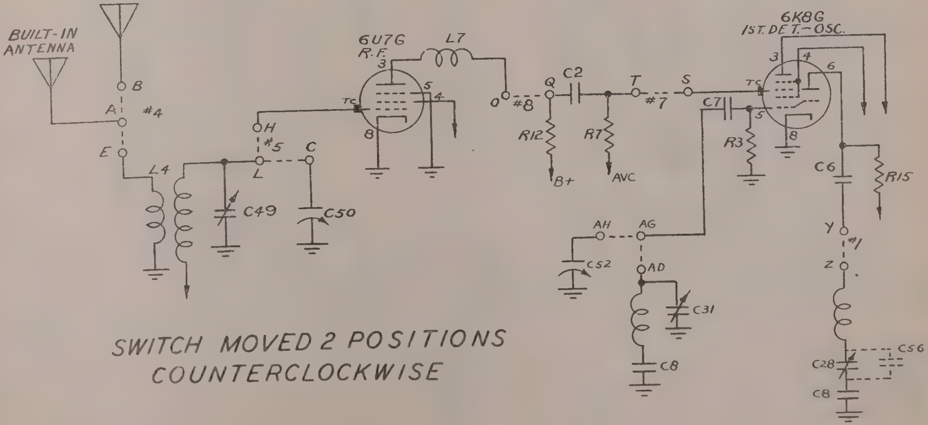
MODEL 1591
See Sears Page 12-17



PUSH BUTTON OPERATION
SWITCH AS SHOWN



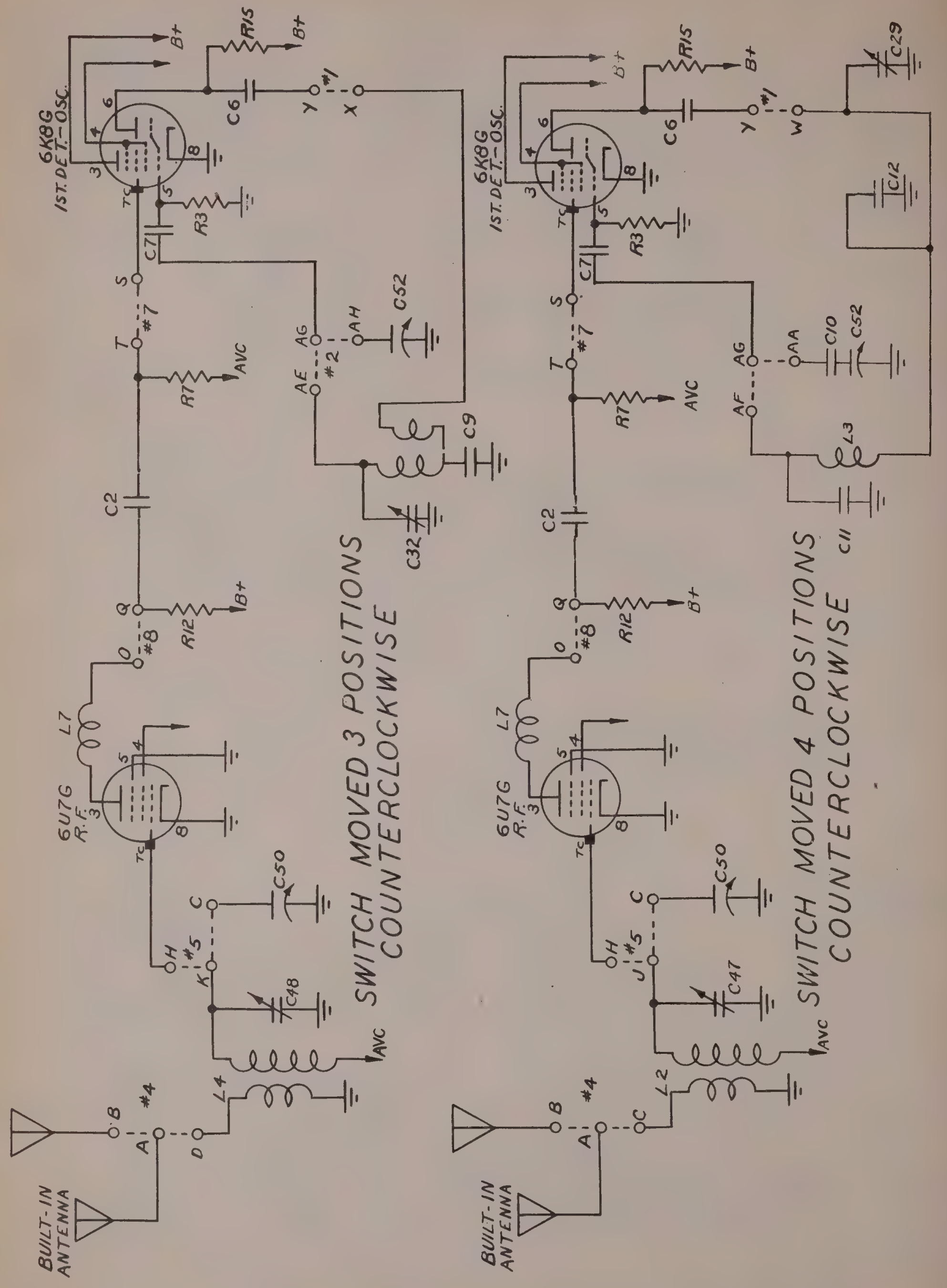
SWITCH MOVED 1 POSITION
COUNTERCLOCKWISE



SWITCH MOVED 2 POSITIONS
COUNTERCLOCKWISE

MODEL 1591
See Sears Page 12-17

SEARS ROEBUCK & CO.

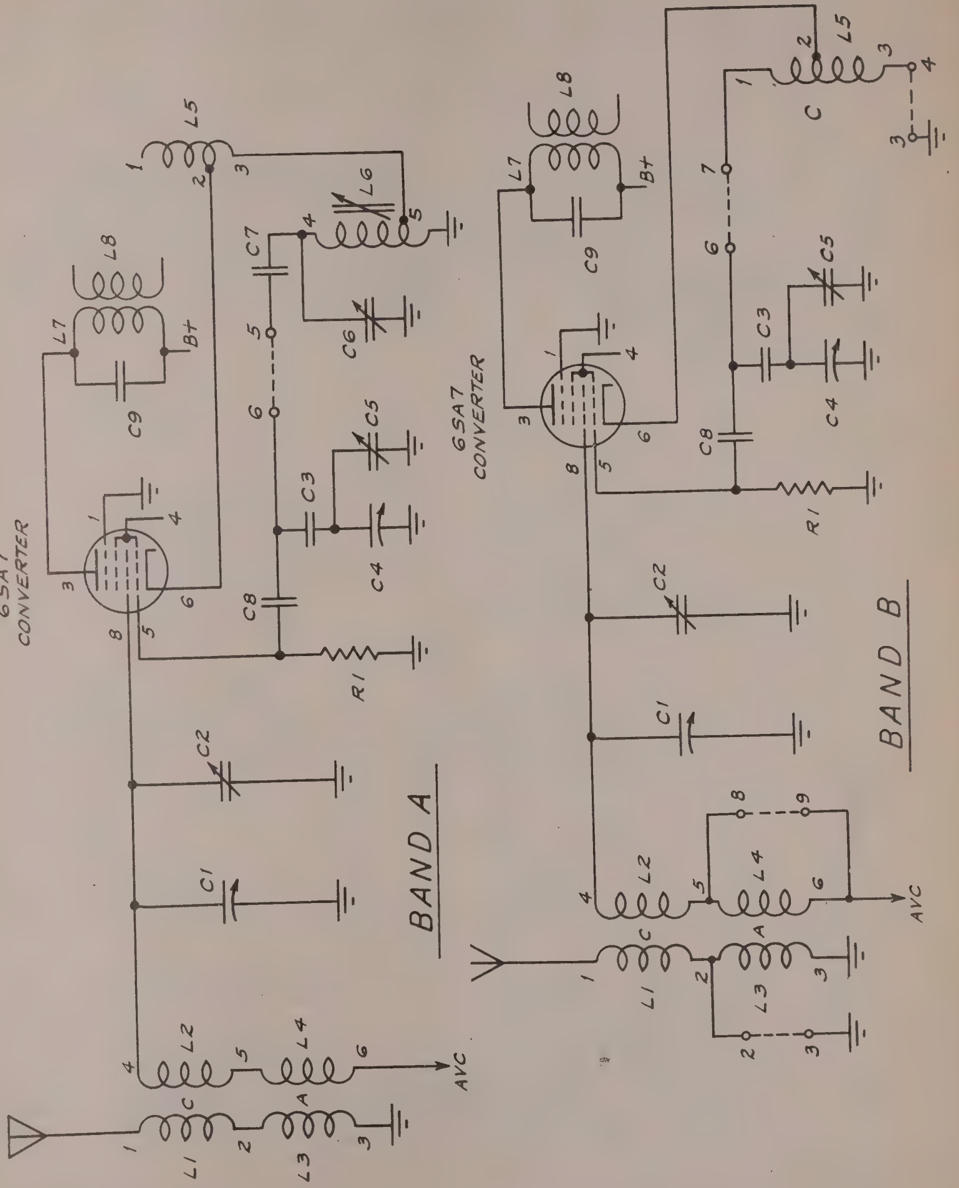


SWITCH MOVED 3 POSITIONS COUNTERCLOCKWISE

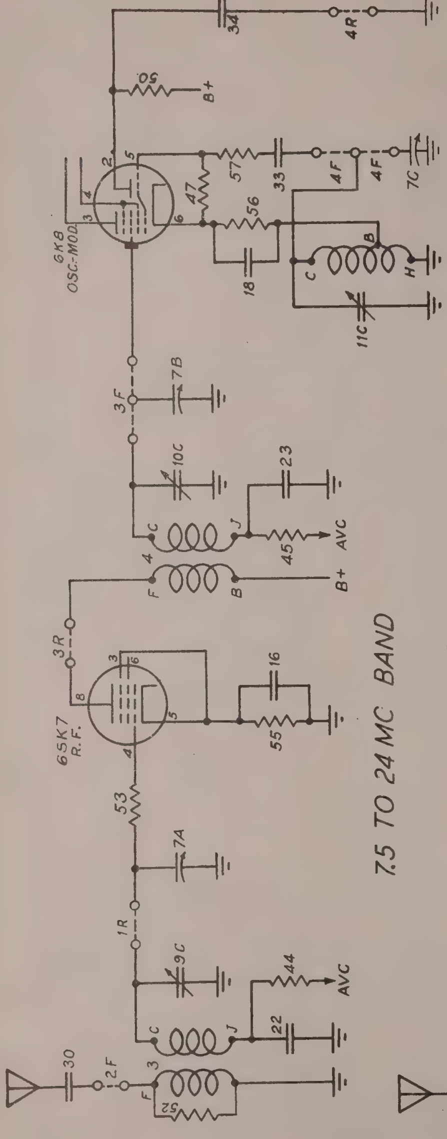
SWITCH MOVED 4 POSITIONS COUNTERCLOCKWISE

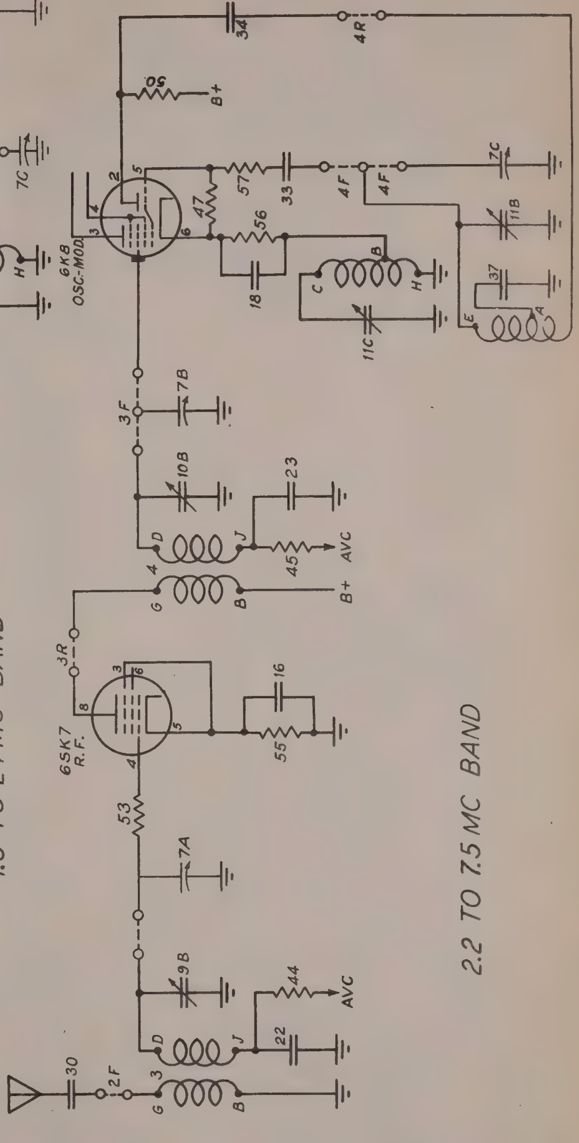
SEARS ROEBUCK & CO.

MODEL 7315, Export
See Sears Page 12-65



SENTINEL RADIO CORP. MODELS 207-U, 207-UE
See Sentinel Page 12-9, 10

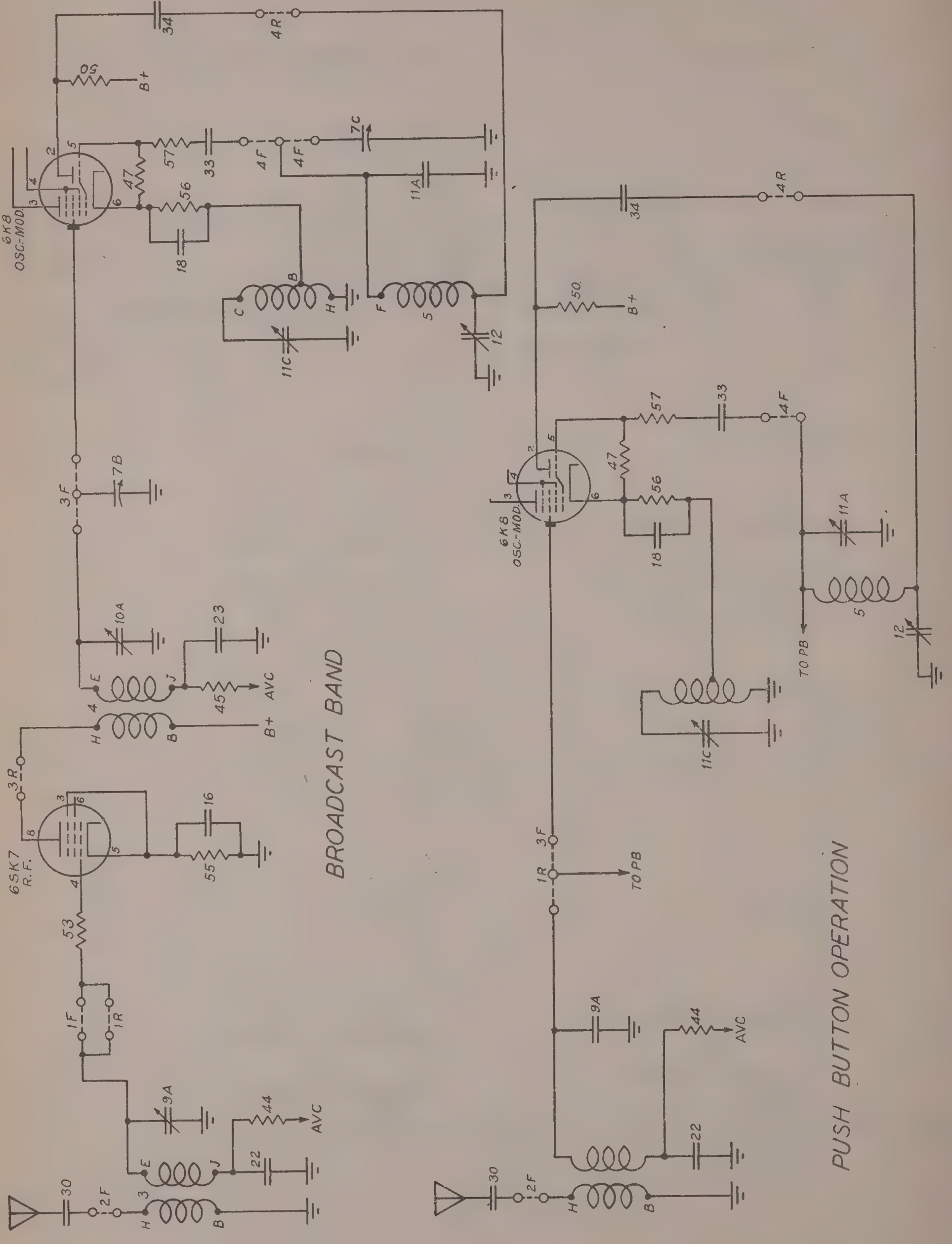

7.5 TO 24 MC BAND


2.2 TO 7.5 MC BAND

MODELS 207-U, 207-UE

See Sentinel Page 12-9, 10

SENTINEL RADIO CORP.

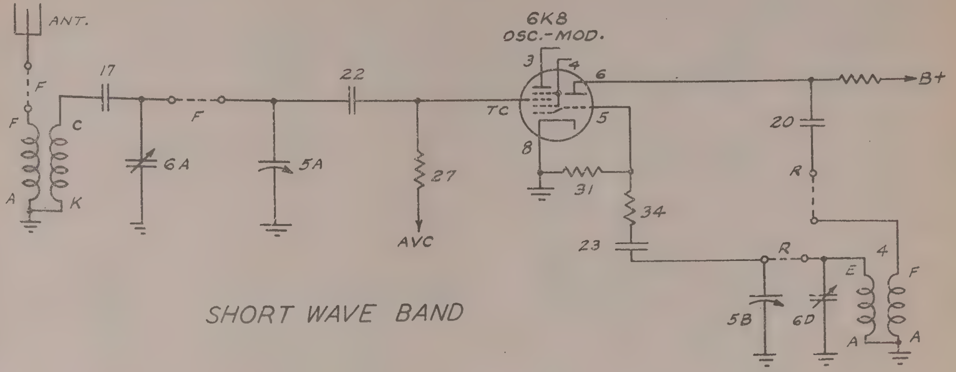


MODEL 236
See Sentinel Page 12-29
MODEL 237
See Sentinel Page 12-37

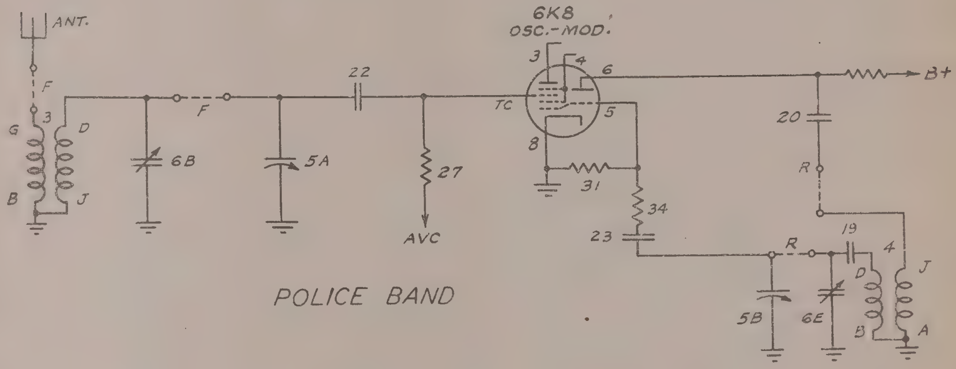
SENTINEL RADIO CORP.

MODEL 239
See Sentinel Page 12-33

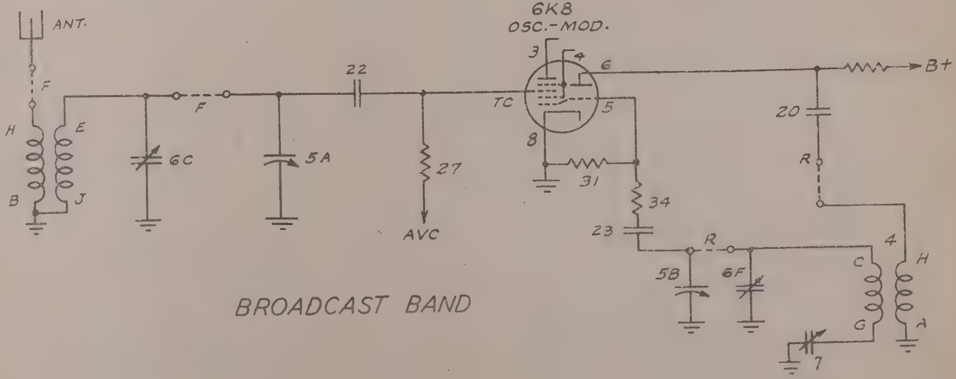
MODEL 234
See Sentinel Page 12-25
MODEL 235
See Sentinel Page 12-27



SHORT WAVE BAND



POLICE BAND

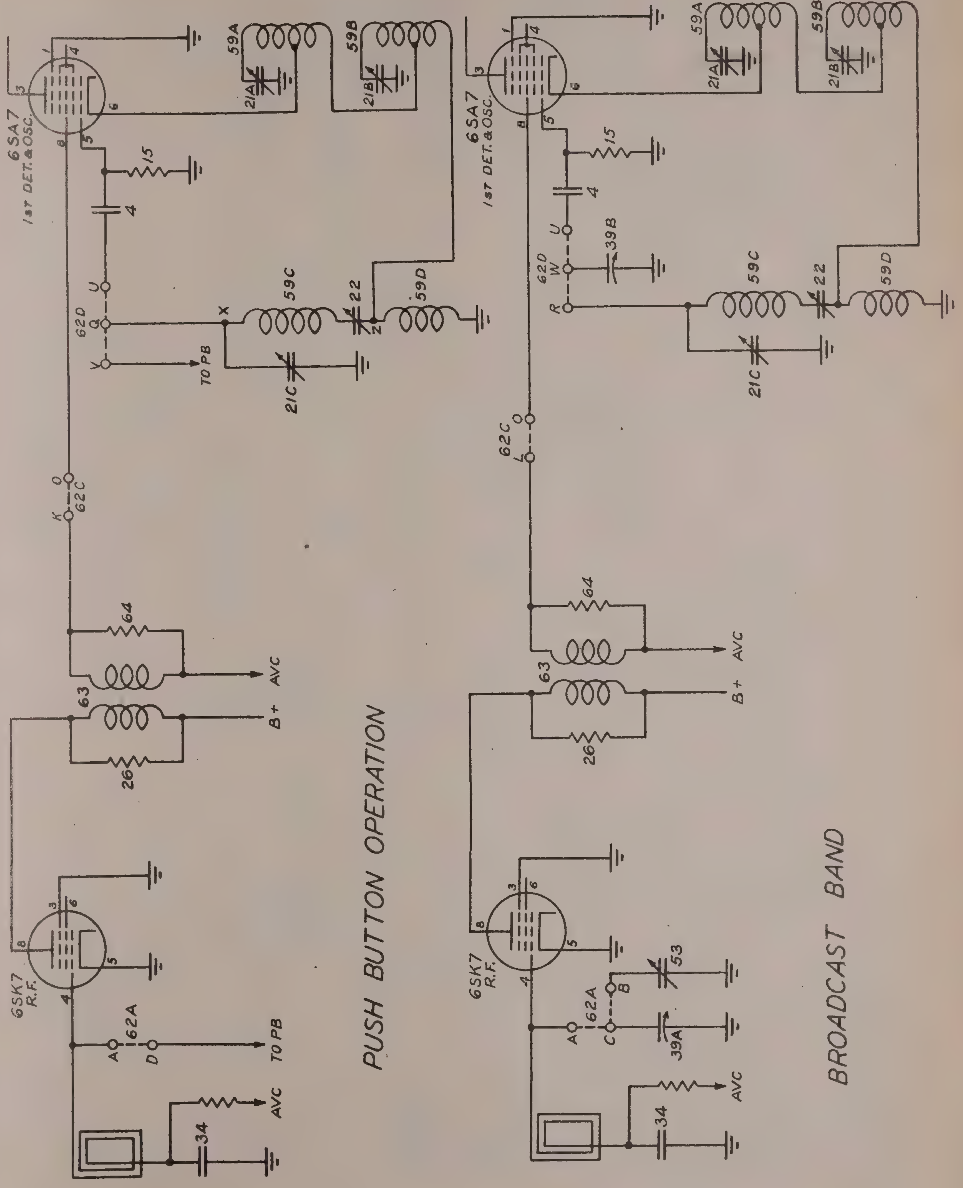


BROADCAST BAND

©John F. Rider, Publisher

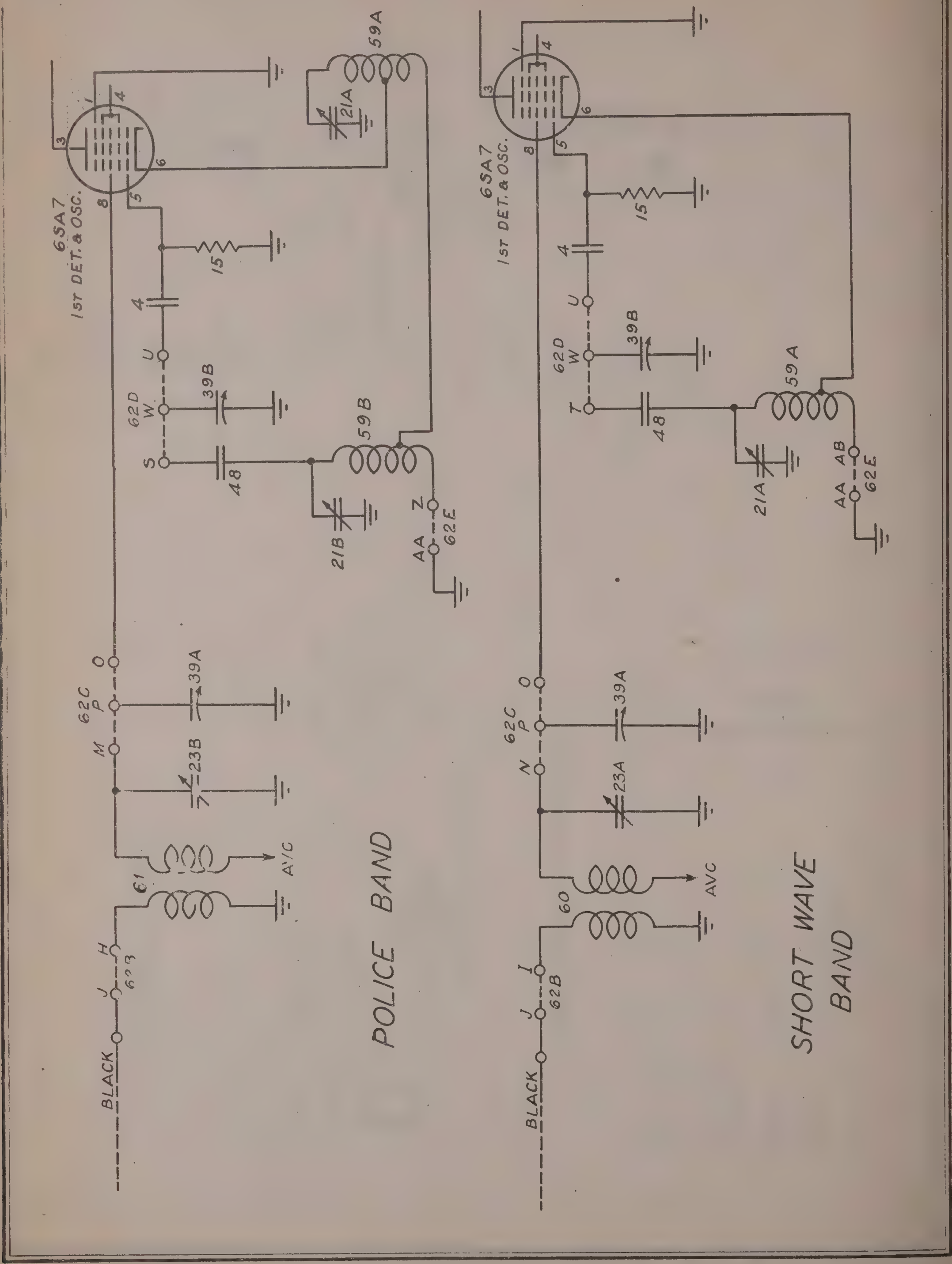
STEWART-WARNER CORP.

MODEL 01-6F9
See Stewart-Warner
Page 12-1, 2



MODEL 01-6F9
See Stewart-Warner
Page 12-1, 2

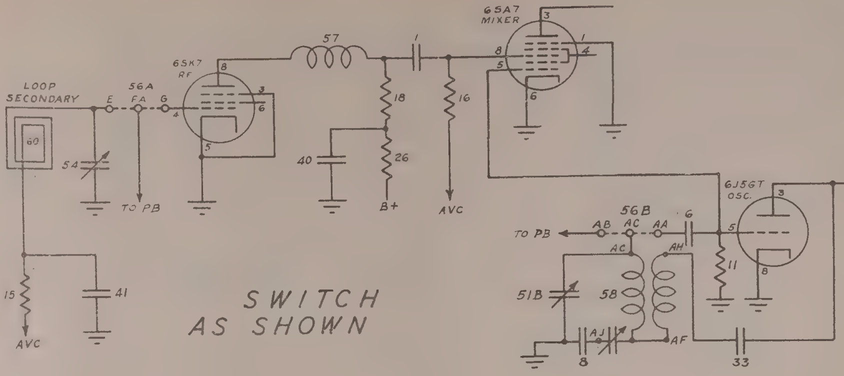
STEWART-WARNER CORP.



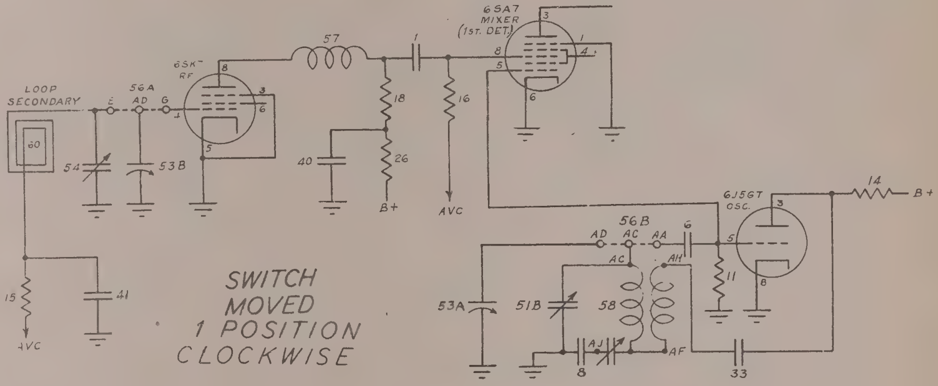
©John F. Rider, Publisher

STEWART-WARNER CORP. MODELS 11-8F1 to 11-8F9, 11-8F1Z to 11-8F9Z

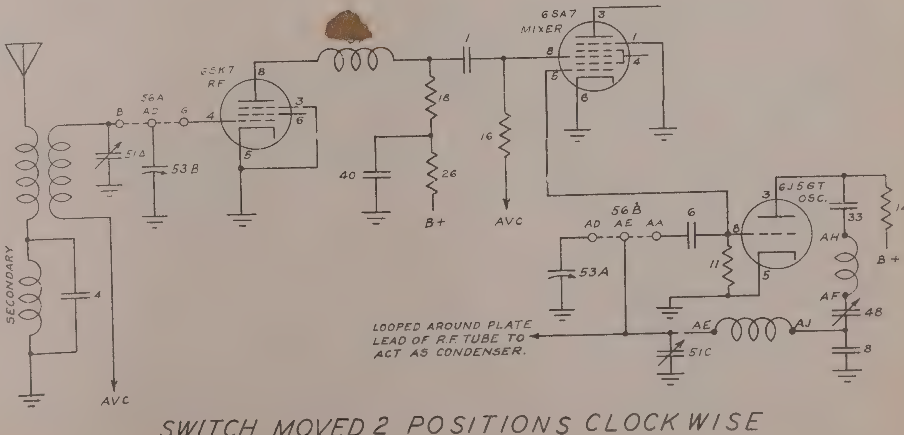
See Stewart-Warner Page 12-23



SWITCH AS SHOWN



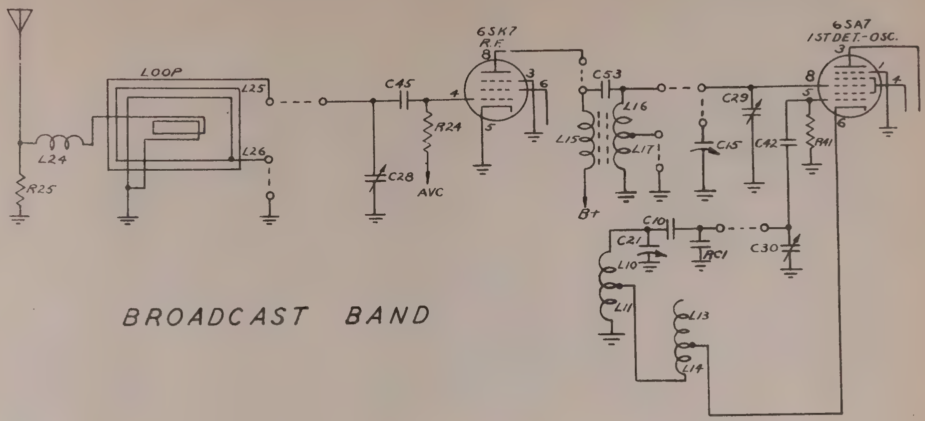
SWITCH MOVED 1 POSITION CLOCKWISE



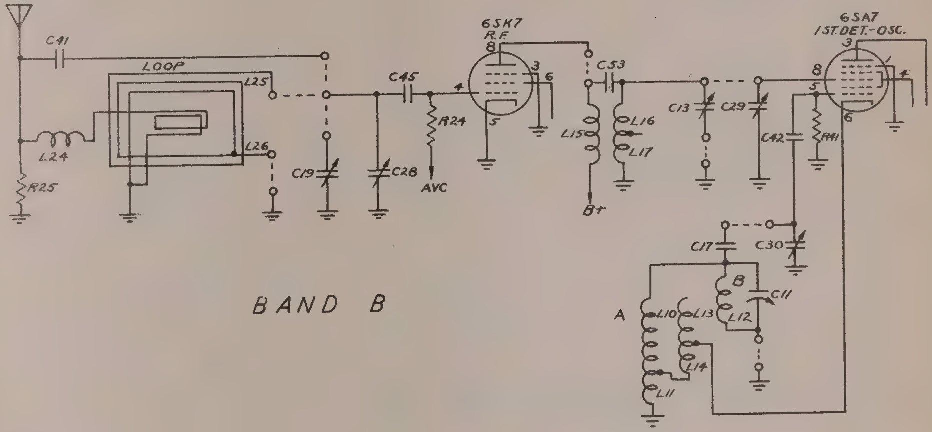
SWITCH MOVED 2 POSITIONS CLOCKWISE

STROMBERG-CARLSON TEL. MFG. CO.

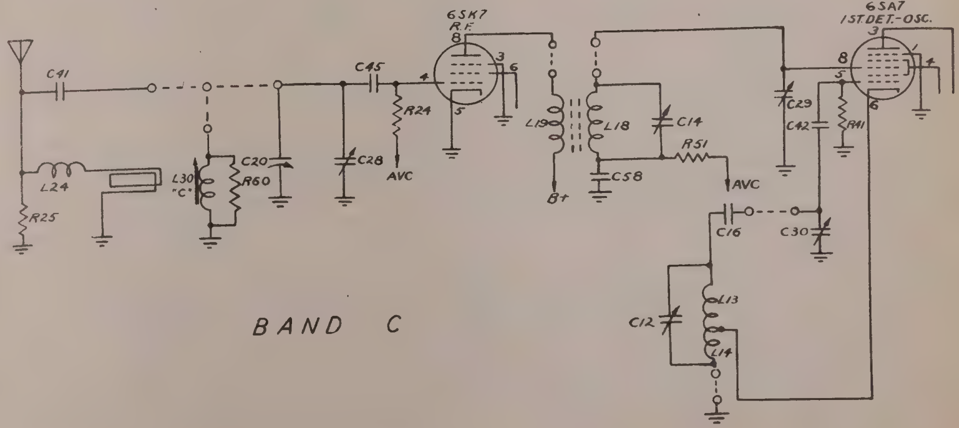
MODELS 530, 535
See Stromberg
Page 12-13



BROADCAST BAND



BAND B

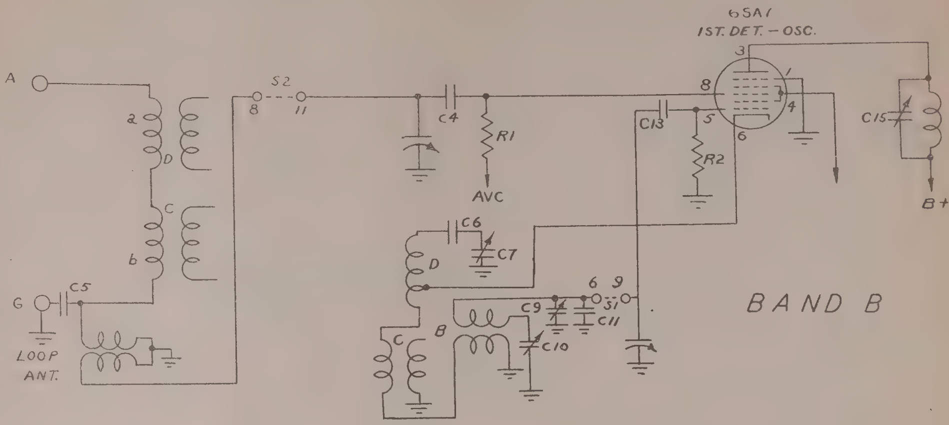


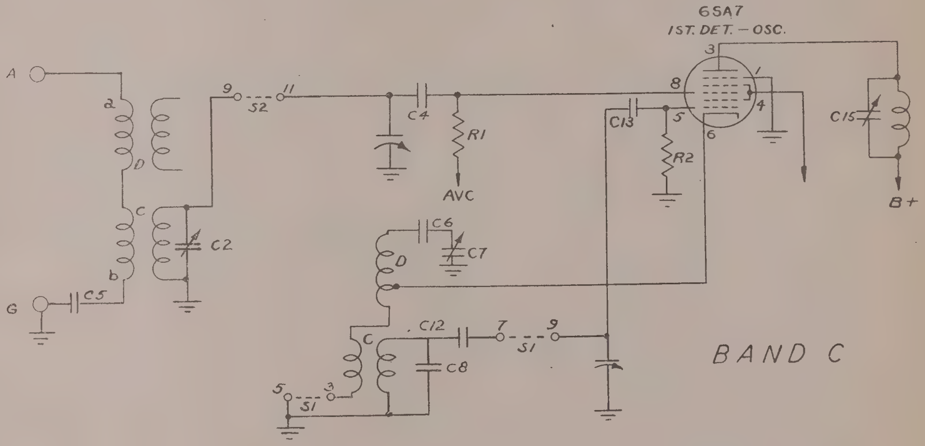
BAND C

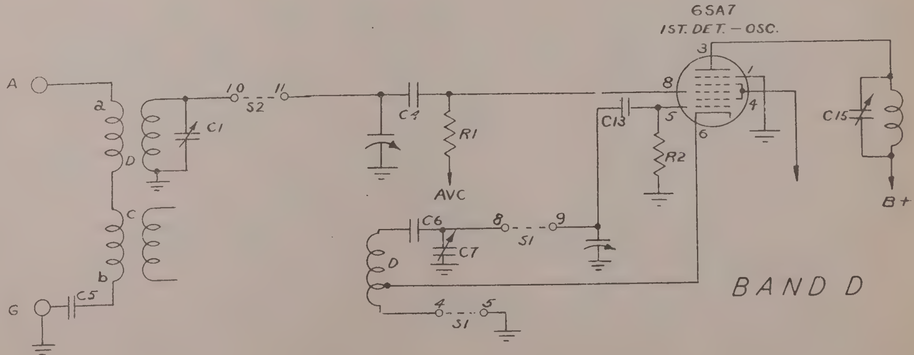
MODEL 7A41 (574X)
See Wells-Gardner
Page 12-10

WELLS-GARDNER & CO.

MODEL 6A43
See Wells-Gardner Page 12-1
MODEL 7A41 (704)
See Wells-Gardner Page 12-9

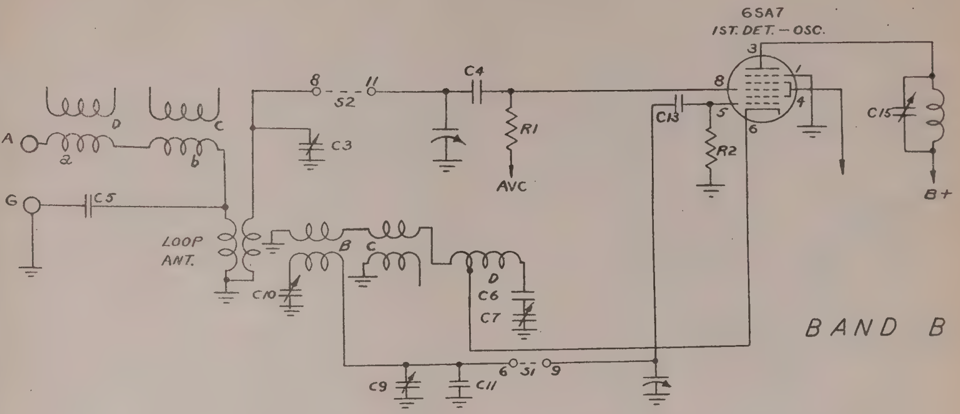


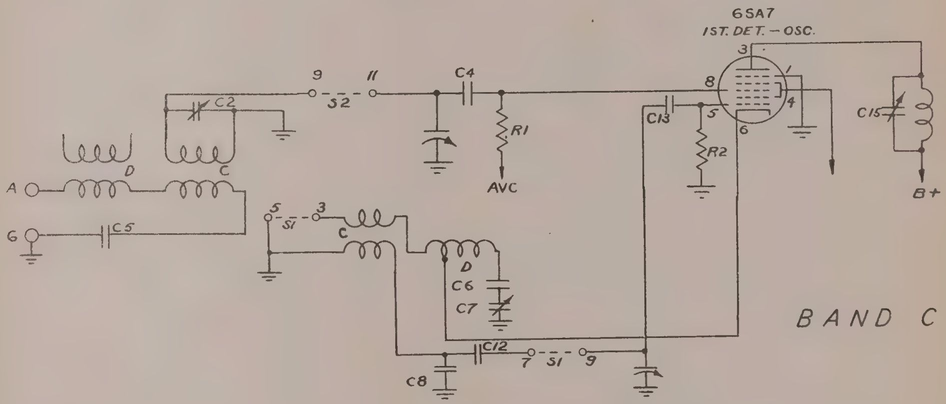


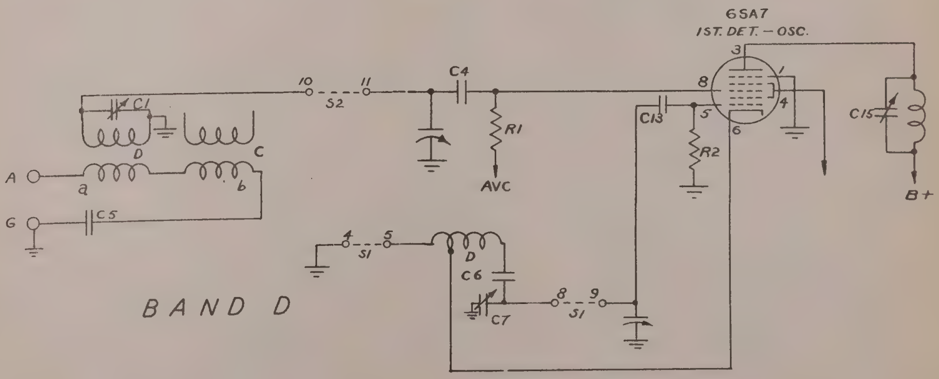


WESTERN AUTO SUPPLY CO.

MODEL D1042
See Truetone
Page 12-17, 18

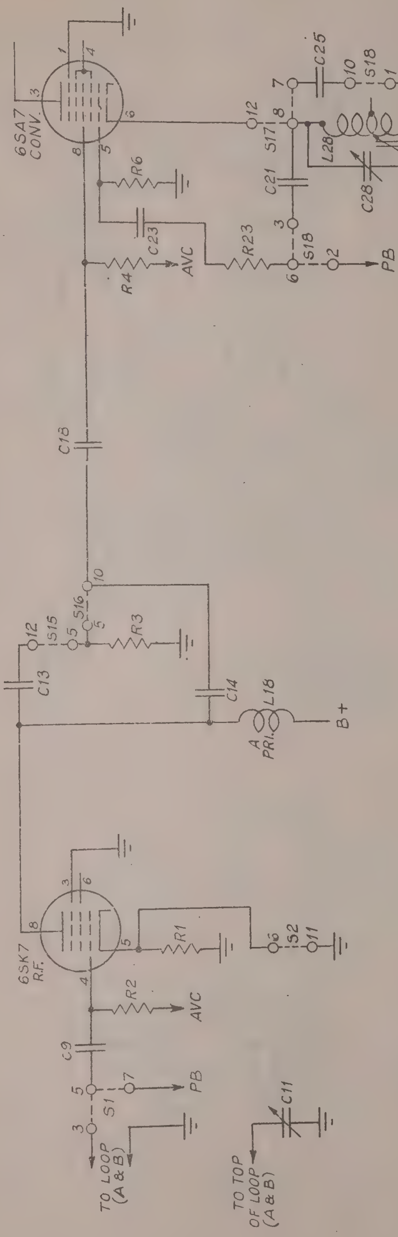




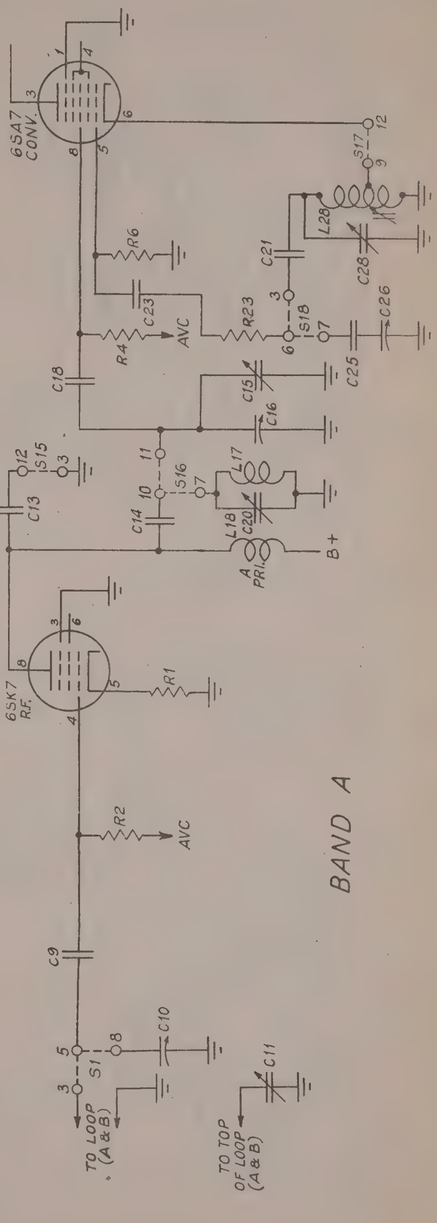


WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR290
See Westinghouse
Page 12-41



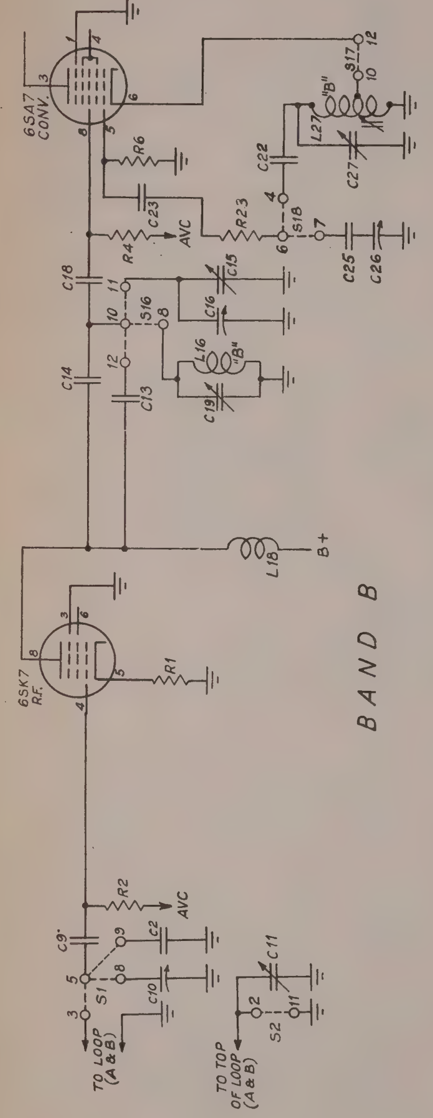
P. B. POSITION SWITCH AS SHOWN

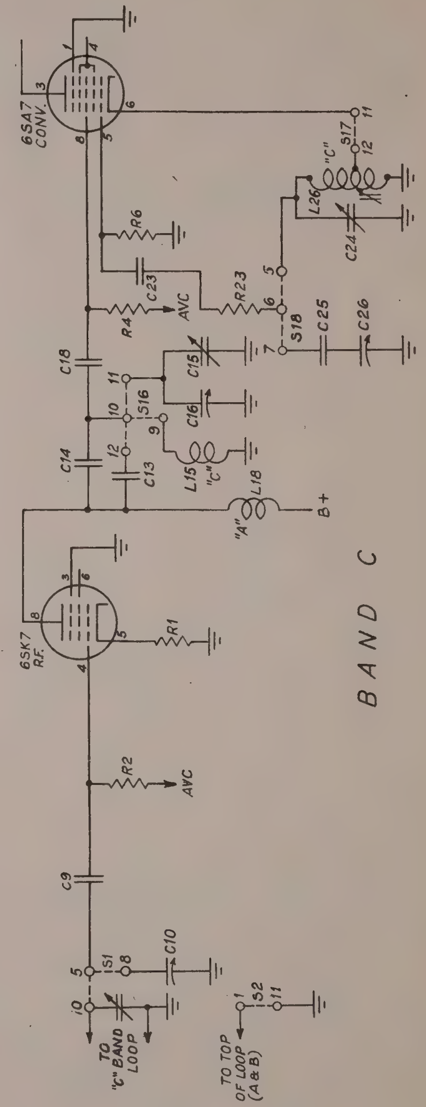


BAND A

WESTINGHOUSE ELEC. SUPPLY CO.

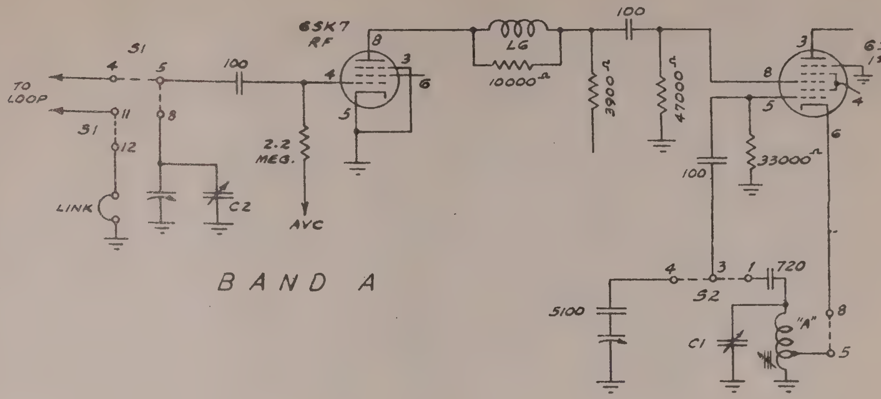
MODEL WR290
See Westinghouse
Page 12-41



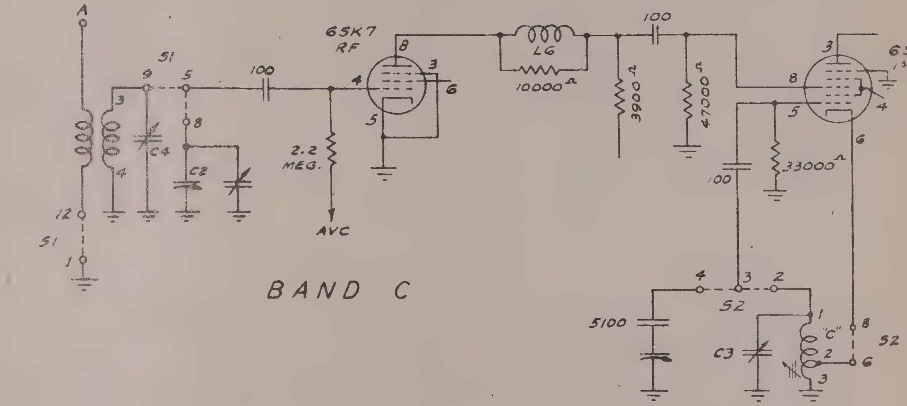


WESTINGHOUSE ELEC. SUPPLY CO.

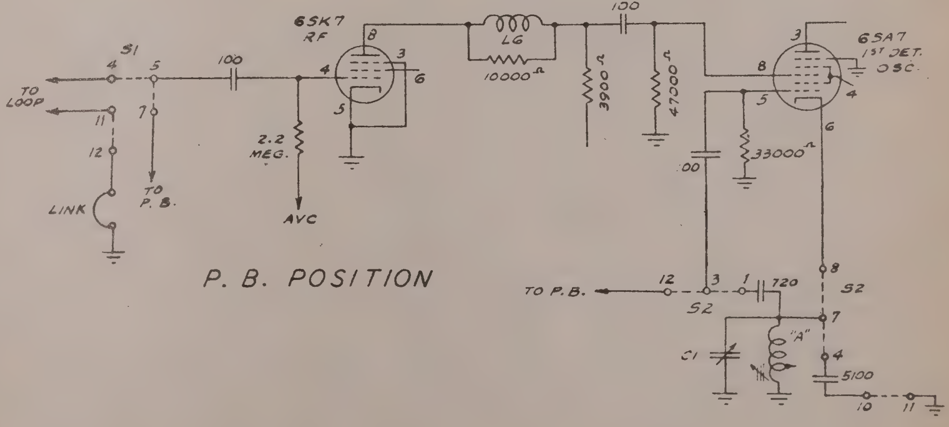
MODEL WR 386
See Westinghouse
Page 12-26



BAND A



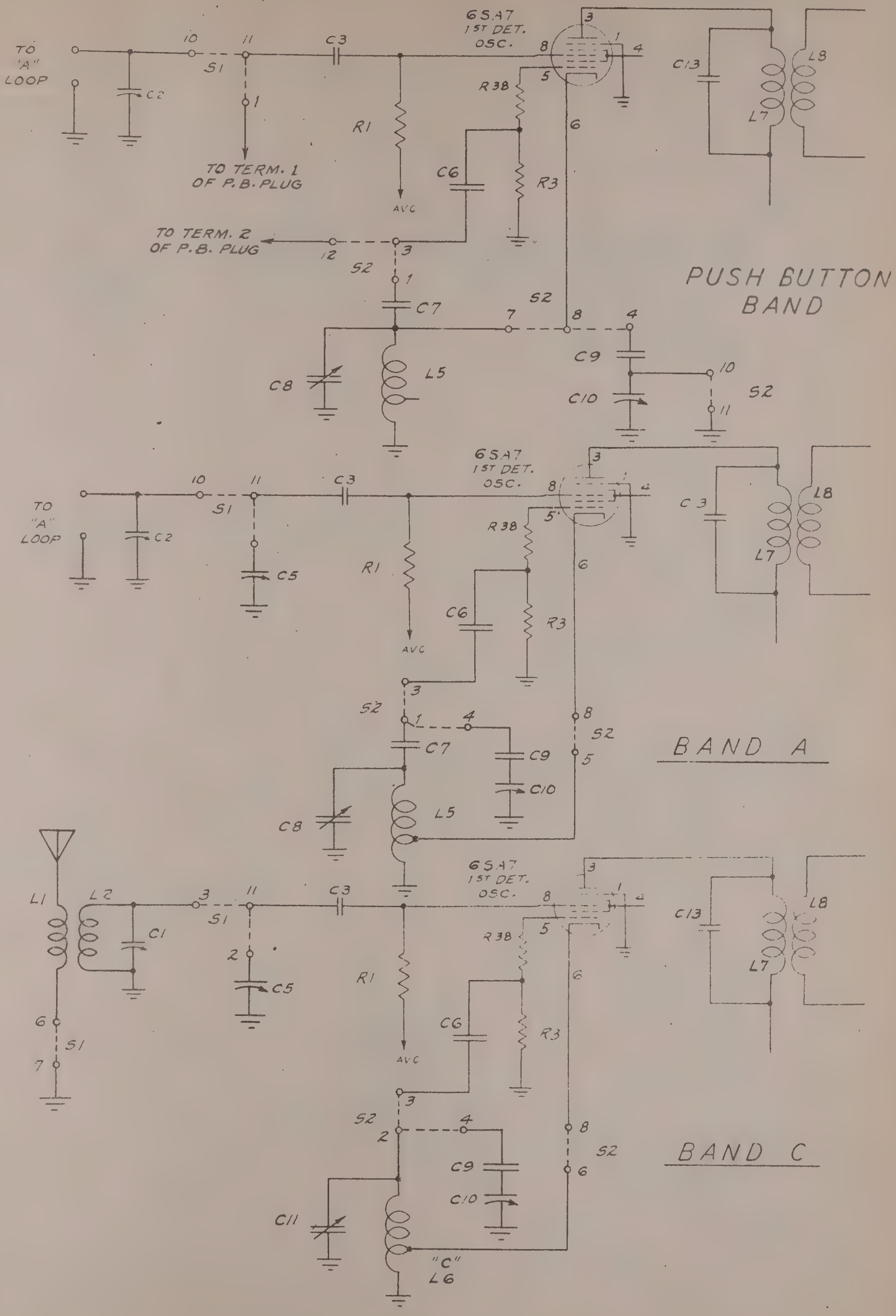
BAND C



P. B. POSITION

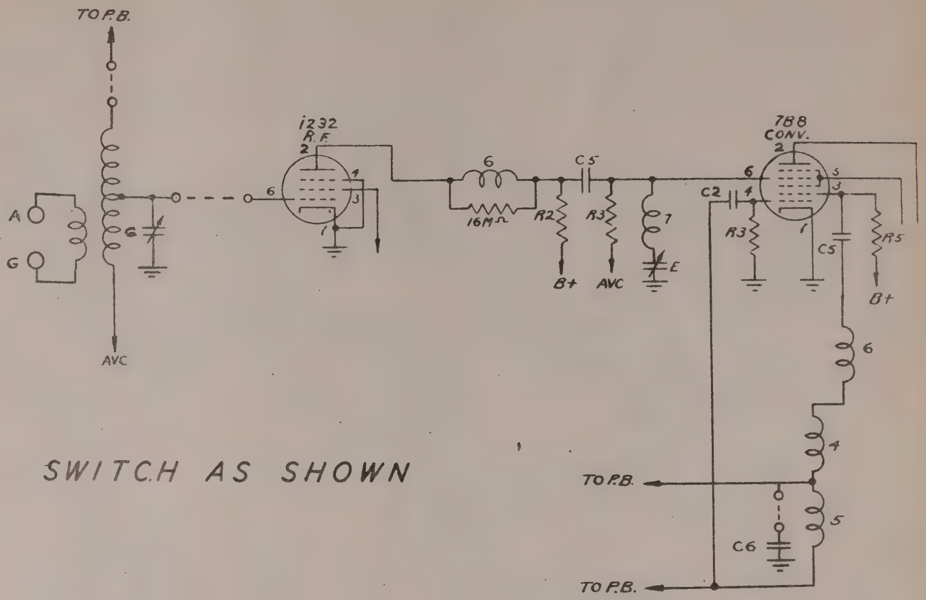
WESTINGHOUSE ELEC. SUPPLY CO. INC.

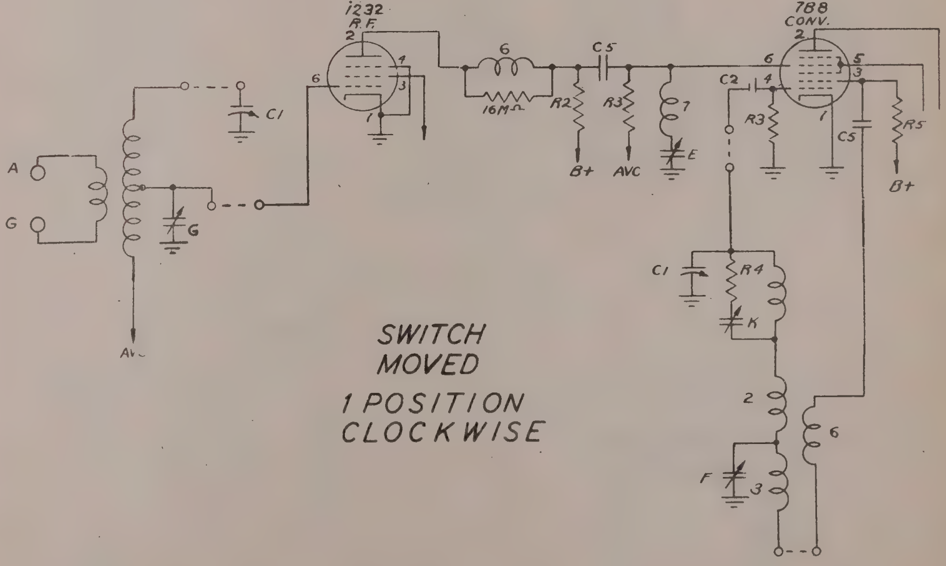
MODEL WR 486
See Westinghouse
Page 12-36



ZENITH RADIO CORP.

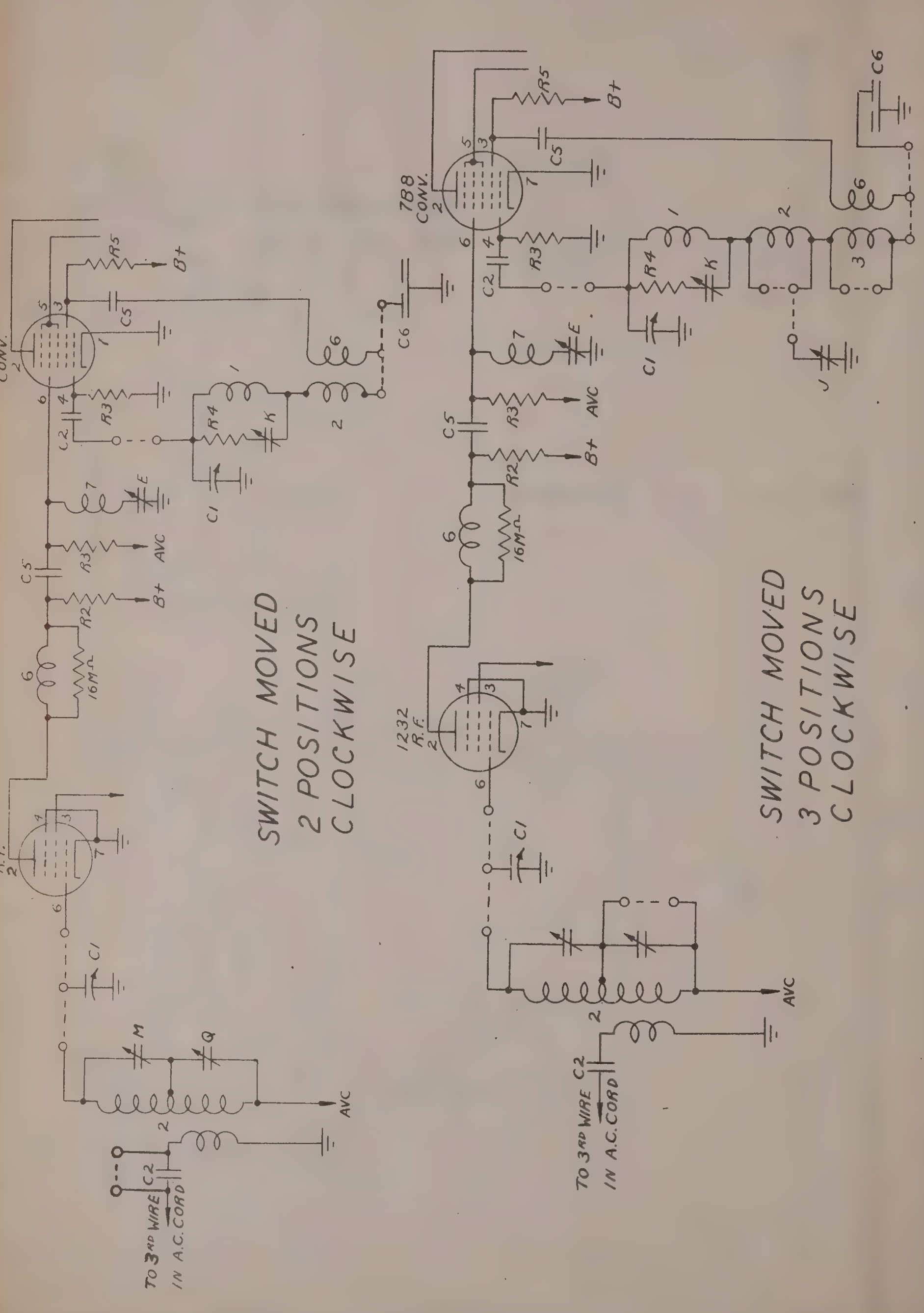
**MODELS 7S-529, 7S-530,
7S-547, 7S-557,
7S-558, 7S-559
See Zenith Page 12-15**





MODELS 7S-529, 7S-530,
7S-547, 7S-557,
7S-558, 7S-559
See Zenith Page 12-15

ZENITH RADIO CORP.

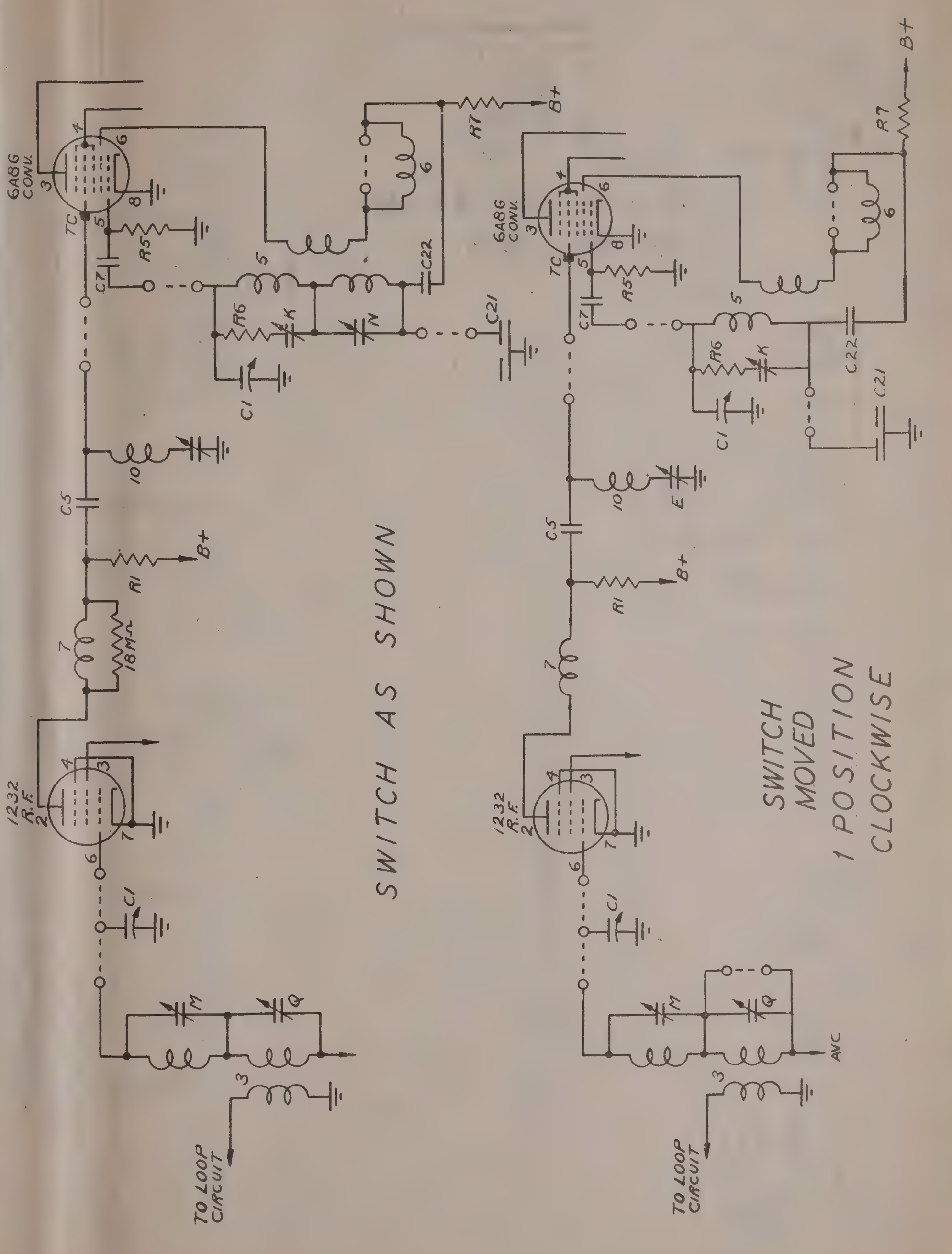


SWITCH MOVED
2 POSITIONS
CLOCKWISE

SWITCH MOVED
3 POSITIONS
CLOCKWISE

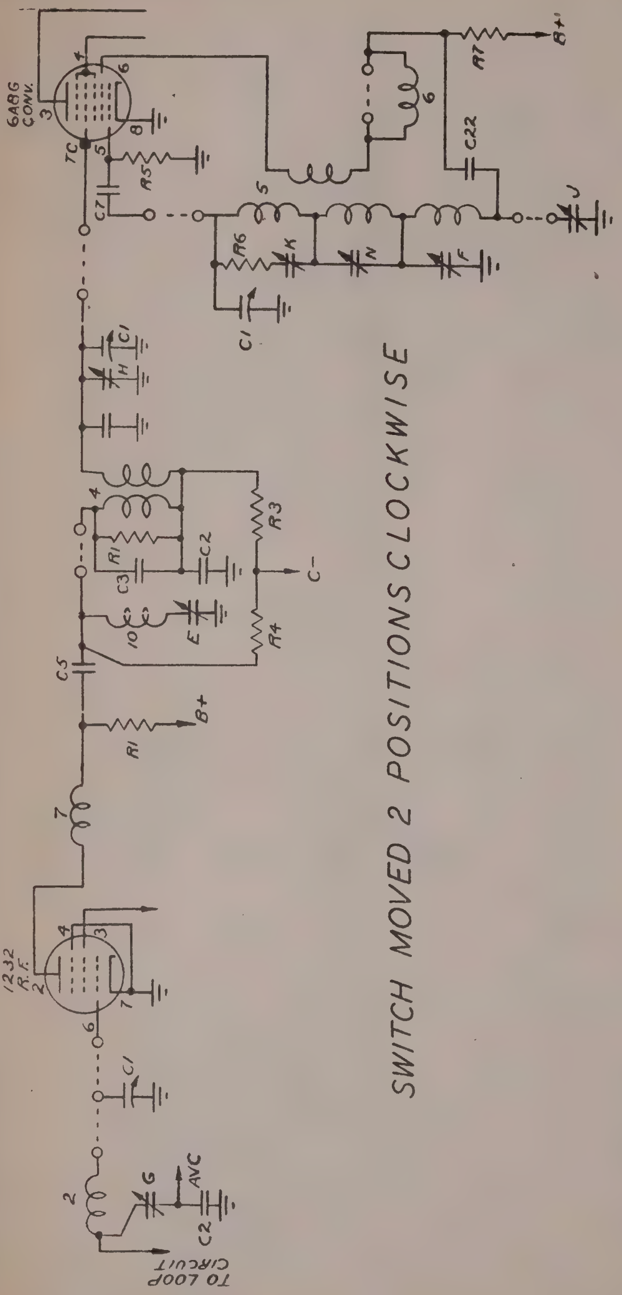
ZENITH RADIO CORP.

MODELS 10S-531, 10S-549,
10S-566, 10S-589,
10S-590
See Zenith Page 12-23

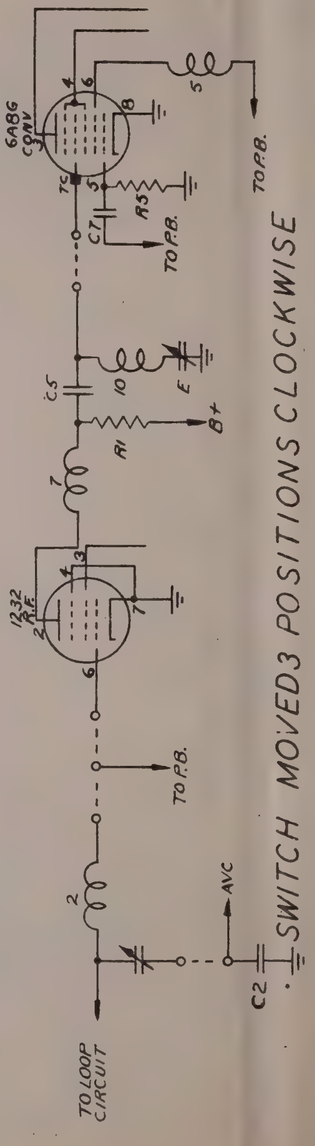


MODELS 10S-531, 10S-549,
10S-566, 10S-589,
10S-590
See Zenith Page 12-23

ZENITH RADIO CORP.

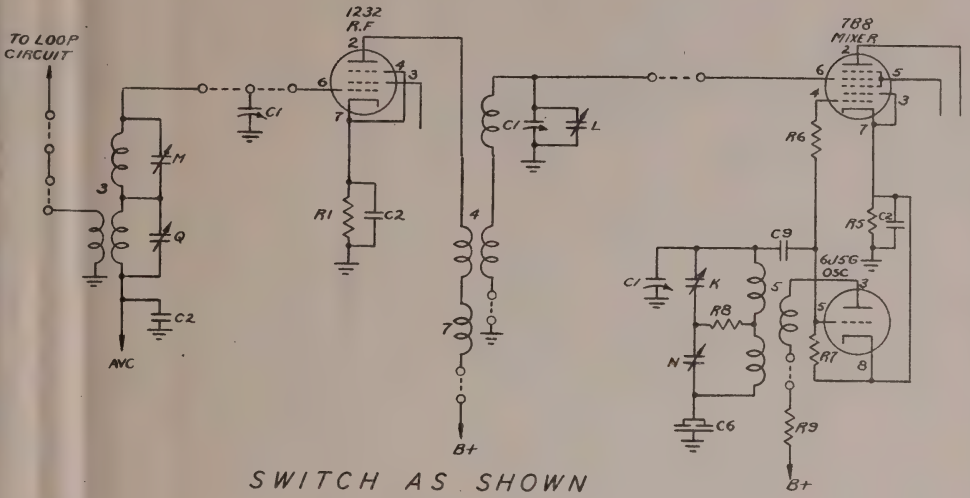


SWITCH MOVED 2 POSITIONS CLOCKWISE

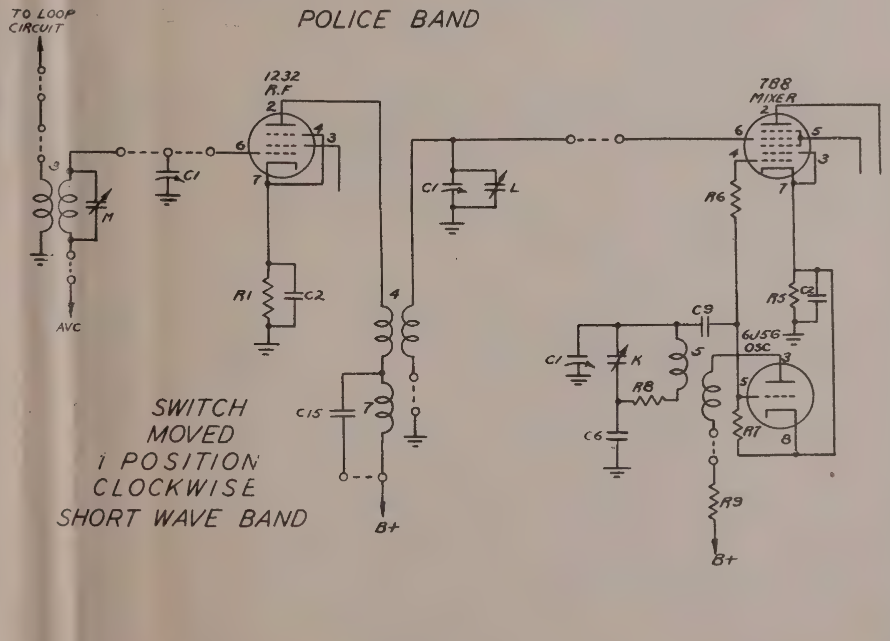


SWITCH MOVED 3 POSITIONS CLOCKWISE

ZENITH RADIO CORP. MODELS 12S-550Z, 12S-568E,
12S-568Z, 12S-569E,
12S-569Z, 12S-595Z
See Zenith Page 12-25



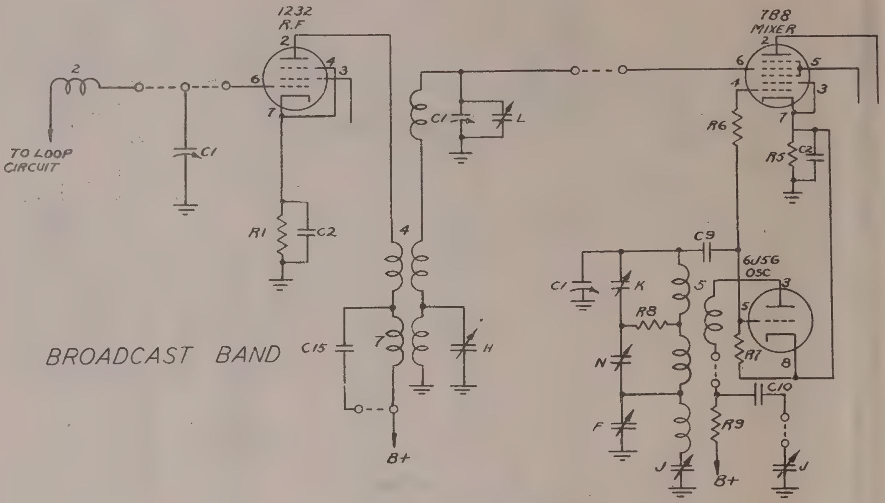
SWITCH AS SHOWN
POLICE BAND



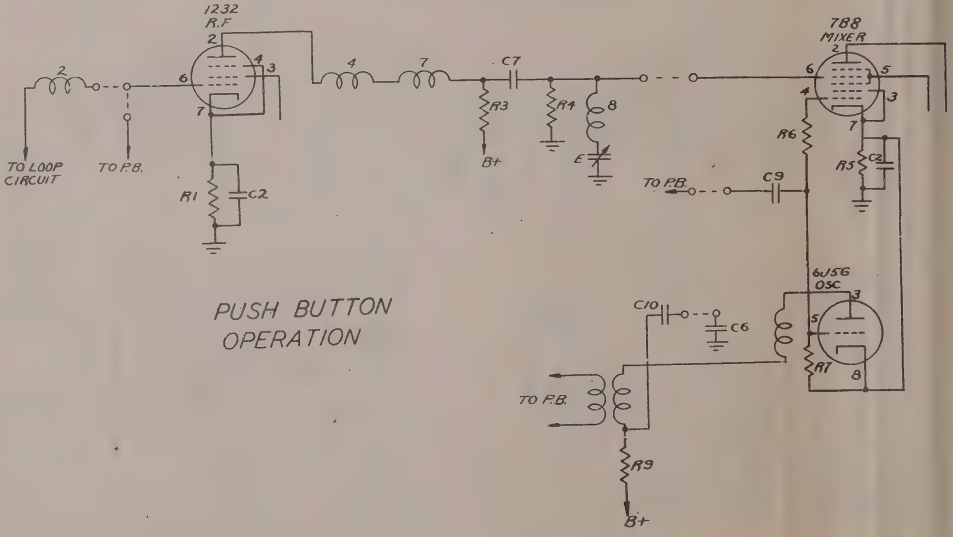
SWITCH
MOVED
1 POSITION
CLOCKWISE
SHORT WAVE BAND

MODELS 12S-550Z, 12S-568E,
12S-568Z, 12S-569E,
12S-569Z, 12S-595Z
See Zenith Page 12-25

ZENITH RADIO CORP.



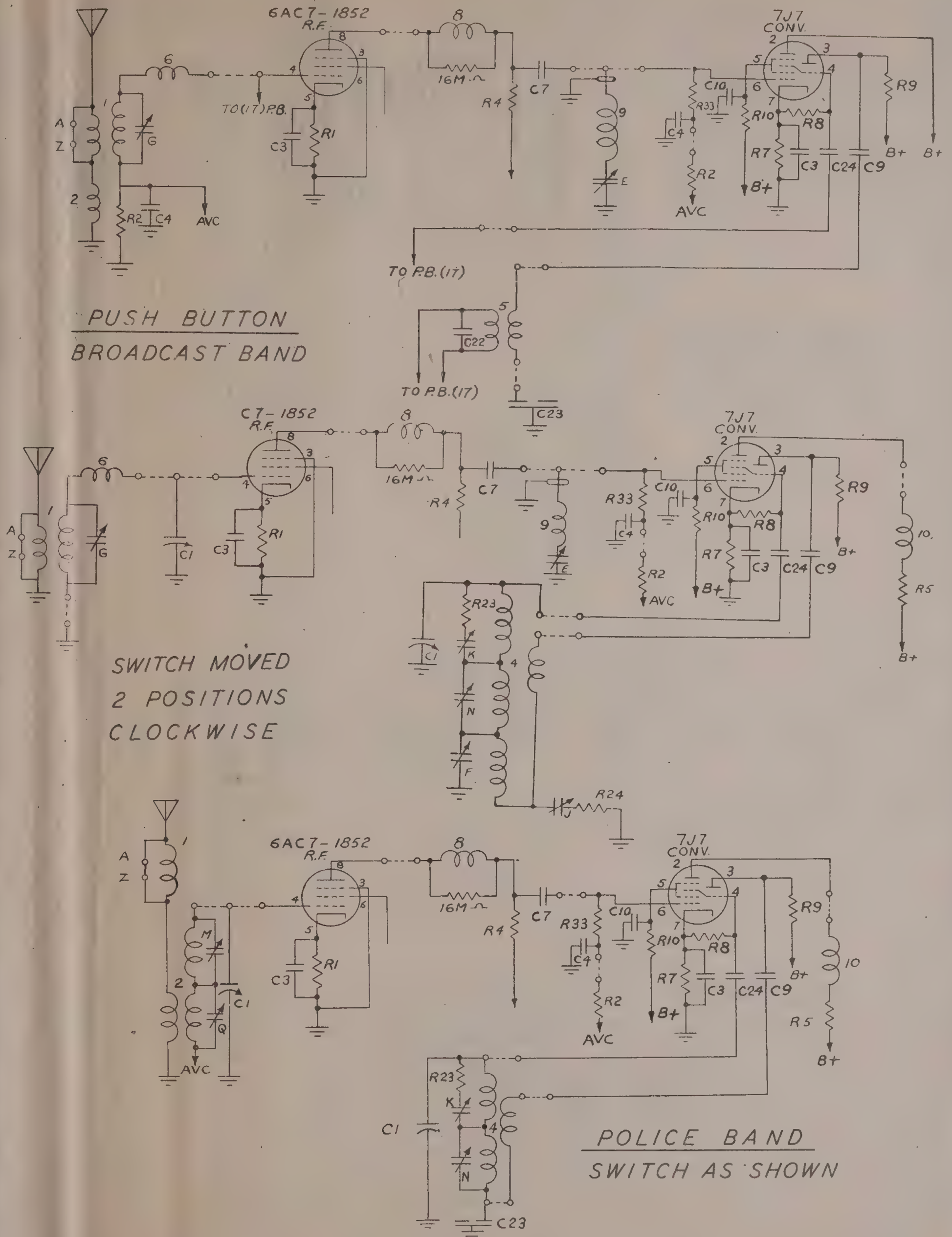
BROADCAST BAND



PUSH BUTTON OPERATION

ZENITH RADIO CORP.

MODELS 10H551, 10H571
See Zenith Page 12-22



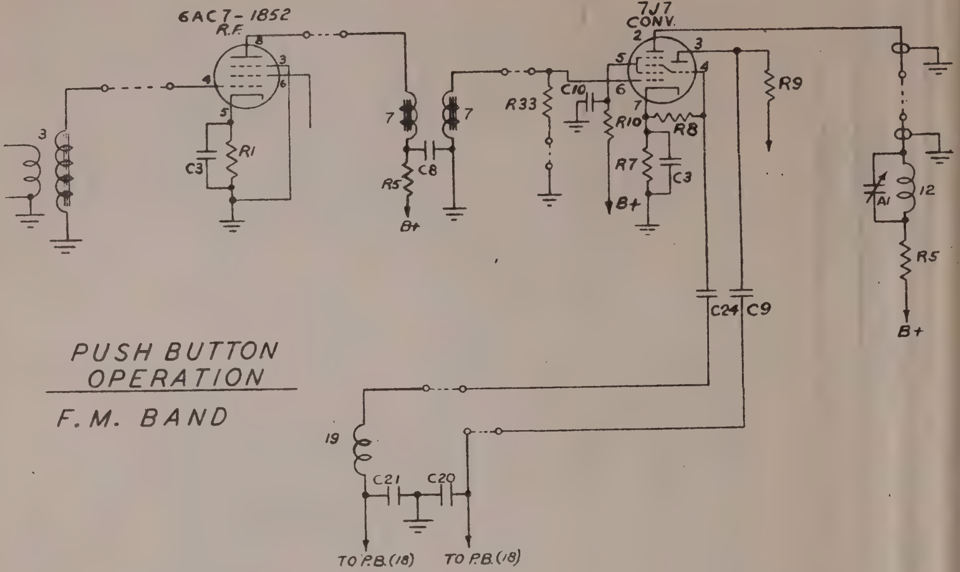
PUSH BUTTON BROADCAST BAND

SWITCH MOVED 2 POSITIONS CLOCKWISE

POLICE BAND SWITCH AS SHOWN

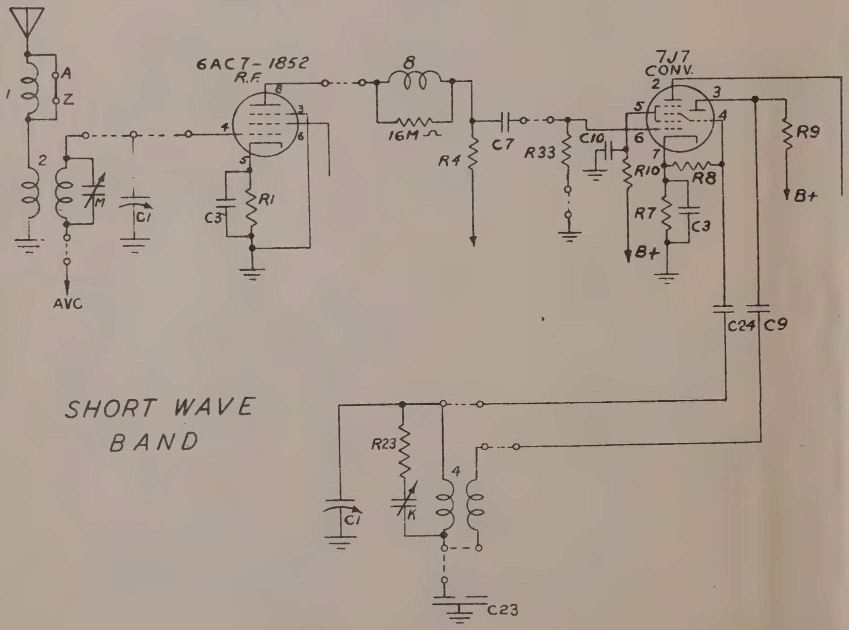
MODELS 10H551, 10H571
See Zenith Page 12-22

ZENITH RADIO CORP.



PUSH BUTTON OPERATION

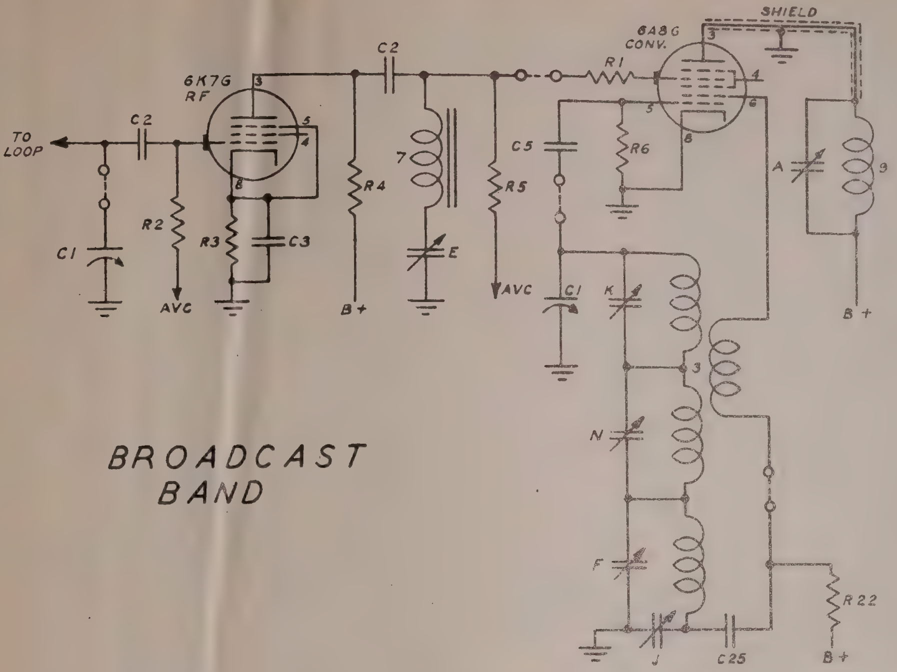
F. M. BAND

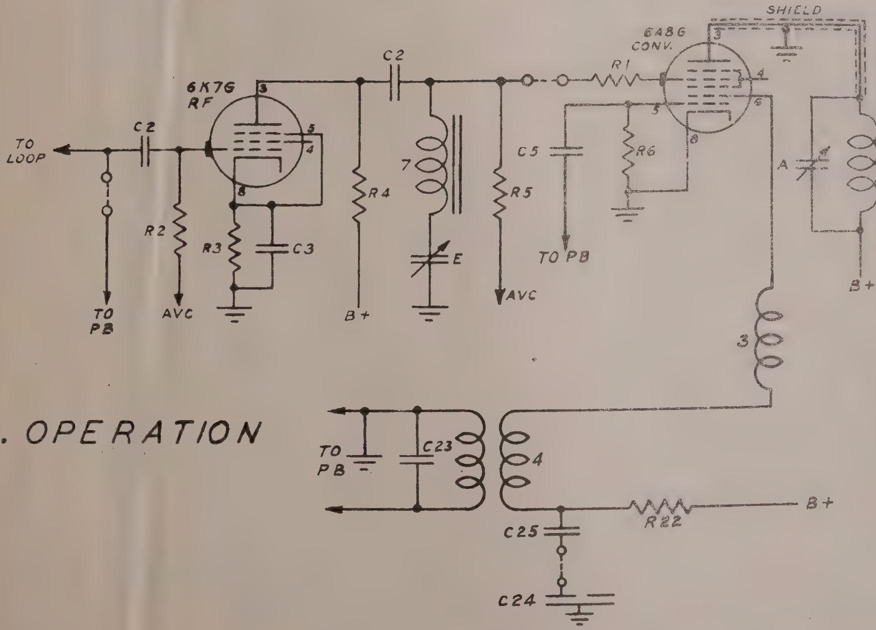


SHORT WAVE BAND

ZENITH RADIO CORP.

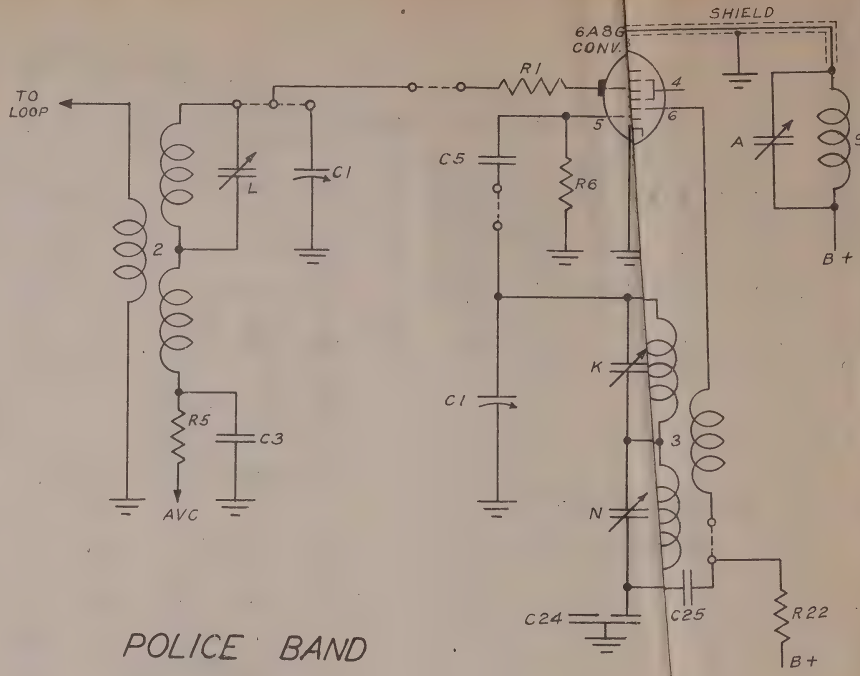
MODEL 7S-585
See Zenith Page 12-17


BROADCAST BAND

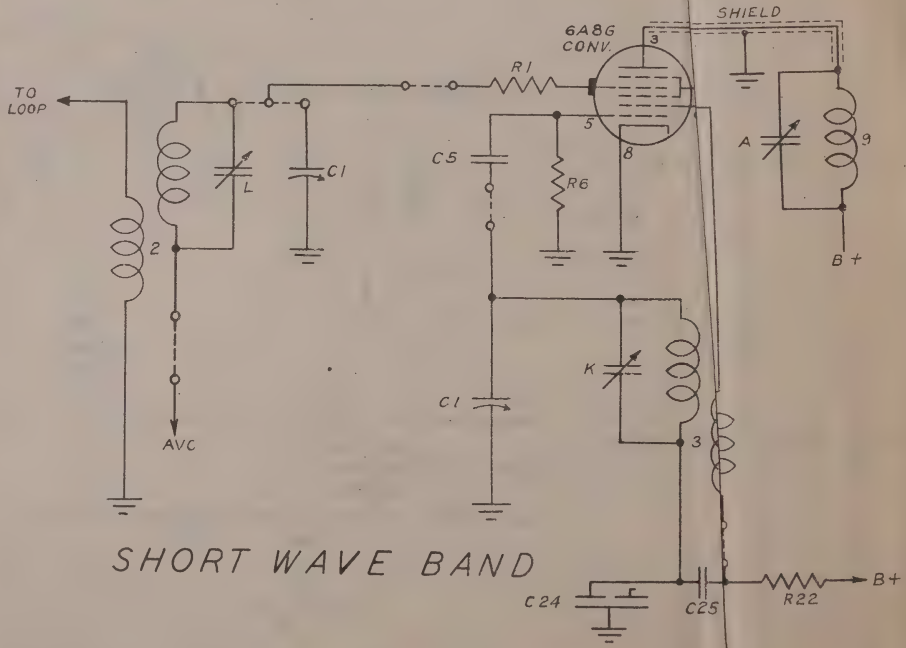

P.B. OPERATION

MODEL 7S-585
See Zenith Page 12-17

ZENITH RADIO CORP



POLICE BAND

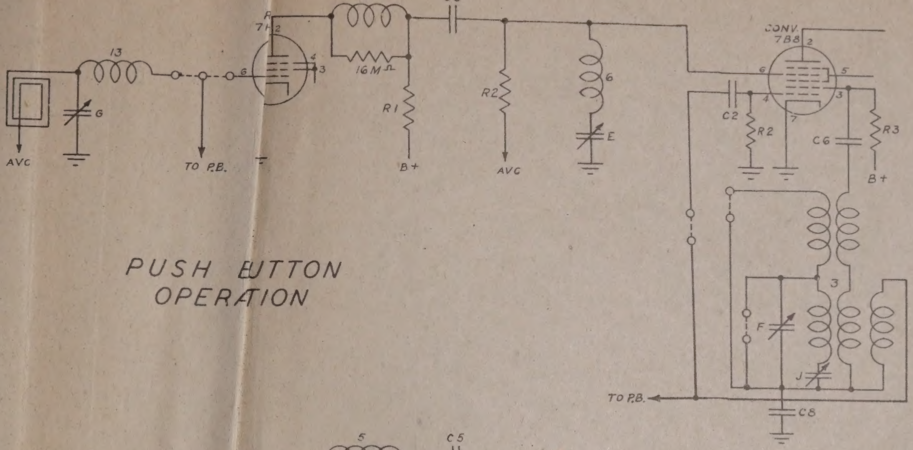


SHORT WAVE BAND

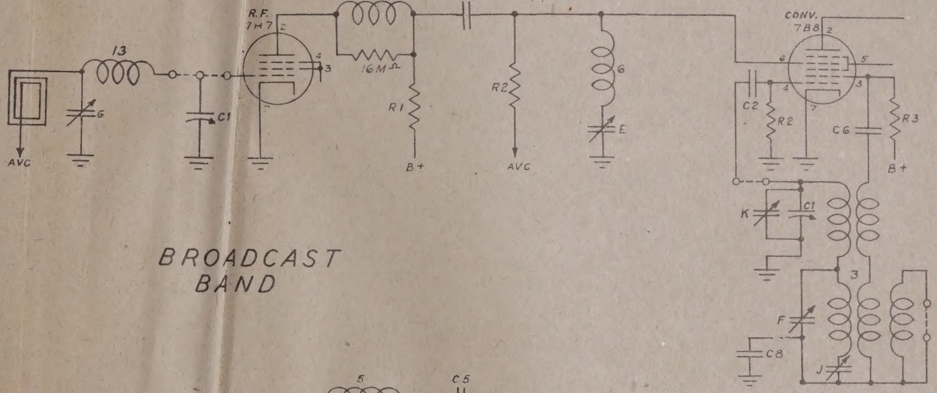
MODEL 6S-596, 6S-597
See Zenith Page 12-14

ZENITH RADIO CORP.

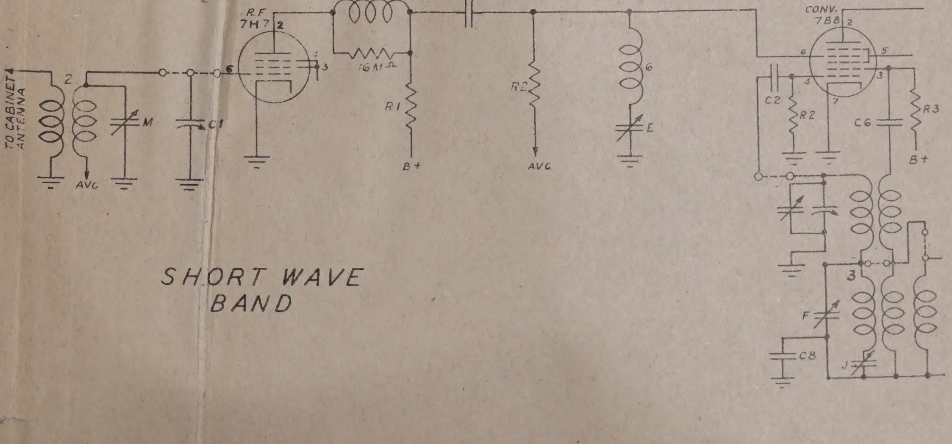
MODELS 6S-532, 6S-546, 6S-556
See Zenith Page 12-36



PUSH BUTTON OPERATION



BROADCAST BAND



SHORT WAVE BAND